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DEPARTMENT OF THE AIR FORCE

Final Environmental Impact Statement for the Mineral Resource Management Plan

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Potential Exploration, Development, and Production of Oil and Gas Resources

Vandenberg Air Force Base

DECEMBER 1987

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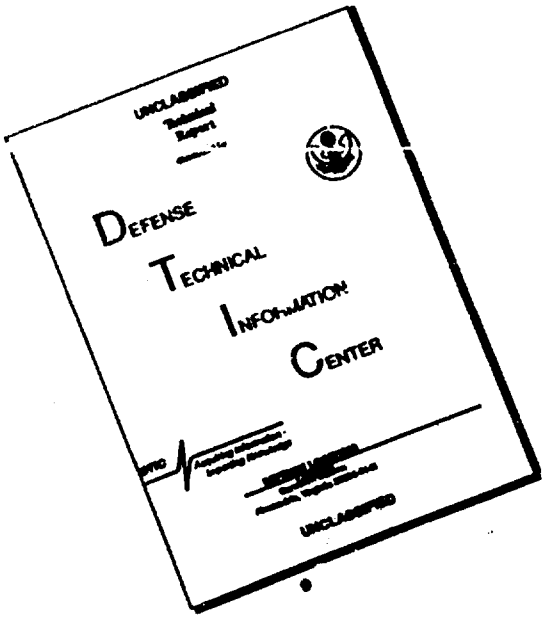

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DEPARTMENT OF THE AIR FORCE
STRATEGIC AIR COMMAND

BUREAU OF LAND MANAGEMENT

POTENTIAL EXPLORATION, DEVELOPMENT, AND PRODUCTION OF OIL AND GAS RESOURCES; VANDENBERG AIR FORCE BASE, CALIFORNIA

FINAL ENVIRONMENTAL IMPACT STATEMENT

Abstract

It is the policy of the Department of Defense and the Department of the Air Force to make government lands available for mineral exploration and extraction to the maximum extent possible, consistent with military operations and national defense activities. Because the development of oil and gas on Vandenberg Air Force Base (VAFB) could adversely affect the base's missions, and, in addition, result in environmental impacts that could adversely affect the quality of the environment, the Air Force has determined that allowing such development to proceed constitutes a major federal action and therefore requires an Environmental Impact Statement (EIS). The Bureau of Land Management was a cooperating agency in developing this EIS. The EIS evaluates the possible environmental impacts associated with the adoption of a Mineral Resource Management Plan (MRMP) for the exploration, development, and production of oil and gas resources on VAFB. The proposed action is to implement the MRMP for oil and gas development on VAFB. None of VAFB would be excluded from consideration for development; however, restrictions (standards and guidclines) placed on applicants may make development more costly. Four alternatives are considered in addition to the no action alternative. Alternatives 1 through 3 assume the MRMP will be adopted. The difference among these three alternatives is based primarily on the area on VAFB that would be excluded from development. Alternative 1 excludes areas of very high and high Air Force mission requirements. Alternative 2 excludes areas of very high environmental constraints. Alternative 3 combines the very high and high mission requirements of Alternative 1 and the high environmental constraints of Alternative 2. Alternative 4 excludes oil and gas exploration, development, and production from all VAFB. The environmental impact analysis found that the potential for significant impacts from oil and gas development exists for some resource areas (with the exception of Alternative 4 which precludes all development), but the level of mineral development that represents the threshold at which impacts become significant cannot be determined because this potential is site and project-specific. Implementation of the MRMP would reduce the potential impacts of oil and gas development when compared to the no action alternative.

The final EIS relies upon the analyses provided in the draft EIS. It does not repeat draft EIS information. It provides erratas for the EIS, Air Quality Technical Appendix, and MRMP. In addition, public and written comments on the draft EIS and responses are provided.

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READER'S GUIDE TO THE DOCUMENT

The Final Environmental Impact Statement (FEIS) is organized as follows:

- o FEIS ABSTRACT.
- o SUMMARY OF THE ENVIRONMENTAL IMPACT STATEMENT (EIS). The summary as it appears in the EIS is presented for informational purposes.
- o TABLE OF CONTENTS.
- o ENVIRONMENTAL IMPACT STATEMENT ERRATA. All changes or revisions to the EIS are identified in this errata.
- o AIR QUALITY TECHNICAL APPENDIX ERRATA. All changes or revisions to the Air Quality Technical Appendix are identified in this errata.
- o PUBLIC COMMENTS AND RESPONSES. Public comments are provided as well as responses immediately following the comments.
- o WRITTEN COMMENTS AND RESPONSES. Each written comment letter is provided as well as responses immediately following each comment letter.
- o MINERAL RESOURCE MANAGEMENT PLAN (MRMP) ERRATA. All changes or revisions to the MRMP are identified in this errata.

During the comment period, 23 agencies, organizations, and individuals provided approximately 340 comments on the EIS and MRMP. Individuals providing public comments received the code "Ind" representing "Individual" speakers. These public commentors have been categorized as follows:

Richard J. Boyle, representing Union Oil Company = Ind-1

Chuck Pergler, individual representing himself = Ind-2

Laurie Tamura, representing Santa Barbara County Resource Management Department = Ind-3

Each agency, organization, and individual providing written comments received a code according to the following designation:

California Regional Water Quality Control Board, Central Coast Region = WQCB

Department of Transportation, District 5 = DOT

U.S. Department of the Interior, Bureau of Mines = BOM

Newhall Resources = NR

San Luis Obispo County Air Pollution Control District = SLOAir

Santa Barbara County Air Pollution Control District = SBAAir

U.S. Department of the Interior, Minerals Management Service = MMS

Santa Barbara County-Cities Area Planning Council = APC

Myra Manfrina = MM

Chuck Pergler = CP

California Coastal Commission = CCC

James H. Mosby, Virginia E. Mosby, Jack S. Foster, and Charlotte P. Foster = Mosby

State Lands Commission = SLC

Resources Agency of California = RAC

Union Oil Company of California = Union

Santa Barbara County Resource Management Department = RMD

League of Women Voters = LWV

LeRoy Scolari = LS

U.S. Environmental Protection Agency = EPA

U.S. Department of the Interior, Office of Environmental Project Review = OEPR

Codes were assigned based on the order the comments were received.

In the Comments and Responses section of this document, the actual letters received are provided with comment codes in the right-hand margin of each letter. Following each letter are the responses for all the comments in that letter. The response codes directly correspond to the comment codes in the letters.

If modifications were necessary to the EIS or MRMP as a result of the comment, a reference to a section of the EIS or MRMP is indicated in the response. The reader is then directed to the errata for the EIS, MRMP, or Air Quality Technical Appendix to see the actual change or revision.

To help understand how the comments and responses system works, an example is presented here. For instance, if the California Regional Water Quality Control Board wanted to review the responses to their letter, they would first note that their organization's code is "WQCB." They would also note from the Table of Contents on which page their letter and responses are located. In the right-hand margin of their letter, they would find that nine comments (WQCB-1 through WQCB-9) had been assigned to the letter. Following their letter, responses for each comment are provided. If revisions have been made to the EIS or MRMP, the response would direct them to the EIS Errata or MRMP Errata to review the actual change.

SUMMARY OF THE ENVIRONMENTAL IMPACT STATEMENT

This is a programmatic environmental impact statement (EIS) for adoption of the proposed Mineral Resource Management Plan (MRMP) for Vandenberg Air Force Base (VAFB).

PURPOSE AND NEED

This programmatic EIS proposes a plan and four alternatives for managing the exploration, development, and production of oil and gas resources on VAFB, including the leasing and development of federally owned oil and gas resources. The EIS characterizes the affected environment and assesses the environmental consequences of implementing each action. The proposed action, the Mineral Resource Management Plan, is detailed in Appendix A of the draft EIS. The purpose of the MRMP is to allow gas and oil exploration, development, and production to occur on VAFB, with the least amount of impact on Air Force missions and the local and regional environment. None of VAFB would be excluded from consideration for oil and gas development under the MRMP (or proposed action). However, various conditions or restrictions would be applied to development proposals, depending on the proposed location.

This EIS and the MRMP have been developed in compliance with statutory regulation. It is the policy of the Department of Defense (DOD Directive 4700.3) and Department of the Air Force (AFR 87-9) to make government lands available for mineral exploration and extraction to the maximum extent possible consistent with military operations and national defense activities. Because the development of oil and gas on VAFB could adversely affect the base's missions, and, in addition, result in environmental impacts that could adversely affect the quality of the environment, the Air Force has determined that allowing such development to proceed constitutes a major federal action. This EIS is required by the National Environmental Policy Act (NEPA). The content and format are specified in the NEPA, CEQ regulations (40 CFR 1500-08), and Air Force Regulation 19-2. This is a programmatic EIS; site-specific assessments for individual applications may be needed to supplement this document.

In general, the existing process on VAFB for authorization of exploration is similar to the process whereby the federal government provides authorization for oil and gas leasing on federal property. An applicant applies for a memorandum of agreement (MOA). The applicant then provides environmental information that is used by the decision makers to determine the relative environmental merits of a site. This leads to approval or rejection of the MOA. The existing process is used on a site-specific basis and case by case; it does not provide an overall guideline or plan for future oil and gas development activities on VAFB, nor does it provide for consideration of the impacts of a series of cumulative projects.

Public issues and concerns were identified during the scoping process, when statements and questions were taken from the general public and concerned agencies. The range of subjects addressed includes geological, biological, cultural, visual, and water resources, air quality, land use, socioeconomics, transportation, noise, and system safety. The scope was intended to include direct and indirect

impacts, and on- and off-base impacts. These issues are presented in section 1 of the draft EIS.

PROPOSED ACTION AND ALTERNATIVES

The proposed action is to implement the MRMP for oil and gas development on VAFB. This is the preferred alternative. None of VAFB is excluded from consideration for development; however, restrictions placed on applicants may make development in some areas infeasible from an economic standpoint.

There are four alternatives to the proposed action. The basis for defining the alternatives for assessment was an environmental and Air Force review process that culminated in the development of a constraint map. Using a Geographic Information System (GIS), constraint maps were developed for all of VAFB. Features and resources have been categorized into high, moderate, or low constraint categories, depending on the degree of protection they are afforded under existing agency regulations or their environmental sensitivity. In addition, maps were developed for Air Force mission features on VAFB. These were identified as posing very high, high, or moderate constraints.

The proposed action and alternatives 1 through 3 assume that the MRMP with its standards and guidelines will be adopted. Alternative 1 excludes from oil and gas development all areas of VAFB that are highly constraining (as defined in the MRMP) because of Air Force mission requirements. Alternative 2 excludes from oil and gas development all areas of VAFB that are highly constraining for environmental reasons (as defined in the MRMP). Alternative 3 excludes from oil and gas development all areas that are highly constraining for both environmental reasons and Air Force mission requirements. Alternative 4 excludes all of VAFB from oil and gas development.

The no-action alternative assumes applicants would continue to submit proposals and review of these would follow the existing process.

A comparison of alternatives is presented in section 2 of the draft EIS.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Section 3 of the draft EIS describes the physical, biological, and social environments of VAFB as they relate to development or leasing of oil and gas resources. Section 4 of the draft EIS describes the environmental consequences of implementing the proposed action (MRMP) and the various management alternatives. The following is intended to provide a brief summary of the affected environment and environmental consequences for key resources; it does not provide an exhaustive comparison of the alternatives. For such a discussion refer to sections 2 and 4 of the draft EIS.

Geology

Affected Environment. The physiography of VAFB is varied and includes the Casmalia Hills uplift on North Vandenberg, San Antonio Terrace, Burton Mesa, the San Antonio Creek and Santa Ynez River drainageways, Lompoc Terrace, and the Santa Ynez Mountains on South Vandenberg. The eight soil associations identified

on VAFB range from slightly to highly erodable; the erosion hazard is typically dependent on the steepness of the slope and the vegetative cover. In addition, VAFB is situated in a seismically active region, and statistics indicate 135 earthquakes occurred between 1932 and 1975. The majority of these faults have not been analyzed extensively for recency of activity and should be considered potentially active.

Environmental Consequences. The geologic environment of VAFB would be affected by petroleum operations through the construction of access roads, pipeline corridors, well pads, and facilities. The off-base geologic environment would be affected by construction of pipelines from on-base production operations to off-base processing facilities, and the upgrade of these facilities, if necessary. The geologic impacts associated with these operations would be dependent upon the magnitude of the proposed operations. All identified geological constraints and hazards can be mitigated to insignificance.

Water Resources

Affected Environment. The major water supply sources are the groundwater basins within the San Antonio Basin (a 500,000-acre-foot basin beneath San Antonio Creek Valley) and the Lompoc Terrace (a 30,000-acre-foot basin that is one of three distinct but hydraulically interconnected basins within the Santa Ynez River watershed). VAFB withdraws water for the base from six wells within these two basins. In addition, four other wells serve the Federal Correction Facility at Lompoc and draw their water supply from the Lompoc Valley groundwater basin along the Santa Ynez River.

The water quality of the VAFB groundwater supplies is best from the San Antonio groundwater basin (meets or exceeds national standards) while waters from the Santa Ynez basin are of lesser quality. Other surface water supplies on base lands are generally of poor quality. VAFB presently monitors surface and ground water quality at various points throughout the base.

Flood hazards are mapped for four stream courses on the base using a 100-year recurrence interval flood (a flood which occurs with a theoretical frequency of once every 100 years). Respective flood flows of the major rivers and streams are 118,000 cubic feet per second (cfs) (Santa Ynez River), 9,000 cfs (San Antonio Creek), 8,900 cfs (Canada Honda Creek), and 3,900 cfs (Shuman Creek).

Environmental Consequences. The highest potential for significant impacts on water availability and use from the proposed action should occur within the San Antonio Creek watershed. Since the greatest potential for oil or gas recovery exists within this watershed (and the watershed overlies one of the largest potable groundwater aquifers), it can be expected that water use would be greatest from the San Antonio Creek groundwater basin. Using projections of likely oil or gas demands, a one-time use of 450 acre-feet for well drilling and a cyclic steam demand of 100 acre-feet a year (for 100 wells) will cause further drawdown of an already overdrawn aquifer. This further drawdown could impact the water supplies of VAFB and other basin users, as well as aquatic and biologically dependent species of Barka Slough and San Antonio Creek.

Also, under the proposed action, significant impacts on water quality could occur from an oil or gas spill or accident during any phase of development. Risks associated with major spills or accidents are estimated at less than three incidents while small oil spills are considered less likely to occur (at least 3 to 30 incidents). Impacts on water quality would depend on the location, duration, type of spill or accident, and the response capability of oil or gas developers to respond to such an incident.

Significant water resource impacts from alternatives to the proposed action are essentially the same as from the proposed action with the exception of alternative 4, which had no expected impacts to water resources (due to complete exclusion and suspension of oil or gas development on the base).

Air Quality

Affected Environment. The ambient air quality on VAFB is generally very good. At present, the northern portion of Santa Barbara County, encompassing VAFB, is in attainment or unclassified for all criteria pollutants (CARB 1986). The exception to this is the total suspended particulates (TSP) nonattainment area within a 15-mile radius of the Santa Maria Library air-monitoring station. Approximately the northern third of VAFB is in this area. The North County may be redesignated as a nonattainment area for ozone, however, due to recently measured violations of the federal 1-hour ozone standard. As a result, additional emissions control of nitrogen oxides (NO_x) and reactive hydrocarbons (RHC) sources may be required in the future.

The primary sources of carbon monoxide (CO) emissions in the North County are licensed motor vehicles. The major contributors of NO_x and RHC emissions are motor vehicles and industrial sources such as petroleum production facilities. Emissions of sulphur dioxide (SO_2) are predominantly from industrial sources, and the majority of TSP emissions result from agricultural and construction activities.

Environmental Consequences. In this assessment, localized, inert pollutant impacts were estimated by analyzing a hypothetical well development and operational scenario. For the proposed action, the significant air quality impacts resulting from the hypothetical development activity for inert pollutants are (1) exceedences of the California 1-hour NO_2, the federal 24-hour TSP, and the California 24-hour PM_{10} (particulate matter less than 10 microns in diameter) standards and Santa Barbara County Air Pollution Control District (SBCAPCD) PSD increments due to combustive emissions from diesel vehicles and fugitive dust as a result of construction emissions associated with well pad preparation; (2) exceedence of the California 1-hour NO_2 and the California 24-hour PM_{10} standards and SBCAPCD PSD increments due to combustive emissions from the drill rig and diesel vehicles during drilling activities; (3) exceedence of the California 24-hour PM_{10} standard and SBCAPCD PSD increments due to combustive emissions from diesel engines during production and maintenance activities.

The regional impact of oil-related development governed by the MRMP is demonstrated by assessing the potential emission reductions in the North County available to offset emissions resulting from oil and gas exploration and production on VAFB. The analysis demonstrates that oil and gas development on VAFB may be constrained by limited offsets available for future development.

Alternatives 1, 2, and 3 are similar to the proposed action. However, under alternative 3 there is some potential for higher localized impacts as a result of concentration of development activities in the nonexcluded areas. Colocation or consolidation of emission sources into a smaller geographic area may result in violations of short-term standards without application of additional control measures.

The short- and long-term effect of alternative 4 on air quality will be a decrease in background concentrations of criteria pollutants, thereby eliminating some degradation of the air resource in the vicinity of the base. Additionally, this alternative action will allow the Air Force maximum flexibility with regard to construction and operation of mission projects, due to the elimination of emission sources that may combine with mission sources to produce air quality standard violations.

Biological Resources

Affected Environment. Biological resources on VAFB are diverse and in many cases unusual because the base is located in an ecotonal region where northern and southern biotic provinces meet, the regional geology is complex, climatic conditions are varied, and the area is relatively undisturbed by human activities. Plant communities on VAFB include annual grassland, coastal sage scrub, Burton Mesa chaparral, oak woodland and savanna, riparian woodland, Bishop pine forest, tanbark oak forest, native grasslands, and various wetland vegetation types. These plant communities support a wide variety of wildlife species. Marine mammals use the coastline for hauling out and breeding, and several species of seabirds nest there. Aquatic habitats on VAFB range from estuaries to freshwater streams, marshes, and lakes.

Several federally listed threatened or endangered species are present at least seasonally on or adjacent to VAFB, including the California brown pelican, California least tern, unarmored threespine stickleback, American peregrine falcon, least Bell's vireo, southern sea otter, and California gray whale. Several other listed whale species are infrequent offshore visitors, and the Guadalupe fur seal visits San Miguel Island in the summer. Numerous rare or special-concern species of plants and animals are also present on VAFB, including approximately 40 species that are candidates for federal listing as threatened or endangered.

Environmental Consequences. The proposed MRMP has been developed to minimize the potential for impact on biological resources on VAFB from oil and gas development. Several very sensitive biological resources (e.g., Barka Slough and the unarmored threespine stickleback) are located in areas with known oil and gas reserves, and could be affected by their extraction even with implementation of the guidelines specified in the MRMP. Alternatives 1 through 3 involve exclusion of portions of VAFB from mineral resource development and would thus protect biological resources within those areas. This could cause greater spatial concentration of oil and gas facilities in the remaining areas, which could in turn have a greater impact on biological resources. Preclusion of all mineral development on VAFB in alternative 4 would eliminate the potential for these activities to affect biological resources.

Cultural Resources

Affected Environment. Cultural resources include archaeological resources, architectural resources, and modern Native American resources. There are over 600 known cultural resources on the base, most of which are prehistoric archaeological sites. Many sites are located in the areas of highest oil and gas potential, and these are most likely to be impacted by oil and gas development. Several resources on VAFB have been evaluated by archaeologists and are considered eligible for nomination to the National Register of Historic Places. It is probable than many of the resources that have not yet been evaluated will also prove to be eligible for nomination.

Environmental Consequences. For archaeological, architectural, and most modern Native American resources, direct impacts are those resulting from any form of ground disturbance, such as clearing, grading, drilling, boring, pipelaying, trenching, compacting, leveling, or recontouring. Indirect impacts are those activities on or off base that destroy cultural resources or reduce their physical integrity but are not strictly associated with the planning, construction, or operation of oil and gas facilities. Indirect impacts include artifact collecting, vandalism, land development, offroad vehicle use, oil spills, and erosion. For cultural resources sacred to local Native Americans, significant impacts cannot be identified completely except through consultation.

Implementation of the MRMP under the proposed action and under alternatives 1, 2, and 3 would reduce significant impacts on most cultural resources to insignificance. The only exceptions are impacts that are unpredictable (i.e., oil spills) and impacts on sacred Native American resources. Both exceptions are expected to be uncommon.

Alternative 4 would exclude all of VAFB from oil and gas development and would cause no significant adverse impacts on cultural resources on VAFB. Of the proposed action and four alternatives, alternative 4, would cause the fewest impacts to cultural resources.

The types of impacts on cultural resources would be the same for the proposed action and for alternatives 1, 2, and 3. However, the magnitude of impacts would differ greatly. Under the proposed action, none of the base would be excluded from oil and gas development, so significant impacts potentially could occur to all cultural resources on VAFB. Under each of the first three alternatives, different portions of VAFB would be excluded from oil and gas development, so the magnitude of impacts caused by each alternative would differ. Some would affect many more cultural resources than others. Because resource preservation is considered the best approach to cultural resource management, elimination of impacts through avoidance is preferred over reducing impacts to insignificance. In order of increasing magnitude of impacts, alternative 4 would cause the lowest impacts, followed by alternative 3, alternative 2, alternative 1, and the proposed action.

Land Use

Affected Environment. Land use on VAFB is characterized by an urbanized cantonment area on North VAFB, scattered launch, test, and tracking facilities on

North and South VAFB, and open lands which are either in a natural state or used for cattle grazing and agriculture on the remainder of the base. Prime agricultural lands, the airfield, residential areas, and community services would be most sensitive to the effects of oil and gas development.

Environmental Consequences. Because neither the proposed action or management alternatives recommend production levels, the alternatives do not in themselves result in varying amounts of land being developed for resource extraction. However, alternatives 1, 2, and 3 exclude various locations from development, as well as implement the MRMP guidelines. Alternative 4 excludes all of VAFB from oil and gas development, thus avoiding land use impacts altogether. After alternative 4, alternative 3 would exclude the greatest number of sensitive land uses from development, including all high-sensitivity uses (e.g., prime agriculture, residential and community services, and the airfield) and some moderate and low sensitivity land uses, such as recreation, agriculture, and open lands. Mission requirements in alternative 1 primarily exclude launch-related coastal areas and could have the effect of concentrating oil and gas development in the high-potential oil reserve areas north of the developed cantonment area.

Socioeconomics

Affected Environment. Employment growth in northern Santa Barbara county was approximately 3.5 percent annually between 1980 and 1985. The resulting growth in population and the increase in temporary and permanent housing has put pressure on local jurisdictions to provide additional services. At the same time, local governments have been under pressure due to tax-limiting legislation. Despite recent reductions in shuttle program employment on VAFB, some North County school districts are currently overcrowded and facility shortages are expected to continue.

Environmental Consequences. Oil and gas development on VAFB would benefit the local economy through the creation of jobs and income. Approximately 125 direct jobs could be created under a feasible development scenario. The proposed action and management alternatives are not expected to create significant impacts on local housing, public services, public finance, or infrastructure. However, cumulative impacts could be significant depending upon the magnitude of future non-oil-related activity on VAFB and off-base energy activity in the area. Areas of high-economic-potential oil reserves could be developed under the proposed action and the first three alternatives. The alternatives, however, by excluding some areas from development, could reduce overall economic benefits.

Transportation

Affected Environment. The major regional access roads to VAFB include Highway 101, a four-lane divided freeway; State Route (SR) 246, a two-lane road east of Lompoc; SR 1, a two-lane road south of Lompoc; and SR S-20, a four-lane road which provides access to the main gate at Vandenberg. Traffic at the major entry gates on VAFB peaks sharply during commuter periods when the main gate experiences traffic delays. Truck traffic, transportation of hazardous materials, and construction traffic are restricted in certain areas on VAFB due to safety and security factors. Truck access routes have been identified by the City of Lompoc and Santa Barbara County. The Southern Pacific Railroad tracks follow the

coastline through VAFB and serve Amtrak and various freight services; two railroad spur lines serve VAFB.

Environmental Consequences. The proposed action, implementation of the MRMP for oil and gas development on VAFB, could increase peak period traffic at the main entrance gates and on major access roads in the vicinity of the base, affect pavement conditions and maintenance requirements on local roads, and increase the number of traffic accidents due to the increase in vehicle miles traveled. Alternatives 1, 2, and 3 exclude various locations from oil and gas development, in addition to implementing the MRMP. These alternatives could have the effect of concentrating exploration and development activities and related traffic in the high-economic-potential oil reserves north of the main cantonment area. Alternative 4 would exclude all oil and gas development from VAFB, thereby avoiding transportation impacts. The MRMP guidelines and goals would reduce the intensity of impacts under the proposed action and alternatives 1 through 4 by minimizing oil- and gas-related traffic during peak hours, restricting traffic through residential areas, requiring coordination with the City of Lompoc and Santa Barbara County, and requiring planning for appropriate maintenance and resurfacing by oil developers.

Visual Resources

Affected Environment. Visual resources on VAFB are characterized by extensive natural landscapes and smaller areas of human modification. Natural features that are most distinctive on or near VAFB are the undeveloped foothills, oak woodlands, Santa Ynez Mountains, Tranquillion Peak, the coastal terrace, rocky shorelines and promontories, beaches, sand dunes, estuaries, wetlands, and the ocean. A smaller portion of VAFB is developed, principally the urbanized cantonment area, roads and highways, and launch, launch support, and tracking facilities.

Environmental Consequences. Significant visual impacts would occur if exploration or production equipment is sited in areas where it is out of character, dominates views in areas that are highly conspicuous, and/or is visible from sensitive public-use areas.

Alternatives 1 and 2 would reduce the impacts by excluding areas of the base from development. Alternative 1, by excluding mission constraints areas, excludes the coastal areas associated with launch and launch support activities. Alternative 2 excludes much of this area due to environmental constraints and also excludes some inland areas having biological and visual constraints. Alternative 3 would have the least visual resource impacts because it combines exclusion zones from alternatives 1 and 2. There would be no visual resource impacts with alternative 4.

Noise

Affected Environment. Day-night averaged noise levels on VAFB typically range from approximately L_{dn} 42 to 65, with single-event noise levels as high as L_{dn} 120 in the vicinity of launch facilities. Residential areas would be the most noise-sensitive uses on VAFB, followed by other nonindustrial cantonment area uses such as schools and recreation, mostly located on the northern portion of the base.

Many portions of VAFB would not be noise sensitive due to their lack of development; however, sensitive instrumentation and protected species would need to be considered in some of these areas.

Environmental Consequences. Noise impacts from oil and gas development would depend upon the *context* in which the noise occurs, which is determined by existing land uses in the area, and the *intensity* of the noise, which is a combination of the noise level and its duration. Oil and gas development would typically produce temporary noise levels as high as 85 to 90 dB at 50 feet from the source during site preparation and well drilling. Noise from well pumping is estimated at 55 to 60 dB at 50 feet and would be the only continuous long-term noise source. Workover operations would normally occur once a year and would produce estimated noise levels of 80 to 90 dB at 50 feet.

Due to the low long-term noise levels produced by well pumping, no significant impacts are expected; however, noise emissions from closely spaced wells and simultaneous workover activities could be additive. The proposed action recommends noise mitigations to reduce the level of noise which occurs in the vicinity of sensitive receptors, especially near residential areas. Alternative 1 would primarily exclude coastal areas used for launch and launch support operations making it similar in impact to the proposed action. Alternatives 2 and 3 would exclude residential and community service (e.g., schools) areas from development, but would not limit development in adjacent areas. Alternative 4 would exclude oil and gas development from VAFB, removing it as a potential noise source.

System Safety

Affected Environment. Contingency/emergency services and planning on VAFB include a disaster control group (DCG), a disaster preparedness plan, and a spill prevention and control plan. Fire protection is provided by seven fire stations on VAFB and through mutual-aid agreements with the cities of Lompoc, Santa Maria, and Guadalupe, as well as Santa Barbara County. The primary hazards associated with mission operations on VAFB include explosives, radio-frequency radiation, toxic gas release, and missile flight. These hazards require distance separation (clear zones) and possible evacuation of personnel.

Environmental Consequences. Potential system safety impacts can be divided into two categories: impacts on contingency/emergency services and impacts on the health and safety of the public. There would not be any impact on either of the above from alternative 4. The impact on contingency/emergency services would essentially be the same for the other alternatives. Some additional assets may be required.

The impact on the health and safety of the public is dependent on the specifics of the oil development, in particular the location of the oil activities relative to populated areas. It is possible, under all alternatives allowing oil and gas development on VAFB, for some of the development activities (e.g., wells, storage tanks, pipelines, truck routes, etc.) to be near enough to populated areas to result in significant health and safety impacts if there were a related accident.

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- California Regional Water Quality Control Board, Central Coast Region (WQCB) ..... C&R-1
- Department of Transportation, District 5 (DOT) ..... C&R-7
- U.S. Department of the Interior, Bureau of Mines (BOM) ..... C&R-9
- Newhall Resources (NR) ..... C&R-11
- San Luis Obispo County Air Pollution Control District (SLOAIR) ..... C&R-15
- Santa Barbara County Air Pollution Control District (SBAAIR) ..... C&R-19
- U.S. Department of the Interior, Minerals Management Service (MMS) ..... C&R-30
- Santa Barbara County-Cities Area Planning Council (APC) ..... C&R-33
- Myra Manfrina (MM) ..... C&R-40
- Chuck Pergler (CP) ..... C&R-48

Page

California Coastal Commission (CCC) ..... C&R-53
James H. Mosby, Virginia E. Mosby, Jack S. Foster, and Charlotte P. Foster (Mosby) ..... C&R-68
State Lands Commission (SLC) ..... C&R-70
Resources Agency of California (RAC) ..... C&R-73
Union Oil Company of California (Union) ..... C&R-78
Santa Barbara County Resource Management Department (RMD) ..... C&R-120
League of Women Voters (LWV) ..... C&R-160
LeRoy Scolari (LS) ..... C&R-174
U.S. Environmental Protection Agency (EPA) ..... C&R-176
U.S. Department of the Interior, Office of Environmental Project Review (OEPR) ..... C&R-183

Mineral Resources Management Plan (MRMP) Errata MRMP-1
Section 1.0 Summary MRMP-1
Section 5.0 Mineral Resources MRMP-1
Section 6.2 Water Resources MRMP-1
Section 6.3 Air Quality MRMP-3
Section 6.4 Biological Resources MRMP-9
Section 6.5 Cultural Resources MRMP-10
Section 6.6 Land Use MRMP-20
Section 6.9 Visual Resources MRMP-21
Section 7.0 Plan Criteria and Application MRMP-21
References MRMP-21

ENVIRONMENTAL IMPACT STATEMENT (EIS) ERRATA

ERRATA FOR THE EIS ON THE PROPOSED EXPLORATION, DEVELOPMENT, AND PRODUCTION OF OIL AND GAS RESOURCES ON VANDENBERG AIR FORCE BASE*

Summary

Water Resources; page S-4, paragraph one, sentence two reads as follows:

"Risks associated with major spills or accidents are estimated at less than three incidents while small oil spills are considered more likely to occur (at least 3 to 30 incidents)."

Section 1.0, Purpose of and Need for Action

Section 1.3.2.2; page 1-10, paragraph four has been changed to the following:

"The Unocal Lompoc production facility has a maximum processing capacity of 1,800 BOPD, and presently handles about 600 BOPD. The Unocal Casmalia production facility has a maximum processing capacity of 2,800 BOPD, and presently handles about 300 BOPD. Since these facilities are not operating at full capacity, some produced oil from VAFB could be processed at these locations. Unocal has stated that if future production from VAFB exceeds their existing processing capacity, these facilities will be expanded to meet this need."

Section 2.0, The Proposed Action and Alternatives

Section 2.1; page 2-2, fifth full paragraph, "Memorandum of Agreement (MOA)" has been changed to "Memorandum of Understanding (MOU). This MOU serves . . ."

Section 2.4.1; page 2-3, last paragraph, the following has been added: "Santa Barbara County's policies for oil/gas pipelines and pipeline corridor consolidation are identified in the Santa Barbara County Article III Zoning Ordinance, Section 290.4 as revised in April 1987."

Section 3.1, Geology

Section 3.1.4.3.2; page 3.1-11, second paragraph, fourth sentence, "Pacific" fault has been changed to "Pacifico" fault.

Section 3.2, Water Resources

Section 3.2.4.1.2; page 3.2-8, add the following sentence at the end of paragraph one: "Water well locations are shown in Figure 3.2-1A." See the attached figure.

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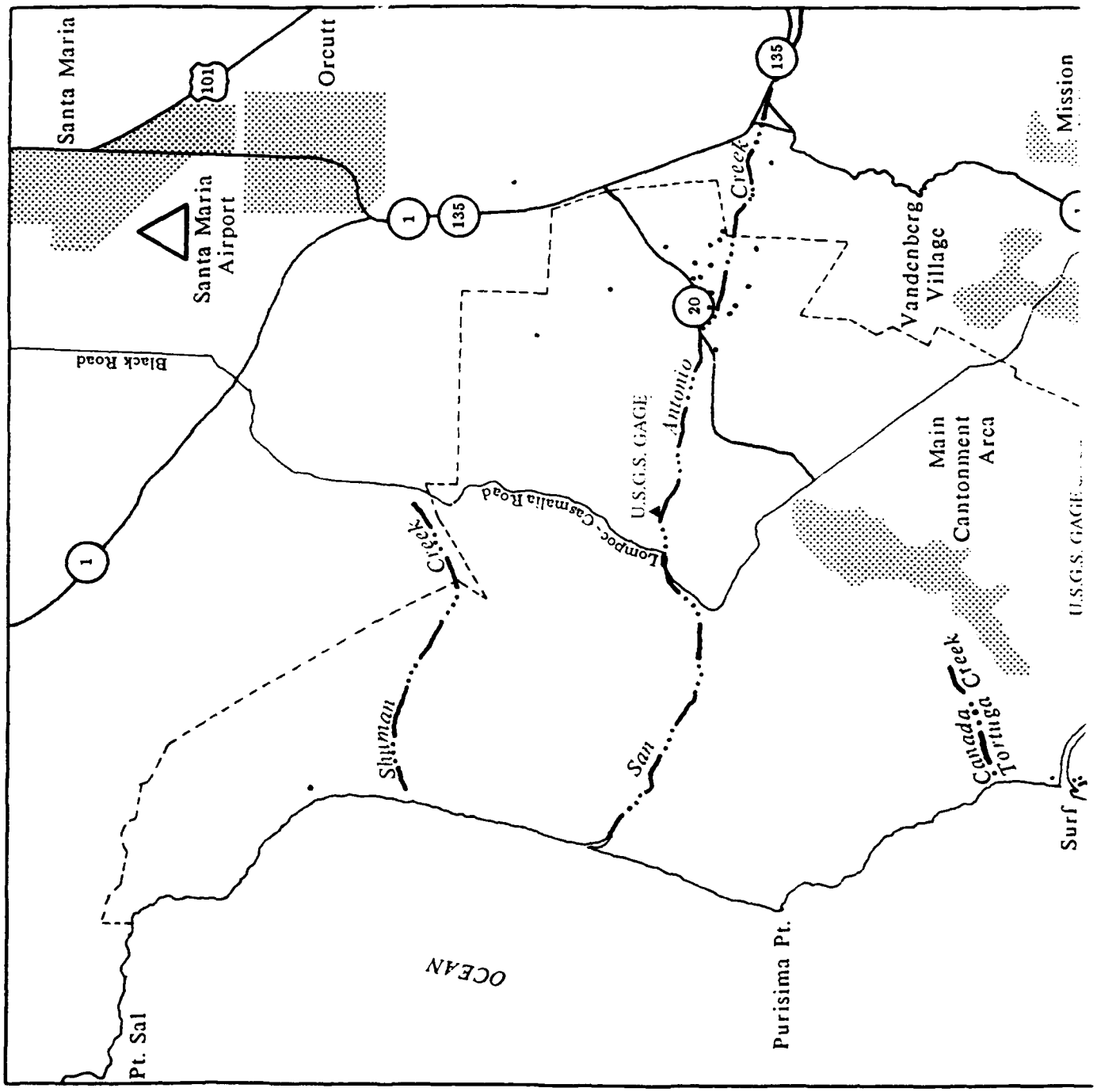
* Note that paragraph or bullet numbers refer to position on page, not position in section.


Santa Maria
101
Orcutt
Santa Maria Airport
1
135
Black Road
Shuman Creek
Lompoc-Casmalia Road
U.S.G.S. GAGE
Antonio Creek
20
135
San
Vandenberg Village
Mission
Main Cantonment Area
U.S.G.S. GAGE
Canada Tortuga Creek
Surf
Purisima Pt.
OCEAN
Pt. Sal

7

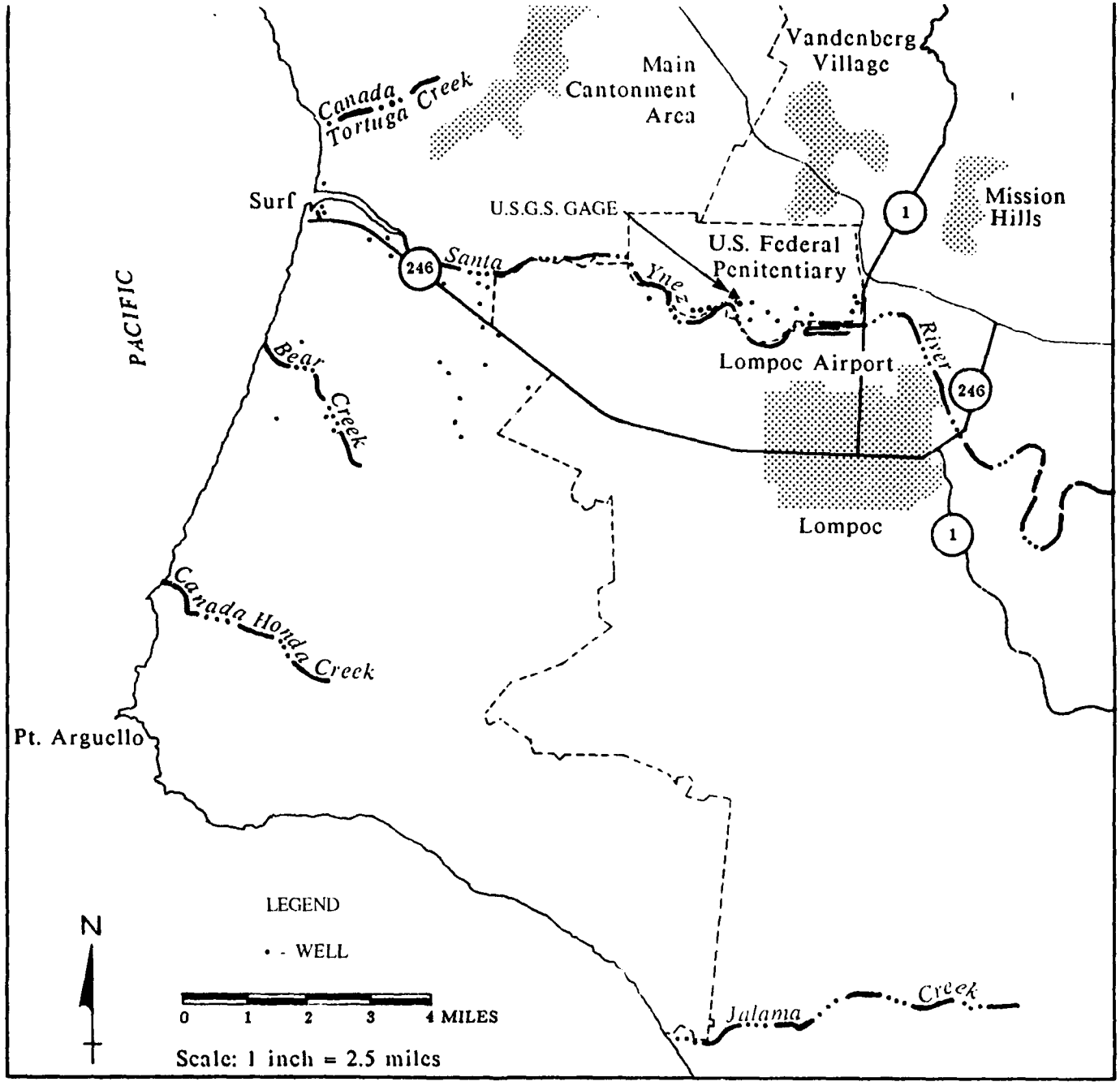


Figure 3.2-1A

WATER WELL LOCATIONS

Section 3.3, Air Quality

Section 3.3.4.2; page 3.3-7, first paragraph, the fifth sentence has been changed to read:

"A nonattainment designation means that a federal primary standard has been exceeded more than three discontinuous times in three years in a given area."

Section 3.3.4.2; page 3.3-7, third paragraph, the first sentence has been changed to read:

"A summary of the maximum pollutant concentrations measured in northern Santa Barbara and southern San Luis Obispo Counties from 1981 to 1986 (1986 incomplete) are given in Table 3.3-4."

Section 3.3.4.2; page 3.3-7, third paragraph, the following sentence has been inserted after the second sentence:

"The southern border of San Luis Obispo County is approximately 12 miles from the area of high potential oil development on VAFB."

Section 3.3.4.2; page 3.3-7, third paragraph, the third to last sentence in this paragraph, the "Union Lompoc site" in this sentence has been renamed as the "Union Lompoc HS&P site."

Section 3.3.4.2; page 3.3-7, third paragraph, the last sentence has been changed to the following:

"Although the transport of ozone and ozone precursors (NO_x and RHC) from the Los Angeles Basin into Santa Barbara County can play a role in North County ozone events, the trend towards higher ozone impacts is also influenced by increased motor vehicle emissions and sources not regulated by local agencies, such as internal combustion (IC) engines and OCS development."

Page 3.3-9, the TSP nonattainment area in Figure 3.3-2 has been corrected to only include the 15-mile radius from Santa Maria that is within Santa Barbara County.

Page 3.3-10, Table 3.3-4, the Lompoc, Union Station monitor has been deleted. The 1985 ozone data associated with this station in the table was actually recorded at the Lompoc, Union HS&P Station and has been in the 1985 ozone data for that station. Air quality data from the Nipomo monitoring station in southern San Luis Obispo County has also been included. See the attached table.

Page 3.3-11, Figure 3.3-3 has been changed to include the Nipomo monitoring station in San Luis Obispo County. See the attached figure.

Page 3.3-13, Table 3.3-5, the Union Sugar, Union Asphalt, and Union Battles Gas Plant have been listed separately instead of under one heading, since they are owned independently. See attached.

Table 3.3-2

PERCENTAGE FREQUENCY OF OCCURRENCE OF STABILITY CLASSES*

Pasquill Stability Class	*Santa Maria*	*Point Arguello*
A	0.5	0.3
B	9.2	4.1
C	17.9	11.0
D	34.7	57.3
E	14.5	8.6
F	23.1	18.4

* Calculated from stability wind rows for each site.

Table 3.3-3

CURRENT ATTAINMENT STATUS FOR CRITERIA AIR POLLUTANTS IN SANTA BARBARA COUNTY

Area	O_3	CO	NO_2	TSP		SO_2	
				Primary	Secondary	Primary	Secondary
Santa Barbara (AQMA)	N	A	A	A	A	U	U
(Non-AQMA, west)	A	A	U	A	A	U	U
(15-mile radius around Santa Maria library air quality station)	A	A	U	N	N	U	U
(Non-AQMA, east)	A	A	U	U	U	U	U

A = Attainment, better than federal air quality standards.
N = Nonattainment, exceeds federal primary standards.
U = Unclassified, insufficient data to make a determination.

Source: CARB, April 1986.

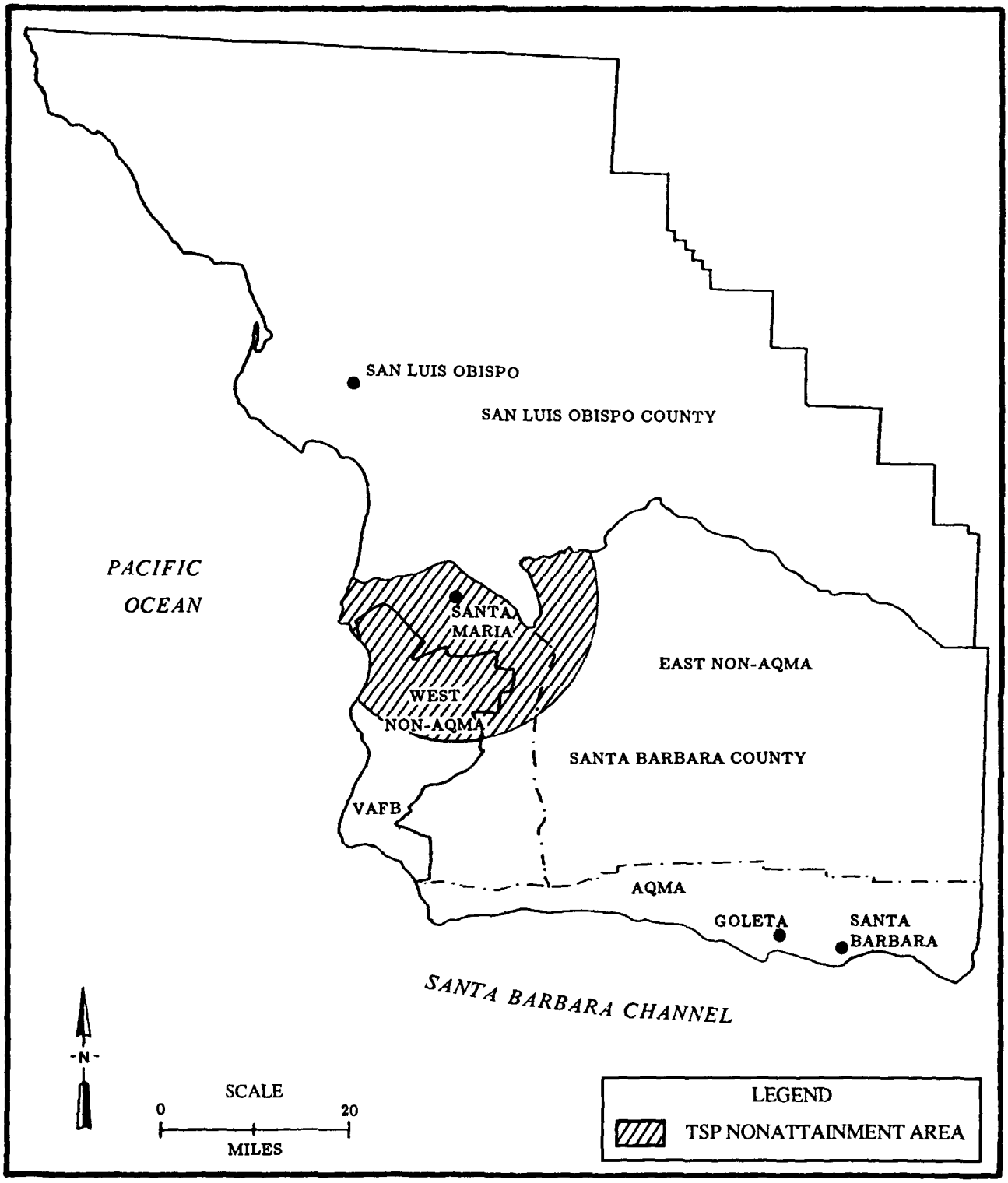


Figure 3.3-2

SANTA BARBARA COUNTY AIR QUALITY MANAGEMENT REGION

Table 3.3-4

MAXIMUM POLLUTANT CONCENTRATIONS MONITORED IN NORTHERN SANTA BARBARA COUNTY

(1981 - 1985)

Pollutant/ Monitoring Station	Averaging Time	Unit of Measure	MAXIMUM CONCENTRATION BY YEAR 1981	1982	1983	1984	1985	1986
Ozone	1-hour	pphm						
Lompoc, G Street			7	10	--	--	--	--
Lompoc, H Street			--	--	9	9	11	--
Lompoc, Union HS&P Station**			--	--	--	--	*12.7	*14.1
~~Lompoc, Union Station~~							~~12.7~~	
Santa Maria, McClelland Street			10	10	8	9	9	--
Santa Ynez Airport			11	11	12	10	*15	--
VAFB, Herado Road			--	10	9	11	11	--
VAFB, Watt Road			--	--	11	11	12	--
Nipomo			10	10	11	11	11	--
Carbon Monoxide	1-hour	ppm						
Lompoc, H Street			--	--	6	10	7	--
VAFB, Herado Road			--	2	3	3	3	--
VAFB, Watt Road			--	--	1	1	1	--
Hydrogen Sulfide	1-hour	pphm						
Santa Maria, Glacier Lane			--	--	--	--	6	--
Nitrogen Dioxide	1-hour	pphm						
Lompoc, H Street			--	--	5	5	6	--
Santa Maria, Glacier Lane			4	5	4	4	5	--
VAFB, Herado Road			--	4	4	5	8	--
VAFB, Watt Road			--	--	11	8	9	--
Nipomo			5	4	5	5	7	--
Sulfur Dioxide	1-hour	pphm						
Lompoc, G Street			--	2	--	--	--	--
Lompoc, H Street			--	--	1	1	2	--
Lompoc, Jalama Road			4	2	2	4	5	--
Santa Maria, Briarwood Drive			9	4	4	6	7	--
Santa Maria, Glacier Lane			6	12	5	8	3	--
Santa Maria, McClelland Street			2	6	8	4	8	--
VAFB, Herado Road			--	1	2	1	1	--
VAFB, Watt Road			--	--	2	1	2	--
Nipomo			17	27	8	9	13	--
Total Suspended Particulates	24-hour	ug/m^3						
Lompoc, H Street			--	--	101	135	192	--
Lompoc, Jalama Road			106	96	85	128	147	--
Santa Maria, Briarwood Drive			*518	*263	*536	*345	*297	--
Santa Maria Library			*416	260	190	*266	204	--
VAFB, Herado Road			--	83	72	146	153	--
VAFB, Watt Road			--	--	116	99	125	--
Nipomo			135	90	85	132	121	--

Source: Santa Barbara County APCD 1985 Annual Report. PM_{10} data not available to date.

** This station also recorded federal ozone standard violations of 13.6 pphm on February 26, 1986 and 12.5 pphm on March 23, 1986.

* Exceeds the federal standard.

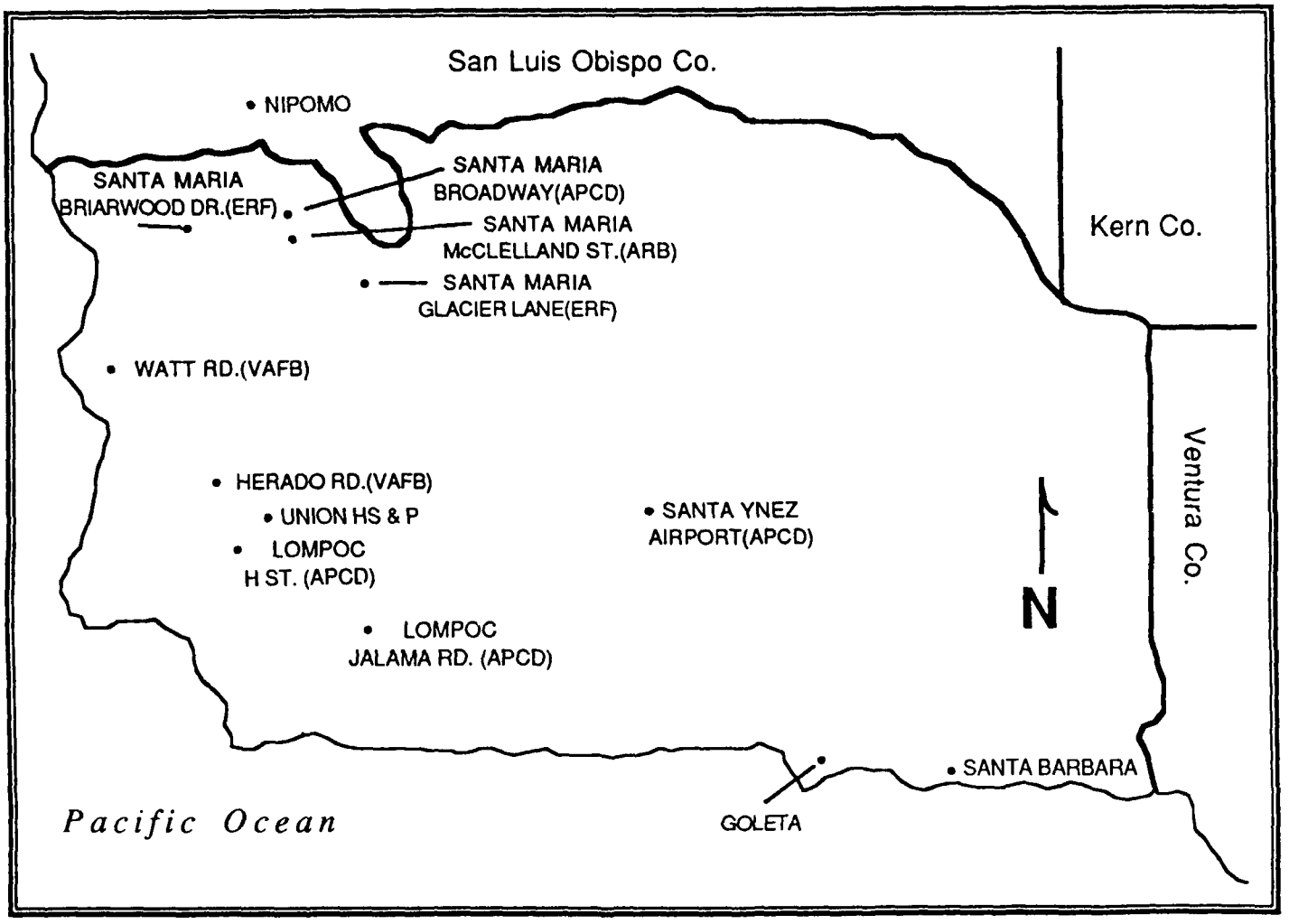


Figure 3.3-3

AIR QUALITY MONITORING STATIONS

Section 3.4, Biological Resources

Section 3.4, Biological Resources; Table 3.4-1; page 3.4-6; surf thistle. Southern extent for *Cirsium rothophilum* on VAFB is Rocky Point, one mile south of Point Arguello.

Section 3.4, Biological Resources; Table 3.4-1; page 3.4-5; Point Conception jerusalem cricket. Add, under distribution on VAFB, "Collected by Zedler, Cohn and Banta (San Diego State University) in the coastal dunes on North Vandenberg. Taxonomic studies in progress."

Section 3.4, Biological Resources; Table 3.4-1; page 3.4-5; add, under Invertebrates:

"Globose dune beetle *(Coelus globosus)*"	C2	No specific records for VAFB.

Section 3.4, Biological Resources; Table 3.4-1; page 3.4-7; Roderick's fritillaria. Add, under distribution, "*Fritillaria grayana* was once considered (apparently incorrectly) by some scientists to be a synonym for both *F. biflora*, which occurs on the south coast, and *F. roderickii*. *F. grayana* is included and called Roderick's fritillaria in this report because of correspondence with USFWS."

Section 3.4.4.4, Threatened or Endangered Species; page 3.4-8, third paragraph, first sentence should read, "The California least tern breeds in the coastal foredunes just south of San Antonio Creek, near Purisima Point, and sometimes on a sandbar in the lower Santa Ynez River or in the coastal foredunes near the river mouth . . . (Pergler, personal communication)."

Section 3.4.4.4; page 3.4-8, last paragraph, add to the last sentence, "Point Arguello, and Purisima Point."

Section 3.4.4.5, Biologically Important Habitats; page 3.4-24; under Marine Mammal Haulouts, first sentence - insert after Rocky Point, "(harbor seal breeding)." In the last sentence, replace "Pt. Arguello" with "Purisima Point and Rocky Point."

Section 4.4.2.1, Proposed Action; page 4.4-3, first paragraph, add after first sentence, "Appendix A of the DEIS should be referred to for details concerning the guidelines of the MRMP."

Section 4.4.4, Cumulative Impacts; page 4.4-8, fourth paragraph, add, after last sentence, "Residential development in the Vandenberg Village and Mission Hills areas continues to result in removal of Burton Mesa chaparral, and this fact should be considered when assessing project-specific cumulative impacts of oil and gas development on VAFB."

Section 3.7, Socioeconomics

Section 3.7.4; page 3.7-3, paragraph 4, sentence 3 now reads ". . . Santa Maria . . ."

Section 3.7.4; page 3.7-3, last paragraph, first sentence should now read "Table 3.7-2 shows a forecast of northern Santa Barbara County employment by sector."

Table 3.3-5

NORTH COUNTY POINT SOURCE EMISSION INVENTORY FOR 1983

Facility	EMISSIONS (TONS/YEAR) NO_x	TOG	RHC	CO	SO_x	PM
Buellflat Rock Co.	0	0	0	1	0	11
Grefco Inc.	39	0	0	4	7	22
Manville Products, Corp.	97	2	1	165	27	384
Coast Rock Products	0	0	0	0	0	41
Kaiser Sand and Gravel	1	0	0	1	2	25
Granite Construction[1]	4	0	0	1	0	20
U.S. Air Force						
VAFB	177	17	15	38	35	15
STS Project - VAFB	9	0	0	2	29	30
Betteravia Byproducts	12	0	0	3	77	142
~~Union~~						
Union Sugar	246	5	3	39	402	85
Union Asphalt	9	0	0	1	10	1
Union Battles Gas Plant	458	246	61	81	0	1
Arco Gas Plant #10 - Cuyama	143	80	19	25	0	0
Shell Oil - Lake Marie, Santa Maria	33	20	18	3	19	1
Conoco Oil Refinery - Santa Maria	63	74	72	15	162	5
Texaco Oil Leases						
Zaca Field	17	71	63	3	0	0
Cat Cyn Field	183	101	92	39	80	12
Orcutt Field	14	14	7	3	0	0
Los Alamos Field	17	26	21	4	6	0
Chevron Oil Leases - Cat Cyn. Field	105	111	100	27	16	2
Conoco Oil Leases - Cat Cyn. Field	155	66	58	39	55	3
Shell Oil Leases						
Cat Cyn. Field	125	139	126	30	99	9
Santa Maria Field	17	33	30	4	9	0
Four Deer Field	0	4	3	0	0	0
Union Oil Leases						
Santa Maria Valley Field	38	68	43	9	0	0
Casmalia Field	31	23	14	6	0	0
Cities Service Oil Leases - Cat Cyn. Field	7	20	18	2	2	0
Petrominerals Oil Leases						
SM Valley Field	1	24	22	0	0	0
Cat Cyn Field	8	16	14	1	0	0
Gilco Oil Lease - Cat Cyn. Field	2	13	12	1	2	0
Grace Petroleum Lease - Casmalia Field	10	1	1	2	3	0
Hunter Resources Oil Lease - Orcutt Field	3	11	10	1	2	0
TOTAL EMISSIONS	2,024	1,185	823	550	1,044	809

Note: 1. Emissions for 1984.

Source: These data were provided by the Santa Barbara County Air Pollution Control District.

Section 3.7.4; page 3.7-4, Table 3.7-1 should have a third note as follows: "3) Population estimates based on information from both the Santa Barbara County-Cities Area Planning Council and the California Department of Finance population projections." Also, the source should now read "Source: URS Corporation, 1986." See the attached table.

Section 3.7.4; page 3.7-5, Table 3.7-2 title should now read "BASELINE PROJECTION: NORTHERN SANTA BARBARA COUNTY EMPLOYMENT BY SECTOR." See the attached table.

Section 3.8, Transportation

Figure 3.8-1 on page 3.8-3 has been revised. Please see the attached figure.

Section 3.9, Visual Resources

In section 3.9.4.1, North Vandenberg; page 3.9-2, paragraph three, sentences one and four, the references to "Figure 3.6-1" have been changed to "Figure 3.6-2."

Section 3.11, System Safety

Section 3.11.1, Description of the Resource; page 3.11-1, second paragraph, first sentence now reads "Accidents may occur during drilling (blowouts), pipeline transfer, storage, processing, and trucking."

Section 3.11.4.1.2, Santa Barbara County; page 3.11-5, add the following as separate paragraphs after paragraph one: "Santa Barbara County and incorporated cities within Santa Barbara County have or are in the process of developing planning guides in accordance with the 'Multi-Hazard Functional Planning Guide' as required by the State Office of Emergency Planning. These plans will replace existing emergency response plans. Santa Barbara County and cities have entered into an Operational Area/Joint Powers agreement whereby they agree to support each other and provide mutual aid when required. VAFB is not a participant in this agreement; however, there is continuing dialogue and coordination between Santa Barbara County and VAFB during the preparation of these plans.

The forthcoming Santa Barbara County planning guide will include a specialized oil and gas annex. This annex will, among other things, delineate both administrative and functional responsibilities among various departments and government agencies involved with oil and gas emergencies."

Section 4.2, Water Resources

Section 4.2.1.1, Significance Criteria; page 4.2-1, third bullet following first paragraph shall now read as follows:

"o Threaten or damage unique hydrologic characteristics or associated biological resources of the area."

Table 3.7-1

BASELINE PROJECTIONS FOR THE REGIONAL GROWTH OF SANTA BARBARA COUNTY

Year	Population	Labor Force	Employment	Unemployment Rate	Earnings Per Worker	Personal Income ($ 000)	Per Capita Personal Income
1980	298,660	148,700	149,616	6.1%	$18,264	$4,056,186	$13,581
1981	303,191	154,300	154,130	6.3%	$18,469	$4,178,622	$13,782
1982	309,272	162,800	155,778	7.9%	$16,533	$4,189,958	$13,548
1983	314,718	167,600	159,900	7.5%	$17,250	$4,406,426	$14,001
1984	320,400	173,539	152,459	5.9%	$17,318	$4,495,012	$14,029
1985	323,728	177,649	169,665	5.7%	$17,626	$4,834,060	$14,932
1986	329,191	184,132	174,896	5.1%	$17,882	$5,075,951	$15,419
1987	334,747	190,726	178,510	5.3%	$17,294	$5,145,043	$15,370
1988	340,396	197,431	180,681	5.6%	$16,783	$5,182,685	$15,225
1989	346,140	204,248	182,503	6.0%	$16,158	$5,180,577	$14,967
1990	351,982	211,181	184,809	6.1%	$16,103	$5,314,426	$15,099
1991	354,774	214,495	189,370	5.8%	$16,504	$5,538,016	$15,610
1992	357,588	217,834	194,274	5.6%	$16,907	$5,776,821	$16,155
1993	360,424	221,200	198,309	5.2%	$16,936	$5,932,041	$16,459
1994	363,283	224,593	200,920	5.0%	$16,702	$5,981,411	$16,465
1995	366,165	228,014	203,572	4.9%	$16,999	$6,160,768	$16,825
1996	367,122	229,149	207,811	5.5%	$17,574	$6,369,426	$17,350
1997	368,082	230,289	211,417	5.8%	$17,782	$6,492,928	$17,640
1998	369,044	231,430	213,869	6.1%	$17,824	$6,546,117	$17,738
1999	370,009	232,576	216,315	6.7%	$18,152	$6,653,823	$17,983
2000	370,976	233,723	220,343	6.1%	$18,542	$6,845,519	$18,453

Notes:
1. 1980 to 1984 values are actual
2. All figures in 1984 dollars
3. Population estimates based on information from both the Santa Barbara County-Cities Area Planning Council and the California Department of Finance population projections.

Source: URS Corporation, 1986.

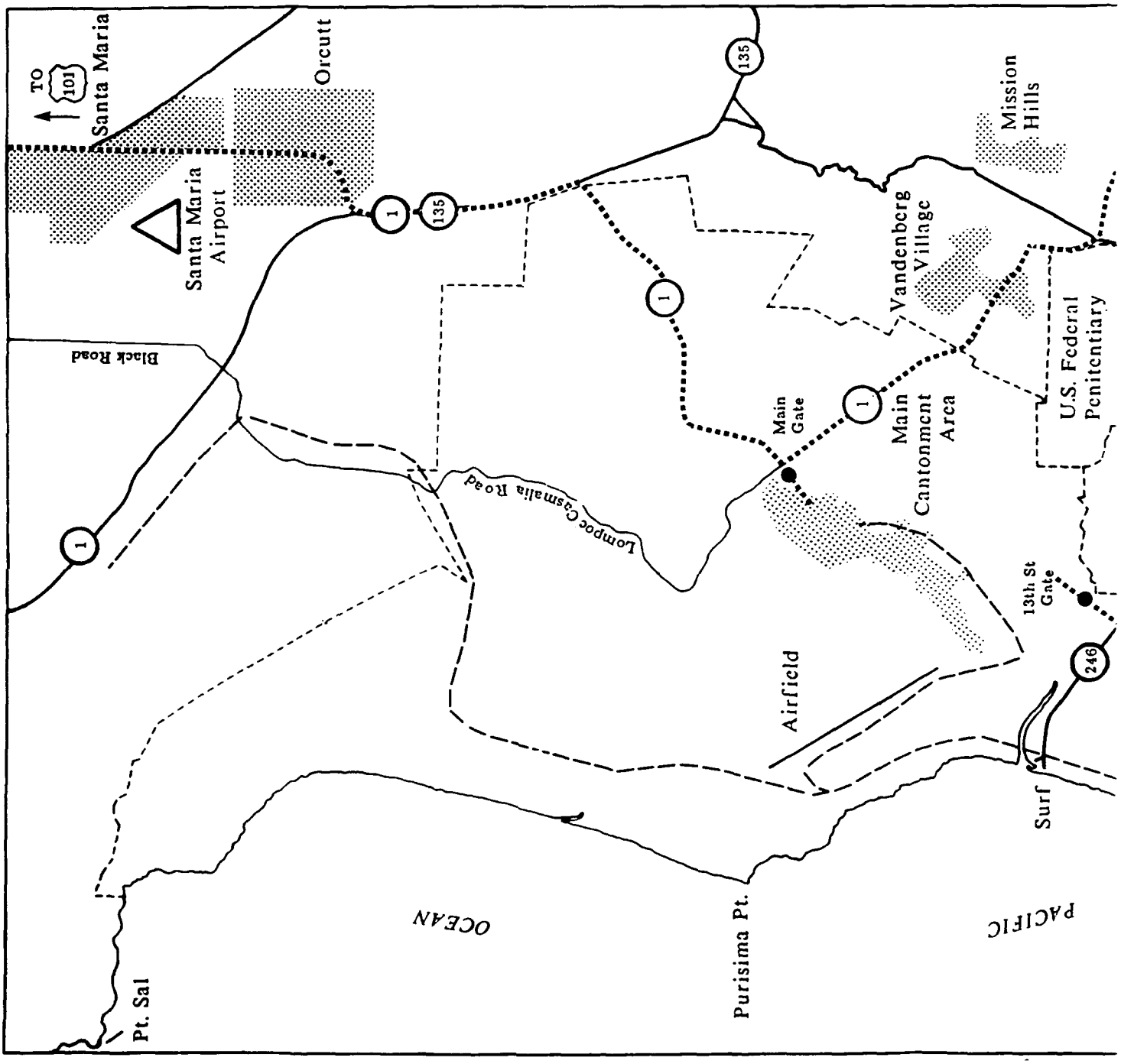
Table 3.7-2

BASELINE PROJECTION: NORTHERN SANTA BARBARA COUNTY EMPLOYMENT BY SECTOR

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Agriculture	5,155	5,317	5,485	5,658	5,836	6,020	6,081	6,143	6,205	6,268	6,332	6,332	6,332	6,332	6,332	6,332	6,332	6,332	6,332	6,332	6,332
Mining	1,187	1,246	1,307	1,372	1,440	1,511	1,511	1,511	1,511	1,511	1,511	1,511	1,511	1,511	1,511	1,511	1,511	1,511	1,511	1,511	1,511
Construction	2,545	2,695	2,856	3,028	3,212	3,408	3,489	3,572	3,658	3,745	3,835	3,884	3,934	3,985	4,036	4,088	4,129	4,171	4,213	4,255	4,298
Manufacturing	7,245	7,634	8,044	8,476	8,931	9,411	9,822	10,253	10,705	11,180	11,677	12,027	12,388	12,760	13,143	13,537	13,808	14,084	14,366	14,654	14,947
Transportation	2,030	2,131	2,238	2,350	2,467	2,590	2,664	2,740	2,819	2,900	2,984	3,024	3,065	3,106	3,148	3,191	3,226	3,262	3,298	3,335	3,372
Wholesale Trade	1,795	1,864	1,936	2,011	2,088	2,169	2,237	2,308	2,380	2,455	2,533	2,592	2,653	2,716	2,780	2,845	2,902	2,960	3,020	3,080	3,142
Retail Trade	9,651	9,964	10,286	10,620	10,964	11,320	11,726	12,146	12,582	13,033	13,501	13,855	14,218	14,591	14,974	15,367	15,630	15,898	16,171	16,449	16,731
Finance, Insurance, and Real Estate	1,438	1,528	1,624	1,726	1,836	1,953	1,999	2,046	2,095	2,145	2,197	2,259	2,323	2,388	2,456	2,525	2,575	2,627	2,679	2,733	2,787
Services	9,002	9,309	9,627	9,956	10,296	10,648	11,028	11,421	11,828	12,250	12,687	13,013	13,347	13,690	14,041	14,402	14,700	15,004	15,315	15,632	15,956
Government	11,201	11,313	11,426	11,541	11,656	11,773	11,832	11,891	11,950	12,010	12,070	12,159	12,248	12,338	12,429	12,521	12,584	12,647	12,710	12,774	12,838
Total	51,249	53,001	54,829	56,736	58,726	60,803	62,389	64,031	65,734	67,498	69,327	70,657	72,020	73,417	74,850	76,319	77,398	78,497	79,615	80,754	81,914
Employment Growth																					
Number of Jobs	N/A	1,752	1,828	1,907	1,990	2,077	1,586	1,643	1,702	1,764	1,829	1,330	1,363	1,397	1,433	1,469	1,079	1,099	1,119	1,139	1,160
Average Annual Percent	N/A	3.4%	3.4%	3.5%	3.5%	3.5%	2.6%	2.6%	2.7%	2.7%	2.7%	1.9%	1.9%	1.9%	2.0%	2.0%	1.4%	1.4%	1.4%	1.4%	1.4

Note: 1980 population and projections for 1985, 1990, 1995, and 2000 were presented by the Area Planning Council in Forecast 85; A straight line projection was used to estimate population in the intervening years.

Source: Santa Barbara County-Cities Area Planning Council 1985.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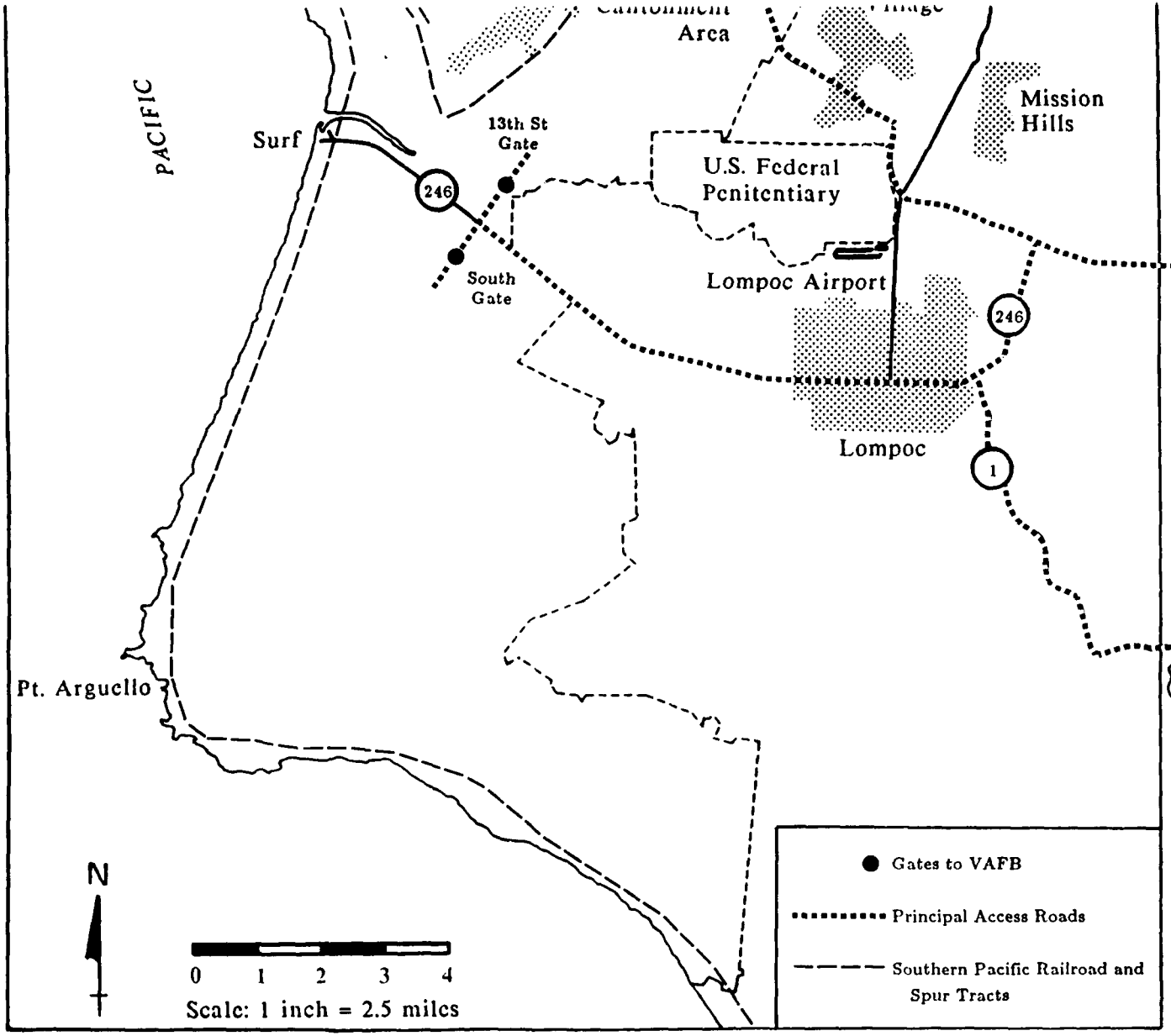


Figure 3.8-1

PRINCIPAL TRANSPORTATION ACCESS TO VAFB

Section 4.2.2.1.1, Impacts; paragraph two, page 4.2-5, last sentence is deleted and replaced with "These potential groundwater withdrawals may not be in accordance with the Santa Barbara County General Plan and may not satisfy the required findings of the Mineral Resource Management Plan with regard to use of alternative sources to the maximum feasible extent and no net increase in withdrawal from overdrafted groundwater basins. There may be instances where it is infeasible to use alternative nonpotable sources or employ alternatives which would not affect the net withdrawal from an overdrafted groundwater basin. These specific instances would have a significant effect on groundwater resources and on surface flows, particularly if they occurred in the San Antonio Creek groundwater basin. Subsequent environmental review on a project-specific basis would be required where it is determined that it is infeasible to satisfy the findings required in the Mineral Resources Management Plan."

Section 4.2.3, Unavoidable Adverse Impacts; paragraph two, page 4.2-8, last sentence now reads "Impacts on the overdrafted groundwater supplies and water quality may occur without implementation of the guidelines contained in the proposed action because of existing water withdrawals for non-oil-related developments.

Section 4.3, Air Quality

This section has been reprinted in its entirety due to extensive revisions that were necessary. Please refer to the following section 4.3 which replaces section 4.3 in the DEIS. New text has been **bolded** and deleted text has been ~~stricken through~~.

4.3 AIR QUALITY

4.3.1 Methodology for Analyzing Impacts

4.3.1.1 Significance Criteria

Criteria for determining the significance of air quality impacts are based on federal, state, and local pollution standards, discussed in Appendix B, Regulatory Setting. Impacts are considered significant if estimated emissions from operation of project sources would increase ambient pollutant levels from below to above federal, state, or local air pollution standards, would exceed allowable increments under Santa Barbara County PSD regulations, would be inconsistent with measures contained in local Air Quality Attainment Plans, or would add to existing or projected violations of federal, state, or local standards. All other impacts would be insignificant.

~~Increases in off-site ambient pollutant levels resulting from operation of project sources that are not measurable are considered to be negligible.~~

Mitigations discussed within this document refer to measures that would reduce or avoid significant impacts. Where mitigations are identified, an evaluation of the effectiveness of each mitigation measure is presented. Generally, distinctions are made to differentiate between impacts of local and regional significance and to establish the short- or long-term duration of each air pollution impact.

4.3.1.2 Methodology for Impact Assessment

The effect of adopting the MRMP will be that each proposed development activity must be assessed according to the guidelines and management practices in the plan. At the present time, it is not clear to what extent individual developers will expand the current oil and gas activity on the base.

Since there are at present no specific proposals from potential developers, an analysis was performed using a hypothetical development scenario to identify a reasonable range of short-term, localized impacts that may result from petroleum exploration, production, and transportation activities. Analysis of this hypothetical scenario cannot accurately assess air quality impacts resulting from petroleum resource development, due to the lack of specific design information from the potential developers. However, the analysis presents an example of potential development governed by the MRMP, and displays a range of impacts and mitigations that may occur as the result of petroleum production.

Long-term, regional impacts of development governed by the MRMP were assessed by comparing the estimated emissions assumed to result from oil and gas development on VAFB to the North County emissions inventory obtained from the APCD. **This part of Santa Barbara County lies north of the Santa Ynez Mountains.**

The regional emissions estimated to result from oil and gas development were derived without the benefit of specific proposals from potential petroleum resource developers. Average emissions per well, as derived from the hypothetical scenario described above, were used to estimate regional emissions. The comparison of oil-

related emissions to the North County inventory is intended to display the availability or lack of sufficient emission reduction potential in the North County to offset possible oil-related emissions on VAFB. Although this analysis cannot accurately predict regional emissions from oil and gas development without specific proposals from mineral rights developers, the analysis illustrates the magnitude of emissions that may occur if petroleum reserves on VAFB are developed, and identifies potential conflicts with emission offset requirements of the APCD.

4.3.1.2.1 Localized Impacts

To assess the local impacts that may result from oil-related development activity on VAFB, a hypothetical, single-well development scenario was formulated as an example to determine compliance with applicable federal, state, and local air pollution standards.

ESTIMATED EMISSION CALCULATIONS. Emissions inventories were generated for six different development activities associated with petroleum exploration and production, using information gathered from the Unocal environmental assessment for the Jesus Maria Development and the Conoco environmental assessment for the Todos Santos Leasing Area as the primary data sources. The ~~assumed~~ development activities include ~~site~~ **well pad** preparation, **drill** rig installation, well drilling, **well completion**, production testing, **well production and maintenance**, product transportation, **and oil and gas processing** as discussed in section 2.0. Detailed calculations and assumptions for these development ~~scenario~~ **activities** are presented in the Air Quality **Technical** Appendix. In general, conservative assumptions were used to develop worst-case emissions estimates for each activity.

Worst-case hourly emissions for development activities that will occur on a temporary basis, such as **well pad** ~~site~~ preparation, **drill** rig installation, and production testing, were calculated to assess compliance with the short-term air quality standards. Similarly, production emissions, or those expected to occur over the life of a project, were assessed for an assumed average and maximum oil and gas production volume ~~and for an assumed production~~. A maximum production scenario was used to estimate short-term, maximum impacts to the local area.

Emission factors for individual pieces of equipment were taken from the EPA's *Compilation of Air Pollution Emission Factors, 4th Edition, AP-42.* Fugitive hydrocarbon emissions from pumps, valves, flanges and other components in gas and liquid service were estimated using factors from the APCD's *Modeling of Fugitive Hydrocarbon Emission, January, 1986.* The hypothetical emissions scenario is intended to represent a reasonable estimate of the pollutants that may occur as the result of oil-related development for a single well. It is likely, however, that each developer of petroleum resources on VAFB will propose a different approach for development, including a variety of construction equipment, drill rigs, pump engines, activity schedules, and other emission-related activities. Additionally, potential production rates and durations cannot be accurately estimated, due to the limited data available regarding the petroleum reserves beneath VAFB. As a result, the emissions presented herein are approximations that have been generated in the absence of specific project proposals and should be used as order-of-magnitude emission estimates for potential oil and gas development.

AIR QUALITY MODELS. The air quality impacts of inert pollutants from the hypothetical scenarios were assessed by applying numerical models, consistent with the approach followed by the APCD. The EPA Industrial Source Complex (ISC) model was used to assess impacts of fugitive dust generated by construction activities and fugitive hydrocarbon emissions, because of its ability to simulate the dispersion of pollutants from area-wide construction sources. Mobile point sources, such as exhaust emissions from vehicles, are treated as volume sources in ISC, and fugitive dust from site preparation and fugitive hydrocarbon emissions are treated as area sources.

Inert pollutants from stationary point sources were modeled using the EPA COMPLEX II, a Gaussian model. The model is generally used to analyze projected air quality impacts for sources located in complex terrain, where terrain heights are equal to or greater than the lowest stack height. A combination of the ISC and COMPLEX II models were used for construction activities involving both area and stationary/point sources. In these situations, the resultant impacts were calculated by adding the modeled results of the separate ISC and COMPLEX II runs. Impacts for averaging periods longer than one hour were calculated by extrapolating the 1-hour estimates using standard conversion factors recommended by the APCD. A complete discussion of the modeling protocol and assumptions appears in the technical appendix.

In the absence of site-specific air quality and meteorological data, the inert pollutant impact analyses were performed using hypothetical meteorology and worst-case air pollution parameters. For all impact receptors, the ISC and COMPLEX II modeling was performed, assuming E and F stability classes at wind speeds of 1, 1.5, and 2 meters per second. A review of existing meteorological data available for the North County showed this range of meteorological conditions would probably occur in the vicinity of VAFB. The existing North County ambient air pollution data were reviewed to establish a worst-case representation of background air contaminants for use in the impact analysis. The selection of hypothetical meteorology and worst-case air quality in lieu of site-specific data is a conservative approach commonly used by the APCD for ground-level impact assessment.

4.3.1.2.2 Regional Impacts

A rigorous photochemical analysis to examine the regional effects of air contaminants resulting from oil-related development is not appropriate for a programmatic document, due to the lack of specific development information available from the mineral resource holders, and the unavailability of an accurate, gridded emission inventory required for a Eularian-based modeling approach.

The impact of the primary photochemical pollutant, ozone, was analyzed on a regional basis by assessing the magnitude of ozone precursor (NO_x and RHC) emissions that may result from ~~oil-related~~ **the** development **of 100, 200, and 300 wells** on VAFB, and compared to the overall Santa Barbara County inventory of potential offsets in the vicinity of the project area. A comparison of estimated project emissions with potential North County offsets is intended to demonstrate whether reductions of NO_x and RHC emissions, in sufficient quantity to demonstrate a net air quality benefit, may be available to offset emissions from oil and gas development, as well as those emissions associated with non-oil-related

development and mission operations. **An analysis of the availability of SO_2, TSP, and PM_{10} offsets is also included.**

Emission estimates for the three potential levels of development were calculated using the single-well emission scenario derived for the localized impact analysis. These estimates represent a conservative assessment of oil and gas buildout scenarios because they do not include emission reductions that may occur due to consolidation of facilities and colocation of activities on individual well pads. Estimates for long-term production were made using average production rates rather than the maximum figures generated for the localized analyses. **The benefit of implementing MRMP recommended mitigation measures to decrease production emissions and the resulting offset liability was also analyzed.**

4.3.1.2.3 Alternatives

When applicable, the alternatives were assessed using methodology similar to that used for the proposed action analysis.

4.3.1.2.4 Cumulative Impacts

A rigorous modeling analysis was determined to be of limited value for assessing cumulative impacts, due to the lack of specific data related to future oil and nonoil development plans in the vicinity of VAFB. Cumulative impacts were assessed using a qualitative methodology similar to that employed for addressing regional impacts. A reasonably foreseeable future buildout scenario of oil development on VAFB, as described in section 2.0, was analyzed for total emission potential, in conjunction with the cumulative sources identified in the *Unocal Oil Project and Central Santa Maria Basin Area Study EIS/EIR* and the *San Miguel Project and Northern Santa Maria Basin Area Study EIS/EIR*. These emissions were compared to the estimated offset potential in the North County to determine if sufficient offsets may exist to demonstrate a net air quality benefit. This analysis also allows the reader to view the projected oil-related emissions in light of the overall North County inventory.

The most difficult assessment of emissions for the cumulative analysis is a quantification of oil and gas-related emissions on the OCS and state tidelands. These sources are large, relative to other North County sources, and have the potential to significantly increase the North County emission inventory. The extent to which offshore development may occur, however, is unknown at the present time.

4.3.1.2.5 Public Nuisance

Historically, there have been within the county many public complaints regarding odors and other nuisance factors due to the oil and gas processing facilities handling crude oil with a high sulfur content. For this reason, it was considered necessary to evaluate the potential for public nuisance due to emissions of reduced sulfur compounds from the hypothetical development.

The primary source of odor from oil and gas development is the hydrogen sulfide (H_2S) contained in fugitive hydrocarbon emissions, although SO_2 is also released from combustion sources. Fugitive emissions occur as the result of storage and handling of produced gas and liquids.

Fugitive emissions were calculated according to APCD-approved methodology and modeled to assess impacts using ISC. The analysis approach is further discussed in the air quality appendix. Modeled results were compared to the California standard and the H_2S olfactory threshold of 0.65 $\mu g/m^3$ to determine significance (Leonardos et al., 1969).

4.3.1.2.6 Visibility

A Level-1 visibility screening analysis was performed for the development and production phases of the hypothetical project to assess the potential impairment of visibility in Class I areas. The methodology described in the EPA's *Workbook for Estimating Visibility Impairment* was used to calculate three contrast parameters: plume contrast against sky (C1), plume contrast against terrain (C2), and change in sky/terrain contrast (C3). The San Raphael Wilderness Area, located approximately 45 km from VAFB, is the closest Class I PSD area. The background visual range was assumed to be 25 km.

4.3.2 Environmental Impacts and Mitigations

Development of oil and gas resources on VAFB may significantly affect air quality, as a result of emissions generated by construction and operational activities. Combustion emissions from gasoline and diesel-powered engines, used for drilling, pumping, transportation, and other support activities, account for the majority of NO_x, CO, SO_2, and TSP pollutants emitted to the atmosphere. Fugitive emissions resulting from the storage and handling of produced gas and liquid account for the majority of RHC emissions. Significant amounts of fugitive dust are generated by clearing and grading activity during well pad preparation.

Localized impacts to air quality were assessed for inert pollutants by comparison with appropriate federal, state, and local standards and increments. Regional impacts of **ozone precursors and** ~~photochemical~~ **inert** pollutants were addressed by examining the estimated emissions reductions available in the North County to emissions offsets **required of** ~~resulting from~~ petroleum production on VAFB.

4.3.2.1 Proposed Action

The proposed action is that the MRMP be adopted to allow oil and gas exploration, development, and production to occur on VAFB with the least amount of impact on Air Force missions and the local and regional environment. None of VAFB would be excluded from consideration for oil and gas development under the proposed action. However, various conditions or restrictions would be applied to development proposals, depending on the proposed location.

For development under the proposed action, it is assumed that all projects will integrate MRMP requirements, as described below.

MRMP Requirements. Besides the demonstration of compliance with all applicable federal, state, and local standards and increments required by the local agencies, potential developers must provide offsets for **NO_x, RHC, SO_2, TSP, and PM_{10}**, in excess of proposed project emissions to ensure a net air quality benefit to the region. To assure that a proliferation of small development projects do not degrade regional air quality and limit future growth, offsets ~~for~~ would be provided for all projects, regardless of local regulatory trigger levels. Additionally, offsets must be held in reserve, so that sufficient emissions reductions will be available if future updates of the county's Air Quality Attainment Plan show that higher offset ratios are needed to demonstrate progress towards attainment.

Potential developers of the petroleum reserves beneath VAFB will also be required to mitigate ozone precursors (RHC and NO_x) by installing vapor recovery controls on crude storage tanks and loading racks, consolidating storage facilities, reducing drill rig NO_x emissions by retarding injection timing, installing low-NO_x burners on steam boilers, using NO_x reduction measures during construction activities, installing **electric motors to run the well pumps, and using** pipelines for transportation of oil and gas. The requirement to use pipeline transportation, as proposed in the MRMP, applies in all cases except where it can be demonstrated that other methods of oil transportation would ~~cause higher~~ **result in lower** impact levels on environmental resources or where the use of pipelines would be inconsistent with Air Force mission requirements. Other control measures than those specified above may be used to achieve equivalent levels of emission control. **For a further discussion of the MRMP guidelines and standards, see section 6.5, Appendix A.**

4.3.2.1.1 Localized Impacts - Inert Pollutants

A hypothetical development site was selected at the south eastern edge of the San Antonio Terrace in the Jesus Maria field. This area is considered to have high petroleum development potential and is centrally located on VAFB, as shown in Figure 4.3-1. The site chosen is not intended to represent a specific development site or specific developer.

Emission scenarios were generated for well site preparation, drilling rig installation, well drilling, well completion, production setup and testing, well production, and **oil and gas processing**. Each of these seven activities are discussed in section 2.0, The Proposed Action and Alternatives. A maximum production rate of 250 barrels per day was assumed to represent a reasonably worst-case scenario for localized impact analyses. The detailed analysis, showing assumptions, **sources included in the model runs**, calculations, and tabular results, is contained in **the Air Quality Technical** Appendix A.

Three development activities, well pad preparation, well drilling, and production, were determined to have the highest potential for significant impact. These activities were modeled, using reasonable worst-case emissions scenarios and hypothetical meteorology to assess incremental impacts. **For example, the production scenario was modeled with a diesel well pump and the use of vacuum trucks to transport oil.** The incremental impacts were added to existing baseline levels, resulting in estimates of total pollutant impact. The modeled results for each activity appear in Tables 4.3-1, 4.3-2, and 4.3-3, respectively.

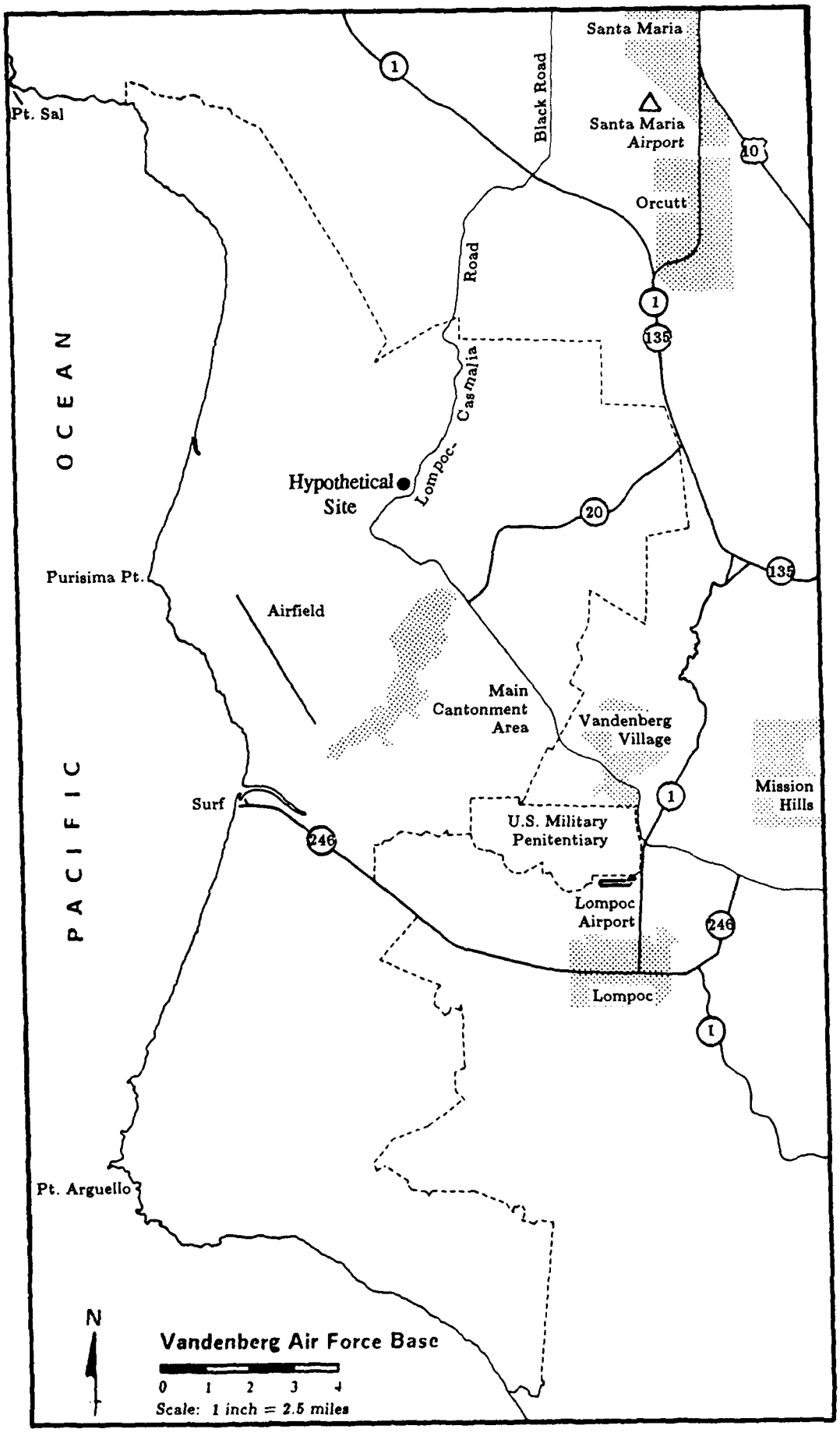


Figure 4.3-1

HYPOTHETICAL DEVELOPMENT SITE

Table 4.3-1

MODELED IMPACTS FOR WELL PAD PREPARATION

POLLUTANT	AVERAGE PERIOD	WIND SPEED (M/S)	STABILITY (P-G)	PROJECT CONCENTRATION (UG/M^3)	BACKGROUND (UG/M^3)	PROJECT PLUS BACKGROUND	AMBIENT CALIFORNIA	STANDARD FEDERAL	NOTES
SO_2	1 hour	1.0	F	293	120	413	655		1
	3 hour	1.0	F	214	88	302		1,300	1
NO_x	1 hour	1.0	E	3,096					
NO_2	1 hour	1.0	E	+549	17	* 566	470		2
CO	1 hour	1.0	E	6,786	14,880	21,666	23,000	40,000	3
	8 hour	1.0	E	+3,732	5,494	9,226	10,000	10,000	3
TSP	1 hour	1.0	F	1,260					
	24 hour	1.0	F	+504	165	** 669		260	4
PM_{10}	1 hour	1.0	F	806					
	24 hour	1.0	F	+323	44	* 367	50		5

* Exceeds California standard.
** Exceeds federal standard.
\+ Exceeds SBCAPCD PSD increment.

Notes:

1. Background SO_2 values were measured during 1984 at the Lompoc Jalama monitor.
2. The NO_2 background value of 17 ug/m^3 was assumed based on the highest simultaneous occurrence of ozone (.127 ppm) and NO_2 (.009 ppm) at Unocal's Lompoc monitor on November 2, 1985. The ozone value was used for computing NO_2 values using NO_x predictions with the Ozone Limiting Method.
3. The CO 1-hour background value of 14,880 ug/m^3 was measured at San Luis Obispo during 1983. The 8-hour value of 5,494 ug/m^3 was measured at the same site in 1983. CO monitoring data were not available for Lompoc. Background levels at VAFB are expected to be lower than these values.
4. The TSP background value of 165 ug/m^3 was measured at G Street, Lompoc, in 1982.
5. The PM_{10} background concentration of 44 ug/m^3 was measured at the Santa Maria Library in March, 1985.

Table 4.3-2

MODELED IMPACTS FOR WELL DRILLING

POLLUTANT	AVERAGE PERIOD	WIND SPEED (M/S)	STABILITY (P-G)	PROJECT CONCENTRATION (UG/M^3)	BACKGROUND (UG/M^3)	PROJECT PLUS BACKGROUND	AMBIENT CALIFORNIA	STANDARD FEDERAL	NOTES
SO_2	1 hour	1.0	F	259	120	379	655		1
	3 hour	1.0	F	189	88	272		1,300	1
NO_x	1 hour	1.0	E	2,281					
NO_2	1 hour	1.0	E	+467	17	* 484	470		2
CO	1 hour	1.0	E	2,771	14,880	17,151	23,000	40,000	3
	8 hour	1.0	E	1,524	5,494	7,018	10,000	10,000	3
TSP	1 hour	1.0	F	225					
	24 hour	1.0	F	+90	165	255		260	4
PM_{10}	1 hour	1.0	F	221					
	24 hour	1.0	F	+88	44	* 132	50		5

* Exceeds California standard.
** Exceeds federal standard.
\+ Exceeds SBCAPCD PSD increment.

Notes:

1. Background SO_2 values were measured during 1984 at the Lompoc Jalama monitor.
2. The NO_2 background value of 17 ug/m^3 was assumed based on the highest simultaneous occurrence of ozone (.127 ppm) and NO_2 (.009 ppm) at Unocal's Lompoc monitor on November 2, 1985. The ozone value was used for computing NO_2 values using NO_x predictions with the Ozone Limiting Method.
3. The CO 1-hour background value of 14,880 ug/m^3 was measured at San Luis Obispo during 1983. The 8-hour value of 5,494 ug/m^3 was measured at the same site in 1983. CO monitoring data were not available for Lompoc. Background levels at VAFB are expected to be lower than these values.
4. The TSP background value of 165 ug/m^3 was measured at G Street, Lompoc, in 1982.
5. The PM_{10} background concentration of 44 ug/m^3 was measured at the Santa Maria Library in March, 1985.

These revised values were included in the Draft Air Quality Technical Appendix but were erroneously stated in Section 4.3 of the DEIS.

Table 4.3-3

MODELED IMPACTS FOR WELL PRODUCTION

POLLUTANT	AVERAGE PERIOD	WIND SPEED (M/S)	STABILITY (P-G)	PROJECT CONCENTRATION (UG/M^3)	BACKGROUND (UG/M^3)	PROJECT PLUS BACKGROUND	AMBIENT CALIFORNIA	STANDARD FEDERAL	NOTES
SO_2	1 hour	1.0	F	104	120	224	655		1
	3 hour	1.0	F	76	88	164		1,300	1
NO_x	1 hour	1.0	E	524					
NO_2	1 hour	1.0	E	+308	17	325	470		2
CO	1 hour	1.0	E	6,152	14,880	21,032	23,000	40,000	3
	8 hour	1.0	E	+3,384	5,494	8,878	10,000	10,000	3
TSP	1 hour	1.0	F	32					
	24 hour	1.0	F	13	165	178		260	4
PM_{10}	1 hour	1.0	F	30					
	24 hour	1.0	F	12	44	* 56	50		5
ROC	1 hour	1.0	F	833					
H_2S	1 hour	1.0	F	2.08			*** 42		

* Exceeds California standard.
** Exceeds federal standard.
*** 1-hour health standard. Odor detection threshold is 0.65 ug/m^3.
\+ Exceeds SBCAPCD PSD increment.

Notes:

1. Background SO_2 values were measured during 1984 at the Lompoc Jalama monitor.
2. The NO_2 background value of 17 ug/m^3 was assumed based on the highest simultaneous occurrence of ozone (.127 ppm) and NO_2 (.009 ppm) at Unocal's Lompoc monitor on November 2, 1985. The ozone value was used for computing NO_2 values using NO_x predictions with the Ozone Limiting Method.
3. The CO 1-hour background value of 14,880 ug/m^3 was measured at San Luis Obispo during 1983. The 8-hour value of 5,494 ug/m^3 was measured at the same site in 1983. CO monitoring data were not available for Lompoc. Background levels at VAFB are expected to be lower than these values.
4. The TSP background value of 165 ug/m^3 was measured at G Street, Lompoc, in 1982.
5. The PM_{10} background concentration of 44 ug/m^3 was measured at the Santa Maria Library in March, 1985.

The significant air quality impacts resulting from the hypothetical development activity for inert pollutants are:

- Exceedances of the California 1-hour NO_2, the federal 24-hour TSP, and the California 24-hour PM_{10} standards due to combustive emissions from diesel vehicles and fugitive dust as a result of construction emissions associated with well pad preparation. **The 1-hour NO_2, the 8-hour CO, the 24-hour TSP, and the 24-hour PM_{10} PSD increments were also exceeded.**

- Exceedance of the California 1-hour NO_2 and the California 24-hour PM_{10} standards due to combustive emissions from the drill rig and diesel vehicles during drilling activities. **The 1-hour NO_2, the 24-hour TSP, and the 24-hour PM_{10} PSD increments were also exceeded.**

- Exceedances of the California 24-hour PM_{10} standard due to combustive emissions from diesel engines **and the H_2S olfactory threshold due to fugitive hydrocarbon emissions** during production and maintenance activities. **The 1-hour NO_2, and the 8-hour CO PSD increments were also exceeded.**

All other localized impacts are determined to be not significant or negligible.

PUBLIC NUISANCE. Odorous emissions of H_2S during production activities were assessed by extrapolating from the maximum modeled RHC level, assuming a fugitive H_2S concentration of 2500 ppm. **This H_2S concentration is based on the maximum value observed in well gas from Unocal's present operations in the Jesus Maria and Lompoc fields (Unocal, 1987).** The results of the ISC model runs appear with the other modeled results in Table 4.3-3. **The** H_2S ground-level concentration **of 2.08 $\mu g/m^3$** did not exceed the state 1-hour standard, ~~PSD increments~~, ~~or~~ **but exceeded the** published olfactory threshold **(0.65 $\mu g/m^3$)** and ~~are~~ **is**, therefore, considered to be **a** insignificant impacts.

4.3.2.1.2 Mitigation Measures for Local Impacts

The activities resulting in significant impacts were reanalyzed after incorporating reasonable control measures into the emission scenarios. **The goal of the mitigation activity was to reduce the proposed action impacts into compliance with the ambient air quality standards.** With the exception of PM_{10} impacts, ~~the significant impacts~~, **the ambient air quality standard exceedances** were ~~mitigated to a non-significant level~~ **eliminated**. The results of the mitigation modeling runs are displayed in Table 4.3-4. The mitigation measures ~~proposed to be incorporated~~ **used** to eliminate **these standard violations have been** proposed in the MRMP **for** potential local impacts due to oil and gas development:

WELL PAD PREPARATION

- Reduce concurrent use of diesel equipment through proper management practices in order to lower the NO_x and TSP emissions.

- Reduce the intensity of diesel engine activity to lower NO_x and TSP emissions.

Table 4.3-4

RESULTS OF MODELING FOR MITIGATION OF AIR QUALITY STANDARD VIOLATIONS

POLLUTANT	ACTIVITY		CONCENTRATION (UGM^3) PROJECT	BACKGROUND	TOTAL	% OF STANDARD CALIFORNIA	FEDERAL
SO_2 (1-hour)	Well Drilling	Unmitigated	664	120	* 784	120	n/a
		Mitigated	388	120	508	78	n/a
NO_2 (1 hour)	Well Pad Preparation	Unmitigated	549	17	* 566	120	n/a
		Mitigated	337	17	354	75	n/a
NO_2 (1 hour)	Well Drilling	Unmitigated	467	17	* 484	103	n/a
		Mitigated	427	17	444	94	n/a
TSP (24 hour)	Well Pad Preparation	Unmitigated	504	165	** 669	n/a	104
		Mitigated	94	165	259	n/a	100
TSP (24 hour)	Well Drilling	Unmitigated	106	165	** 271	n/a	104
		Mitigated	80	165	245	n/a	94
PM_{10} (24 hour)	Well Pad Preparation	Unmitigated	323	44	* 367	734	n/a
		Mitigated	65	44	* 109	218	n/a
PM_{10} (24 hour)	Well Drilling	Unmitigated	88	44	* 132	264	n/a
		Mitigated	78	44	* 122	245	n/a

* Exceeds California standard.

** Exceeds federal standard.

Note: The actual SO_2 and TSP impacts for well drilling did not exceed their respective air quality standards. See Table 4.3-2.

- o **Additional** use of water sprays and organic mulches to reduce fugitive dust emissions.

- o Minimize the area to be worked to reduce fugitive dust emissions.

WELL DRILLING

- o Use low NO_x-emitting diesel drilling engines to reduce NO_x emissions.

The ~~Impacts--resulting--from--emissions--of~~ PM_{10} ambient air quality standard exceedance could not be effectively mitigated to insignificance, due to the elevated background value of 44 ug/m^3 assumed for the analysis. This background value represents 88 per cent of the California 24-hour standard. **The SBCAPCD PSD air quality increment exceedances for TSP and PM_{10} also were not eliminated in the modeling analysis. This could be accomplished by further reductions in concurrent use and intensity of diesel equipment.**

WELL PRODUCTION. **Oil and gas pipelines were included in the well design, which effectively eliminates all storage and transfer fugitive hydrocarbon and H_2S emissions. The mitigated H_2S impact was estimated to be 0.19 μg/m^3 which would be insignificant.**

Although mitigation model runs were not executed for the ~~well production activity, the~~ PM_{10} ambient standard and SBCAPCD air quality increment exceedances, these impacts would be mitigated to insignificance by incorporating the transportation of oil and gas by pipeline and an electric well pump into the project design.

Each mineral rights holder seeking to develop the petroleum reserves beneath VAFB may propose a development scenario that differs from the hypothetical activities analyzed in this document. As a result, it may not be necessary to impose all the proposed mitigations to each development. If it can be demonstrated by the mineral rights holder that one or more of the above measures is not necessary to achieve the same level of emission control, the mitigation will not have to be incorporated into the project design.

Additionally, locations of specific developments may be in areas that promote or prohibit air pollutant dispersion, due to the local meteorological regime and/or the proximity of elevated terrain. As a result, actual development projects proposed by the mineral rights holders may result in impacts above or below those analyzed in this document. If the required modeling analyses identify additional or more severe significant impacts than those displayed above, further mitigation measures may be required. A tabular listing of ~~potential~~ **MRMP recommended** mitigations that may be applied to projects that display significant impacts appears in Table 4.3-5.

Given the conservative nature of the hypothetical development emission scenarios, it appears likely that many development activities for specific projects will produce insignificant impacts if proper mitigation measures are applied to the appropriate emission sources.

Table 4.3-5

MRMP RECOMMENDED MITIGATION MEASURES FOR REDUCING AIR QUALITY IMPACTS

Activity	*Pollutant(s)*	*Mitigation Measures*
CONSTRUCTION	NO_x, SO_2, TSP, PM_{10}, and ROC	Reduce intensity of diesel construction activity.
	SO_2	Use low-sulfur diesel fuel.
	NO_x	Use gasoline, propane, ~~or~~ precombustion-chamber diesel engines, **or retard engine-timing.**
	NO_x, CO, and **ROC**	Retrofit gasoline engines with catalytic converters.
	TSP and PM_{10}	Minimize area to be worked on daily. Use water spray, organic mulches, or other soil stabilizers.
	All pollutants	Reduce hours of construction daily. Minimize the use of diesel equipment through proper management. Transport workers in carpools to reduce inert pollutant emissions.
DRILLING AND OPERATIONAL	**ROC**	**Use fixed roof with vapor recovery system on oil storage tanks. I&M program consistent with Union Irene Project. Design all components accessible.**
	NO_x	Use gasoline, propane, ~~or~~ precombustion chamber diesel engines, **or engine timing retard.** Use low-NO_x burners or Thermal De-NO_x to reduce emissions from steam boilers.
	All pollutants	Consolidate storage and transportation facilities. Replace internal combustion engines with electric motors powered by the utility grid. **Use an electronic flare ignition. Transport oil and gas by pipeline.**
	SO_2	Use low-sulfur diesel fuel.

4.3.2.1.3 Regional Impacts

The regional impact of oil-related development governed by the MRMP is demonstrated by assessing the potential emission reductions in the North County available to offset emissions resulting from oil and gas exploration and production on VAFB. The estimated emissions for the hypothetical development scenario were extrapolated to produce ~~estimated~~ emissions for ~~several--levels~~ the regional development of **100, 200, and 300 wells** on VAFB.

In order to analyze regional impacts, Table 4.3-6 shows the total emissions caused during the first year of production of a single well, *including exploration and* associated activities, with an average oil production rate of 50 barrels per day (bpd) **and 70,000 standard cubic feet per day (scfd) of gas.** If a single well produces more than or less than 50 bpd **and 70,000 scfd**, the emissions increase or reduction will not be proportional to the change. **Production during the first year was estimated to occur for 272 days using a natural gas fired well pump and vacuum truck transport of oil.** ~~For development governed by the proposed action, it is assumed, in the calculation of regional emissions, that all oil and gas will be transported by pipeline after the first year, as required by the MRMP.~~ **The on-road motor vehicles category in Table 4.3-6 refers to emissions from vehicles licensed to operate on public roads, such as vacuum trucks and crew vehicles. Emissions from these sources occurred both on-site and during assumed round trips to and from Santa Maria (24 miles).**

An estimate of ~~total yearly~~ **annual** emissions for a single well producing 50 bpd of oil **and 70,000 standard cubic feet per day (scfd) of gas** ~~an average rate of for subsequent years assuming pipeline transportation~~ *after the first year* appear in Table 4.3-7 **and are based on three production scenarios:**

> **(1) Production with oil transported by vacuum truck and the use of a natural gas-fired well pump.**
>
> **(2) Production with oil transported by pipeline and the use of a natural gas-fired well.**
>
> **(3) Production with oil transported by pipeline and the use of an electric powered well pump.**

These scenarios were developed to demonstrate the benefit of implementing the two most important MRMP mitigation measures for reducing emissions during production; pipeline transport of oil and gas and an electric well pump. Incorporating a pipeline in the well design will eliminate emissions from the flare and vacuum trucks, and reduce fugitive ROC emissions, since oil storage and transfer emissions are eliminated. This will result in a decrease of the following well emissions during production: ROC, 17.9 percent, NO_x, 25.1 percent, SO_2, 66 percent, and particulate matter, 84.1 percent. The use of an electric well pump will eliminate a significant amount of natural gas-firing and result in a reduction of the following emissions during production: ROC, 26.2 percent, NO_x, 68.5 percent, SO_2, 0.1 percent, and particulate matter, 4.5 percent.

Using the numbers presented in Tables 4.3-6 and 4.3-7, estimates were derived for regional development of oil and gas reserves on VAFB by multiplying the single

Table 4.3-6

FIRST-YEAR EMISSIONS FOR DEVELOPMENT OF A HYPOTHETICAL WELL

(Production at 50 Barrels per Day)

Activity	POUNDS PER YEAR					
	ROC	*NO_x*	*SO_2*	*CO*	*PM*	*PM_{10}*
Well pad preparation	28.1	335.6	31.6	128.7	427.4	302.4
Drilling rig installation	17.5	170.6	13.9	79.9	15.0	14.6
Well drilling	459.9	14,828.2	2,061.7	4,599.1	1,744.5	1,674.7
Well completion	42.6	415.2	41.3	204.3	40.0	38.2
Production testing[1]	216.8	2,517.2	703.7	471.5	38.4	36.5
Production[2]	2,962.4	9,733.1	1,230.6	1,577.4	60.1	57.1
Oil and gas processing[2]	**247.0**	**254.0**	**229.0**	**63.0**	**6.0**	**5.7**
SUBTOTAL						
(lb/yr)[3]	**3,974.3**	**28,253.9**	**4,311.8**	**7,123.9**	**2,331.4**	**2,129.2**
(tons/yr)[3]	**2.0**	**14.1**	**2.2**	**3.6**	1.2	1.1
ON-ROAD MOTOR VEHICLES						
(lb/yr)	1,590.4	8,837.3	953.7	20,385.7	805.9	.775.1
(tons/yr)	0.8	4.4	0.5	10.2	0.4	0.4
TOTAL EMISSIONS						
(lb/yr)	**5,564.7**	**37,091.2**	**5,265.5**	**27,509.6**	**3,137.3**	**2,904.3**
(tons/yr)	**2.8**	**18.5**	**2.6**	**13.8**	1.6	**1.5**

1. Emissions based on 50 barrels of oil and 250 barrels of water per day and 70,000 SCFD of produced gas.
2. First year production time = 365 days - development days (93) = 272 days. Assumes truck transport of produced crude oil.
3. Represents emissions from stationary sources on site.

Table 4.3-7

ANNUAL EMISSIONS FOR A HYPOTHETICAL WELL AFTER THE FIRST YEAR BY PRODUCTION SCENARIO
(Production at 50 Barrels per Day)

Activity	*ROC*	*NO_x*	*SO_2*	*CO*	*PM*	*PM_{10}*
	POUNDS PER YEAR					
No Pipeline or Electric Power						
Stationary sources	4,309.4	13,403	1,959.4	2,175.1	88.6	84.2
On-road motor vehicles	813.1	3,516	418.6	18,456.9	338.4	325.4
Total emissions	5,122.5	16,919	2,378	20,633	427	409.6
Pipeline but No Electric Power						
Stationary sources	3,683.8	12,176.6	781.2	1,868.5	44.8	42.6
On-road motor vehicles	521.5	502.2	26.4	17,251.4	23.3	23.1
Total emissions	4,205.3	12,678.8	807.6	19,119.9	68.1	65.7
Pipeline and Electric Power						
Stationary sources	2,385.8	587.1	778.9	207.5	25.5	24.2
On-road motor vehicles	521.5	502.2	26.4	17,251.4	23.4	23.1
Total emissions	2,907.3	1,089.3	805.3	17,458.5	48.9	47.3

Note: Includes oil and gas processing at 50 barrels and 70,000 SCFD, respectively.

Table 4.3-8

ESTIMATED REGIONAL EMISSIONS BY PRODUCTION SCENARIO (TONS/YEAR)
(Production at 50 Barrels per Day)

No. of Wells	TONS PER YEAR					
	ROC	NO_x	SO_2	*CO*	*PM*	PM_{10}
No Pipeline or Electric Power						
100						
Stationary sources	212	856	128	172	33	31
On-road motor vehicles	50	242	29	947	23	22
200						
Stationary sources	424	1,712	256	344	66	62
On-road motor vehicles	100	484	58	1,894	46	44
300						
Stationary sources	636	2,568	384	516	99	93
On-road motor vehicles	150	726	87	2,841	69	66
Pipeline but No Electric Power						
100						
Stationary sources	188	810	84	160	31.7	29.6
On-road motor vehicles	39.6	128.8	12.9	901.9	11.0	10.9
200						
Stationary sources	376	1,620	164	320	63.4	59.2
On-road motor vehicles	79.2	257.6	25.8	1,803.8	22	21.8
300						
Stationary sources	564	2,430	246	480	95.1	88.8
On-road motor vehicles	118.8	386.4	38.7	2,705.7	33	32.7
Pipeline and Electric Power						
100						
Stationary sources	149	375	83.9	98	31	29
On-road motor vehicles	39.6	128.8	12.9	901.9	11.0	10.9
200						
Stationary sources	298	750	167.8	196	62	58
On-road motor vehicles	79.2	257.6	25.8	1,803.8	22	21.8
300						
Stationary sources	447	1,125	251.7	294	93	87
On-road motor vehicles	118.8	386.4	38.7	2,705.7	33	32.7

Note: 25 percent of wells are assumed to be in first-year production and 75 percent in post first-year production.

well estimates by the total number of wells assumed to be developed in the region. This calculation procedure will result in conservative estimates for the assumed production rate, because emission reductions realized by colocation of wells is not taken into account. A slight reduction in emission estimates may occur as the result of colocation of facilities, to the extent that this strategy is used in development plans. Table 4.3-8 shows the yearly estimated emission rates from the development of 100, 200, and 300 wells. These calculations are made assuming that 25 percent of the wells are in the first year of production.

An estimate of the offset requirements for oil development on VAFB was based on the assumption that the primary source of offsets would come from North County oil related facilities. Most of these sources are located within 15 miles of the moderate to high potential oil reserves on VAFB. Using the APCD-developed distance factors for computing offset ratios, the analysis assumed that 75 percent of the sources used for offsets would be within 15 miles of VAFB (1.2 to 1 ratio), 15 percent would be 15 to 20 miles away (1.5 to 1 ratio), and 10 percent would be 20 to 25 miles away (1.8 to 1 ratio). This resulted in an average offset ratio of 1.305 to 1. ~~Presuming, as a reasonable worst-case, that offsets can be obtained within an average radius of 25 miles from VAFB, an offset ratio of 1.8 to 1 was assumed, consistent with APCD developed distance factors~~. The addition of reserve offsets, at a ratio of 0.5 to 1, resulted in a total estimated offset ratio of **1.805** to 1. The total offsets required **for the oil development buildout on VAFB based on** the three ~~development levels~~ production scenarios are presented in Table 4.3-9. **Only stationary source emissions in Table 4.3-8 were used in deriving Table 4.3-9.**

Estimates for total North County emissions obtained from the APCD are displayed in Table 3.3-5, 3.3-6, and 3.3-7. Emissions from all petroleum-related sources were extracted from these tables and are compiled in Table 4.3-10. These emission estimates represent the primary sources available as offsets to potential developers for VAFB oil and gas development.

A significant aspect of the emissions displayed in Table 4.3-10 is that they are incomplete estimates which probably underestimate current North County emissions, and are currently being updated by the APCD. For example, Unocal recently submitted to the APCD a list of over 200 existing internal combustion engines that are not contained in the inventory, and which may serve as potential offset sources. The full extent to which additional offset sources exist in North County is unknown; however, the total offset pool available for future development is clearly larger than that indicated by Table 4.3-10.

A comparison of the North County inventory presented in Table 4.3-10 to the estimated offsets displayed in Table 4.3-9, shows that oil and gas development on VAFB may be constrained by the limited offsets available for future development. Although there may be sufficient offsets available for RHC's, ~~estimated emissions of NO_x and~~ TSP **offsets may not exist for as few as** 100 wells ~~scenario~~ **during any production scenario** ~~is above the existing petroleum source inventory value~~. **NO_x offset requirements for 100 wells exceed** ~~Additionally, estimated emissions of SO_2 are larger than~~ the current petroleum inventory ~~when 200 wells are assumed~~ **unless electric well pumps are included in the well design. With pipeline transport and electric well pump production, NO_x offsets apparently exist for about 200 wells.**

Table 4.3-9

ESTIMATED REGIONAL EMISSION OFFSET REQUIREMENTS
BY PRODUCTION SCENARIO (TONS/YEAR)

	TONS PER YEAR				
No. of Wells	*RHC*	NO_x	SO_2	*PM*	PM_{10}
No Pipeline or Electric Power					
100	382.7	1,545.1	231.0	59.6	56.0
200	765.3	3,090.2	462.1	119.1	111.9
300	1,148.0	4,635.2	693.1	178.7	167.9
Pipeline but No Electric Power					
100	339.3	1,462.1	151.6	57.2	53.4
200	678.7	2,924.1	303.2	114.4	106.9
300	1,018.0	4,386.2	454.9	171.7	160.3
Pipeline and Electric Power					
100	268.9	676.9	151.4	56.0	52.3.
200	537.9	1,353.8	302.9	111.9	104.7
300	806.8	2,030.6	454.3	167.9	157.0

Note: Emission offsets calculated from ratio of 1.305 to 1, plus offsets reserved at 0.5 to 1. Emission offsets are not required for CO.

Table 4.3-10

NORTH COUNTY PETROLEUM SOURCE EMISSION INVENTORY FOR 1983

Sources	Emission (Tons/Year)				
	NO_x	*RHC*	*CO*	*SO_2*	*TSP*
Union Battles Gas Plant	458	61	81	0	1
Conoco Refinery	63	72	15	162	5
Texaco Leases	231	183	49	86	12
Chevron Leases	105	100	27	16	2
Conoco Leases	155	58	39	55	3
Shell Leases	142	159	34	108	9
Union Leases	69	57	15	0	0
Cities Service Lease	7	18	2	2	0
Petrominerals Leases	9	36	1	0	0
Grace Petroleum Leases	10	1	2	3	0
Hunter Resources Lease	3	10	1	2	0
Petroleum Marketing[1]	0	294	0	0	0
Petroleum Production[1]	117	2,294	18	15	7
Total	1,369	3,343	284	449	39

1. Area sources, all other facilities are point sources.

Additionally, SO_2 **offset requirements for 200 wells exceed the current petroleum inventory unless pipeline transport is included in the well design.**

Although ~~the--estimated~~ emissions for the three development scenarios may be **somewhat overestimated** ~~actual--emissions~~, it appears that **the emission offset requirement** for development of between **200** and **300** wells are on the same order of magnitude as ~~all~~ **the** existing **North County** petroleum-~~related~~ source **emission inventory.** As a result, it appears that future oil and gas production on VAFB will be limited, due to the requirement to obtain offsetting emissions, unless additional technology is applied to proposed developments or additional sources of offsets are identified. This problem may be exacerbated by future oil and gas development on the OCS and state tidelands, which, due to large emission rates, may require a significant portion of available offsets.

PUBLIC NUISANCE. **As shown by the mitigation analysis for H_2S emissions, including a pipeline in the well design would decrease odors locally, as well as regionally. This well design could potentially allow many producing wells in a locality without exceeding the odor threshold. To assure this, wells would have to be spaced far enough apart so that their combined H_2S emission rates do not exceed 0.65 $\mu g/m^3$ at any point downwind.**

VISIBILITY. The analysis showed that the values of the three contrast parameters, C1, C2, and C3, are well below the critical value of 0.10 defined in the EPA's *Workbook for Estimating Visibility Impairment.* This analysis indicates that the activities will have no significant effect on visibility in the San Raphael Wilderness Area.

4.3.2.1.4 Mitigation Measures for Regional Impacts

Emissions resulting from regional development can be ~~partially~~ **significantly** mitigated by requiring that available measures, such as those listed in Table 4.3-5 and in the MRMP, be incorporated into the project design. **As shown in the previous section, pipeline transport of oil and electric well pumps are exceptional production mitigation measures for reducing emissions and the associated offset liability.** ~~For--example,-electrification-of--well-pumps~~ **Incorporating these measures into well design** could decrease yearly NO_x **and** SO_2 emissions by **almost** ~~over~~ **6** tons each per well, or over **579** tons each ~~per--year~~ for the 100-well scenario. **Unocal has, in fact, proposed these measures for wells after the first year of oil development on VAFB (Unocal, 1985).** The incorporation of the mitigation measures in the MRMP, or the application of other advanced technology, will allow additional nonoil development in the North County.

4.3.2.2 Alternative 1

The analysis for alternative 1 assesses the air quality impacts resulting from oil-related development on VAFB, as directed by the MRMP, with the very high and high mission constraint areas excluded from oil and gas development.

4.3.2.2.1 Local and Regional Impacts

Exclusion of the very high and high mission constraint areas of VAFB from oil and gas development is not expected to substantially change the impact analysis

presented for the proposed action. The guidelines and standards set forth in the MRMP will apply to development actions regardless of their location on the base. Incorporating the suggested additional mitigation measures, identified under the proposed action in the MRMP requirements, may mitigate localized impacts to an insignificant level and reduce regional impacts.

In the event that oil development constraints, due to eliminating development in the very high and high mission constraint areas, reduced the overall level of oil and gas development on the base, this alternative would have an incrementally smaller impact on the availability of pollution offsets at a regional level.

4.3.2.2.2 Mitigation of Local and Regional Impacts

Mitigations similar to those described for the proposed action will be required if exceedances of standards are identified as the result of the required project-specific impact analysis.

4.3.2.3 Alternative 2

The analysis for alternative 2 assesses the air quality impacts resulting from oil-related development on VAFB, as directed by the MRMP, with the highest environmental constraint areas identified in the MRMP excluded from oil and gas development.

4.3.2.3.1 Local and Regional Impacts

Exclusion of the highest environmental constraint areas of VAFB from oil and gas development is not likely to substantially change the impact analysis presented for the proposed action. The guidelines and standards set forth in the MRMP will apply to development actions regardless of their location on the base. It is likely that impacts estimated to be above standards may be mitigated to insignificance.

If the areas excluded from development are large, there is some potential for higher localized impacts, as a result of concentration of development activities in the nonexcluded areas. Colocation or consolidation of emission sources into a smaller geographic area may result in violations of short-term standards without application of additional control measures.

In the event that oil development constraints, due to eliminating development in the highest environmental constraint areas, reduced the overall level of oil and gas development on the base, this alternative would have an incrementally smaller impact on the availability of pollution offsets at a regional level.

4.3.2.3.2 Mitigation of Local and Regional Impacts

Mitigations similar to those described for the proposed project will be required if standards exceedances are identified as the result of the required project-specific impact analysis.

4.3.2.4 Alternative 3

The analysis for alternative 3 assesses the air quality impacts resulting from oil-related development on VAFB, as directed by the MRMP, with the very high and high mission constraint and the concentrated high environmental constraint areas identified in the MRMP excluded from oil and gas development.

4.3.2.4.1 Local and Regional Impacts

Exclusion of the high and moderate mission constraints and the concentrated high environmental constraint areas from oil and gas development is not likely to substantially change the impact analysis presented for the proposed action. The guidelines and standards set forth in the MRMP will apply to development actions regardless of their location on the base. It is likely that impacts estimated to be above standards may be mitigated to insignificance.

If the areas excluded from development are large, there is some potential for higher localized impacts, as a result of concentration of development activities in the nonexcluded areas. Colocation or consolidation of emission sources into a smaller geographic area may result in violations of short-term standards without application of additional control measures.

In the event that oil development constraints, due to eliminating development in the highest Air Force mission constraint and high environmental constraint areas, reduced the overall level of oil and gas development on the base, this alternative would have an incrementally smaller impact on the availability of pollution offsets at a regional level.

4.3.2.4.2 Mitigation of Local and Regional Impacts

Mitigations similar to those described above for the proposed project will be required if exceedances of standards are identified as the result of the required project-specific impact analysis.

4.3.2.5 Alternative 4

The analysis for alternative 4 assesses the air quality impacts associated with the removal of all existing oil-related development on VAFB and the exclusion of any future development of petroleum reserves on the base.

4.3.2.5.1 Local Impacts

The short- and long-term effect of alternative 4 on air quality will be a decrease in background concentrations of criteria pollutants, thereby eliminating some degradation of the air resource in the vicinity of the base. Additionally, this alternative action will allow the Air Force the maximum flexibility with regard to construction and operation of mission projects, due to the elimination of emission sources that may combine additively with mission sources to produce air quality standard violations.

4.3.2.5.2 Regional Impacts

The elimination of existing and potential future oil-related emissions in the vicinity of VAFB will allow for more offsets to be available for non-oil development and mission operations in the North County.

4.3.3 Unavoidable Adverse Impacts

The unavoidable adverse impacts due to construction and operation of hypothetical oil and gas development analyzed in this document are:

- Increase of localized background air pollutant concentrations in the vicinity of the well pad due to emissions from internal combustion engines, the steam generator, fugitive RHC sources, and dust generated by construction activities.

- Increase of regional background air pollutant concentrations due to emissions from sources not required to be offset (e.g., vehicular emissions resulting from transport of equipment, personnel, and production fluids).

- Exceedance of the California 24-hour PM_{10} standard due to emissions from internal combustion engines and fugitive dust during construction activities. These impacts do not appear to be mitigable, due to the high existing background concentrations in the region.

- ~~Odor created during production due to fugitive emissions of hydrogen sulfide from storage tanks, transfer activities, and in-line components.~~

4.3.4 Cumulative Impacts

The cumulative analysis assesses the impacts of an assumed buildout of development, as described in section 2, with all other future foreseeable sources.

The oil and gas development scenario projected for cumulative impacts assumes a peak oil production of 250 bpd from 297 wells located on 104 pads. Additional sources assumed for the analysis include the Santa Maria Aggregate project, a consolidated gas processing plant in the North County, and oil development activities in the Los Padres National Forest.

An inert-pollutant localized modeling analysis for cumulative impacts was determined to be unnecessary, because no new projects were assumed to be located within close enough proximity to VAFB to significantly exacerbate the air quality impacts from the proposed action. Development will follow the guidelines and standards set forth in the MRMP **(See section 6.5). As a result,** ~~It is likely that~~ significant impacts estimated to be above standards ~~may~~ **should** be mitigated to insignificance.

Regional impacts will be similar to those described for the proposed action, except that fewer offsets will be available due to the additional projects requiring offsets. Major projects, such as offshore oil and gas development, will result in the greatest

cumulative impact due to the relatively large emission offsets required for these activities. Thus, oil and gas development on VAFB may be further limited, as compared to the proposed action. The extent of petroleum development that may be accommodated will be a function both of the mitigations applied to future projects and of the identification of additional offset sources or innovative methods of control.

Section 4.7, Socioeconomics

Section 4.7.2.1.1; page 4.7-5, paragraph 2, last sentence now reads ". . . and no net increase in direct employment would result."

Section 4.7.2.1.1; page 4.7-5, paragraph 2, add the following after the last sentence: "No change in indirect or induced employment as a result of direct employee spending is anticipated. Although there may be additional expenditures associated with drilling new wells on VAFB, there would likely be an offsetting decline in expenditures as existing wells off base are abandoned. Therefore, only minor indirect and induced employment changes would be expected as a result of changes in oil and gas production expenditures."

Section 4.7.2.1.1; page 4.7-5, paragraph 3, sentence 1 now reads "Since no net increase in direct oil and gas employment levels and only minor changes in indirect and induced employment levels are expected, baseline population and income levels would remain relatively unchanged as a result of the proposed action."

Section 4.7.2.1.1; page 4.7-5, paragraph 4, sentence 2 now reads "If this were to occur, additional direct jobs would cause the average annual growth rate in employment in the region of influence . . ."

Section 4.7.2.1.1; page 4.7-5, paragraph 4, add the following after sentence 2: "The creation of over 89 new indirect and induced jobs would be required before the 3-percent employment threshold would be reached."

Section 4.7.2.1.1; page 4.7-5, paragraph 4, last sentence now reads "However, as noted, the baseline projection does not include major energy projects in the region or new missions on VAFB."

Section 4.7.2.1.1; page 4.7-6, paragraph 4, add the following after sentence 5: "Although additional property tax revenues could be collected by the county, the spending limitations imposed by Proposition 4 may force the county to return a portion of the revenues to taxpayers."

Section 4.7.2.1.1; page 4.7-7, first paragraph, add the following after the second sentence "Such mitigation measures may include developer fees to assist local schools, police and fire departments, water and sewer districts, or other local public service providers that are adversely affected as a result of increased project-related population levels within their jurisdictions."

Section 4.7.2.1.2; page 4.7-7, second paragraph, add after the last sentence "It may be possible to combine the efforts of the on-going monitoring program with monitoring of oil and gas employment and expenditures on VAFB under the responsibility of the Santa Barbara County-Cities Area Planning Council."

Section 4.7.2.1.2; page 4.7-7, second paragraph, add the following after the first sentence "Additional environmental analysis would be required on individual projects and more specific mitigations may be required under NEPA regulations as more specific employment growth information is available."

Section 4.7.4; page 4.7-9, paragraph 1, delete sentence 2 which reads "Most of these jobs would be created in northern Santa Barbara County."

Section 4.9, Visual Resources

Section 4.9.2, Environmental Impacts and Mitigations; page 4.9-4, end of the paragraph at the top of the page, the last sentence has been changed to read "Since the duration of the exploratory drilling phase would be short, the visual impact would be significant but short-term."

Section 4.9.2, Environmental Impacts and Mitigations; page 4.9-4, paragraph two, sentences one and two have been changed to read "The final production phase involves use of the pumping unit, gas scrubber, oil and gas separator, steam generator, pipelines and tankage (see figures 4.9-3 and 4.9-4 for the typical components). A typical well site consists of one or more pumping units and associated pipelines. The support components could be located on one site that has a pumping unit (see Figure 4.9-6) or concentrated in one area (shown in Figure 4.9-4) and serve several wells. The pumping unit or units, and the associated support equipment would remain on site for the life of the well."

Figure 4.9-3 on page 4.9-5 has been retitled "Steam Generator" as shown on the attached figure.

Section 4.9.2.1.1, Impacts; page 4.9-7, paragraph four, sentence one shall now read "Areas within the expanded region of influence that could be affected by oil and gas development include the residential communities of Vandenberg Village and Mission Hills, Jalama County Beach Park and vicinity, and the public-use area of Ocean Beach County Park."

Section 5.0, Growth-Inducing Impacts of the Proposed Action

Section 5.0; page 5-1, second paragraph, first line, the words "Comprehensive Plan" have been added between the words "Santa Barbara County" and "Land Use Element."

Distribution List

Page 1, column two, fourth address: note that the U.S. Environmental Protection Agency will receive four copies of the FEIS.

Page 2, column one, fifth address: add "Bruce Blanchard," before "Director" in the first line. Note that the Office of Environmental Project Review will receive 18 copies of the FEIS.

Figure 4.9-3

STEAM GENERATOR

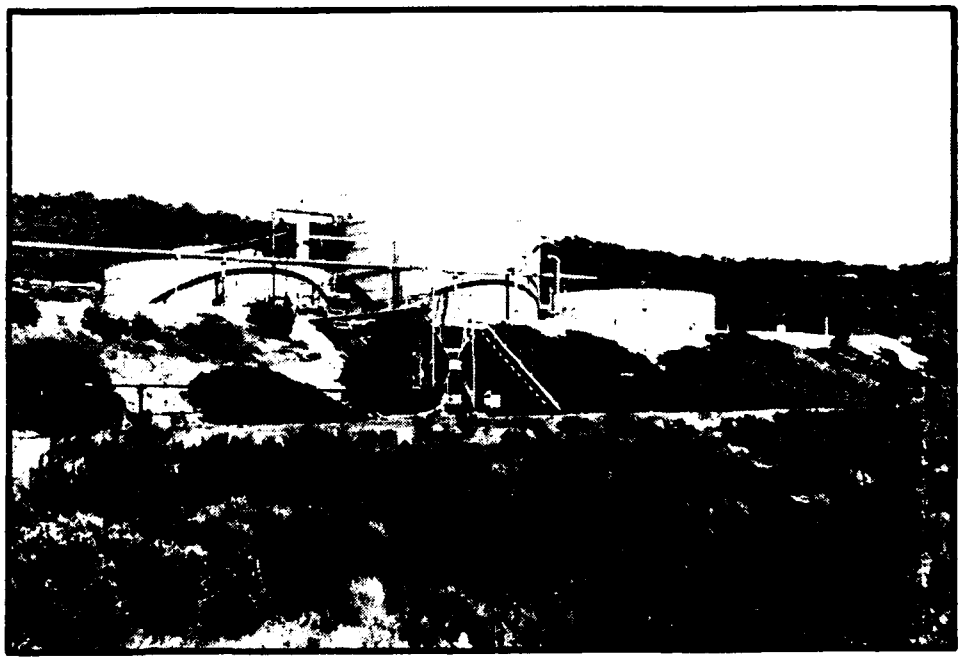


Figure 4.9-4

PRODUCTION TANKAGE

Page 3, column two, fourth address: revise the ZIP code to read "94105-3973."

Page 3, column two, bottom of the page: add the following address:

James Johnson/Mark Capelli
California Coastal Commission
925 De La Vina Street
Santa Barbara, CA 93101

Page 5, column one, first address: change "David Elbans" to "David.Elbaum."

Page 5, column two, second address: change "Bill Onsdorff" to "Bill Orndorff."

Page 6, column two, bottom of the page: add the following address:

Dames and Moore
222 E. Anapamu Street
Santa Barbara, CA 93101
Attn: John Grey

Page 7, column one, top of the page: add the following address:

Bixby Ranch Company
211 E. Victoria Street, Suite E
Santa Barbara, CA 93101
Attn: John M. Baucke

Page 7, column one, first address: delete Coastal Service Corporation's address.

Page 8, column two, seventh address: change the address to read as follows:

Madeline Hall
United Chumash Council
849 Mission Canyon Road
Santa Barbara, CA 93105

Page 10, column one, third address: change "Jacobis" to "Jacobs."

Page 10, column one, seventh address: change "Logomarsino" to "Lagomarsino."

Page 10, column two, second address: change "Mary" to "Myra."

Page 10, column two, sixth address: change "Lee" to "Lou."

Page 12, column two, first address: change "Caufield" to "Canfield."

Page 12, column two, seventh address: change "Bolaam" to "Balaam."

References

Page 8, under sections 3.3 and 4.3, Air Quality, add the following references:

_____. 1985c. Environmental Assessment: Northwest Lompoc/Jesus Maria Development project, Vandenberg Air Force Base, Santa Barbara County, California. For Union Oil Company of California.

Leonardo, Kendall, G., D.A., and Bainard, N. 1969. Odor Threshold Determinations of 53 Odorant Chemicals. *Journal of the Air Collection Control Association*, St. Louis, Missouri, June 14-18, 1970.

Appendix A, Mineral Resource Management Plan

Section 6.4.2.2, Water Quality; page A-30, seventh bullet beginning with "The design of pipelines . . ." will include a third sentence to read: "Block and check valves will be placed at stream crossings and adjacent to wetland areas to minimize the potential damage to water resources resulting from potential pipeline failures."

Section 6.4.2.4, Regulatory Setting; page A-31, second paragraph following sixth bullet to read: "404 Permit - issued by the U.S. Army Corps of Engineers for placement of dredge and fill material in stream channels and wetland areas. The guidelines for permit issuance are established by the Environmental Protection Agency pursuant to Section 404(b)(1) of the Clean Water Act. The Environmental Protection Agency maintains a review role for compliance with the guidelines during permit issuance."

Section 6.4.2.4, Regulatory Setting; page A-31, add fifth paragraph following sixth bullet to read: "Water Quality Control Plan for the Central Coast - developed by the Central Coast Regional Water Quality Control Board to protect water quality to a level necessary to support designated uses. The plan establishes limitations for water quality criteria including temperature and dissolved oxygen."

Section 6.4.2.4, Regulatory Setting; page A-31, add sixth paragraph following sixth bullet to read: "Streambed Alteration Agreements - issued by the California Department of Fish and Game to protect stream habitats from physical alterations resulting from construction activities."

Section 6.4.2.4, Regulatory Setting; page A-31, add seventh paragraph following sixth bullet to read: "Groundwater Protection Strategy for the State of California - the State Water Resources Control Board has proposed a draft strategy to protect the groundwater resources of the state from the effects of water quality degradation which will pertain to future development of oil and gas resources at VAFB."

Page A-32, paragraph five has been changed to read:

"Offsets must be provided for NO_x, SO_2, RHC, TSP, and PM_{10}, in excess of project emissions to satisfy regulatory requirements and to ensure a net air quality benefit. Consistent with Santa Barbara County APCD rule 205.C, offsets will be provided at a minimum ratio of 1.2:1 for intrapollutant tradeoffs (e.g., NO_x for NO_x), and the ratios will increase with distance from the proposed activity. The APCD may also

allow interpollutant tradeoffs (e.g., NO_x for RHC), but only on a case-by-case basis to assure a net air quality benefit. A minimum offset ratio of 1.2:1 is required for interpollutant tradeoffs. Since an accurate AQAP update is not available for the northern areas of Santa Barbara County, the required offset ratios for demonstrating a net air quality benefit cannot be definitively assessed for any type of pollutant tradeoff. Emissions from less stringently regulated sources in the air basin, such as motor vehicles and OCS oil development, for which offset emissions are not required, may result in a requirement for higher offset ratios for strictly regulated future onshore sources. Thus, VAFB must adopt a policy requiring that offset sources be legally encumbered for each project and held in reserve in the event that offset ratios increase due to future AQAP update analyses."

Page A-33, the first sentence of the third paragraph has been changed to:

"Due to the uncertainty of determining adequate offset ratios for interpollutant tradeoffs without a representative AQAP update, mineral rights holders may not use interpollutant tradeoffs unless a net air quality benefit is demonstrated and accepted by the APCD."

Page A-33, the second sentence in paragraph four has been changed to:

"To significantly limit NO_x and RHC emissions from oil development on VAFB, it is recommended that all wells incorporate a baseline design that includes a drill rig with low NO_x-emitting engines, pipeline transportation of oil and gas, electrification of crude oil pumps, vapor-recovery controls on crude storage tanks and tank truck loading facilities, and low-NO_x burners on enhanced oil recovery steam boilers."

Page A-33, the following sentence has been inserted after the second sentence of paragraph four:

"This baseline design could also minimize potential regulatory requirements for the developer, such as emission offset."

Page A-34, second paragraph, the last sentence has been changed to:

"The proposed project emission scenarios must reflect the incorporation of BACT into project design, in accordance with APCD rule 205.C, and the baseline well design and mitigation measures described in the previous section."

Page A-34, the first sentence of the last paragraph has been changed to:

"Photochemical modeling for determining ozone impacts will be required if precursor emissions from the project can reasonably be expected to result in exceedances of the ozone standards or exacerbation of existing ozone standard violations within or outside of Santa Barbara County, including San Luis Obispo County."

Page A-35, the last paragraph before the third to last bullet has been changed to:

"For standard violations resulting from drilling and operational emissions, potential mitigations in addition to the baseline well design outlined in section 6.5.1 may include:"

Page A-36, the following two bullets have been inserted before section 6.5.2.2:

"o Initiate an inspection and maintenance program to control fugitive hydrocarbons.

o Use an electronic flare ignition system to reduce inert pollutants."

Page A-36, in the first sentence of section 6.5.2.2, "CO" has been deleted.

Page A-36, the last paragraph, the first sentence has been changed to:

"Odor, fugitive dust, and noise resulting from emissions associated with construction and operation are most likely to cause nuisance complaints."

Page A-37, the first paragraph, the last sentence has been changed to:

"The primary contaminant of concern is H_2S, which has an olfactory threshold of approximately 0.047 pphm or 6.5 $\mu g/m^3$."

Page A-37, the second paragraph, the third sentence has been changed to:

"Watering the soil or applying organic mulches or soil stabilizers during construction can eliminate most fugitive dust (TSP and PM_{10})."

Page A-37, the third sentence in paragraph three has been deleted.

Page A-37, the second sentence of the fourth paragraph has been changed to:

"Mineral rights holders may satisfy the net air quality benefit requirement by mitigating proposed development projects to the extent feasible and providing offsets as outlined in section 6.5.2.2."

Section 6.6.1, MRMP Guidelines, General Measures; page A-39; third bullet: replace both paragraphs with the following:

"The applicant shall generically define well abandonment in terms of production level (volume/time and percent time operating) or minimum period of nonproduction in their first application to VAFB. For each proposed well pad site, the applicant shall provide a preliminary estimate of calendar time from initial drilling to abandonment. These estimates will be updated as new reservoir information is obtained.

Verification: The developer shall provide the Air Force with estimated times for abandonment of all wells within six months after production has begun and update these estimates every two to five years as new information becomes available. A final estimated date shall be given to the Air Force six months prior to

abandonment. A copy of the final abandonment letter and well site survey issued by the state Division of Oil and Gas and BLM (if federally owned mineral rights) shall be provided once abandonment has been completed."

Page A-40, replace second paragraph with the following:

"*Verification*: The applicant shall prepare preliminary written procedures for facility abandonment and submit them to the Air Force for Approval six months prior to initiation of construction. A final site-specific set of procedures shall be submitted six months prior to abandonment. The Air Force will review the procedures and approve them or request further information within 30 days of their receipt."

Page A-40, second bullet, add at end "At a minimum, total areas of specific plant communities and estimated numbers of important species (e.g., rare, threatened, or endangered) that could be affected by cumulative development shall be determined."

Section 6.6.2.2, Wetlands Guidelines; page A-44; replace sixth bullet with the following:

"Perform all construction through or adjacent to wetlands during the dry season unless important wildlife breeding areas would be affected. Fall or early winter may be the environmentally preferred construction period in this case. Short duration (less than about one week) construction projects may be performed during dry weather periods in winter on a case-by-case basis with Air Force approval."

Section 6.6.2.14, Revegetation Guidelines; page A-49, add the following to the fifth bullet:

". . . unless important wildlife breeding areas would be affected. Fall or early winter may be the environmentally preferred construction period in this case. Short duration (less than about one week) construction projects may be performed during dry weather periods in winter on a case-by-case basis with Air Force approval (refer to Wetlands section)."

Section 6.6.2.14, Revegetation; page A-50, first sentence should read: "Plant species to be used in revegetation shall be native species that are compatible with adjacent vegetation types, or approved naturalized species."

Section 6.8; page A-75, delete the unnecessary characters preceding the headings for sections 6.8 and 6.8.1.

Section 6.8.1; page A-76, change bullet three to read as follows:

> "When an area is proposed for oil and gas development, the applicant shall identify the location of off-base lands that would be affected by development and describe the nature and timing of the impacts on those areas. This determination should be based upon (1) off-base areas that would be affected by public safety risks, noise, traffic, odor, visual incompatibility, or other "nuisance" effects associated with oil and gas development; (2) requirements for new construction

or expansion of off-base oil- and gas-related transportation, treatment, processing, storage, or refinery facilities; (3) growth inducement, that is, project-related and cumulative employment and population increases that could result in requirements for new housing and public facilities; and (4) compatibility with federal, state, and local land use laws."

Section 6.8.2; page A-76, bullet four, regarding prime agriculture, add the following sentence after the first full sentence: "Prime agricultural lands on VAFB have already been identified by the U.S. Soil Conservation Service."

Section 7.2.4; page A-94, second paragraph, lines 1 and 3: Change "MOA" to "MOU."

Section 7.2.4; page A-94, third paragraph, line 1: Change "MOA" to "MOU."

Appendix B, Regulatory Setting

Section 2.2; page B-11, paragraph one, last sentence has been changed as follows:

"A pollutant is considered in nonattainment if its federal primary standard has been exceeded in a geographic area more than three discontinuous times in three years."

Page B-15, the following paragraph has been added after the first paragraph of section 2.2.2.2:

"The requirements of the Coastal Act, Public Resource Code sections 30105.5, 30250(a), 30253(3), 30260, and 30262 include assessing the cumulative effects of a proposed project with the effects of past, present, and probable future projects. Proposed projects must be mitigated to the maximum extent feasible, and will not be located where significant adverse effects will occur, either individually, or cumulatively on coastal resources. New development shall be consistent with the requirements of the local APCD or the CARB."

Page B-15, the last paragraph has been changed as follows:

"The Santa Barbara County APCD PSD review for attainment pollutants generally include the federal PSD requirements mentioned above, but the following criteria for triggering requirements are somewhat different:"

Page B-16, the following bullets have been included after the second bullet:

"o An air quality modeling incremental analysis and an analysis of the impairment to visibility, soils, and vegetation is required of any source that emits in its entirety more than 20 pounds/hour of any attainment pollutant.

o No source shall cause the violation of an ambient air quality standard or lead to the violation of any air quality increment."

Page B-16, the following two paragraphs have been inserted after the last bullet of the page:

"The APCD is currently revising Rule 202, which exempts internal combustion (IC) engines from the Authority to Construct or Permit to Operate requirements. This rule change will require existing IC engines of an undetermined size to be permitted. Future proposed IC engines, based on a size threshold, may eventually be required to conform to APCD NSR/PSD Rule 205.C.

Communications with the SBCAPCD have determined that oil development emission sources on VAFB may be regulated by combining peak hour production emissions from proposed and existing stationary sources on each oil lease, minus emissions from IC engines. Once a regulatory requirement is triggered (such as BACT), it will apply to all existing and future emission sources on that lease, including IC engines."

Page B-17, a new table has been created to replace Table B-4. Then, former Table B-4 was renamed as Table B-5.

Page B-18, paragraph two, sentence five has been deleted. It has been replaced with the following text:

"Interpollutant tradeoffs, such as NO_x for RHC, are allowed by the SBCAPCD on a case by case basis to assure a net air quality benefit. However, the SBCAPCD encourages intrapollutant tradeoffs. A minimum offset ratio of 1.2:1 is required for interpollutant tradeoffs."

Table B-4

PSD AIR QUALITY INCREMENTS, SBCAPCD RULE 205.C

Pollutant: *Monitoring Interval*	MAXIMUM ALLOWABLE INCREASE *(micrograms/cu meter)* *Class I*	*Class II*	*Baseline Date*	*Air Quality Standard*
As established in the Clean Air Act Section 163(b)				
Particulate Matter:				
Annual Geometric Mean	5	19	8/7/78	75
24-hour Maximum	10	37		260
Sulfur Dioxide:				
Annual Arithmetic Mean	2	20	8/7/78	80
24-hour Maximum	5	91		365
3-hour Maximum	25	512		1,300
Carbon Monoxide:				
8-hour Maximum	200	2,500	1/1/84	10,000
1-hour Maximum	800	10,000		40,000
Nitrogen Dioxide:				
Annual Arithmetic Mean	2	25 - 100	1/1/84	100
1-hour Maximum	10	100 - 470		470
Reactive Organic Compounds:				
3-hour Maximum	3	40 - 160	1/1/84	160
Particulate Matter 10:				
24-hour Maximum	2	12 - 50	1/1/84	50

Table B-5

SUMMARY OF NSR/PSD REQUIREMENTS AND TRIGGER LEVELS

NEW SOURCE REVIEW RULE:

Applies to sources which emit non-attainment pollutants: NO_x and HC in South County, and PM within 15 miles of Santa Maria.

Exemptions to NSR rules are identified on page 213.n.

BACT required for net emissions increase of 2.5 pounds per hour for non-attainment pollutants.

AQIA required for sources with net emissions greater than 5 pounds per hour but less than 10 pounds per hour, 240 pounds per day, or 25 tons per year of non-attainment pollutants. AQIA must show no violation or interference with attainment.

Offsets are required for sources emitting less than 10 pounds per hour, 240 pounds per day, or 25 tons per year.

PREVENTION OF SIGNIFICANT DETERIORATION RULE:

Applies to sources which emit attainment pollutants.

PSD exemptions are identified on page 213.o.

BACT required for emissions increase greater than 5 pounds per hour for attainment pollutants (CO trigger is 50 pounds per hour or 550 pounds per day).

BACT is required for emissions increase greater than specified levels (page 213.w) for non-criteria pollutants.

Offsets required for emissions increase above 10 pounds per hour for ROC, NO_x, SO_x, or PM. Offsets must result in net air quality benefit.

Modeling is required to show no increment exceedence if project is in Class I impact area and if it emits more than 20 pounds per hour of CO or 5 pounds per hour of other attainment pollutants.

Modeling is required to show no increment exceedence if project in entirety emits more than 20 pounds per hour of attainment pollutant (increment analysis must include secondary growth).

Pre-construction monitoring is required if project emits more than 5 pounds per hour of PM or 10 pounds per hour of other attainment pollutants, if representative data are not available. Pre-construction monitoring required if Class I impact area criteria apply.

Visibility, soils, and vegetation analyses are required if more than 20 pounds per hour of attainment pollutants are emitted.

AIR QUALITY TECHNICAL APPENDIX ERRATA

AIR QUALITY TECHNICAL APPENDIX ERRATA

Section 2.0, page 1, the following paragraph has been inserted between the second and third paragraph:

"Oil- and gas-processing emissions source data were developed from scenarios presented in section 14.3.2 of the Air Quality Technical Appendix to the Unocal/Exxon Project Shamrock EIS (Little, 1985). These scenarios were based on a production rate of 96,000 barrels of oil and 80,000,000 standard cubic feet (scf) of gas per day. The oil- and gas-processing emissions due to production on VAFB were estimated by factoring down these scenarios to the assumed daily production rate of 50 barrels of oil and 70,000 scf of gas. The gas yield estimate was based on the average well yield stated in Unocal's Environmental Assessment for petroleum development on VAFB. Emissions for this activity are given in Tables 2-19 and 2-20."

The column heading in tables 2-2, 2-5, 2-8, 2-11, 2-14, 2-17 entitled "Number Active in Peak Hour", has been changed to "Typical Number Active Per Day". This heading includes footnote #6, which will state: "All of these equipment will not be operating simultaneously."

The titles for tables 2-16, 2-17, and 2-18 have been changed to end with ". . . First Year."

Two tables, Table 2-19 and Table 2-20, have been added. See the attached.

Page 21, line two, the 24 ppm of fugitive H_2S content has been changed to 2,500 ppm.

Page 28, section 3.3, the following text has been inserted between paragraphs one and two:

"The results of the modeling also showed that the following SBCAPCD PSD air quality increments would be exceeded:

- The 1-hour NO_2, 8-hour CO, 24-hour TSP, and 24-hour PM_{10} increments during well pad preparation.
- The 1-hour NO_2, 24-hour TSP, and 24-hour PM_{10} increments during well drilling.
- The 1-hour NO_2 and 8-hour CO increments during well production."

Page 28, section 3.3, paragraph two has been changed as follows:

"The results of the odor analysis indicated that downwind H_2S concentrations would be below 1 $\mu g/m^3$ for all activities, except production, which would be 2.08 $\mu g/m^3$. This is well below the California 1-hour standard of 42 $\mu g/m^3$, but exceeds the olfactory threshold of 0.65 $\mu g/m^3$."

Table 2-19

OIL PROCESSING EMISSION RATES - AFTER FIRST YEAR

EQUIPMENT	POUNDS PER PEAK HOUR						TOTAL POUNDS PER ACTIVITY - AVERAGE YEAR[1]					
	ROC	NO_X	SO_2	CO	PM	PM_{10}	ROC	NO_X	SO2	CO	PM	PM_{10}
Heater Treaters	<0.01	0.17	<0.01	0.04	<0.01	<0.01	1.24	62.1	0.26	15.3	2.2	2.1
Fugitive Hydrocarbons	0.01	--	--	--	--	--	84.8	--	--	--	--	--
Tank Fugitives[2]	<0.01	--	--	--	--	--	2.74	--	--	--	--	--
TOTAL EMISSIONS	0.01	0.17	<0.01	0.04	<0.01	<0.01	88.78	62.1	0.26	15.3	2.2	2.1

1. Assumes 50-bbl/day production of oil and 250 bbl/day of water.
2. Assumes 95-percent vapor recovery.

Note: These emission rates are factored down from scenarios presented in A.D. Little, 1985.

Table 2-20

GAS PROCESSING EMISSION RATES - AFTER FIRST YEAR

EQUIPMENT	POUNDS PER PEAK HOUR						TOTAL POUNDS PER ACTIVITY - AVERAGE YEAR[1]					
	ROC	NOX	SO_2	CO	PM	PM_{10}	ROC	NO_X	SO_2	CO	PM	PM_{10}
Flare	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.53	8.4	0.05	1.68	0.25	0.23
Flare Pilot	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.06	0.77	<0.01	0.16	0.02	0.02
Boilers	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	5.55	279.0	1.19	69.76	5.99	5.67
Generator (Emergency)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	0.65	0.04	0.14	0.05	0.05
Firepump (Emergency)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.26	0.02	0.05	0.02	0.02
Fugitive Hydrocarbons	0.03	--	--	--	--	--	237.6	--	--	--	--	--
Sulfur Plant	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	306.6	0.00	0.00	0.00
TOTAL EMISSIONS	0.03	0.03	0.04	0.01	<0.01	<0.01	243.8	289.1	307.9	71.8	6.33	5.99

1. Assumes 70,000 standard cubic feet of gas/day.

Note: These emission rates are factored down from scenarios presented in A.D. Little, 1985.

Page 28, section 4.0, the first sentence has been changed to read:

"The impact analysis presented in the previous section identifies several significant impacts where air quality standards were violated."

Page 30, Table 3-14, the total impact for PM_{10} has been changed to *132. The addition of the project increase and background was incorrect.

Page 31, Table 3-15, the 1-hour and 24-hour project increase for PM_{10} has been changed to 30 and 12, respectively, and the 24-hour total impact has been changed to *56. The 1-hour H_2S project increase has been changed to 2.08, to reflect the revised H_2S content of the fugitive hydrocarbon emissions.

The title of Table 4-3 has been changed to "Mitigated Well Drilling - Proposed Action."

Page 34 has been changed to include the following section:

"4.1.3 Well Production Mitigation Measures

Oil and gas pipelines were included in the well design, which effectively eliminates all storage and transfer fugitive hydrocarbon and H_2S emissions. The mitigated H_2S impact was estimated to be 0.19 $\mu g/m^3$, which would be insignificant.

Although mitigation modeling was not executed for the PM_{10} ambient standard and SBCAPCD PSD air quality increment exceedance, incorporating oil and gas transport by pipeline and an electric well pump into the project design would effectively mitigate these impacts to insignificance. These mitigation measures would decrease short-term PM_{10} emissions by 61 percent.

Page 34, section 4.2, the first sentence has been changed to read: "Table 4-4 shows the results of the mitigated project impacts for well pad preparation and well drilling."

Page 34, section 4.2, the third sentence has been changed to read: "The TSP impacts during well pad preparation were also mitigated to below the standard, but PM_{10} impacts for these two activities remained above the standards."

Page 34, section 4.2, the fourth sentence has been changed to the following:

"Impacts of PM_{10} from these activities are not considered to be mitigable to values below the standard due to the high background level assumed in the analysis."

The following has been included after the above sentence:

"The TSP and PM_{10} SBCAPCD PSD air quality increment exceedances also were not eliminated in the modeling analysis. This could be accomplished by further reductions in concurrent use and intensity of diesel equipment."

A revised Table 4-4 is included in this errata.

Table 4.3-4

RESULTS OF MODELING FOR MITIGATION OF AIR QUALITY STANDARD VIOLATIONS

POLLUTANT	ACTIVITY		CONCENTRATION (UGM^3) PROJECT	BACKGROUND	TOTAL	% OF STANDARD CALIFORNIA	FEDERAL
SO_2 (1 hour)	Well Drilling	Unmitigated	664	120	* 784	120	n/a
		Mitigated	388	120	508	78	n/a
NO_2 (1 hour)	Well Pad Preparation	Unmitigated	549	17	* 566	120	n/a
		Mitigated	337	17	354	75	n/a
NO_2 (1 hour)	Well Drilling	Unmitigated	467	17	* 484	103	n/a
		Mitigated	427	17	444	94	n/a
TSP (24 hour)	Well Pad Preparation	Unmitigated	504	165	** 669	n/a	104
		Mitigated	94	165	259	n/a	100
TSP (24 hour)	Well Drilling	Unmitigated	106	165	** 271	n/a	104
		Mitigated	80	165	245	n/a	94
PM_{10} (24 hour)	Well Pad Preparation	Unmitigated	323	44	* 367	734	n/a
		Mitigated	65	44	* 109	218	n/a
PM_{10} (24 hour)	Well Drilling	Unmitigated	88	44	* 132	264	n/a
		Mitigated	78	44	* 122	245	n/a

* Exceeds California standard.

** Exceeds federal standard.

Note: The actual SO_2 and TSP impacts for well drilling did not exceed their respective air quality standards. See Table 4.3-2.

References

Please note the following addition to the references section:

A.D. Little, Inc. 1985. **Union Oil Project/Exxon Project Shamrock and Central Santa Maria Basin Area Study EIS/EIR.** Santa Barbara, California.

PUBLIC COMMENTS AND RESPONSES

1.0 PUBLIC COMMENTS AND RESPONSES

The Air Force and its consultant, URS Corporation, held three public hearings in the VAFB area in July 1987 in order to identify issues and concerns regarding the DEIS and MRMP for the proposed oil and gas development on VAFB. In accordance with the Council on Environmental Quality (CEQ) regulations, public notice of the hearings was provided in the DEIS, as well as in the following newspapers: the Lompoc Record on June 30 and July 7, the Santa Maria Times on July 1 and July 8, and the Santa Barbara News Press on July 1. The cities of Lompoc and Santa Maria, California were chosen for the location of the public hearings due to their proximity to VAFB. Two of the hearings took place July 8, 1987, at the Lompoc City Hall Council Chambers. The third was July 9, 1987, at the Santa Maria City Hall Council Chambers. Representatives of federal, state, and local agencies, special-interest groups and organizations, the press, and members of the public were invited to attend.

The objectives of the public hearings were to:

- Provide information on the project to interested agencies, organizations, and the public.
- Provide a forum whereby the concerns of agencies, organizations, and the public would be identified.
- Define comments and issues that will be examined and addressed in the Comments/Response Appendix of the Final EIS (FEIS).
- Ensure that the EIS adequately discusses relevant issues.

The following comments represent concerns and issues identified during the public hearing process. Each comment has received an alphabetical code as indicated in the right-hand margin on the following pages. Responses to the comments are provided immediately after each individual's comments.

Richard J. Boyle, Union Oil Company = Ind-1

Union expresses its support for the No-Action alternative plan detailed in the DEIS. It is Union's understanding that since the EIS process was initiated, Northern Michigan Exploration Company (NOMECO) and Conoco have virtually given up their leases on VAFB, and consequently, their plans to drill approximately 565 wells on VAFB. Based on Union's best "guestimate" (227 well proposal) and the assumption that only 50-60 percent of the proposed wells would be successful, it would now appear that of the 800 wells proposed to be drilled on VAFB only 18 percent would actually be drilled. It is Union's opinion that the extensive and time consuming review of projects as set out in the DEIS is unnecessary. Adoption of the No-Action alternative would continue to allow oil and gas proposals on VAFB to be reviewed and implemented following existing procedures. Union believes that the existing Memorandum of Understanding (MOU) process adequately addresses the concerns of VAFB and the surrounding communities. If, however, a mineral resource management plan is implemented, Union recommends that the MRMP as proposed in the EIS is implemented. A

After a project goes through the Air Force review process and receives the necessary approvals, is there a process for amending the project without again going through the full review process if modifications to the project are deemed necessary? B

The section on Application Fees is rather vague. Could we have a better idea as to what the charge per project would be? C

VAFB, as well as the oil developers on base, are subject to the permitting requirements of the Santa Barbara County APCD rules and regulations. These regulations are designed to protect air quality standards and increments through mitigation measures triggered by the emission potential of a project. These mitigation measures, as part of the APCD rules and regulations, are adopted by the Santa Barbara County Board of Supervisors through the traditional rulemaking process. Union finds it alarming that the MRMP ignores this rulemaking process and requires the most stringent of mitigation measures and more. Specifically, the requirement for offsetting all emission increases at a minimum of 1.2:1 ratio is not consistent with the APCD rules and regulations. The MRMP takes an added step in requiring the identification of emission sources which will be used as offsets in the event that an Air Quality Attainment Plan (AQAP) update requires higher offset ratios and then calls for a binding agreement which would allow these potential offsets to be used by VAFB to meet their own Santa Barbara APCD offset requirements. Offset emissions are the property of the owner and insure their potential for future expansion. The MRMP should not be used to earmark private industry's offset emissions to facilitate future growth of the Air Force at VAFB. D

Union believes that COMPLEX II is not the appropriate model for the evaluation of short-term inert pollutant impacts in complex terrain. The Santa Barbara APCD and EPA model of choice is COMPLEX I. E

Written comments will be submitted before July 27, 1987. F

Mr. Boyle also clarified an issue in an article which appeared in the Santa Barbara News Press on July 9, 1987 as a result of the above comments made at the public hearing on July 8, 1987. The article stated that Union would be drilling about 480 wells. Mr. Boyle's testimony at the hearings indicated that since Conoco and NOMECO withdrew their leases, they would not be drilling 565 wells. Of the 227 wells that Union has proposed, probably 50 percent would not be drilled. Mr. Boyle feels that the Santa Barbara News Press took 50 to 60 percent of 800 wells and ended up with 480 wells. Union wants to clarify that it is actually only 130 to 140 wells. G

Responses to Ind-1

A Please see the response to comment Union-1 in the Written Comments and Responses section.

B The process that would be required for amending an approved project would depend on the change(s). If the change(s) were minor with no change in impacts, a simple efficient modification process (i.e., an EA process) would occur. If a new area was impacted or changes to impacts occurred because of the change, a supplemental EIS may be required.

C Please see the response to comment Union-54 in the Written Comments and Responses section.

D Please see the responses to comments Union-6, Union-8, and Union-13 in the Written Comments and Responses section.

E Please see the response to comment Union-7 in the Written Comments and Responses section.

F Please see the responses to comments Union-1 through Union-59 in the Written Comments and Responses section.

G Comment noted.

Chuck Pergler, Individual Representing Himself = Ind-2

Mr. Pergler supports the plan (MRMP). He feels that it is a well-written document. Philosophically, he is opposed to its conclusions but, from a pragmatic sense, he feels that the document deserves support. A

Barka Slough and the dune resources on VAFB should be protected. These areas should be excluded from any sort of development. These areas represent environments that are declining in number. For example, of the 33 historic dune systems that were present in California at one time, VAFB now represents the best dune system south of San Francisco. These environments should be respected. B

Responses to Ind-2

A Comment noted.

B Comment noted.

Laurie Tamura, Santa Barbara County Resource Management Department = Ind-3

Ten people in different departments and agencies within Santa Barbara County have been organized to review the MRMP and DEIS. Written comments will be submitted before July 27, 1987. A

Her organization is impressed with the way the document is written and the information provided in the document. Their emphasis during the review of the documents will be focused on the impacts to Santa Barbara County's areas of jurisdiction. B

Responses to Ind-3

A Please see the responses to comments RMD-1 through RMD-133 in the Written Comments and Responses section.

B Comment noted.

WRITTEN COMMENTS AND RESPONSES

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

July 7, 1987

Colonel William R. Newell
1 STRAD/ETD
Vandenberg AFB, CA 93437-5000

Dear Colonel Newell:

SUBJECT: VANDENBERG AIR FORCE BASE, PROPOSED OIL AND NATURAL GAS PRODUCTION

We reviewed the Draft Environmental Impact Statement for the subject project contained in your Public Notice dated June 5, 1987.

The report does not contain the information we addressed in our letter, dated September 25, 1986, responding to the request for our assistance from the Department of the Air Force. The aforementioned letter (enclosed) asks for detailed descriptions of wastes involved which may affect ground or surface water quality. WQCB-1

The report should contain the information listed in the enclosed letter, and describe what specific measures will be used to prevent impacts on water resources.

Please call Bill Meece at this office if there are any questions on these comments.

Very truly yours,

WILLIAM R. LEONARD
Executive Officer

CE:sg

ENCLOSURE

RECEIVED
9 1987
TF

NEWELL.LTR/3

STATE OF CALIFORNIA GEORGE DEUKMEJIAN, Governor

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

September 25, 1986

URS Corporation
111 W. Micheltorena
Santa Barbara, CA 93101

Gentlemen:

SUBJECT: VANDENBERG AIR FORCE BASE, PROPOSED OIL AND NATURAL GAS PRODUCTION

We received a letter from the Department of the Air Force dated August 22, 1986, regarding preparation of an Environmental Impact Statement (EIS) for the subject proposal. Our assistance in identifying potential environmental issues or impacts which should be evaluated in the EIS was requested.

Our major regulatory responsibilities involves discharges to land or surface waters which may affect ground or surface water quality. We request that the EIS contain the following information. WQCB-1

1. Detailed description of all wastes/wastewaters involved (i.e. domestic wastewater, drilling muds, chemical additives, cuttings, oil production wastewaters, hydrostatic test water etc.) including their quantities. WQCB-2

2. Detailed description of methods for treatment, storage, and disposal of all wastes/wastewaters, including times, quantities, and location(s) of discharge. WCQB-3

3. Detailed description of potential water quality impacts resulting from disposal operations. WQCB-4

4. Map showing all surface waters and water wells in the vicinity of the proposed projects. WQCB-5

5. Potential hazards to water quality from abandoned test holes. WQCB-6

6. Hazards of drilling which could involve accidental discharges of large amounts of oil - blowouts, spills, equipment or pipeline failure, etc. WQCB-7

7. Measures to mitigate potential impacts identified above, including plans for preventing adverse impacts from accidental discharges. WQCB-8

8. Specific practices to be followed to minimize erosion resulting from land disturbance activities. WQCB-9

We appreciate the opportunity to comment on this environmental assessment process. If you have any questions regarding our comments, please call Bill Meece at this office.

Very truly yours,

KENNETH R. JONES
Executive Officer

WJM:kd

RESPONSE TO COMMENTS
FROM THE
CALIFORNIA WATER QUALITY CONTROL BOARD

WQCB-1 The California Regional Water Quality Control Board, Central Coast Region comments are discussed in the MRMP. Please see responses to comments WQCB-2 through WQCB-9.

Section 6.2.3.3 of the MRMP identifies the Regional Water Quality Control Board's regulatory responsibilities for waste discharges to surface or groundwaters under the Porter Cologne Water Quality Control Act of 1967. Specific information requested in the comment related to discharge of waste is addressed in each of the succeeding responses.

WQCB-2 A discussion of wastewaters, including drilling muds, additives, cuttings, and production brine waters is contained in the MRMP, section 5.2.1.3, Well Producing Operations, and section 5.2.2.2, Produced Water Disposal.

Descriptions of waste generation are described in sections 5.2.1.3, 5.2.1.4, and 5.2.1.5 of the MRMP. Waste volumes and characteristics are described for generalized activities based on the type of activity anticipated by development for an individual well. Characteristics of hazardous materials produced or stored on site are described in section 5.2.4.1 of the MRMP. The total amount of wastes generated from exploratory wells, well completion, testing, and production will be dependent on the actual number of wells that reach each of these development phases. Detailed descriptions of waste quantities and characteristics will need to be submitted during review of individual projects.

WCQB-3 A discussion of methods for treatment, storage, and disposal of all wastes/wastewaters is contained in the MRMP, section 5.2.1.3, Well Drilling Operations, and section 5.2.2.2, Produced Water Disposal. Specific quantities, times of disposal, and locations of disposal are not in the MRMP and DEIS. These issues will be addressed in the individual applications and supplemental environmental assessments, as necessary, that each project will file.

General methods for treatment, storage, and disposal of wastes are described in the sections referenced in response to comment WQCB-2. Detailed descriptions of these methods will be submitted for individual projects.

WQCB-4 Impacts due to accidental oil spills are addressed under section 4.2.2.1.1 of the DEIS. Methods and requirements for disposal of produced water are addressed in sections 5.2.2.2 and 5.2.4.3 of the MRMP. As indicated in the above-referenced sections, the CDOG is responsible for prevention of damage to underground and surface waters resulting from produced waters. Measures specified in CDOG

guidelines ensure that disposal operations do not adversely affect surface and groundwater supplies suitable for irrigation or domestic use. No adverse impacts on water quality are therefore anticipated.

WQCB-5 Surface water and groundwater features are delineated in figures 3.2-1 and 3.2-2 of the DEIS, respectively. Water well locations are displayed on a new figure (Figure 3.2-1A of the errata for the EIS).

WQCB-6 Potential hazards to freshwater aquifers are discussed in the MRMP, section 5.1.4.3, Freshwater Aquifers, and in section 5.2.1.3, Well Drilling Operations.

Abandoned test holes do not present a threat to groundwater quality if proper procedures prescribed by the CDOG are followed. Specific requirements, designed to eliminate any potential for contamination of water supplies, are established for abandoning test holes. The specifics are dependent on the stratigraphy and location of groundwater resources in a particular application.

WQCB-7 Section 4.11 of the DEIS addresses system safety impacts of oil and gas drilling on VAFB, including the potential for accidents and large releases of oil. Blowouts are discussed on pages 4.11-6 and 4.11-13. The probability of a blowout has been estimated to be between 1 in 1,000 and 1 in 100 per well drilled, with less than 10 percent resulting in a release of oil. Historically, the size of blowouts have been as follows:

Spill Volume (bbl.)	*Probability of Volume in Spill*
10 or more	0.952
100 or more	0.847
1,000 or more	0.577
10,000 or more	0.302
100,000 or more	0.106
1,000,000 or more	0.040
10,000,000 or more	0.018

Spills from on-site activities, such as operational activities and storage, are addressed on pages 4.11-7 and 4.11-12 of the DEIS. Pipeline spills are addressed on pages 4.11-7 through 4.11-10 and pages 4.11-12 through 4.11-13 of the DEIS.

Impacts resulting from potential spills are addressed in section 4.2.2.1.1 of the DEIS. Section 5.2.4.2 of the MRMP addresses the potential causes and probability of such spills occurring.

WQCB-8 Mitigation measures are discussed on page 4.11-14 of the DEIS. In addition to the mitigation measures listed, there are numerous mitigation measures required by law. Examples include blowout prevention equipment at wells, standards for material such as pipeline thickness and dikes, and curbing around drill pads and

storage tanks. The oil companies, VAFB, and Santa Barbara County have contingency plans for containing and cleaning up spills.

Section 6.2.5.2.2 of the MRMP addresses the measures to mitigate potential impacts from accidental discharges. These measures include the development of a spill prevention control and countermeasure plan, provision of adequate on-site containment areas, and operational requirements to minimize the potential for spills or damage resulting from spills.

WQCB-9 A discussion of specific erosion control practices is contained in the MRMP, section 6.1.5.3, Soil Erosion.

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY GEORGE DEUKMEJIAN, Governor

DEPARTMENT OF TRANSPORTATION
P.O. BOX 8114
SAN LUIS OBISPO, CA 93403-8114
Telephone: (805) 549-3111
TDD (805) 549-3259

Date: June 29, 1987

Colonel William R. Newell
1 STRAD/ETD
Vandenburg AFB, CA 93437-5000

File: SB-001-31.04
Vandenburg AFB
Oil & Gas Exploration

Subject: Intergovernmental Review

Dear Colonel Newell:

Caltrans District 5 staff has reviewed the above-referenced document. The following comments were generated as a result of the review:

The maps showing Route 101 intersecting Route 135 in Santa Maria (fig. 3.8-1, 3.8-2, & 4.8-1) are in error. The intersection takes place to the north of this location. What is shown is Santa Maria Way - not Route 101. Also, County Road S20 is now State Route 1 through Vandenburg AFB. The old Route 1, between Lompoc and Route 135, has been relinquished to the county. DOT-1 DOT-2

Please send us a copy of the completed Environmental Impact Statement when it is available. Thank you for the opportunity to comment.

If you have any questions, please contact me at (805) 549-3139.

A. C. Carlton
District 5
Intergovernmental Review Coordinator

cc: Terry Roberts, State Clearinghouse
JMA,VLN

RECEIVED 13 JUL 1987

RESPONSE TO COMMENTS
FROM THE
CALIFORNIA DEPARTMENT OF TRANSPORTATION

DOT-1 You are correct. The figure has been revised by deleting the Route 101 symbol. Please see the revised figure in the EIS errata for section 3.8, Transportation.

DOT-2 You are correct. These route numbers were recently changed. The base map has been revised to show the most recent route designations. Please see the revised figure in the EIS errata for section 3.8, Transportation.

United States Department of the Interior

BUREAU OF MINES

WESTERN FIELD OPERATIONS CENTER
EAST 360 3RD AVENUE
SPOKANE, WASHINGTON 99202

June 26, 1987

Colonel William R. Newell
1 STRAD/ETD
Vandenberg AFB, California 93437-5000

Dear Colonel Newell:

SUBJECT: POTENTIAL EXPLORATION, DEVELOPMENT, AND PRODUCTION OF OIL AND GAS RESOURCES, VANDENBERG AIR FORCE BASE, CALIFORNIA

Thank you for the opportunity to review the Draft Environmental Impact Statement for the Mineral Resource Management Plan for Vandenberg AFB. The document appears adequate. The Air Force is to be commended for their efforts to provide for utilization of natural resources concurrently with use of the land for Air Force objectives. BOM-1

Sincerely,

D'Arcy P. Banister

D'Arcy P. Banister, Supervisor
Mineral Issues Involvement Section
Branch of Engineering and Economic Analysis

RECEIVED JUN 1987 ETE

RESPONSE TO COMMENTS FROM THE BUREAU OF MINES

BOM-1 Thank you for your comment.

COMMENT SHEET
VANDENBERG AFB MINERAL RESOURCE MANAGEMENT PLAN
DRAFT ENVIRONMENTAL IMPACT STATEMENT
PUBLIC HEARINGS
Date: July 13, 1987

Name: Dan Masnada

Organization/Agency: Newhall Resources

Mailing Address: 23823 Valencia Blvd.
P.O. Box 55000
Valencia, CA 91355

You may also use this sheet to submit a written comment in the space provided below. You may turn your comment in at the close of the meeting or send it to the address at the bottom of this sheet. Written comments may also be submitted in a letter or other format.

See attached

Mail comments to:

Col. William R. Newell
1STRAD/ETD
Vandenberg Air Force Base, CA 93437-5000

RECEIVED 17 EJ

July 13, 1987
Dan Masnada
Newhall Resources
P.O. Box 55000
Valencia, CA 91355

While we are generally in support of the statement made by Mr. Richard Boyle on behalf of the Union Oil Company of California (UNOCAL) at the 7/8/87 public hearing, we have the following additional comments: NR-1

- Whether a "No Action" or MRMP approach is ultimately approved by the USAF, a step-by-step procedure should nevertheless be established by the USAF to deal with oil and gas exploration and development on the Vandenberg AFB. It is for this reason we prefer the MRMP to a "No Action" scenario. UNOCAL has been dealing with the USAF for quite some time and, in effect, has probably developed an internal permitting gameplan which has come to be fairly well accepted by the USAF over the years. Any oil companies initiating activities on the Base would need a formalized process in order to most expediently and cost-effectively pursue drilling and production on the Base. Conoco's and NOMECO's experiences during the last few years serve as an example of what can happen without such a process. NR-2

- Even though Mr. Boyle correctly stated at the meeting that both Conoco and NOMECO have given up on their leases on the Base, future drilling activity, will most likely not, as he states, be reduced 82%. Future interest in developing the Vandenberg minerals is directly related to oil pricing and the economics of drilling on the Base. After the severe pricing downturn of last year, it is generally believed that oil pricing will continue to increase with time. Consequently, the potential for oil and gas leasing of the acreage given up by both Conoco and NOMECO should increase with time (especially in light of the fact this acreage represents good hydrocarbon potential). As a matter of fact, it is Newhall Resources' intention to actively market its acreage for leasing purposes to other oil companies once the EIS is finalized and MRMP is adopted since the permitting process will be established at that time. NR-3

- We reiterate the same three comments/questions expressed by Mr. Boyle concerning the Draft EIS regarding project modificiations, application fees and air quality issues. Of most concern to us is the plan to impose even more stringent mitigation measures than those already set forth in the APCD Rules and Regulations adopted by the Santa Barbara County Board of Supervisors. We believe the Santa Barbara County APCD Rules and Regulations apply to the VAFB as well as to the rest of the County and the proposed use of a revised set of standards on the VAFB different from that applicable to the rest of the County is inappropriate. NR-4

Table 8-3 "Process Characteristics by Task" of the MRMP indicates "Earliest Start/Finish" and "Latest Start/Finish"dates are shown to be the same for both schedules. Clarification regarding possible acceleration of the schedule should be made in the case where an applicant completes tasks in less time than the time shown in the table. For example, three applicant tasks alone total 180 days (or almost 1/2 year) and, if completed in less time, should allow the applicant to reduce the overall time required to implement his project. NR-5

We appreciate the opportunity to comment. If you have any questions, please contact Dan Masnada at the above address or call him at (805) 255-4253.

RESPONSE TO COMMENTS
FROM
NEWHALL RESOURCES

NR-1 Comment noted. Please see the responses to comments NR-2 through NR-5 and Union-1 through Union-59.

NR-2 Comment noted.

NR-3 Future drilling activity will, most probably, not be reduced by 82 percent of the original 800 wells estimated several years ago by the oil industry. Activity, for the most part, will be governed by future oil-pricing developments. The higher the price of oil, the greater the oil industry activity on VAFB because of the increased economic incentive to emplore. Therefore, even with Conoco and NOMECO no longer active on VAFB, other oil companies will probably take their place on the base at some time in the future. There are many parts of VAFB that have high oil potential today, but there are other areas on VAFB which will probably be classified as having high potential when the price of oil increases again.

NR-4 Comment noted. As stated in SBAAir-1, the Santa Barbara County APCD is generally in agreement with the offset requirements proposed in the MRMP for oil development on VAFB.

NR-5 Multiple start and finish dates do not apply to the MRMP schedule. The standard format of the task display form used in the MRMP allows for multiple start dates as well as cost data. Although not necessary for data display here, the columns were retained as a matter of convenience. Since multiple-scheduling tracks were not proposed, the later start/finish columns display the same figure as the early start/finish columns. The second set of columns can be ignored.

The dates identified are meant to reflect maximums. Additional fast-tracking procedures have not been proposed by the U.S. Air Force. Adjusting processing schedules to reflect prompt responses on behalf of the applicants would be at the discretion of the U.S. Air Force.

AIR POLLUTION CONTROL DISTRICT

COUNTY OF SAN LUIS OBISPO

2156 SIERRA WAY, SUITE B – SAN LUIS OBISPO, CALIFORNIA 93401 – (805) 549-5912

RECEIVED 23 JUL 1987 EIF

July 17, 1987

Colonel William R. Newell
1 STRAD/ETD
Vandenberg AFB, California 93437-5000

Subject: DEIS for Mineral Resources Management Plan, Vandenberg AFB

Dear Colonel Newell:

We have reviewed the DEIS on the Mineral Resources Management Plan for Vandenberg AFB. The air quality analysis differentiated between localized impacts due to inert pollutants and regional impacts resulting from emissions of ozone precursors. Worst-case gaussian modeling predicted insignificant localized impacts after implementation of appropriate mitigation measures. The regional impact analysis, however, indicated that future oil and gas development on VAFB may be limited by a lack of available offsets in the area.

APCD staff find the technical approach to the analysis to be appropriate for a study of this nature, and we agree, in principle, with the stated conclusions. However, we are concerned that the analysis of regional impacts failed to consider, or even mention, the potential for air quality impacts in San Luis Obispo County. Substantial emissions of nitrogen oxides and reactive hydrocarbons are predicted to result from the proposed energy development. As stated in our September 23, 1986 letter to URS during the EIS scoping process (attached), San Luis Obispo County is located in the South Central Coast Air Basin, in close proximity to VAFB. Our southern border is less than fifteen miles north of the area identified as having the highest resource and development potential in the MRMP. Periodic transport of ozone precursors from the proposed development into our County is therefore highly probable. This added pollutant burden poses significant concern to the District and could hamper our efforts to remain in attainment of the Federal ozone standard. These issues should be addressed in the Final EIS. In addition, we request that any future project-specific impact analyses related to the MRMP include an analysis of potential ozone impacts in San Luis Obispo County. SLOAir-1

Our specific recommendations for corrections and additions to the FEIS are as follows:

1. The TSP non-attainment area described on page 3.3-7 and depicted in Figure 3.3-2 mistakenly includes a portion of southern San Luis Obispo County. No areas in San Luis Obispo County are currently designated as Federal non-attainment areas for any pollutants. TSP measurements at Nipomo are well within Federal standards. The Nipomo monitoring station is located approximately nine miles north of Santa Maria. This correction should be noted in the FEIS. SLOAir-2

2. The description of baseline air quality and emissions in the study area on pages 3.3-7 through 3.3-16 should include emissions and baseline air quality data from southern San Luis Obispo County. The narrative should include a discussion of the proximity of San Luis Obispo County to the proposed development and a description of the potential meteorological conditions which could transport pollutants into our County. SLOAir-3

3. The "regional impacts" analysis presented on page 4.3-3 does not define the area in which "regional" impacts are expected to occur. The study area for potential regional impacts should be defined and should include southern San Luis Obispo County. SLOAir-4

4. The last paragraph on page 4.306 discusses exceedances of the "California 1-hour NO_x" standard. This should be corrected to "California 1-hour NO_2 standard." SLOAir-5

We appreciate the opportunity to provide input to this process and request that our recommendations be included in the final document. Please contact us should you have any questions regarding these comments.

Respectfully,

LARRY R. ALLEN
Senior Air Quality Specialist

LRA/kw

Attachment

AIR POLLUTION CONTROL DISTRICT

COUNTY OF SAN LUIS OBISPO

2156 SIERRA WAY, SUITE B – SAN LUIS OBISPO, CALIFORNIA 93401 – (805) 549-5912

September 23, 1986

URS Corporation
111 West Micheltorena
Santa Barbara, California 93101

Dear Sirs:

We have reviewed the scoping information package for the EIS under preparation for the proposed oil and natural gas production on Vandenberg AFB. Air pollutant emissions from a development of this nature will likely be substantial, with the potential to cause significant local and regional air quality impacts in the South Central Coast Air Basin. San Luis Obispo County is located within this air basin, approximately 20 miles north of Vandenberg AFB. We are concerned that ozone precursor emissions from this project may result in photochemical pollutant impacts in our County under adverse meteorological conditions. The photochemical modeling in the air quality analysis for the EIS should examine this potential. We would suggest the analysis of at least one or more episode days capable of transporting project emissions into San Luis Obispo County under conditions conducive to ozone formation. The APCD would be happy to work with the consultant in selecting the appropriate days for analysis. SLOAir-1

We appreciate the opportunity to provide input to this process and request that we be kept informed on the progress of the environmental analysis. Please contact us should you have any questions regarding our comments.

Sincerely,

Larry R. Allen

LARRY R. ALLEN
Senior Air Quality Specialist

LRA/kw

RESPONSE TO COMMENTS
FROM THE
SAN LUIS OBISPO COUNTY AIR POLLUTION CONTROL DISTRICT

SLOAir-1 As stated in the Region of Influence section of the DEIS and the introduction of the MRMP, "the region of influence of the emissions of ozone precursors from oil development on VAFB may include most of Santa Barbara County, as well as San Luis Obispo and Ventura counties." The FEIS includes text at the end of paragraph six on page 4.3-1 of the FEIS which states the following: "This part of Santa Barbara County lies north of the summit of the Santa Ynez Mountains. However, it is recognized that during certain meteorological conditions, emissions from oil development on VAFB may impact a larger region, in particular southern Santa Barbara and San Luis Obispo counties." Please see the air quality errata.

In the Air Quality Guidelines section on page A-34 of the DEIS, it states that photochemical modeling will be required if project emissions can reasonably be expected to result in exceedances of the ozone standard or exacerbate existing ozone standard violations within or outside of Santa Barbara County. In the FEIS, this sentence now ends with: ". . . including San Luis Obispo County." This change is also incorporated on page 6.3-28 of the MRMP (see the air quality errata).

SLOAir-2 Comment noted. This correction has been made in the FEIS and MRMP (see the air quality errata).

SLOAir-3 Please see the response to comment SLOAir-1 and section 4.3.1.2.2 of the DEIS. It is beyond the scope of this EIS to quantify the impacts of emissions from oil development on VAFB for comparison with the San Luis Obispo County emission inventory. However, baseline air quality data from the Nipomo station and its proximity to the project area have been included in the FEIS (see the air quality errata).

SLOAir-4 Please see the response to comment SLOAir-1.

SLOAir-5 Comment noted. This correction has been made in the FEIS (see the air quality errata).

County of Santa Barbara
AIR POLLUTION CONTROL DISTRICT
5540 EKWILL, SUITE B, SANTA BARBARA, CALIFORNIA 93111
PHONE: (805) 964-8111 FAX (805) 967-4872

JAMES M. RYERSON
Air Pollution Control Officer

July 23, 1987

Colonel William R. Newell
1 STRAD/ETD
Vandenberg AFB, California 93437-5000

REGARDING: Santa Barbara County Air Pollution Control District (SBCAPCD) Comments on Draft Mineral Resource Management Plan and Draft EIS, Vandenberg AFB

Dear Colonel Newell:

Attached are the SBCAPCD comments on the documents referenced above. They are broken into general comments and specific comments, all of which we feel are important to address in the final documents.

If you have any questions or need any information, please contact me at (805) 964-8111.

Sincerely,

Brian Shafritz
Engineer II

BS/kj
5355.10W2

Attachments

cc: Doug Anthony, SBC Resource Management Department

General Comments:

1) Proposed Action, Mineral Resource Management Plan (MRMP) Requirements Section 4.3.2.1

Apparently, the MRMP would require offsets for all proposed projects regardless of local regulatory trigger levels as well as require offsets in reserve. The District strongly supports these requirements since emissions from oil and gas development on VAFB could be substantial (from Table 4.3-8, NO_x emissions are estimated to be on the order of 1000 tons per year or more depending upon the extent of development) and were not fully accounted for in the current Air Quality Attainment Plan (AQAP). However, it should be specified in the text whether the MRMP would require offsets for all pollutants or just for selected pollutants. Pollutants of particular concern to the APCD are ozone and particulate matter, because of the potential for increases in emissions to interfere with the County's attainment and maintenance of air quality standards. Therefore, the APCD would recommend that the MRMP require offsets of ROC, NO_x (ozone precursors), TSP and PM_{10} at a minimum. Likewise, reserve offsets for the pollutants noted above would be appropriate to assure sufficient emissions reductions are available if found necessary in the future AQAP update.

The District also supports the inclusion of emission reduction measures as part of the requirements of the MRMP. For the most part, control measures stated in the document were geared specifically for NO_x and ROC (page 4.3-6). The District suggests that Best Available Control Technology (BACT) measures be considered for all criteria pollutants in the MRMP. A list of applicable control technologies/procedures is attached for consideration. SBAAir-1

One ROC control measure that was not addressed is a fugitive hydrocarbon inspection and maintenance program (I & M). An I & M program is considered BACT by the APCD for petroleum production/processing facilities and is probably worthwhile to include in the MRMP for the projected oil and gas activity on VAFB.

In the original scoping comments, the APCD requested that the use of electric power for all drilling activities and production activities be addressed in the EIS. Only a brief statement regarding the potential for reduction of NO_x emissions by electrifying well pumps was included in the Air Quality Section (4.3.2.1.4, "Mitigation Measures for Regional Impacts"). Considering the large tonnage of NO_x emissions anticipated from future activities, the APCD feels that much more emphasis on electric powered rigs as a control measure integral to the MRMP should be contained in the document. Further analysis and discussion of availability and feasibility of providing electric power, as well as alternative means of generating electric power, is warranted and should be presented in the EIS. One alternative the District feels should be examined is the use of

a clean fuel powered generator (located safely away from the drilling activity) along with an all electric rig. Control of NO_x emissions is of paramount importance in order to preserve the pool of offsets available for other development projects and to prevent deterioration of local and regional air quality. SBAAir-1

2) Alternative to Proposed Action, Sections 4.3.2.2, 4.3.2.3, 4.3.2.4, 4.3.2.5

The APCD generally agrees with the description of how the alternatives considered might affect air quality, however, there are a few additional concerns which need to be addressed. Restricting drilling to certain preferential areas on the base may not necessarily result in a reduction of the overall level of oil and gas development on the base. It appears form Figure 1-2, that most of the potential for oil and gas reserves is located on the upper NE portion of the base. Thus, it is likely that portion of the base would be the prime area for development under the proposed action and for each of the three alternatives, since the alternatives place little or no restrictions on that area of the base. Consequently, it is uncertain whether the more restrictive alternatives would reduce the overall level of activity and consumption of offsets relative to the proposed action. SBAAir-2

Likewise, the possibility exists for a highly concentrated area of development under the proposed action and any of the alternatives. Therefore, it is difficult to assess whether the proposed action would have any advantages with respect to localized short-term air quality impacts.

Please consider the above points in the comparison of alternatives (pages 4.3-21, 4.3-22).

3) Section 1.3.2.2, 4.3.2.1.3, 4.3.36

There is very limited discussion in the document regarding processing alternatives for the oil and gas produced on VAFB. It is stated that "it is anticipated" that the produced oil would be processed at facilities located off the base; however, it is not clear whether existing facilities could handle the levels of production expected or whether expanded or new facilities would be necessary. Existing UNOCAL facilities in North County are mentioned as possibilities for off base processing, but it is also noted that the remaining capacity might not be able to accommodate the estimated throughput from VAFB. Given the above, it would seem reasonable for the EIS to examine processing alternatives both on-base and off-base, along with potential local and regional impacts. SBAAir-3

Moreover, transportation options for the crude oil were not comprehensively evaluated. It was assumed that oil would be trucked off-base for the development phase of an individual well (one-year) and thereafter pipeline transportation would occur (throughout production). Pipelining would eliminate air

emissions associated with trucking crude oil and from an air quality standpoint would be favorable for all phases of development/production. Secondary emissions associated with the Vandenberg activities, i.e., vehicular emissions resulting from transport of crude oil, equipment, personnel and production fluids could be substantial and should be assessed for potential impacts. These emissions should be quantified to the extent possible and compared to the projected emissions from well production and the North County emissions inventory. Potential emissions reduction measures for these activities should be identified and considered for inclusion in the MRMP.

Finally, the individual components comprising the hypothetical well drilling and production scenarios are not clearly identified in the text. This is important to gain a perspective of what the emission scenarios and air quality modeling results reflect. For instance, do the generic scenarios include steam injection and hydrogen sulfide scrubbing and the associated equipment? Was NGL production and transportation considered as a possibility? Was flaring of test gas and produced gas included in the impact analysis? Were support facilities (steam generators, compressors, tanks, etc.) accounted for in the installation/well pad preparation emission and modeling scenarios? The particular assumptions should be stated in the text to provide a clear picture of what was considered in the impact assessment. SBAAir-3

Specific Comments:

Section 4.3.1
p. 4.3-1, paragraph 2, sentence 1

It is not clear exactly what this sentence means, or how it would be applied in determining significance of impacts. Please clarify, or delete to avoid confusion. SBAAir-4

Section 4.3.2.1
p. 4.3-6, paragraph 1, sentence 2

It is presumed that "higher impact levels" should be "lower impact levels." Please correct SBAAir-5

Section 4.3.2.1.1
p. 4.3-6, paragraph 5, bullet 2

This is inconsistent with Table 4.3.2 which shows an SO_2 California 1-hour standard violation for well drilling (unless this paragraph is referring to mitigated impacts). Please clarify. SBAAir-6

p. 4.3-8, 4.3-9, 4.3-10; Tables 4.3-1, 4.3-2, 4.3-3

It would be useful in include as a footnote in these tables the assumed PM_{10}/TSP emission ratios and the basis for those assumptions. SBAAir-7

Section 4.3.2.1.1
p. 4.3-11, paragraph 1 (Public Nuisance)

Please provide the rationale for assuming an H2S concentration of 24 ppm. Is it possible that this could vary spatially and temporally, i.e, different geographic areas on the base and over the lifetime of drilling/production? Please examine further, and if warranted, assess potential odor impacts using an appropriate range of H_2S concentrations. SBAAir-8

Section 4.3.2.1.2
Page 4.3-11, paragraph 2

It appears from Table 4.3-4 that SO_2 impacts for well drilling were mitigated to insignificance. Please state explicitly in the text what SO_2 mitigation measures were assumed, and whether these will be incorporated into the MRMP. SBAAir-9

Section 4.3.3
Page 4.3-23 (Unavoidable Adverse Impacts)

The text includes odor as an unavoidable adverse impact. Please make reference to specific analyses performed which would lead to this conclusion. Apparently, this is inconsistent with page 4.3-11, paragraph 1, which concluded ISC model runs showed H2S odor impacts would be insignificant. (Please note that a previous comment recommended that odor impacts be reevaluated.) SBAAir-10

Section 3.3.4.2
Page 3.3-7, paragraph 3, last sentence

Ozone formation is influenced by a number of variables (meteorological and others) and complex physical and chemical interactions. Therefore, it is difficult to associate ozone events with general scenarios. The APCD suggests that the "Scenario" presented of transport of ozone and ozone precursors from the Los Angeles Basin be de-emphasized in the text, especially with respect to increased ozone in North County. It is recommended that the word "significant" be deleted, or the first part of the sentence be deleted altogether. SBAAir-11

Volume II

Section 6.3.4.3
Page 6.3-20, 2nd sentence

It is stated that the "APCD PSD review for attainment pollutants include the federal PSD requirements mentioned above" (p.6.3-16). The text should specify that the general requirements are the same, but that the criteria for triggering the requirements are somewhat different. For instance, the air quality modeling increment analysis and the visibility, soils and vegetation analysis are triggered if the project in its entirety (not net emissions increase) is greater than 20 pounds per hour. SBAAir-12

Section 6.3.4.3
P. 6.3-21, Table 6.3-8

The air quality standard for 3-hour Sulfur Dioxide is 1300 (micrograms/cu meter). The 1-hour sulfur dioxide standard is 655. Please correct. SBAAir-13

Section 6.3.4.3
P. 6.3-22, Paragraph 2

Please delete the statement "A minimum offset ratio of 2:1 is required for interpollutant tradeoffs, such as NO_x for RHC." This is not correct. The Santa Barbara County APCD rules provide for evaluating interpollutant trading on a case by case basis to assure consistency with reasonable further progress and demonstration of a net air quality benefit. The District encourages intrapollutant trading. Also, please clarify the same point on page 6.3-26, paragraph 4. SBAAir-14

Section 6.3.6.2.5
Page 6.3-33

The Santa Barbara County APCD generally considers offsets which fulfill all applicable criteria to suffice as a demonstration of net air quality benefit for an individual project. Thus, the APCD suggests that the sentence "This demonstration generally requires a rigorous, grid-based modeling exercise" be deleted in paragraph 1. Furthermore in paragraph 2, it is suggested that the preface "In lieu of photochemical modeling" in sentence 2 be deleted, given the premise that offsets and other required mitigation will be acceptable for meeting the test of net air quality benefit. An alternative wording might be to start out the sentence with "To meet the net air quality benefit requirements, ..." SBAAir-15

Page 1-9, Table 1-2

As noted in a previous comment, the APCD does not encourage inter-pollutant trading. Therefore, it might be worthwhile to remove the reference to interpollutant trading from the guidelines (while placing more of an emphasis on intrapollutant trading in the MRMP). SBAAir-16

BS/ja
5355.10W2

ATTACHMENT

ONSHORE PROCESSING FACILITY

Equipment	Control Technology/Procedures
Gas Turbines	- water injection with SCR
Auxiliary Duct Burner	- low NO_x burner - pipeline quality natural gas
Sulfur Recovery Unit	- pipeline quality natural gas - thermal De NO_x
NGL Truck Loading	- submerged loading with 100% closed vapor balance system
Oil Storage Tank	- fixed roof with vapor recovery system
Fugitive Hydrocarbon Emissions	- I & M program consistent with Union Irene project Authority to Construct Permit (see Union Final Decision Document, Table 4-2) - design all components accessible - eliminate, to extent feasible, components whose repair must await process turn around
Flare	- electronic ignition - plant design to minimize size and frequency of events
Pneumatic Instruments	- powered by air
Gas & Oil Transportation	- pipeline
Purging	- vapor recovery system
Internal Combustion Engines	- replace with electric motors powered by utility grid - engine timing retard to reduce NO_x - precombustion chamber diesel engines - alternative fuels such as propane

BS/ja
5355.10W2

RESPONSE TO COMMENTS
FROM THE
SANTA BARBARA COUNTY AIR POLLUTION CONTROL DISTRICT

SBAAir-1 Offsets will be required for NO_x, SO_2, RHC, TSP, and PM_{10}. This has been included in the FEIS on pages 4.3-5 and A-32 (see the air quality errata), and in the MRMP on page 6.3-26 (see also the air quality errata). As shown in Table 4.3-9, offsets will not be required for CO.

The control measures for project emissions stated on page 4.3-6 relate to ozone precursors -- NO_x and RHC. However, control measures for all project pollutants are included in Table 4.3-5. Additional BACT measures provided by the APCD have been included in the FEIS (see the air quality errata).

It was assumed that grid electricity would be used to supply all the power needs of future petroleum production activities on VAFB, starting with the second year of each well's life. Due to the relatively low power requirements of this activity, grid electricity availability was not assumed to be an issue.

Grid electricity was not considered for well drilling since many sites could be miles from the grid system and it would be an unreasonable economic requirement for development of those wells. Unocal sources have stated that, at this time, no land rigs exist to their knowledge on the West Coast that are powered by the electric grid system. With regard to the availability of alternate means of power generation for drilling, Unocal sources also stated that there are no drill rigs to their knowledge that are powered by propane-fueled generators. Natural gas-fired drill rigs would be highly unfeasible, since a pipeline would have to be laid to the rig, an unreasonable economic requirement.

Tables 4.3-7 through 4.3-9 show the emissions decrease as a result of the electrification of well pumps (see the air quality errata).

The U.S. Air Force is recommending that oil developers mitigate the diesel generators that power the drilling rig to the maximum extent feasible and use electric-powered well pumps to minimize emissions.

SBAAir-2 Thank you for your comments. They were considered in the evaluation of air quality impacts for the Alternatives to the Proposed Action in the DEIS.

SBAAir-3 As stated on page 1-10 of the DEIS, it has been proposed that oil production that occurs south of San Antonio Creek will be processed at Unocal's Lompoc field production facilities. Oil produced north of San Antonio Creek will be processed at Union's facilities in the Casmalia field. The U.S Air Force will require that all oil processing and refining occur off base.

Further communications with Unocal have revealed that oil produced from the Jesus Maria, Atlas, and Challenger prospects will be processed at the Casmalia facility. This facility presently processes about 300 BPD of oil and has a maximum handling capacity of 2,800 BPD. Production from the Columbia, Mercury, and Arkley prospects will occur at the Lompoc facility. This facility presently processes about 600 BPD and has a maximum handling capacity of 1,800 BPD. The present combined processing capacity of 4,600 BPD obviously is less than Unocal's estimated 11,000- to 14,000-BPD production of oil from VAFB reserves. Unocal has stated that if future production exceeds the existing processing capacity, these processing facilities will be expanded to handle this production. This information will be included in the FEIS.

Although not included in the DEIS, an analysis of oil processing emissions will be included in the FEIS.

With regard to the transportation of oil, Table 4.3-6 includes emissions of transporting oil by vacuum truck during the first year of development, which are equal to 272 days of production at 50 barrels of oil and 250 barrels of water per day. These truck emissions are based on 2.5 round trips between the well and a hypothetical processing facility at Santa Maria (24 miles) plus on-site emissions. Unfortunately, these emissions were blended into the total on-road motor vehicle category for all six development activities in Table 4.3-6. This makes the comparison to a well transporting oil by pipeline in Table 4.3-7 somewhat difficult. Implementing oil transportation by pipeline will eliminate emissions from the vacuum truck and flare and decrease fugitive hydrocarbon emissions, resulting in an annual decrease of the following production emissions: RHC, 17.9 percent, NO_x, 25.1 percent, SO_2, 66.0 percent, CO, 7.4 percent, and TSP, 84.1 percent. This will be stated in the FEIS. With regard to tables 4.3-7 through 4.3-9, the elimination of emissions from the flare and a decrease of fugitive hydrocarbons during the second year were overlooked. This has been corrected in the FEIS (see the air quality errata).

The modeling results for well production were based on vacuum-truck transporting of oil as a worst-case scenario.

Secondary emissions for all vehicles needed to service a well for the various development scenarios are also included in Table 4.3-6. These emissions are based on round trips between the well and Santa Maria (24 miles) plus on-site emissions and are summarized in the on-road motor vehicle category.

The details of the air quality impact analysis are included in the Air Quality Technical Appendix of the DEIS. A reference to this document will be included in section 4.3.2.1.1 of the FEIS.

SBAAir-4 This sentence has been deleted from the FEIS (see the air quality errata).

SBAAir-5 Your comment is correct. The sentence has been changed to ". . . would result in lower impact levels on . . ." Please see the air quality errata.

SBAAir-6 The text is correct, but Table 4.3-2 is in error. Only the 1-hour NO_2 and 24-hour PM_{10} standards would be violated as a result of well drilling. Table 4.3-2 has been corrected in the FEIS (see the air quality errata).

SBAAir-7 These assumptions are included in the Air Quality Technical Appendix of the DEIS in Tables 2-1, 2-7, and 2-16.

SBAAir-8 The original H_2S content of 24 ppm in fugitive RHC emissions referenced a Unocal analysis of gas from one of their exploratory wells in the Point Federnales field. A more accurate estimate has been obtained from a range of H_2S concentrations monitored in well gas from Unocal's Jesus Maria and Lompoc fields. Individual wells ranged from 400 to 2,500 ppm, with an average of about 1,100 ppm. Using the maximum value of 2,500 ppm in the odor impact analysis results in a maximum modeled downwind concentration of 2.08 ug/m^3, which is still below the olfactory detection threshold of 6.5 ug/m^3. This revision will be included in the FEIS.

SBAAir-9 Please see the response to comment SBAAir-6.

SBAAir-10 This text has been deleted in the FEIS (see the air quality errata).

SBAAir-11 The word "significant" will be deleted from this sentence in the FEIS and MRMP (see the air quality errata).

SBAAir-12 The text on page 6.3-20 of the MRMP has been changed to include the following: "The . . . APCD PSD review for attainment pollutants generally includes the federal PSD requirements mentioned above, but the criteria for triggering the requirements are somewhat different. . . :

- An air quality modeling incremental analysis and an analysis of the impairment to visibility, soils, and vegetation is required of any source that emits in its entirety more than 20 pounds/hour of any attainment pollutant.

- No source shall cause the violation of an ambient air quality standard or lead to the violation of any air quality increment."

Please see the air quality errata.

SBAAir-13 This has been corrected in Table 6.3-8 of the MRMP (see the air quality errata).

SBAAir-14 This sentence has been replaced with the following:

"Interpollutant tradeoffs, such as NO_x for RHC, are allowed by the Santa Barbara County APCD on a case-by-case basis to assure a net air quality benefit. However, the Santa Barbara County APCD encourages intrapollutant tradeoffs. A minimum offset ratio of 1.2 to 1 is required for interpollutant tradeoffs."

Also, the text on page 6.3-26 has been clarified in the MRMP (see the air quality errata).

SBAAir-15 You are correct. The MRMP and the FEIS include these suggestions (see the air quality errata).

SBAAir-16 Since interpollutant tradeoffs are allowed by the Santa Barbara County APCD on a case-by-case basis, the text on page 1-9 has been changed to include the following: ". . . for offsets to demonstrate a net air quality benefit." Please see the air quality errata.

United States Department of the Interior

MINERALS MANAGEMENT SERVICE
PACIFIC OCS REGION
1340 WEST SIXTH STREET
LOS ANGELES, CALIFORNIA 90017

In Reply Refer To:
MMS - Mail Stop 300

JUL 21 1987

William R. Newell, Colonel, USAF
Chief, Developmental Division
Environmental Task Force
1 STRAD/ETD
Vandenberg AFB, CA 93437-5000

Dear Mr. Newell:

The Pacific OCS Regional office of the Minerals Management Service has reviewed the Environmental Impact Statement for the Mineral Resource Management Plan for Vandenberg Air Force Base. We provide the following comments on that environmental analysis.

The EIS has done a credible job of clearly identifying the proposed project and alternatives. In general we found the document to be well-organized and readable. However, there are two areas where additional clarification and analysis is needed.

The first relates to specifying the area on Vandenberg Air Force Base underlain by Federal or State-owned minerals where environmentally protective requirements exist. In particular, clarification of the conclusions found on page 2-12 are needed to reflect the differences between extraction of Federal minerals versus privately-owned minerals. In the discussion of the no-action alternative it was stated that "...the current development process for mineral development on VAFB under [the no-action] alternative would do little to protect biological resources on the base other than federally listed threatened or endangered species...[and] would cause several significant cultural resource impacts." These types of impacts may occur where privately-owned surface rights and minerals exist, though some county and state regulations could apply. However, the portions of the base containing Federal or State minerals are subject to several laws and regulations which require mitigation of significant impacts to biological and cultural resources. MMS-1

It is our understanding that the southern portion of the base contains Federal minerals and would be subject to the Federal laws and requirements for oil and gas development. It appears that the Mineral Resource Management Plan would place requirements similar to those found on Federal leases for the entire base. The differences between the MRMP and existing Federal and State laws applicable to certain portions of the base need to be clarified further in the document.

The second comment relates to the discussion in the document found on page 2-16 which refers to phasing of oil and gas development. It is not clear from the document what exactly is envisioned by "regulated exploration, development, MMS-2

and production of oil and gas resources at a consciously slower pace that existing development procedures might warrant." Additional detail on what is meant by phasing should be provided in the FEIS, along with a review of how it would be implemented. One impact which should be considered in the review is the potential impact on reservoir management and conservation of the resources. MMS-2

We appreciate the opportunity to comment on this environmental document. If you have any questions concerning our comments, please contact Mary Elaine Warhurst at FTS 798-4480.

Sincerely,

William E. Grant
Regional Director

RESPONSE TO COMMENTS
FROM THE
MINERALS MANAGEMENT SERVICE

MMS-1 You are correct. The federal government owns both the surface and mineral rights of the southern 15,000 acres of VAFB. Oil and gas exploration and development on that portion of the base would have to comply with the MRMP if adopted. Federal laws and regulations for private oil and gas exploration and development have been incorporated into the MRMP -- so compliance with the MRMP would also mean compliance with federal laws and regulations. For exploration and development of federal oil and gas resources, additional mitigations may be required. The mitigations required can only be determined when applications for specific sites are reviewed. This environmental impact statement is a programmatic document which, by being general, leaves open several issues about future applicability of laws that can only be addressed accurately when dealing with site-specific analysis.

MMS-2 Regarding the consideration given to phasing, "regulated exploration, development, and production of oil and gas resources at a consciously slower pace than existing development procedures might warrant" means that if oil and gas market conditions were such that they exceeded the assumed "most likely" volumes of oil production over the next 40 years identified in Table 2-1 of the DEIS, then there may be additional impacts which would require mitigation (such as slowing the approvals for development over a period of peak time). Each environmental resource analysis considered the cumulative impacts associated with oil and gas development at VAFB (see the last section for each environmental resource in Chapter 4) based on the level of activity and timing identified in Table 2-1 in addition to other developments in the surrounding region. Each environmental resource section identified whether or not there was a critical threshold of development over which additional mitigations, such as phasing, should be considered. The MRMP and the subsequent EIS do not recommend phasing -- except if the level of oil activity were to greatly exceed expectations.

SANTA BARBARA COUNTY-CITIES

Area Planning Council

An Association of Local Governments in Santa Barbara County

July 22, 1987

Colonel William R. Newell
1 STRAD/ETD
Vandenberg AFB, California
93437-5000

Dear Col. Newell,

Thank you for the opportunity to review the Draft Mineral Resource Management Plan and Draft EIS for oil and gas development on Vandenberg AFB. I offer the following comments on the socioeconomic baseline and impact analyses presented in the EIS:

1) Section 3.7.4, Page 3.7-3, Para. 3: A paragraph should be added here describing the current state of the shuttle-related workforce at VAFB, and indicating the potential for conflicts if the shuttle is rescheduled for liftoff during the peak development period for on-base oil and gas. APC-1

2) Section 3.7.4, Page 3.7-4, Table 3.7-1: The baseline population forecast presented in this table is quite different from that presented in "Forecast 85", especially for the 1985 to 1990 period. This discrepancy should be noted and explained in the text or NOTES. APC-2

3) Section 3.7.4, Page 3.7-4, Table 3.7-1: Some of the NOTES for this table and Table 3.7-2 have apparently been mixed up. APC-3

4) Section 3.7.4, Page 3.7-5, Table 3.7-2: These employment figures are inconsistent with data presented in Table 3.7-1, in "Forecast 85"(Table 37), and in recent EDD reports. Why are these figures so much lower? APC-4

C&R-33

922 Laguna Street • Santa Barbara, California 93101 • (805) 963-7194

MEMBER AGENCIES: City of Carpinteria, City of Guadalupe, City of Lompoc, City of Santa Barbara, City of Santa Maria, City of Solvang, County of Santa Barbara

5) Section 3.7.4, Page 3.7-6, Para 1: The report should clarify that only the onshore portion of the Santa Maria Basin is described in this section and in Figure 3.7-1 (if this is indeed the case). The statement that 80% of the county's oil and gas employment is based in the Santa Maria basin does not seem right, considering the extensive development ongoing and proposed on the south coast. Please explain. APC-5

6) Section 3.7.4, Page 3.7-6, Para 2: Please quantitatively document the decline in employment that would accompany the anticipated decline in production from the Santa Maria Basin, (with and without VAFB oil development). APC-6

7) Section 3.7.4, Page 3.7-6, Para 5: The report should provide current rental vacancy estimates made by the cities of Lompoc and Santa Maria, since these are much higher than the 1986 FHLB figures. Contact Jeremy Graves of the Lompoc Community Development Department and Jerry Frasier of the Santa Maria Community Development Department to obtain this information. APC-7

8) Section 4.7.1.1, Page 4.7-2, Para 1: The use of a 3% regional (or county-wide?) growth in employment as a measure of significant socioeconomic impacts seems arbitrary, and is unsupported by any background information. To my knowledge, it has not been used for socioeconomic analyses of any previous oil and gas projects in Santa Barbara County. APC-8

9) Section 4.7.1.2, Page 4.7-2, Para 5: Despite statements made in this paragraph, the report presents no logical or quantitative link between levels of employment and population impacts. In fact, no quantitative population impacts are presented at all. This is unacceptable. APC-9

10) Section 4.7.1.2, Page 4.7-2, Para 5: By estimating public service impacts based only upon direct project-related employment, this analysis ignores the potential indirect and induced impacts of the project. These are often considerably larger than the project's direct impacts. The assessment of these additional impacts should be based on estimated local expenditures for the project. These could be calculated on an incremental (ie. per well) basis. APC-10

11) Section 4.7.2.1.1, Page 4.7-5, Para 1: Are these FTE estimates based on yearly construction estimates? APC-11

12) Section 4.7.2.1.1, Page 4.7-5, Para 7: Please spell out ROI. APC-12

13) Section 4.7.2.1.1, Page 4.7-5, Para 7: The report qualitatively describes public service impacts based on a single estimate of the change in regional employment. This method has no apparent theoretical basis, and ignores the potential for localized population and public service impacts within the region. APC-13

14) Section 4.7.2.1.1, Page 4.7-6, Para 4, Sentence 2: This is a statement of possibility rather than a documented assessment of "worst-case" impacts. At the very least, the report should address the effect of public finance limitations imposed by the Gann Amendment ("Prop. 4"). APC-14

15) Section 4.7.2.1.1, Page 4.7-6, Para 5, Sentence 3: Please indicate the likelihood that a pipeline would be constructed to transport VAFB oil and/or gas, and how long this pipeline might be. Previous large oil and gas pipelines have been constructed using large numbers of in-migrant workers, who have created large, short-term impacts in some areas. APC-15

16) Section 4.7.2.2 through 4.7.2.5 (Pages 4.7-7 through 4.7-8): Some level of quantitative analysis would be useful here. For example, approximately how many wells are likely to be drilled under each project alternative? Is the work force proportional to the number of wells, or would the same size work crew be used in each case, with development occurring over a longer time period? APC-16

17) Section 4.7.4, Page 4.7-9, Para 1, Sentence 1: The cumulative population impacts of oil and gas development that are presented in "Forecast 85" are out of date. Please use estimates from the most recent SEMP report, wherever possible. APC-17

18) Section 4.7.4, Page 4.7-9, Para 1, Sentence 2: Most of the jobs would be created in SOUTHERN Santa Barbara County, although most of the population impacts are likely to be felt in the north. APC-18

Thanks again for this opportunity to comment, and please call me if you have any questions.

Sincerely,

Kim W. Fulton-Bennett
Area Planner

cc: Doug Anthony - Santa Barbara Co. Energy Division

RESPONSE TO COMMENTS
FROM THE
SANTA BARBARA COUNTY-CITIES AREA PLANNING COUNCIL

APC-1 At the time the DEIS was written, the most current information regarding the shuttle-related work force on VAFB was included in the baseline existing conditions section. An update has been included in the EIS errata for section 3.7, Socioeconomics.

APC-2 The baseline population forecast presented in Table 3.7-1 was estimated by URS Corporation based on information from both the Santa Barbara County-Cities Area Planning Council and the California Department of Finance population projections. A third note has been included on the table indicating the basis for the estimates, and the source has been changed to include only URS Corporation. See the EIS errata for section 3.7, Socioeconomics.

APC-3 The notes on tables 3.7-1 and 3.7-2 are correct as originally presented.

APC-4 Table 3.7-2 refers only to *northern* Santa Barbara County. The table was mislabeled and has been changed in the EIS errata for section 3.7. The text on page 3.7-3, last paragraph, has been changed in the EIS errata for section 3.7 to refer to northern Santa Barbara County.

APC-5 Section 3.7.4, page 3.7-6, paragraph 1 clarifies that the employment projection does not include offshore oil and gas exploration, drilling, and production.

APC-6 The anticipated decline in oil production from the Santa Maria basin (excluding VAFB production with or without implementation of the MRMP) is graphically illustrated in Figure 3.7-1 of the DEIS. This estimate was made by URS Corporation and was based on the historic trend of declining production over the past 15 years from information compiled by CDOG. After this estimate was made, URS Corporation analysts contacted Unocal personnel to verify the projected decline. Unocal personnel concurred, saying that their expectations also indicated that production from the Santa Maria basin would continue to decline between 1987 and 2000. No quantitative estimate of future production from the basin was made available by Unocal. Unocal personnel also indicated that as production in the basin declined, layoffs would likely occur. No quantitative estimate of future oil and gas employment in the basin was made available by Unocal.

Since total employment in the onshore mining sector represents a relatively small portion of northern Santa Barbara County jobs (approximately 2.5 percent), quantitative analysis of the anticipated decline in employment associated with the expected decline of oil production would not considerably enhance the socioeconomic impact assessment and is therefore unnecessary.

APC-7 There are several sources of permanent housing vacancy rates, including the U.S. Bureau of the Census, the Federal Home Loan Bank (FHLB), and local planning departments. Vacancy rate data from the FHLB annual vacancy survey were used because they were current and could be compared across jurisdictions.

The Census Bureau uses a door-to-door canvassing sampling technique but only accomplishes this study every 10 years. The FHLB contracts with the U.S. Postal Service to provide housing vacancy data based on reports from mail carriers. The FHLB vacancy survey is comparable between different jurisdictions because the same sampling technique is used and the information is presented on an annual basis. Although it is sometimes true that planning departments have the means available to perform more accurate housing vacancy surveys than the aforementioned sources, their methods may be inconsistent (e.g., one city may sample electric use while another may sample water use) and therefore comparison of rates between jurisdictions cannot be made. For these reasons, the FHLB estimates of vacancy rates have been used in this analysis, as well as other local environmental impact studies (including those prepared for Cities Service Oil and Gas Corporation's San Miguel project and the Arco Coal Oil Point project).

APC-8 This methodology was discussed with Mike Powers of the Area Planning Council prior to its use in the DEIS. No concerns were raised at that time.

The 3-percent employment growth-rate threshold level refers to the northern Santa Barbara County region. The use of this threshold indicator is warranted in this analysis since the MRMP is not a typical construction project that has a set level of employment associated with it. Actual employment levels will depend on the amount of oil and gas that is found underlying the base. Since very little exploratory work has been accomplished on VAFB, oil and gas reserves are not known. Hence, employment levels associated with production from these fields are also not known. Since identification of specific employment levels is not possible for this EIS, the analysis of socioeconomic impacts focuses on identifying a minimum level of employment growth that could have the *potential* for causing significant impacts.

APC-9 In section 4.7.2.1.1, Impacts, page 4.7-5, paragraph 6 indicates that "no net increase in oil and gas employment is expected [therefore] baseline population and income levels would remain relatively unchanged as a result of the proposed action." The previous paragraph explains that this finding is based on the anticipated decline in production (and employment) from onshore oil and gas fields located adjacent to VAFB. This is the basic conclusion of the socioeconomic analysis; however, a worst-case scenario is also analyzed which indicates that even if the peak level of employment associated with oil and gas production on VAFB were to occur during the peak year of projected baseline growth and all of the oil

and gas jobs were new jobs filled by in-migrants to the county, the northern Santa Barbara County employment growth rate would increase by less than 10 percent. These jobs represent less than 0.2 percent of the projected number of jobs in northern Santa Barbara County in 1988.

APC-10 Additional discussion of both indirect and induced employment and project-related expenditures has been included in sections 4.7.1.2, Methodology and 4.7.2.1.1, Impacts. Please see the EIS errata for section 4.7, Socioeconomics.

APC-11 The full-time equivalent (FTE) personnel estimates are based on a per well basis. An assumption of the number of wells drilled annually is used to create the estimated annual employment range of between 25 and 125 FTE employees.

APC-12 The text has been changed to incorporate your comment. Please see the EIS errata for section 4.7, Socioeconomics.

APC-13 Refer to the responses to comments APC-8 and APC-9.

APC-14 The text has been changed to incorporate your comment. Please see the EIS errata for section 4.7, Socioeconomics.

APC-15 Discussion concerning the circumstances under which a pipeline might be feasible for oil and gas developers is located in section 2.4.2, Trucking versus Pipelines. This section indicates the "likelihood" of the construction of a pipeline depends on the amount of oil or gas that is found on VAFB. This section also indicates that any such development of a pipeline would be subject to Santa Barbara County regulations and development standards, including an updated emergency response plan and survey of the pipeline corridor to determine potential environmental impacts. If a pipeline were proposed in the future, the county could then assess the socioeconomic impacts associated with project-related employment.

APC-16 As stated in the response to comment APC-8, actual employment levels associated with production from VAFB are not known. A range of between 25 and 125 FTE workers is anticipated between now and the year 2000, based on information from potential on-base oil and gas developers contained in development plans received by the base. These plans do not contain enough information to correlate geographic areas of very high and/or high mission or environmental constraints with levels of production and employment. These plans do not contain such information since very little exploration has taken place on VAFB. It is therefore not possible to quantitatively estimate specific levels of production or employment with alternatives 1, 2, or 3.

APC-17 At the time the DEIS was written, the Tri-County Socioeconomic Monitoring Program (SEMP) had not yet produced a report with any future projections. The report issued in February 1987 has now been reviewed; however, there are no cumulative oil and gas employment projections within that report which would supersede those made in *Forecast '85*.

APC-18 The text has been revised to incorporate your comment. Please see the EIS errata for section 4.7, Socioeconomics.

Myra Manfrina
338 So. D St.
Lompoc,CA 93436-7310

Col. William R. Newell
1 STRAD/ETD
Vandenberg AFB,CA 93437-5000

10 July,1987

Thank you for sending me your EIS for Mineral Resources Management Plan for VAFB. It will prove valuable to all our Lompoc Valley Historical Society researchers, and to others who will use it in our reference library.

I can add nothing to your document - other than correct name spellings in the Individuals list, pages 10, 11 and 12.

Ray C Jacobi is JACOBS
Richard A. Logomarsino may be Richard or Robert, depending on if it is the Congressman - and it is Lagomarsino
Mary H. Manfrina is me - MYRA Huyck Manfrina
Helen Lee Ross is Helen LOU Ross
Richard and Emma Caufield (pg.12) is CANFIELD
Dave Bolaam is BALAAM

MM-1

My thanks, again

Sincerely,

Myra Manfrina

Myra Manfrina, historian
Lompoc Valley Historical Society

P.S. you may be interested in the enclosed bit of Lompoc-Surf bit of history - I am writing this book, which will be available hopefully in Sept.1987 - these are pages from it: re Huyckville and Surf and Aloha Beach (a project in the 1930s that failed!)

RECEIVED
15 JUL 1987
ETF

Andrew Lewis Huyck, continued

He was in San Jose, CA, from the 1840s to 1874 - actually about 1875 late or 1876. He came to Lompoc to look over the proposed colony in 1874, bought land in the big sale that year, buying much more property than he had expected to, because he liked the place so much. He returned to San Jose to wind up affairs there so that he could devote time to clearing his Lompoc land and ready the place for his family. All that took 3 years, but he and his three older sons were in Lompoc working part of the years between 1875 and 1877 when they, he and two of the older boys, John and Walter, came down and stayed practically the whole year and on into 1878, Edgar, then 17, went back and forth from Lompoc to San Jose in order to care for the other four children and his mother Emily, who was not well in that year. He was with Emily when she died the following June, 1878.

When word reached Andrew that Emily was dying, he and John and Walter hitched up the wagon and the best mules, and took off as fast as the mules would run, driving day and night, but they arrived in San Jose too late. She had died before he could reach her bedside. The saddened family packed the rest of the household goods and the children's belongings and were soon traveling toward Lompoc to make a new life, sooner than intended. The mules he drove so hard had to be left behind and died a short time later of over exertion. Andrew was kind to his animals and loved horses, but only ran these unmercifully because of his wife's illness.

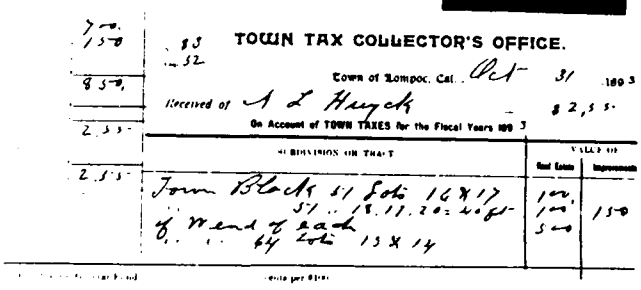
With the help of a male Chinese cook and an elderly lady and the three older boys, Andrew raised the four younger children himself - Sherman, Amy, Ida and Eva.

He was involved in community work - with the Lompoc Valley Land Company, of which he was a director for 2 years, 1878-1880; helped in the financing of the Town Hall (fire station on So. G St.); gave property for school purposes, saw that money was given for graveling of the roads; farmed, had a thresher outfit and crew; had a lumber business, planing mill and grain and flour mill.

Photo at right, Andrew's town property: Grain and Planing Mill and lumber yard (with photographer's tents in it) on east side of unpaved No. I St., 100 blk. Seen across street is roof of fruit dryer. Across Ocean Ave. is Beyerholm's blacksmith shop on 1986 site of Moore's gift shop. Upper middle, first Odd Fellows Bldg., H and Ocean, and Opera House can be seen at back right. Era was 1893 - receipt below, saved by Veda Perkins, shows that year also.

Photo from Harry and Carrol Paaske.

Sherman Huyck was given the grain mill property. His son Ray sold it to Laurence Huyck. Today there are County Offices, a dance studio and Farm House Bingo on the site.



TOWN TAX COLLECTOR'S OFFICE.

Town of Lompoc, Cal., Oct 31 1893

Received of A L Huyck $2,55

On Account of TOWN TAXES for the Fiscal Years 1893

SUBDIVISION OR TRACT | VALUE OF Real Estate | Improvements

Town Block 51 Lots 16 & 17 | 100 | 150

of West of each 51 18.11.20 = 40 ft

by Lots 13 & 14 | 100 | 50

J N Saunders

Tax Collector of the Town of Lompoc.

A.L.Huyck's lumber business, in partnership with E.R.Tutt and William Cantlay (related to Mrs. Frank Huyck), was called General Lumber Dealers and Planing Mill. It was located where the photographer's tents are in the above photo. Huyck owned most of that side of the block, and Tutt's home was on the SW corner of H and Walnut, and Cantlay's home was also on H about where Grossman & Cox law offices are in 1986. So the 3 of them owned most of that block between H and I and Walnut and Ocean.

Lumber dealers Sudden & Jacobs on the NW corner of I and Ocean, bought out their business in 1893, the same year Huyck dissolved his partnership with Tutt and Cantlay. That left only one lumber yard in town. In 1887 Sudden & Jacobs had built a two story building for the Farmers' Union and a public hall on the second floor - that floor was removed years ago and the bottom floor housed Perozzi Hardware until it went out of business this year, 1986. Appropriately, there is an antique market there now. McAdam, McAdam & Smith, and Smith Hardware all preceeded Perozzi on the site.

Left is home of E.R. Tutt, partner with Huyck in lumber business. Was on SW corner of H and Walnut. At right side is east side of Andrew's grain mill on I Street. Pipe behind is on the fruit dryer, west side of I toward J St. Photographer in top picture must have climbed the pipe to take the picture. Tutt's home was later owned by George Harris family. Site is now Walnut Plaza. The old home is being restored on 400 blk. So. J St.

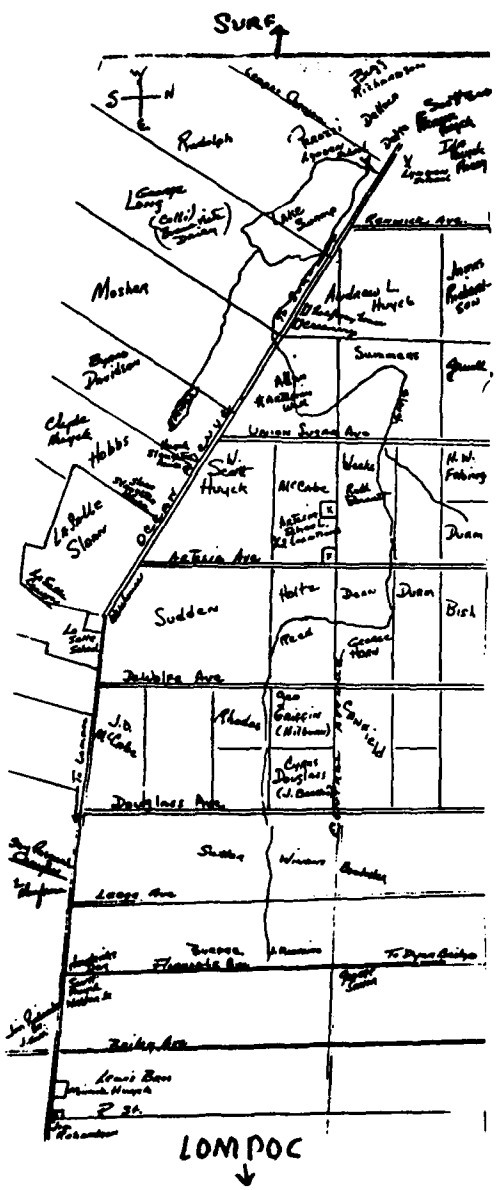
Historical Society photo

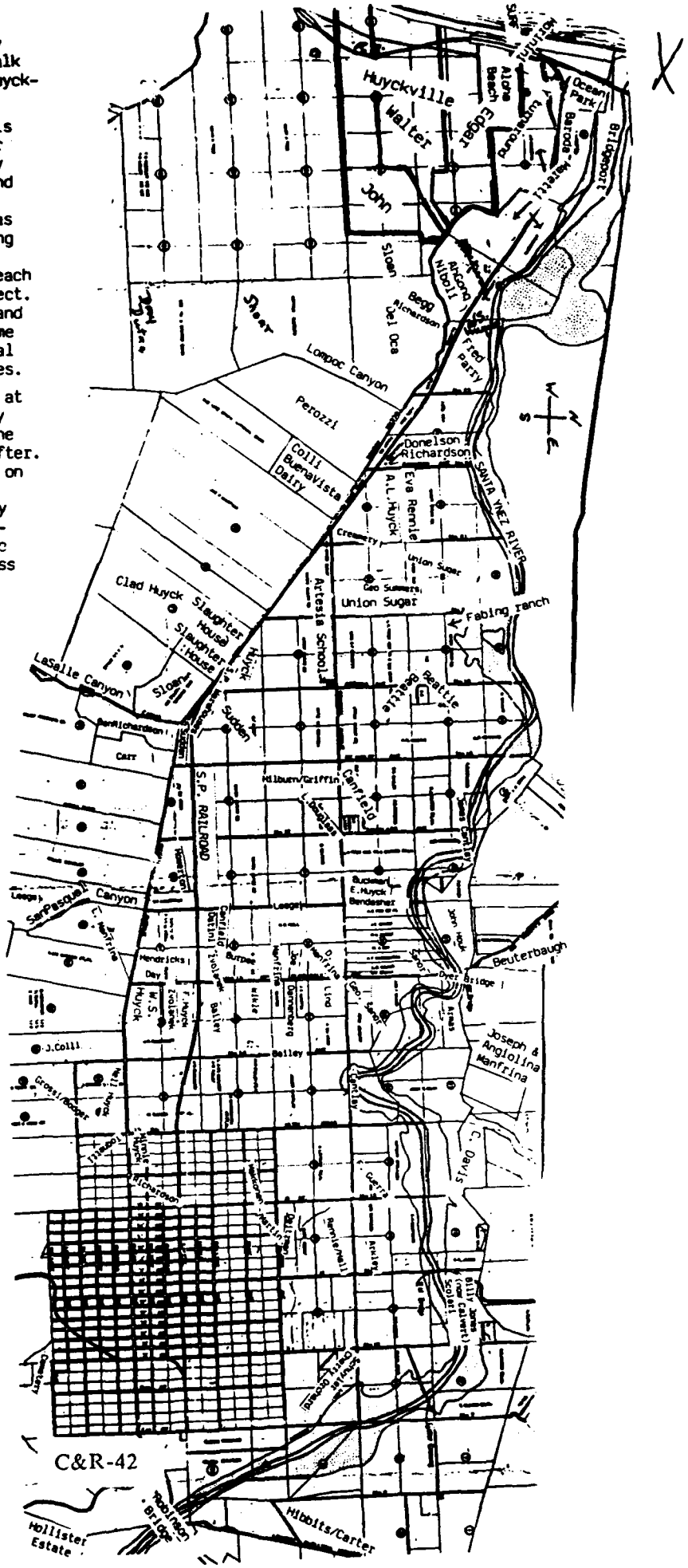
Maps upon which I have pinpointed (hopefully correctly) some of the names and places I talk about in this book. I started out to show Huyckville and got carried away!

If I don't accomplish anything else with this book, at least I will have corrected a major error I have made in every article and story I have ever written about Andrew L. Huyck and Huyckville (newspaper articles and Lompoc Legacy and Lompoc 100 Years booklets). I was somehow under the impression - without having ever checked the map - that Andrew had 3000 acres at Huyckville and gave 1000 acres to each of his 3 older sons. That is vastly incorrect. Each of those squares represents 40 acres, and they add up to about 1040 acres. By the time the railroad took its right-of-way, the total was 1014, making each son's section 338 acres.

Several families lived on the same location at various times. If you don't find your family name perhaps you can find the location by the name of the family living there before or after. I make no claim to being perfectly accurate on these maps.

Barbara Mundell Cabral, of the S.B. County Assessor's office, helped me with the Huyckville map; Veda Perkins told me where people lived in those days, and the rest is by guess and by gosh by me!





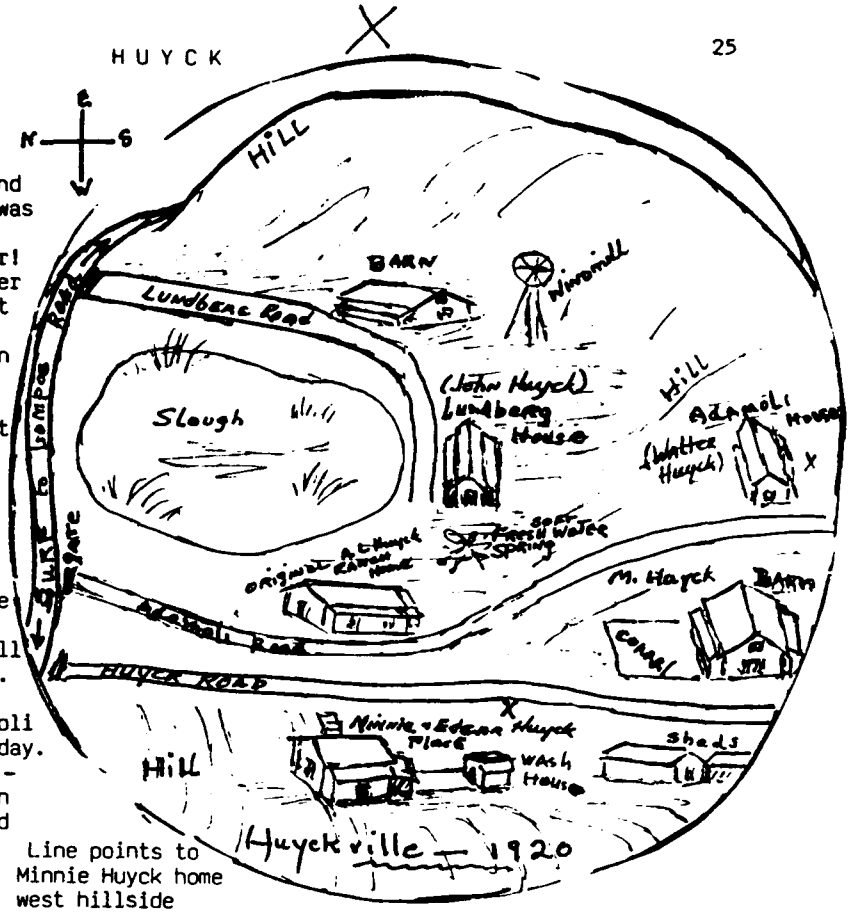
Andrew L. Huyck, continued

HUYCKVILLE, 1920 -- Drawn in perspective and from memory, by Marie Pierce Huyck, as it was when she lived in the little settlement in 1918 to 1921. Drawn in 1984, 67 years later! Looking from the west hillside at her former home (Minnie Huyck's place) toward the east hillside. Ocean Avenue is to the north.

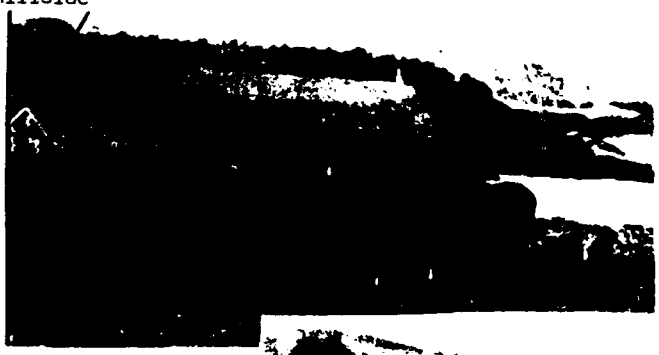
The original A.L. Huyck ranch was built in 1875 while Andrew and 3 sons, Edgar, John and Walter, cleared the land for farming. When Edgar married, his first home was built on a rise on the west hillside. About 1900 the family outgrew the little cabin and he built the one my generation remembers, on higher elevation.

John and Maggie Huyck's home was over on the east side of the valley. Walter and Nellie were on the southern hillside in the middle, and when John Adamoli bought the place he built a new home higher on the hill and painted an Italian flag on the rooftop. It was a landmark for years as you drove along Ocean Avenue to and from Surf. Adamoli flew the American and Italian flags every day.

When Marie and Lloyd Huyck lived at Huyckville the Lundberg family lived in the John Huyck place. They were John and Susan, and children: Ted, Jack, Harold and Susan (who was born there). Marie recalls hearing the Italian music and singing wafting over to their home from the Adamoli place, in that era.

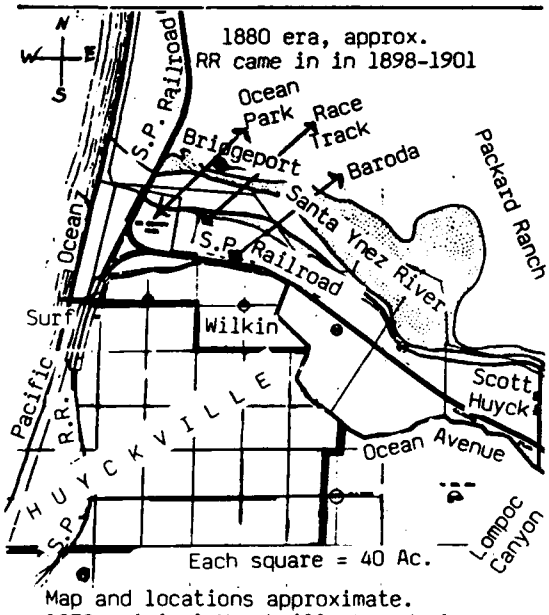


Line points to Minnie Huyck home west hillside



Photos, 1920, from Ted Lundberg's album, looking west from East hillside.

Susan Lundberg is on the disk seat.



Map and locations approximate. 1875 original Huyckville boundaries, which included Surf. Shows locations of RR construction town Bridgeport, racetrack at Ocean Park, Baroda and Scott Huyck's land. In Mar.1924, Huyckville sold to John McIllree and Charles Culton - 338 acres from owner Albert Adamoli; 338 acres from owner Richard Sykes and 338 acres from owner Minnie Huyck. Those buyers in turn sold to J.L.Wyers and wife Irene, who with partner McDonald, took upper half of Minnie's portion for their Aloha Beach project. More on that in Lloyd Huyck section, Pages 59 and 60.

Trivia

There was a cistern up the canyon from which soft water was piped down to the houses. A well for irrigation gave hard water. The spring near the middle of Huyckville had soft water, lots of lillies and water cress.

Surf was "Lompoc Junction" before 1920. It had 2 saloons in 1899 and Baroda had 3 saloons. According to Ronald Adam, Lompoc Editor owner and editor, who wrote in 1930 "low women followed the construction workers"!

Recipe for sticking plaster for the cure of all humors of the skin, such as breaking out, inflamed sores; will cure weak back, spinal affections, cure corns on feet, and is one of the best cures known to plug hollow teeth, which will effectually cure tootheache: had to send in $5 for the recipe and this was written in pencil on one of Andrew's papers:

Mar. 26, 1867

1 lb white rosin
1/2 lb gum Terpentine
1/2 lb Bees Wax
1 lb Mutten Sewet

mix all together over a slow fire then pour out into a pan of wotten (Dutch for water) as soon as cool take out and work until it turns yellow, then fit for use.

Recipe from Andrew's papers saved by Veda Perkins.

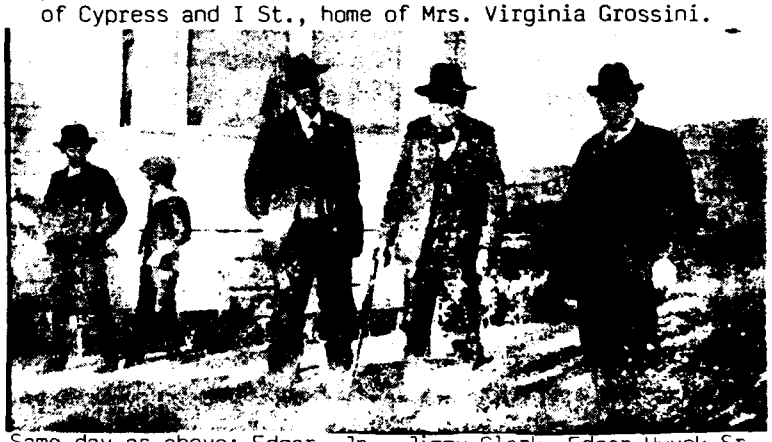
Descendants of Andrew L.Huyck gathered for his 75th birthday celebration, one year before his death in 1901. Taken 11 Nov.1900. Bottom row: Veda Richardson, Babe Huyck, Ray Huyck, Ralph Huyck, Edgar and Lloyd Huyck, Minnie and Alma Huyck, Louise Rudolph, Willie Rennie, Etta Huyck and Donalda Huyck. On porch rail: Gene Huyck. 2nd row: Nellie Huyck, Eva Rennie, Emily Huyck, Jim Richardson, Andy Huyck, his mother Maggie Huyck. Above: Edna Huyck (peaked hat) and parents Minnie and Edgar Huyck. Next row: (doorway) Tom Clark, Jim Rennie; Andrew L., Lucinda Hardwick Deitzman Moody, Sherman and Effie (Hardwick) Huyck. Taken on porch of Andrew's Renwick and Ocean home. House now on SE corner of Cypress and I St., home of Mrs. Virginia Grossini.

"A delightful birthday dinner was given Nov. 11th to Mr. A. L. Huych, at his residence on Ocean Ave. by his daughters Mrs. Jas. Rennie and Mrs. J. N. Richardson in honor of his seventy fifth anniversary. There were forty guests present including his children, seventeen grandchildren, other kinfolks and friends, and as all gathered around the beautifully decorated tables, so beautifully laden with good things to eat, one and all hoped grandpa Huych would live to enjoy many more such birthdays. Music, singing, gift making, and picture taking helped to make the gathering a very happy one, long to be remembered by every one present.

DIED.

HUYCK.—Near Lompoc October 18, 1901, Andrew Lewis Huyck, aged 78 years.

On Friday morning last, Mr. A. L. Huyck, one of the oldest settlers in this colony passed away after a lingering illness. Mr. Huyck was highly respected and leaves two sons and three daughters, all married, to mourn his death. The remains will be taken to San Jose for burial.



Same day as above: Edgar, Jr., Jimmy Clark, Edgar Huyck,Sr., Andrew L., and Sherman Huyck.

Trivia

Lompoc Record, 21 July,1889: Mr. A.L.Huyck is back from recent visit to San Jose whither he had gone to get plans and specifications for a $10,000 mansion to adorn our town." (Renwick Ave. home). 1890: lumber arrives by ship to the Old Landing. 1891: Burdick to build Huyck house in valley. See receipt for work on house, pg. 22.

In 1911 that house had been vacated, owned by Union Sugar Co., then sold and moved into Lompoc to the SE corner of Cypress and I. It was a monumental project moving it, taking over a week with 30 head of horses pulling it. Contractor was Mr. Logan. Movers were Babe and Andy Huyck and Frank Huyck, Charles Ruffner and Charles Dean. They would go a ways until almost dark, pull over at a wider spot on the avenue for the night, and continue the next morning. Traffic was diverted to Central Ave. during the day. At night there was room to pass. I WISH I COULD FIND A PHOTO OF THAT MOVE.

It was called at one time "The White House" or White Apartments, since it was owned by Mr and Mrs. White. It was the Whites who had the place in 1914 era when my mother and her sister Marie and Myrtle Pierce, boarded there in the upper NW room. There were other roomers but they were the only boarders - schoolchildren whose parents lived out on the Hollister Estate on the Santa Rosa. Whites sold to J.G. and Mrs. Martin when there was just a week of school left before summer vacation. So Myrtle and Marie went across Cypress and stayed with Alice Day (Art Day's mother) for that week. At a later time the house was known as the Bean Apartments. Mattie Bean, grandmother of the local Hennessy family, ran the place. Virginia Grossini bought it in the 1950s and it has been her home since.

Mr. Lloyd Huyck and Marie Huyck
601.1 (Camp Cooke-Triangular Division Camp-Aloha Beach-Tract 100-229)
LA PADRE-P3.10
23 September 1944.

The above estimate of the compensation for the taking of this land is for the surface rights only, subject to a restriction on the right to explore the property for the duration of the present emergency and six months thereafter.

According to the Preliminary Certificate of Title furnished this office at the time of the taking of the above described land by the Government, Irene Wyers Smith was the record owner of Parcel 1 thereof, the remainder thereof being vested in the following named persons according to the following described interests:

Cedric Huyck, as to an undivided 1/8th interest
Edgar Huyck, as to an undivided 1/8th interest
Lloyd Huyck, as to an undivided 1/8th interest
Edna Moody, as to an undivided 1/8th interest
Emily Horn, as to an undivided 1/8th interest
Etta Day, as to an undivided 1/8th interest
Alma Lewis, as to an undivided 1/8th interest
Alma Scott, as to an undivided 1/16 interest
Albert MacKinzie, as to an undivided 1/16 interest
As to Parcel 2

Minnie Huyck's Original Purchase

Alvin Lewis and Alma Lewis, his wife, as joint tenants, as to Parcel 3

A. H. Pierce and Rosa Pierce, husband and wife, as joint tenants, as to Parcel 4

Cedric Huyck and Eva Huyck, his wife, as joint tenants, as to Parcel 5

Lloyd Huyck and Marie Huyck, his wife, as joint tenants, as to Parcel 6

George P. Titcomb, by deed to him dated August 17, 1929, as to Parcel 7 UNKNOWN

Ira D. Mullin, as to Parcel 8

-3-

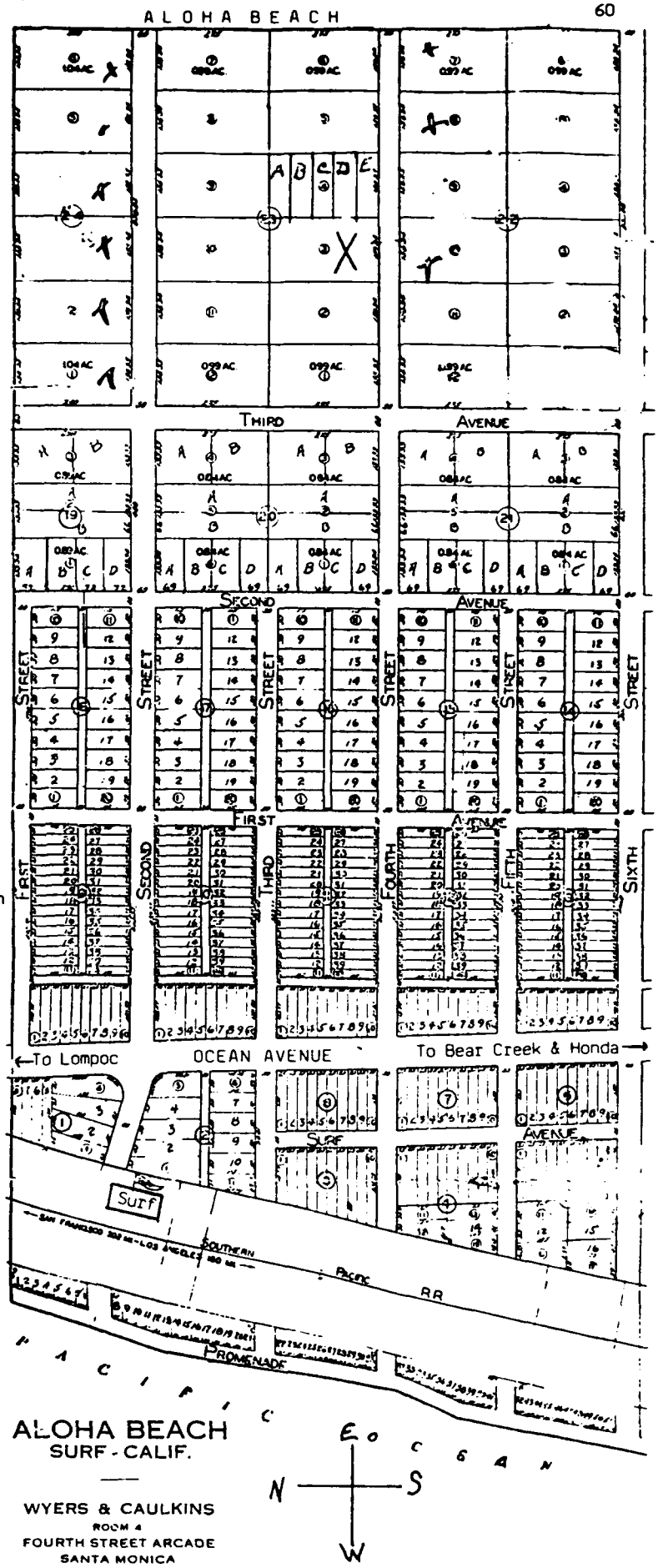
Listed above are owners of the 107.45 acres of Lot 3, Block 23 (marked by X). So far as I can determine, a total of $11 was paid and divided among all the 8 parcel owners! Owners do have the mineral rights. If anything ever comes of this in the way of minerals it'll take some monumental bookwork to figure out who gets what!

Left----map of blocks and parcels that was for sale at Aloha Beach. Many Los Angeles people bought lots. As you can see from map, there were even ocean frontages for sale. The whole area once belonged to Andrew L. Huyck, then to his son Edgar, and was inherited by Edgar's wife Minnie and her children, who sold it in the 1920s. Property was later owned by John Livingston Wyers and wife, Irene. At left, map shows Wyers' partner as Mr. Caulkins.

Map copied from one of Lompoc Valley Historical Society's collection of memorabilia.

Old Lompoc residents knew this dream of Wyers' would never work, but prospects of oil made many of them buy property. Those from Los Angeles and other areas thought maybe the resort might work but were also prompted by oil prospects. The above bunch bought back property just to have a bit of the ranch again. The Aloha Beach project died on the vine, so to speak, within a short time.

Picnic on rocks and driftwood at Ocean Park, 1915 era



Lloyd and Marie (Pierce) Huyck, continued

From 1932 to 1940 Lloyd was Superintendent of the City of Lompoc Sanitation Department. At that time he sold his horses and I recall going to the Lompoc train depot with him and the horses and sending them off by train to a pasture somewhere up north. It was a sad day, since I had grown up with those horses.

Camp Cooke began its takeover of coastal property and building up of its military installation in 1940. Lloyd began work that year in Civil Service, in road construction and handling of heavy road equipment. He was a builder of all the original roads and named them after the States of the Union. He also built the road to the top of Mt. Tranquillion. At Camp Cooke, in Post Engineers, he worked under Tony Armas. Lloyd was labor foreman of roads, Ninth Service Command Post Engineers. April 1944-45 he was Engineer of Heavy Equipment Grader Operator, and had a very good efficiency rating.

His helpers were German and Italian Prisoners of War who were being detained at Camp Cooke during WWII. Some of them were skilled in road and bridge construction. The prisoners liked Lloyd. He was always polite and considerate to people who worked with him, and it didn't make any difference to him that they were prisoners. They were human beings. He got some letters from several of them when they returned to their countries after the war.

In 1947 while working with his heavy equipment in the outreaches of the camp, he saw a truck approach, stop, and a man scoot out of it into the brushy area. Knowing it was a military prisoner (U.S.Army) escaping, he hailed a nearby jeep, jumped in and drove back to headquarters to report the escape. They didn't have the network of radios they have today! Camp officials caught the escapee. Turned out that at the cabinet and woodworking shop that the prisoners worked in, some of them built a false bottom in a truck. If that escapee had succeeded, the prisoners would have had a good thing going! But they probably would not have known where to escape to, not knowing the terrain nor any of the area. Officials would not allow Lloyd's name to be released for fear of retaliation from those who helped build the escape cover. Col. E.A. Everitt, commandant of the U.S. Disciplinary Barracks, commended him for his alertness and remedial action, in a letter written 17 Nov. 1947. That was the first "escape" from the USDB.

After Camp Cooke was deactivated Lloyd transferred to the USDB, where he was Field Crops Supervisor to Oct., 1958, then was in Prisoner Training Section Vocational Farm Branch as Crop Specialty Farmer Head Foreman. When the Federal Government took over the Disciplinary Barracks, he continued in the same capacity at the Federal Correctional Institution until he retired, 1960, which he was forced to do because of hearing deterioration due to the detonating of old live ammunition on Camp Cooke after the war games with the training regiments. It wasn't thought safe for him to be around prisoners with impared hearing. At the time of his death he was a school crossing guard at H and Ocean. He died of a heart attack while gardening in his lots next to the house one Saturday morning, Mar. 31, 1962, at age 66.

Marie with her great grandchildren 1984. Bryan, Deena, Donica and Jodi and Marie.

Marie and Lloyd, 1961

MARIE PIERCE HUYCK

Born in Santa Barbara, Marie Pierce attended school there until at age 13 her family moved to Lompoc area. "Our moving to Lompoc was the beginning of a new way of life for all of us. My father had been a businessman, used to association with lots of people He had many friends and relatives in Santa Barbara. After moving to Lompoc he hardly left the dairy, working every day, into the night. My mother did the driving back and forth from town and my sister and I had never been away from home before."

Grandpa Pierce (Alfred) worked for the Hollister Estate, and they transferred him to their dairy property on the Santa Rosa. Marie and her sister Myrtle could have gone to the little country school across the river, Santa Rosa School, but, with the river running full most of the time, and her parents anyway wanting them to be educated in the town schools, they paid board for the two girls, who lived in town during the week, coming home on the weekend.

"We were terribly homesick in town. We walked a long distance to school from our landlord's residence, SW corner of E and Locust (Jon and Diane Phelps have restored that old home into a beautiful place today). After a while at the Edrington's we moved in with Mrs. Ivory and later with Mr. and Mrs. Andersen, a nice old couple who ran a boarding house in the old Andrew L. Huyck house, Cypress and I Street. We lived in it shortly after it was moved there. We had the northwest bedroom upstairs. The very last week we were to be there the place was sold and since we had only one week to go until school was to be out, we went across the street and stayed with Mrs. Day (Art Day's mother). We wished we had known about her the whole 5 years we had to board in town."

On Friday after school Rosa would pick the girls up and drive them home to the dairy. Then on Monday morning she would take them back in, and while she was in town would sell her eggs and butter. "Riding back and forth from school in the buggy in the cold winter - really most of the year - was a cold experience. Ice all along the roadside. We were cold and stiff when we got in town for school. In winter the road was very bad and the big chalkrock grade on the Santa Rosa Road was very slippery, and the mud, in other parts, was deep. My father, in bad weather, would ride on horseback to meet us and lead the way with a lantern, since it would be dark before we got home. (More on Pierce dairy in Alden Lewis story).

"I graduated from high school the year my folks moved into town, 1915, and then went back for another year, taking a business course. Myrtle and I made our own clothes after we moved from Santa Barbara, and bought most of our materials at Rudolph's Store. After my extra year in school Lucy Rudolph asked me to work in their store. I was bookkeeper for them about a year. Sometimes I stayed with the Bendasher girls who were renting a house at 215 So. H St. From there I would go to the store at 7 am and open it up. I really enjoyed working there. All the people there were my friends and we had a lot of fun."

"Then my best friend's father, Doc Lewis (my friend was Maude), who had "Doc and Bill"s Garage (where Lompoc Record office is today), heard that the bank was looking for a girl bookkeeper. There were only men in the bank in those days. So Mr. Lewis recommended me for the job. I became the first girl employee of the First National Bank of Lompoc. It had just changed over from the Bank of Lompoc and Farmers & Merchants Savings Bank (site of present Lilley Bldg.) I remember I had to stamp all the paper work with the new bank name. This was 1917. I had just started going with Lloyd Huyck, and after he returned from Fort Lewis, having received an Honorable Discharge from the military due to an old eye injury, we decided to get married. So I quit my job in April, 1918, and recommended my sister Myrtle for the job. She became the second girl employee of that bank. They held the job for her until she graduated from high school in June of that year." The next year, 1919, the bank sold to the Bank of Italy, and Myrtle continued working until she married in 1920." Women's Lib would have loved that story.

RESPONSE TO COMMENTS
FROM
MYRA MANFRINA

MM-1 Comment noted. The revisions have been made in the EIS errata to the Distribution List.

July 24, 1987

Melissa J. Mooney
URS Corporation
1421 Chapala St.
Santa Barbara, CA 93101

RECEIVED
JUL 27 1987
11:45 AM.

Dear Melissa

The EIS prepared by URS is a quality product containing complete and accurate information especially considering the constraints under which it was prepared (ie) programmatic documentation as opposed to a project where most parameters are known. From a philosophic viewpoint I oppose the proposed action since wetlands and coastal dunes are not excluded from development. However, pragmatically it is the logical decision for a variety of reasons. I trust the public will be informed through publication of a seperate EA(s) if these areas are selected to suffer impacts from oil development. CP-1

I have enclosed several documents for your perusal which can supplement your biological data. The insect paper is a very rough draft but contains important information should the dune system undergo oil exploitation activities. Information contained in Bionetic's special interest plants paper and my review of it can augment the EIS table on plant candidate species for Federal protection. CP-2

Addressing the Biological sections of the EIS I have the following comments:

1) Pg. 3.4-3 Isn't the "rare slug" found on Tranquillon Peak really just a banana slug. What is your source for that statement. CP-3

2) Pg. 3.4-5 Invertebrate data requires some corrections.

- "Morro Bay Blue Butterfly" I believe "correct" common name is Morro Blue Butterfly.
- Wandering Skipper is Panoquina errans.
- Pseudocopaeodes eunus eunus common name Eunus Skipper? I'm am not sure this is even a Santa Barbara county insects. CP-4
- Helminthoglypta traski coelata isnt this a San Diego county species. - contact point for further information is Dr. Barry Ross (415) 387-8538.
- See insect paper for further information

pg. 3.4-6 Southern extent for cirsium rhothophilum on VAFB is Rocky Point. CP-5

pg. 3.4-8 Least terns also nest in the coastal foredunes at SLC as well as the Santa Ynez River sand bar. CP-6

Pg. 3.4-8 Peregrine falcon sighting this year and late 1986 include Jalama beach area (4), SLC-6, and Purisima Point area (Juv.). CP-7

pg. 3.4-24 Elephant seals (generally pups of the year) haul out at Rocky Point and Purisima Point not Point Arguello.

~~Hab~~ Harbor seals ~~breed~~ haul out, pup and breed at Rocky Point and Purisima Point (400+ and 200+ animals respectively in 1987) CP-8

pg. A-50 Revegetation plant species should stipulate native or approved naturalized species. CP-9

pg. 1 I believe it is incorrect to list Air Force personnel under "List of Preparers" they should have their own heading such as "Reviewers". CP-10

Sincerely

Chuck Perry

816 West Fir Ave.

Lompoc, CA. 93436

RESPONSE TO COMMENTS
FROM
CHUCK PERGLER

CP-1 Comment noted.

CP-2 We appreciate receiving the insect information. It has been incorporated in Table 3.4-1, as appropriate. Additional site-specific data will be incorporated by VAFB staff as the biological monitoring program studies are completed.

CP-3 Information on the slug found on Tranquillon Peak was provided by Al Naydol at VAFB. We did not find any other information about that species.

CP-4 The common name, "Morro Bay blue butterfly," in Table 3.4-1 is the name under which this taxon was listed as a category 2 candidate for listing by the U.S. Fish and Wildlife Service, although "Morro" was misspelled as "Moro" (*Federal Register*, May 22, 1984). The U.S. Fish and Wildlife Service recommends use of this common name until a revision of the list of federal candidate taxa is completed and published, probably sometime in 1988 (Jeurel Singleton, USFWS, personal communication).

The common name, "wandering skipper," for *Pseudocopaeodes eunus eunus* in Table 3.4-1 is in accord with the published listing of this taxon as a category 2 candidate for listing by the U.S. Fish and Wildlife Service (*Federal Register*, May 22, 1984). Although known primarily from interior alkaline marshes or sinks, this skipper could occur on VAFB (Jeurel Singleton, USFWS, personal communication). The common name, "salt marsh skipper butterfly," is applied to *Panoquina panoquinoides errans* by the U.S. Fish and Wildlife Service (op cit); Table 3.4-1 follows this nomenclature. Lepidopteran taxonomy, including the use of common names, is continually undergoing revision, and nomenclature often varies among regions, investigators, and agencies. We have attempted to minimize ambiguities by being consistent with the official listing of these taxa by the U.S. Fish and Wildlife Service.

The snail, *Helminthoglypta traski coelata*, is known from San Diego County and along the coast as far north as Santa Barbara and San Luis Obispo counties (Jeurel Singleton, USFWS, personal communication).

CP-5 This information has been added to Table 3.4-1. Please see the EIS errata for section 3.5, Biological Resources.

CP-6 The text has been changed to reflect the nesting location of least terns at Surf. Please see the EIS errata for section 3.5, Biological Resources.

CP-7 These peregrine sightings have been added to the text. Please see the EIS errata for section 3.5, Biological Resources.

CP-8 The text and database have been changed to include the marine mammal information provided. Please see the EIS errata for section 3.5, Biological Resources.

CP-9 The text has been revised to include approved naturalized plants. Please see the EIS errata for section 3.5, Biological Resources.

CP-10 Please see page 1 of the "List of Preparers" in the Appendix section of the DEIS. U.S. Air Force personnel are listed under the heading "Air Force Environmental Reviewers."

STATE OF CALIFORNIA—THE RESOURCES AGENCY GEORGE DEUKMEJIAN, *Governor*

CALIFORNIA COASTAL COMMISSION
631 HOWARD STREET, 4TH FLOOR
SAN FRANCISCO, CA 94105
(415) 543-8555

July 23, 1987

Colonel William R. Newell
1 STRAD/ETD
Vandenberg AFB
CA 93437-5000

RE: Comments on Draft Environmental Impact Statement for Mineral Resources Management Plan for Vandenburg AFB, California

Dear Colonel Newell:

Attached are Coastal Commission staff comments on the draft Environmental Impact Statement (EIS) for the Mineral Resources Management Plan (MRMP) for Vandenburg Air Force Base. We appreciate the additional document copies you have provided our offices.

These comments, listed by issue area, request that additional impact issues be addressed in the Final (EIS). These comments also list mitigation measures that should be considered in the EIS to address adverse impacts on coastal resources. Further, comments are included on your Mineral Resources Management Plan.

As you may know, exploration, development and production of oil and gas resources within the coastal zone require a California Coastal Management Program consistency review by the California Coastal Commission. These same activities located outside the coastal zone but affecting the coastal zone may require consistency review in certain cases. The Final EIS should note these requirements and identify the coastal zone boundary on all maps and figures. CCC-1

Thank you for the opportunity to review your EIS. If you have any questions please call either me at (415) 543-8555 or James Johnson in our Santa Barbara office at (805) 963-6871.

Sincerely,

Susan M. Hansch

Susan M. Hansch, Manager
Energy and Ocean Resources Unit

cc: Dr. Gordon F. Snow, Assistant Secretary of Resources
Robert Almy, Acting Director, Santa Barbara Energy Division

COASTAL ISSUE COMMENTS

General

Minerals Resource Management Plan (MRMP)

(1)	p. A-94	The MRMP establishes an implementation process to standardize the application process for oil and gas development on Vandenburg AFB. The Coastal Commission has federal consistency review authority over this type of development within and beyond the coastal zone. How will the Commission's consistency authority be incorporated into the process? The MRMP does not include a procedure to allow the Air Force to submit the MRMP to the Commission for consistency certification. In addition, the MRMP does not include a Commission consistency certification for the approval of individual projects through the final Memorandum of Agreement between the Air Force and the applicant. Please include information on these issues in the MRMP. We would like to review this information prior to its completion to assist the Air Force in incorporating Coastal Commission responsibilities into the MRMP.	CCC-2

Land Use

MRMP

(2)	p. 6.6-9 Section 6.6.3.4 Local Regulations, policies and plans Also p. A-31 Section 6.4.2.4	The discussion on regulatory authority needs to be more comprehensive. It is true that local plans and policies are generally not binding on federal property. However, the the California Coastal Commission has consistency review authority over federally licensed or permitted activities within the coastal zone and those activities beyond the zone which affect the coastal zone. In addition, local city and county regulations would be applicable to any oil and gas development that is proposed outside the VAFB boundaries as result of development.	CCC-3
(3)	p. 6.6-15 Section 6.6.5 Guidelines and Management Practices	Environmental review procedures for reviewing specific oil and gas development proposals should be discussed in this section. For example, the document should clearly state whether the applicant's required impact analysis discussed under this section would be generated from future NEPA/CEQA documents.	CCC-4
(4)	p. 6.6-17 Section 6.6.5.1 Second bullet para.	It should be made clear whether the applicant's mitigation plan will be generated from future NEPA documents that would provide mitigation measures for significant impacts.	CCC-5

Draft EIS for MRMP

(5) p. 3.7-1 Section 3.7.2 Region of Influence	Since VAFB is located in Northern Santa Barbara County, there may be certain socio-economic effects on San Luis Obispo County. This section does not include any discussion related to San Luis Obispo communities. Has it been determined that there would be no socioeconomic impacts to this adjacent county? If so, evidence providing such should be submitted. The discussion on Housing (p.3.7-6) includes San Luis Obispo statistics.	CCC-6
(6) p. 3.6-1 Section 3.6.4 Existing land use conditions	If off-base areas will be affected by VAFB oil and gas development, then the existing land use conditions related to off-base areas should be included in this document.	CCC-7
(7) Sec. 4.6.2.1.1 p. 4.6-3 Residential	The Division of Oil and Gas is not the only agency that regulates development wells in residential areas. The text discussion on the regulation of development wells in residential areas needs to be expanded to include local government regulations involving general plans, local coastal programs, and zoning ordinances.	CCC-8
(8) p. 4.6-1 Section 4.6.1 and 4.6.1.1	The text indicates that a land use impact is considered significant if it involves an action that conflicts with applicable federal, state, or local laws, standards, regulations, or policies. The Alternative Impact discussion (p. 4.6-6 through p. 4.6-8) does not include any analysis of conflicts to laws, standards, regulations or policies including Coastal Act policies. Land use impacts related to these conflicts should be addressed in the document if used as significant criteria.	CCC-9
(9) p. 4.6-6 through p. 4.6-8 Impacts to Alternatives	Land use impacts to VAFB area are generally discussed in these sections. However, the level of land use impacts to off-base areas based on different alternatives is not addressed in these sections. The level of oil and gas development on VAFB will have varying levels of impact to off-base areas.	CCC-10
(10) p. 4.6-6 and 4.6-7 Mitigation Measures 4.6.2.2.2, 4.6.2.3.2 4.6.2.4.2	Under each Alternative Section, it indicates that there are no mitigation measures other than the standards and guidelines in the MRMP. It should be pointed out that additional mitigation measures may be required with specific oil and gas developments that require additional NEPA analysis.	CCC-11

(11) p. 4.6-8 Section 4.6.4 Cumulative Impacts First Paragraph	The text indicates that cumulative impacts result from incremental impact of the project when added to other closely related present and future projects. It is difficult to determine the cumulative impacts resulting from the alternative scenarios since there are no detailed cumulative assessments of the Alternatives and other projects. Please expand discussion to address these issues.	CCC-12
(12) p. 4.6-8 Section 4.6.4 Second Paragraph	It is not clear whether the cumulative development scenario includes all Alternatives. Variations in Alternatives would change cumulative impact assessments. Please clarify.	CCC-13
(13) p. 4.7-7 Section 4.7.2.1.2 Mitigation Measures	Even though the MRMP does not specify mitigation guidelines, additional environmental analysis required on individual projects would have to specify mitigation measures as required under NEPA and CEQA. This discussion should be included under this section.	CCC-14

Air Quality

MRMP

(14) p. 6.3-19 Section 6.3.4.2	Coastal Act requirements should be identified and outlined in the State requirement section. These requirements include Public Resource Code sections 30250(a), 30105.5, 30253(3), 30260 and 30262.	CCC-15

Draft EIS for MRMP

(15) p. 4.3-2 Section 4.3.1.2.1	Hypothetical development scenarios should be expanded to consider emissions from oil processing facilities and pipeline transport even if the emission sources are located beyond Vandenberg AFB boundaries. The hypothetical single well development scenario is not adequate to determine compliance with applicable air pollution standards. Air emissions originating beyond Vandenberg AFB can cross base and coastal zone boundaries to affect the coastal zone.	CCC-16
(16) p. 4.3-5 Section 4.3.2.1	The MRMP requires that additional offsets be held in reserve so that sufficient emission reductions will be available if future updates of the County's Air Quality Attainment Plan show that higher offset ratios are needed. Will future development be constrained if these offsets are held in reserve? If so, this potential impact should be identified in the EIS.	CCC-17

(17)	p. 4.3-6 Section 4.3.2.1.1	The Coastal Act requires that adverse impacts be mitigated to the maximum extent feasible. Additional mitigation measures reducing ozone precursors should be identified in the document. The other methods of oil transportation causing higher impacts levels should be identified in the text.	CCC-18
(18)	p. 4.3-6 Section 4.3.2.1.1	Oil processing facility emissions generated beyond Vandenberg AFB boundaries may produce the highest potential for significant impacts, and thus these impacts should be assessed as a project component. Reducing nitrogen dioxide and reactive hydrocarbons is important, since north County may be redesignated as a non-attainment area for ozone due to recent measured violations of federal ozone standards (S-4) and mineral right holders may develop petroleum reserves using a development scenario different from the document's hypothetical scenario. The Coastal Act requires that adverse impacts be mitigated to the maximum extent feasible. Mitigation measures should be identified in the EIS such as electric grid power and gas turbine generators equipped with selective catalytic reduction, and other advanced pollution control technology.	CCC-19
(19)	p. 4.3-13 Section 4.3.2.1.3	What is the basis for the development scenarios of 100, 200 and 300 wells and the assumption that 25 percent of the wells will be drilled in the first year? Is the 300 well scenario considered a reasonable worst case?	CCC-20
(20)	p. 4.3-23 Section 4.3.4	The cumulative impact section concludes that significant cumulative impacts can likely be mitigated to insignificance. What's the basis for this conclusion? Please specifically describe evidence in the document.	CCC-21

<u>System Safety</u>

<u>MRMP</u>

(21)	p. 2-1	The MRMP states that none of the base is excluded from consideration for oil and gas development. However, one of the five goals and objectives states: "Identify areas assessed as unsuitable for oil and natural gas development due to potential conflicts with Air Force mission requirements or environmental resource sensitivity."(p. A-2) Please clarify this difference.	CCC-22

Draft EIS for MRMP

(22)	p. S-1	We understand the purpose of this document is to review the impacts, mitigations and alternatives of the MRMP. It is unclear if future oil and gas development will require a site specific environmental document pursuant to NEPA and CEQA. Please describe the NEPA and CEQA requirements for future oil and gas development on Vandenburg AFB in this document.	CCC-23
(23)	p. S-4 first paragraph	The document states that small oil spills are considered less likely to occur than major spills. Please correct what appears to be a typo.	CCC-24
(24)	p. 4.11-14 Section 4.11.2.1.2	The document recommends a mitigation measure creating a 300 foot separation of oil and gas development from populated areas to eliminate the public health and safety impact from a fire at the site. However, the danger of a sour gas blowout would not be eliminated. According to page 4.11-12, "A blowout of sour gas could have severe or disastrous impacts on the health and safety of the public depending on the volume of gas released, the H_2S concentration of the gas, and the location of the well relative to populated areas". This mitigation measure needs to be reconsidered and expanded to include reducing impacts resulting from sour gas blowouts. The EIS is unclear on the issue of pipeline transport of oil vs. truck transportation of oil. Does the MRMP require pipelining where feasible or does the EIS only recommend it as a mitigation measure? Please clarify this issue in the appropriate sections of the MRMP and EIS.	CCC-25

Geology

MRMP

(25)	p. 6.1-10 Section 6.1.2.3.1	What types of development are planned for the landslide areas? What is the size and type of these landslides, in terms of cubic yards and failure type?	CCC-26
(26)	p. 6.1-24 Section 6.1.5.1	What are the proposed minimum bluff top setbacks for any development on the bluff top? The development should be setback from the blufftop an adequate number of feet for protection during the life of the development without the need for a shoreline protective device.	CCC-27

Visual

Draft EIS for MRMP

(27) p. 4.9-7
Section 4.9.2.1.1

Areas within the expanded region of influence that could be affected by oil and gas development should include: Jalama Beach County Park and vicinity; and the two mile section of beach adjacent to Ocean Beach County Park now open to the public as a result of Commission review of the Air Force Space Shuttle Program. CCC-28

Water Resources

Draft EIS for MRMP

(28) p. 4.2-5
Section 4.2.2.1.1

The EIS identifies project water demand as a serious impact because the groundwater basins are in overdraft. The MRMP includes a policy to require each developer to address cumulative impacts. Cumulative impacts and mitigation measures should be identified in the MRMP now, since water does not appear to be available for most development. If desalination or trucking of water are the only immediate sources, the MRMP and EIS should identify these sources and estimate water demand. If water is not available, the MRMP and EIS should note that oil and gas development may not be allowed.

This MRMP policy above is designed to meet the objective that oil-related development not adversely affect surface or groundwater quality nor strain already overdrafted groundwater supplies. However, the EIS states that although the MRMP discourages use of any overdrafted groundwater basins it will not have the authority to prevent overdraft of basins within Vandenburg AFB. The EIS further states that overdraft may result from oil and gas development. This statement is inconsistent with MRMP policies and possibly the California Coastal Act. The implementing policies discussing water supply plans would be submitted to the California Water Resources Control Board and the County of Santa Barbara for review. These plans should be identified now in the MRMP and analyzed in the EIS. These plans and policies should be reviewed by the Commission in the federal consistency process. Until these inconsistencies are resolved, staff recommends that alternative four, prohibiting oil and gas development, be implemented at least until the MRMP shows how water basin overdraft problems are to be solved. CCC-29

(29)	p. 4.2-8 thru 4.2-10 Section 4.2.4.1	The projected water demand for Vandenburg AFB is too high and needs to be updated (Earth Science Associates, 1982). These projections should be revised downward due to Vandenburg AFB water conservation gains and reduction of water demand for the Space Shuttle program.	CCC-30

RESPONSE TO COMMENTS FROM THE CALIFORNIA COASTAL COMMISSION

CCC-1 Federal property is excluded from the California coastal zone; however, any development on federal property which directly impacts the coastal zone will be submitted to the California Coastal Commission for consistency review. The initial decision of whether a specific development proposal directly impacts the coastal zone should be made only after consultation with the California Coastal Commission. This requirement is found in Air Force Regulation 19-9.

CCC-2 The approval of the MRMP itself will not allow any development. It only establishes a review process for future proposals and therefore does not contemplate a consistency review for the plan itself. The review process will include a requirement to consult with the California Coastal Commission on the question of direct impacts and seek consistency review if there is a direct impact. This requirement is found in Air Force Regulation 19-9.

CCC-3 Further discussion of land use regulations, policies, and plans is provided in Appendix B, section 2.5.4 of the DEIS. The additional comments that you have provided regarding applicability of plans and policies are generally accurate. With regard to coastal zone requirements, Air Force Regulation 19-9 provides further clarification: "the Act encourages coastal states to develop Coastal Zone Management (CZM) programs with appropriate affected government agencies, including the Department of Defense (DOD), and to exercise authority over coastal zone lands and waters according to approved programs. Section 304(a) of the Act excludes from the coastal zone all federal lands and those held in trust by the federal government. However, section 307 of the Act provides that federal agencies that conduct activities, including development projects, which directly affect the coastal zone must make sure that these activities are, to the maximum extent practicable, consistent with approved state CZM programs." It is the responsibility of the U.S. Air Force to consult with the Coastal Commission in order to determine if an activity or project directly affects a coastal zone. A judgment of "no direct effect in the coastal zone" means there is no need for the U.S. Air Force to prepare a consistency determination for review by the Coastal Commission.

CCC-4 The MRMP/EIS is a programmatic document and is not site specific. Each proposal submitted in accordance with the MRMP will be evaluated for NEPA compliance. If the impacts of a given proposal have been adequately considered in a previous environmental analysis or EIS, the proposal may not require further documentation in accordance with CEQ Regulations and Air Force Regulation 19-2. If not, a site-specific environmental analysis will generally be required to support a Finding of No Significant Impact (FONSI). If it is clear that from a given proposal there will be significant impacts which have not been adequately considered in a previous EIS or if the site-specific environmental analysis does not support a FONSI, then a site-

specific EIS will be required for that project. All of the above NEPA documentation will be developed in accordance with applicable regulations and will, where required, include state and local coordination and public comment. It is understood that future proposals may require NEPA or CEQA documentation.

CCC-5 Please see the response to comment CCC-4.

CCC-6 It has been determined that no socioeconomic impacts would be expected in adjacent San Luis Obispo County. The discussion of temporary housing resources in section 3.7.4, Existing Conditions, on page 3.7-6 of the DEIS includes San Luis Obispo hotel and motel statistics because, although these hotels and motels would not be impacted by the proposed project, they are considered part of the central coast region by Pannel, Kerr, and Forster, a major hotel/motel industry consulting firm. Statistics and recent trends in new construction and occupancy levels are discussed cumulatively for the entire region by this firm, hence these statistics are presented in the EIS in the same manner.

CCC-7 For analytic purposes, off-base areas that could be affected are included in the region of influence. Until specific developments are proposed, impacts on off-base locations cannot be known. Therefore, it would not be useful to describe the existing conditions in off-base areas until the impact evaluations can be conducted.

CCC-8 CDOG requirements would be applicable to wells drilled on VAFB, whereas local government land use regulations would not be. Wells drilled in off-base residential areas are not the subject of the MRMP or DEIS since they are not within the jurisdiction of VAFB and would not be a probable result of on-base development (e.g., additional processing capacity).

CCC-9 The DEIS evaluates the environmental impacts of the implementation of the proposed MRMP and its alternatives. The significance criterion that relates to regulatory conflicts would be applied to specific development proposals in accordance with the MRMP procedures (section 6.6.5.1).

CCC-10 With the exception of Alternative 4, which would entirely exclude oil and gas development on VAFB, neither the proposed action nor any of the alternatives would generally preclude development in the highest potential oil reserve areas (i.e., those which are concentrated in the northeast portion of VAFB). Areas excluded by the various alternatives tend to be located in the western portions of the base, those farthest from communities near VAFB, and, therefore, the alternatives would not result in off-base land use effects significantly different from the proposed action. The alternatives relate to *locations* rather than *levels* of development. No production levels have been estimated for the locational alternatives.

CCC-11 Please see the response to comment CCC-4.

CCC-12 Different production levels have not been estimated for the alternatives presented in the DEIS because these are *locational* alternatives and would not dictate specific production levels. Figure 4.7-1 illustrates a feasible cumulative oil production scenario for the Santa Maria basin with and without VAFB oil production. The figure indicates that without the VAFB activity, future Santa Maria basin oil production will continue to gradually decline through the year 2000. With VAFB activity, future production will level off at approximately the 1987 level. (Also see the response to comment CCC-13.)

CCC-13 The cumulative development scenario referred to in the second paragraph of section 4.6.4 is a "most likely" feasible scenario for mineral development on VAFB that has been developed for use in the DEIS cumulative analysis. (No specific long-term oil development plans have been submitted by the oil companies.) The scenario distributes wells and pads in sections of the base according to their potential for mineral development, without giving any consideration to environmental or mission constraints or to management practices described in the plan. Implementation of either the proposed action (the MRMP) or the no-action alternative could result in development in this range. Implementation of any of the remaining alternatives would probably reduce this production level; however, exclusion of surface areas from development would not necessarily reduce production levels since different drilling techniques could be used (e.g., slant drilling) if the potential oil reserves warrant the greater expense.

CCC-14 Please see the response to comment CCC-4.

CCC-15 Comment noted. These sections are summarized in the regulatory requirements of the FEIS (see the EIS errata).

CCC-16 As stated on page 4.3-1 of the DEIS, the analysis of a hypothetical single-well scenario cannot accurately assess air quality impacts from petroleum development without specific design information from the resource developers. This scenario, however, is based on reasonable assumptions. The analysis of this scenario in the DEIS is governed by the guidelines of the MRMP, which outlines acceptable impacts and mitigations. The guidelines ensure that the applicable air quality standards will be protected for the duration of oil development on VAFB.

With regard to the analysis of emissions from oil processing facilities and pipeline transport, please see the response to comment SBAAir-3.

CCC-17 This issue is identified on page 4.3-19, paragraph three of the DEIS.

CCC-18 Additional BACT measures for ozone precursors provided by the Santa Barbara County APCD are included in the FEIS (see the air quality errata).

The two expected methods of oil transport on VAFB, by vacuum truck and pipeline, have been assessed in the DEIS. Please see the response to comment SBAAir-5.

CCC-19 Processing due to oil development on VAFB is now assessed in the FEIS (see the air quality errata). Please see the response to comment SBAAir-3.

Electric grid power and propane fuels have been stated as mitigation measures for internal combustion engines in Table 4.3-5 of the DEIS, although they are probably infeasible for the generators that power the drilling rig (see response to comment SBAAir-1). Additional mitigation measures have been provided by the Santa Barbara County APCD and are included in the FEIS (see the air quality errata).

CCC-20 These well numbers were used as round figures to identify a chronological increase as a result of development on VAFB. It was assumed that 25 percent of the wells would be drilled in the first year so that a peak-emission year could be derived to estimate the peak annual offset requirements. Table 2-1 on pages 2-18 and 2-19 of the DEIS gives a best estimate of the expected development scenario for VAFB and shows that 297 wells will be drilled during the next 30 years. Unocal, in their environmental assessment of oil development on VAFB, estimated that 225 wells would produce oil and gas as a maximum build-out. The 300-well scenario identified in the DEIS is equal to 225 wells in the second year of production, with 75 wells in the first year of development.

CCC-21 If oil development on VAFB follows the guidelines outlined in the MRMP (mitigating significant impacts to insignificance so that all air quality standards will be protected), development can occur regardless of future sources of off-base emissions. However, development may not be on the scale of 297 wells, due to a smaller pool of emissions offsets that are taken up by the future projects off base. The second to last sentence on page 4.3-23 will reference section 6.5, where the MRMP guidelines and standards are described. The last sentence in the paragraph will read as follows:

"As a result, significant impacts estimated to be above standards should be mitigated to insignificance."

CCC-22 The MRMP identifies varying degrees of potential mission or environmental constraints from none, to low, moderate, and high. In the MRMP, there are recommended guidelines, standards, and management practices which minimize the environmental or mission conflict identified. Some of the recommendations in the MRMP are to avoid certain sensitive areas. Potentially, off-set or directional drilling could be proposed to avoid impacts on certain highly sensitive sites.

CCC-23 Any future development on base would require compliance with NEPA and coordination with federal, state, and local agencies. The U.S. Air Force would be the lead agency. Any actions off VAFB would require

compliance with CEQA. Whether or not a proposed development would require a NEPA EIS or CEQA EIR would be made by the responsible agency on a case-by-case basis.

CCC-24 This suggested modification has been noted. The corrected version of this paragraph is contained in the errata for the EIS.

CCC-25 A blowout of sour gas could have severe or disastrous impacts on the health and safety of the public, depending on the volume of gas released and the H_2S concentration in the gas. To guarantee that no members of the public are harmed by a blowout of sour gas, separation of wells from populated areas would have to be measured in thousands of feet. There are numerous factors why this separation is not normally required. First, although the historical probability of a blowout is between 1 in 1,000 and 1 in 100 per well, there is only one recorded instance of a blowout resulting in fatalities to residents living near the well. Second, the production formations on VAFB, in general, are not highly pressurized and, therefore, the potential for blowout is low. Third, all wells will be equipped with the required blowout prevention equipment. Fourth, injury or death would not necessarily occur immediately from exposure to low levels of H_2S. A contingency plan with evacuation procedures could reduce the impact from a blowout.

The California Administrative Code allows drilling within 300 feet of residences if certain additional mitigation measures are included. Excluding drilling within several thousand feet of residential areas would result in an unexceptably large exclusion zone. Wells should not be allowed within 300 feet of residences, with larger separations required on a case-by-case basis depending on the expected characteristics of the formation and drilling plan.

CCC-26 The scope of the MRMP and EIS is not to determine or plan the types or extent of oil and gas development on VAFB. Therefore, no oil and gas development proposals have been reviewed for the preparation of these documents. Correspondingly, the sizes and types of landslides, including cubic yardage and failure type, were not evaluated on a site-specific basis. Recommended guidelines are discussed in the MRMP in section 6.1.5.4, Landslide Areas, and in the DEIS in section 4.1.2.1, Proposed Action. Each development proposal will be evaluated for landslide occurrences on an individual basis.

CCC-27 Setbacks from bluff-top edges (as addressed in the MRMP, Recommended Guidelines, Standards, and Management Practices, section 6.1.5.1, Steep Topography, and in the DEIS, section 4.1.2.1, Proposed Action) will be addressed on an individual proposal basis. All development proposals will be reviewed for geotechnical considerations, including bluff stabilization through the life of each project.

CCC-28 Both Jalama and Ocean Beach County parks are identified in the DEIS and considered public-use areas with recreational land uses. The DEIS concluded that potential impacts could occur if development is viewed

from recreation areas. As referenced in section 4.9.2.1.1, Impacts, on page 4.9-7, the region of influence does include Ocean Beach County Park. Jalama Beach County Park is identified in section 4.9.2, Environmental Impacts and Mitigations, on page 4.9-2. Since Jalama Beach County Park is a recreational area adjacent to VAFB and could be affected by oil and gas development activities, it is considered within the region of influence. Therefore, changes have been made in section 4.9.2.1.1, Impacts, in the EIS errata, to include Jalama Beach County Park.

CCC-29 The DEIS identifies potential impacts to water resources which may result due to withdrawal of groundwater for exploration and production. These impacts are considered most significant for the San Antonio Creek basin where the potential for development of oil and gas resources is highest and the existing overdraft situation is most acute. Other groundwater basins described in the DEIS may also be subject to significant impacts resulting from groundwater withdrawals for oil and gas development.

The MRMP contains general and specific measures designed to ensure that these potential impacts are reduced to an insignificant level. These are described in section 4.2.2.1 of the DEIS and in section 6.2.5 of the MRMP. Included in these requirements is the provision of a cumulative impact analysis and a detailed water supply plan for each development proposal. The proposed MRMP does not provide for exclusion of any portion of the base from oil and gas development based on impacts to groundwater resources due to the availability of nonpotable water and other strategies which would reduce the level of impact on groundwater resources to an insignificant level.

It is the intent of the MRMP to require that an analysis of alternative water sources be performed and to require that these sources be utilized to the maximum feasible extent. To clarify this intent, an errata to the MRMP has been provided under section 6.2.5.2. This will provide for a required finding that water supplies other than potable groundwater have been incorporated in the development proposal to the maximum feasible extent. In the case of proposed withdrawals from groundwater basins which are overdrafted or are projected to be overdrafted, it will also require a finding that there is no net increase in withdrawal of groundwater resources resulting from the proposal.

Estimated water demands from oil and gas development are presented in section 4.2.2 of the DEIS. Available sources other than overdrafted groundwater basins to satisfy projected needs are also discussed under that section. They include perched groundwater basins not presently developed for water supply, saline groundwater, wastewater treatment plant effluent, produced water from oil field operations, and excess surface water flows not necessary to satisfy minimum stream flow requirements. In addition, conservation practices and other modifications of agricultural practices may provide for expansion of the present uses of water for oil and gas development without causing adverse impacts on groundwater resources when measured against current conditions. Agricultural uses account for the majority of

groundwater withdrawals in the project area. A 2.8-percent reduction in agricultural withdrawals in the San Antonio Creek groundwater basin would provide the required supply of water for development of the 297 wells anticipated in the project description. Providing for conservation of water for agricultural purposes or curtailment of highly consumptive uses for limited time periods through an offset program may provide adequate water to meet the water requirements during development since they are not long-term demands. Implementation of an offset program could be accomplished in a manner similar to that utilized for air quality offsets, where a demonstration of no net effect on groundwater withdrawals from overdrafted groundwater basins would be required.

Production requirements for cyclic steam injection, if employed, could similarly be satisfied through long-term reductions in agricultural water use as an offset to increased water demands. In addition, use of wastewater treatment effluent from the City of Lompoc could satisfy the long-term demand associated with production requirements. For instance, the total demand of 100 acre-feet per year associated with the estimated 100 wells which may require steam injection could be satisfied through the use of 13.4 percent of the effluent from the City of Lompoc. Wastewater effluent would satisfy both quality and quantity requirements associated with estimated production demands.

Potential impacts to groundwater resources associated with a particular oil or gas development proposal would be evaluated through the required water supply plan and cumulative impact analysis. Given the variety of measures and strategies available to eliminate the potential impact, the standard measures proposed in the MRMP should be adequate to avoid adverse impacts due to further withdrawals from overdrafted groundwater basins.

CCC-30 The water-demand estimates utilized in the analysis are considered to be representative of the reasonable worst-case conditions that may prevail at VAFB, given current planned activities, and were therefore used as the basis to evaluate potential impacts. It is recognized that water conservation efforts may reduce these demands and that curtailment of certain activities may further reduce these demands; however, given the position of VAFB as a strategic location for polar-based missile launches and other activities that may occur at the facility, it is unlikely that curtailment of a single program will reduce the overall demand for water. A more realistic worst-case assumption is that any curtailed activities will be replaced by other, currently undefined mission requirements, which would have similar water needs.

JAMES H. MOSBY, D.M.D.
33 CAMBRIDGE DRIVE
LOMPOC, CALIFORNIA 93436

TELEPHONE: (805) 736-6322

RECEIVED
30 JUL 1987

July 26, 1987

William R. Newell, Colonel, USAF
Chief, Development Division
Environmental Task Force
1 STRAD/ETD
Vandenberg AFB, CA 93437-5000

Dear Colonel Newell

As owners of the sub-surface mineral estate of Tract 83 on VAFB, consisting of 838.5 acres, we are concerned about several items in the June, 1987 Draft Environmental Impact Statement:

1. The technique used to determine the mineral potential on Tract 83; no conclusive scientific exploration testing was done.
2. The resulting effect of government-controlled access to Tract 83 for mineral development. (Inverse Condemnation)
3. Compensation for lost mineral lease revenue due to stigma precipitated by government actions and obvious intent to keep oil development off VAFB was not addressed. (Union Oil was paid $50,000 per year from 1960 to 1980 for not attempting to exercise their property rights; our oil lease termination was recorded March, 1987.

Mosby-1

History appears to be repeating itself,i.e.,the U.S. Government confiscated a multi-million dollar Dolomite deposit on Tract 83 for a mere $28,000. This action cost the taxpayer approximately $750,000 in court costs and several million dollars in additional construction costs by eliminating the competing source for construction material for SLC 6, Port San Luis, San Luis Obispo Breakwater, etc., since 1971!

Glaring, by its omission in the DEIS, is the concern for individual property rights as guaranteed by the U.S. Constitution, and any attempt to address the issue of due compensation.

The actions by the government to date (past opposition and litigation to prevent mineral development) have created a stigma which is responsible for lease terminations, with lost lease revenues, and the loss of future mineral development. This is a clear case of Inverse Condemnation.

We hope the U.S. Government and VAFB will be more open-minded about the mineral development on Tract 83 and prevent litigation to protect the property rights of its citizens. Due compensation is mandatory.

Sincerely

James H. Mosby Virginia E. Mosby Jack S. Foster Charlotte P. Foster

RESPONSE TO COMMENTS
FROM
JAMES MOSBY, VIRGINIA MOSBY,
JACK FOSTER, AND CHARLOTTE FORSTER

Mosby-1 No new exploratory information was collected for purposes of the MRMP and the DEIS. The MRMP and the EIS were based on existing data furnished by agencies and several oil companies who have performed exploratory work in the area. There was sufficient information to develop an MRMP and an EIS. The MRMP can be updated as additional information becomes available.

Regarding your comment about compensation or inverse condemnation, it was not addressed in the DEIS because the proposed action of the MRMP and the EIS is to allow oil and gas resource exploration wherever they occur. The MRMP does, however, identify certain guidelines to be followed at various locations to minimize impacts on the environment and U.S. Air Force missions at VAFB.

STATE OF CALIFORNIA

GEORGE DEUKMEJIAN, *Governor*

STATE LANDS COMMISSION

LEO T. McCARTHY, *Lieutenant Governor*
GRAY DAVIS, *Controller*
JESSE R. HUFF, *Director of Finance*

EXECUTIVE OFFICE
1807 - 13th Street
Sacramento, California 95814

CLAIRE T. DEDRICK
Executive Officer

July 27, 1987

Colonel William R. Newell
1 STRAD/ETD
Vandenberg AFB, CA 93437-5000

Dear Colonel Newell:

Thank you for the opportunity to review the Draft Environmental Impact Statement (DEIS) for the proposed Mineral Resource Management Plan (MRMP) which could result in potential exploration, development and production of oil and gas resources on Vandenberg AFB.

Although we recognize that this document is, of necessity, a "programmatic EIS", it is for that reason that staff of the State Lands Commission believes that the document should recognize and discuss any potential drainage of oil and gas from State tidelands and submerged lands by potential onshore well locations. The final MRMP should consider and recognize this potential and provide a process to ensure that the State's financial interests are equitably considered prior to the granting of drilling rights by and on Vandenberg AFB. SLC-1

The MRMP should also provide a mechanism whereby potential oil and gas development on Vandenberg could be coordinated with any potential development of the State's offshore lands to enable each to proceed with the highest utilization of common facilities, rights-of-way, etc.. As you may recall, in 1982, the State proposed the lease of eight parcels offshore Vandenberg AFB between Pt. Conception and Pt. Arguello. SLC-2

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Should you have any questions or require additional clarification, please contact Mr. Al Willard at our Long Beach Office at (213) 590-5207 or me at (916) 322-7827.

Sincerely,

Dwight E. Sanders

DWIGHT E. SANDERS, Chief
Division of Research
and Planning

DES:maa
cc: Claire T. Dedrick, Executive Officer
James F. Trout, Assistant Executive Officer
Al Willard

RESPONSE TO COMMENTS
FROM
STATE LANDS COMMISSION

SLC-1 Approvals for proposals will be done on a case-by-case basis. Notification of state and local agencies when a development proposal is received is a step in the MRMP process. Those agencies requesting notification or coordination should forward their requests formally to 1STRAD/ETD stating the basis for their request. A file will be maintained to ensure the notification and coordination process occurs.

The area along the coastline would be the most difficult to develop where potential oil and gas could be drained from offshore reservoirs. The area would be difficult to develop because of both high mission and high environmental constraints. If an application is received for development along the shoreline, the State Lands Commission would be notified, assuming they were formally on file (see paragraph above). Geological studies could be performed on the site-specific area at that time.

SLC-2 See response to SLC-1.

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

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

GEORGE DEUKMEJIAN
GOVERNOR OF
CALIFORNIA

THE RESOURCES AGENCY OF CALIFORNIA
SACRAMENTO, CALIFORNIA

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

Colonel William R. Newell
U.S. Air Force
1 STRAD/ETD
Vandenberg AFB, CA 93437-5000

July 27, 1987

Dear Colonel Newell:

The State has reviewed the Draft EIS, Mineral Resources Management Plan for Vandenberg AFB, Santa Barbara County, submitted through the Office of Planning and Research. Review was coordinated with the Air Resources, Central Coastal Regional Water Quality, and Solid Waste Management Boards; the Coastal, Energy, and State Lands Commissions; and the Departments of Conservation, Fish and Game, Parks and Recreation, Water Resources, Health Services, and Transportation.

Attached are comments received from the Department of Fish and Game. RAC-1

The Department of Water Resources (DWR) comments that San Antonio Creek is in overdraft. Therefore, DWR recommends undertaking a study to determine how increased demand may be met without using fresh water. Use of either treated wastewater or water produced from the oil fields should be considered. RAC-2

The Department of Conservation recommends adoption of the proposed Mineral Resource Management Plan, to allow oil and gas development at Vandenberg AFB. The Department believes that Alternatives 1, 2, and 3 may be too restrictive because they preclude development in some high and moderate potential areas. The Department finds Alternative 4 unacceptable because there are several producing wells and wells capable of production on the base. RAC-3

The Department of Transportation, Coastal Commission, and Central Coast Regional Water Quality Control Board have already responded directly to you regarding this document. RAC-4

Thank you for providing an opportunity to review this proposed project.

Sincerely,

Gordon F. Snow, Ph.D

Attachment

Office of Planning and Research
1400 Tenth Street
Sacramento, CA 95814
(SCH 86082707)

C&R-73

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ETF

State of California

The Resources Agency

Memorandum

To : Honorable Gordon K. Van Vleck
Secretary for Resources
1416 Ninth Street
Sacramento, CA 95814

Date : July 20, 1987

From : Department of Fish and Game

Subject: Draft EIS for Mineral Resources Management Plan for Vandenberg Air Force Base, Santa Barbara County, SCH 86082707

We have reviewed the DEIS for the Vandenberg Air Force Base (VAFB) Mineral Management Plan (MRMP) and have the following comments.

The document provides a good description of the various natural resources including sensitive species and habitats found on the base. It is particularly important to note that the coastal wetlands and dunes present on VAFB are probably the very best examples of these habitats in the entire county. They are even more significant when it is perceived that much of this type of natural resource has been lost to development in most other areas of southern California. Accordingly, the natural resources of VAFB are regionally significant.

The proposed action would permit oil and gas exploration, development, and production to occur throughout VAFB irrespective of the fact that certain portions of the base are extremely sensitive from a biological perspective. This DEIS indicates that state- and federally-listed threatened and endangered species including the unarmored threespine stickleback, least Bell's vireo, and California least tern could be negatively impacted by the proposed action. Further, the DEIS indicates that significant adverse impacts to coastal dunes, wetlands, and coastal streams could result from moderate to high levels of mineral development. RAC-5

An effective, and apparently feasible, means of avoiding these impacts would be simply not to allow oil and gas exploration, development and production to proceed within known areas of high biological value. In this regard, we recommend that oil and gas exploration, development, and production be precluded within the union of those areas delineated on Figure 2-2 "Areas of High Environmental Constraint" and those areas delineated on Figure 3.4-5 "Sensitive or Unusual Plant Communities". Comparing these figures with Figure 1-2 "Potential Economic Oil Reserves", it becomes apparent that all of that area generally south of the mouth of San Antonio Creek is of "low" and "very low" potential for economic oil reserves. Further, it becomes apparent that only relatively small portions of the area designated as having a high potential for economic oil reserves would be affected by our recommendation. These areas are primarily associated with the San Antonio Creek streambed which, given the possibility for slant

drilling and the biological sensitivity of San Antonio Creek, would be unlikely locations in which to site oil and gas facilities. Thus there would seemingly always be feasible alternatives to the siting of oil and gas facilities in the small area encompassed by the intersection of areas designated as having a high potential for economic oil reserves on Figure 1-2 with the union of those areas depicted on Figures 2-2 and 3.4-5.

Regarding those areas shown on Figure 1-2 which have a "Moderate Potential" for economic oil reserves, area M-1 would be essentially unaffected by our recommendation except for a relatively small area adjacent to and including San Antonio Creek. Our recommendation would result in removal of approximately 60 percent of area M-2 from consideration for oil and gas exploration, development, and production. However, and as this document discusses in considerable detail, the dune complex (i.e., foredunes, dune scrub, and wetlands between the dunes) contained in area M-2 is a rare habitat type, and this particular dune complex is likely the finest example remaining between Point Sal and Mexico. Consequently, we recommend against proposed activities within this dune complex.

RAC-5

In summary, our recommendation would result in little, if any, practical effect upon oil and gas exploration, development, and production within areas of high potential economic reserves; would result in little practical effect upon these activities in the area of moderate potential in which discovery of reserves is judged to be most likely (M-1); and would curtail future oil and gas development and exploration within approximately 60 percent of the area of moderate potential in which discovery of reserves is judged to be least likely. Further, our recommendation would permit oil and gas exploration, development, and production to occur within approximately 80 percent of those areas of low and very low oil and gas reserve discovery potential. The Department also recommends the incorporation of those procedures contained in Section 4.4.2.1 of the DEIS into all future oil and gas related projects. The Department believes that its recommendations may be feasibly incorporated into the MRMP, and that if incorporated they would lead to orderly gas and oil exploration, development and production, while simultaneously providing protection to those sensitive biological resources present within VAFB.

Lastly, the San Antonio Creek groundwater basin is now in a state of overdraft by approximately 11,000 acre-feet/year and oil and gas development on VAFB is expected to add to this overdraft. Although the Department is not usually concerned with groundwater basin problems, in this case, the continued overdraft may lead to the drying up of both Barka Slough and San Antonio Creek during the dry season. These areas provide important wildlife habitat, including habitat for the state- and federally-listed unarmored threespine stickleback and potential habitat for the least Bell's vireo. For these reasons, we recommend that a detailed plan for effectively dealing with the overdraft problem be completed and implemented prior to any expansion in oil and gas related development within VAFB.

RAC-6

Thank you for the opportunity to comment on this MRMP. If you have any questions, contact Fred Worthley, Regional Manager, Region 5, 245 West Broadway, Suite 350, Long Beach, CA 90802; telephone (213) 590-5113.

for Pete Bontadelli
Acting Director

cc: Nancy Kaufman - USFWS

RESPONSE TO COMMENTS FROM THE RESOURCES AGENCY OF CALIFORNIA

RAC-1 Please see responses to comments RAC-5 and RAC-6.

RAC-2 The study recommended by the Resources Agency in the comment will be required for each individual oil and gas development proposal on a detailed basis. The general feasibility of the suggested approach is addressed in response to comment CCC-29. The use of alternative sources of water will be required to the maximum feasible extent on each development proposal.

RAC-3 Comment noted.

RAC-4 Please see responses to the letters from the Department of Transportation (DOT), California Coastal Commission (CCC), and the Central Coast Regional Water Quality Control Board (WQCB).

RAC-5 Comments noted. The U.S. Air Force will decide if and what areas may be excluded from mineral development on VAFB following filing of the final EIS.

RAC-6 The project description specified that oil and gas development on VAFB would not use groundwater on the base unless produced water were desalinated. Thus, a plan for dealing with the current overdraft problem in the San Antonio aquifer is not appropriate at this time. See response to comments RAC-2 and CCC-29.

Union Oil and Gas Division: Western Region

Union Oil Company of California
201 South Broadway, Orcutt, California 93455
Telephone (805) 937-6376

union 76

Richard J. Boyle
Area Landman

July 27, 1987

William R. Newell, Colonel, USAF
Chief, Development Division
Environmental Task Force
1 STRAD/ETD
Vandenberg AFB, California 93437-5000

VANDENBERG AIR FORCE BASE
JESUS MARIA FEE
SANTA BARBARA COUNTY, CALIFORNIA
Union Oil Company's Comments On
The Draft Environmental Impact (DEIS)
Statement For The Mineral Resource
Management Plan (MRMP)

Dear Colonel Newell:

Union Oil company of California (Union) welcomes the opportunity to add to our oral comments on subject DEIS presented at the July 8, 1987 public hearing held in Lompoc, California.

Before getting into our detailed comments, we would first like to reiterate our support for the No Action Alternative Plan detailed in the draft EIS. Union-1

As was stated in Union's oral testimony, since the perceived impact of oil and gas development on Vandenberg, as identified during the Air Force's scoping process, would be reduced by approximately 82% now that Northern Michigan Exploration Company and Conoco Inc. have virtually given up their leases on Vandenberg, it is Union's opinion that the extensive and time consuming review of projects as set out in the draft EIS is unnecessary.

Although Union supports the No Action Alternative, Union wishes to make the following comments in regard to the draft EIS and MRMP:

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DRAFT EIS

1.0 PURPOSE AND NEED FOR ACTION

1.2 History

Union's mineral ownership and surface rights were reserved in a deed from Union Oil Company to H. S. Stephenson dated December 15, 1906 which deed was recorded in Book 119, Page 51 of Official Records of Santa Barbara County. Union's surface and water rights reserved in said 1906 deed are substantially greater than indicated in the draft EIS and 4.3.2 of the MRMP. Union-2

1.3 Oil and Gas Development on VAFB

1.3.2. Existing Oil and Gas Activities

Oil from the Arkley wells is not shipped to Union's Battle Plant but is transported via pipeline to Unocal's Mesa refinery west of Nipomo. Union-3

2.0 THE PROPOSED ACTION AND ALTERNATIVES

2.5 Cumulative Impact Considerations

The drilling of 297 wells is not a valid scenario especially since Northern Michigan Exploration Company and Conoco Inc. have virtually given up their leases on VAFB. What were the assumptions used to determine the 297 well figure? Union-4

3.0 AFFECTED ENVIRONMENT

3.2 Water Resources

As indicated in Union's comment for 1.2, Union in the 1906 Deed from Union to H.S. Stephenson reserved certain surface and water rights on a 41,000 acre portion of the land known as Vandenberg Air Force Base. Union-5

Because of said reservation, Union's use of the water takes priority over Vandenberg's or any entity's use of the water.

Air Quality - General Comments

1. Many of the stringent mitigation measures outlined in the DEIS are based on the assumption that the northern portion of Santa Barbara County will be designated by the EPA as a non-attainment area for ozone. This assumption is, in part, based on air monitoring data from Union's Lompoc H.S.& P. air monitoring station. The use and/or reference to that data in Union-6

this context is not appropriate. First, the data has not been accepted by the SBAPCD nor the EPA for use as pre-construction data or post-construction data. Further, one year of data does not indicate a "trend" in increased air pollution. Ozone concentrations tend to be higher during certain months of the year and lower in others. As such, no "trend" can be ascertained without examining several years of data. Finally, EPA designation of non-attainment areas is much more involved than simple noting of standard exceedances. The process involves complex determinations regarding meteorology, transport, etc. As such, re-designation of northern Santa Barbara County as a non-attainment area for ozone will not occur soon, if ever. Union-6

2. The atmospheric dispersion model for describing impacts from stationary point sources in complex terrain should be COMPLEX I not COMPLEX II. COMPLEX II is notorious for over-predicting air quality impacts (see Attachment 1). Further, the SBAPCD model of choice for this type of application is COMPLEX I (see Attachment 2). Use of COMPLEX II with its documented tendency for ultra-conservative results will significantly hamper the responsible development of energy resources at VAFB, as well as any projects which VAFB may need to permit. Union-7

3. The DEIS goes well beyond the requirements of the EPA and the SBAPCD in requiring mitigation measures for air quality impacts. The DEIS supports these stringent mitigation measures by overstating emissions (see specific comments), use of COMPLEX II vs COMPLEX I modeling, threatening re-designation of the area to non-attainment for ozone by presenting data not yet approved by the SBAPCD and by using baseline ambient air monitoring data which is not applicable (see specific comments).

Union-8

The SBAPCD and the EPA have rules and regulations to which industry as well as VAFB must adhere. These regulations go through a long process of workshops, public comment, cost benefit analyses, etc. Mitigation measures such as the requirement for offsets irrespective of project size, circumvent the rules and regulations and the corresponding process which goes into the adoption of those rules. The MRMP requirement for offsets must strictly adhere to the SBAPCD Rules and Regulations, i.e., 1.2:1 or greater offset ratios when project emissions exceed 10#/hr, BACT triggered at 5#/hr, etc. Certain proposed mitigation measures which go beyond the regulatory requirements and therefore should be eliminated include the requirement for offsetting all emission regardless of emission level, the requirement for BACT at 2.5#/hr, the requirement for reserve offsets, offsetting certain hydrocarbon species with similar species, etc.

Air Quality - Specific Comments

3.3.4.2 Baseline Air Quality

Page 3.3-7 Beginning with this section and in numerous other locations in the document there are references to a Union Lompoc ambient air monitoring Union-9

station. Please note that no such station exists. Also, please note that, consistent with our general comments, the air quality data collected at the Lompoc H.S.& P. air monitoring station has not received formal approval by the SBAPCD, and all references to that data should be eliminated from this document. Union-9

3.3.4.3 North County Emissions

Union is disturbed that, even though the document admits that the current AQAP emissions inventory is inadequate, it is still used in the analysis without any modification or manipulation. For example, the emissions inventory on pages 3.3-13 and 3.3-14 shows total NOx emissions for the North County to be 7,399 TPY. Elimination of mobile sources from this total leaves a NOx total of 1,957 TPY. Turning to page 4.3-18, the regional offset requirement for NOx is 5794.5 TPY (300 well project). There are thousands of wells and associated production facilities in the North County. Further, there are numerous large industrial facilities such as Union Sugar and Manville Products. It is impossible for 300 wells and their associated production facilities to emit more than the entire North County industrial community. The effect of an inadequate emissions inventory is to greatly exaggerate the assumed impact associated with current pollution levels. This inflation is magnified by the modeling. The solution to this problem is not simple. However, some type of multiplier needs to be arrived at to legitimize the emissions inventory and the modeling which depends on an accurate inventory. Union-10

Table 3.3-5 North County Emission Inventory

The listing for Union Sugar, Union Asphalt and the Union Oil Company is misleading. They should be listed as separate items since they are in no way related other than the fact that they share the same first name. Union-11

4.0 ENVIRONMENTAL CONSEQUENCES

4.3 Air Quality

4.3.1.2.1 Localized Impacts

Page 4.3-3 refers to the "absence of site-specific air quality and meteorological data" yet numerous air quality monitoring stations and the data that they collect are used to describe the existing air quality and this data is used for baseline in the modeling runs. In almost all cases, the baseline data is taken from air monitoring stations which experience higher than would be expected levels because they are located in an environment atypical of VAFB. For example, monitoring data from the Jalama Road air monitoring station is used for the SO2 baseline. This station probably sees some of the higher values for SO2 in the county because it was placed at its site to monitor the sulfur dioxide impacts from Manville Product's operations when they burn 1% sulfur fuel oil. Another example is the use of PM10 data collected at the Santa Maria Library for the baseline on VAFB. It is widely recognized that the Union-12

cause of these high levels of particulate matter is the extensive agricultural operations in the Santa Maria area. This type of farming and subsequent fugitive particulate matter is not present on VAFB. Even more inappropriate is the use of CO data from San Luis Obispo. Obviously these levels are associated with a fairly urban environment and not applicable in this case. More detailed evaluation of the appropriate baseline data needs to be undertaken for the modeling in this EIS. Union-12

4.3.2.1 Proposed Action

The MRMP mitigation measures go beyond acceptable mitigation techniques provided for in the Rules and Regulations of the SBAPCD. For example, the requirement for 1.2:1 offsets without regard to emission trigger levels is unwarranted and unsubstantiated by the existing rules and regulations. The DEIS identifies a potentially non-existent problem (ozone non-attainment) and builds a series of unwarranted mitigation measures on that premise. Union-13

4.3.2.1.3 Regional Impacts

Table 4.3-9 Estimated Offset Requirements

This table, when compared with Table 4.3-8 and Table 3.3-7, effectively eliminates any possibility for a 300 well or even a 100 well project within the scope of the MRMP. For example, if the NOx offset requirement for a 300 well project is 5794.5 TPY, there are not enough point source offset sources in the emissions inventory to allow this level of activity to occur. This is a function of the inaccuracy of the emissions inventory, but also of the ultra-conservancy of the approach this document takes with respect to baseline air quality, modeling and potential emissions. Union-14

4.4 Biological Resources

4.4.2 Environmental Impacts and Mitigation

Paragraph 1 states that "...drilling activities could continue for a longer time at each pad because more than one well could be drilled...". This practice of consolidation of more than one well per pad is beneficial to land use and operations and should not be considered a negative aspect of the project. Union-15

4.7 Socioeconomics

It is obvious that the authors of the DEIS contemplated large oil and gas developments on Base and since Northern Michigan Exploration Company and Conoco Inc. have virtually given up their leases on Base, Union would disagree with the excessive number of wells and the personnel required for installation and operations. Union-16

Additionally, the MRMP requires all applicants identify the cumulative growth related impacts that their proposed VAFB oil and gas developments will create off Base. It does not specify specific guidelines for mitigating those impacts, but does relate that the oil industry proposing OCS oil and gas development off the Central Coast are presently participating in a Tri-County Socioeconomic Program (SEMP), and states that the oil and gas companies developing facilities on VAFB could participate in a similar monitoring program. Union would support such a recommendation. Union-17

4.9 Visual Resources

4.9.2 Environmental Impacts and Mitigation

Paragraph 2 states that "If cut slopes are required for both road and pad, visibility of the facility is increased". This is true; however, revegetation of those slopes will help to lessen their visibility and minimize and control erosion. Union-18

The end of the paragraph at the top of page 4.9-4 states that "since the exploratory drilling phase would be short, the visual impact would not be significant". This statement is contrary to the one found in the MRMP, Section 6.9.4, Page 6.9-8, paragraph 2, which states that "Due to the duration...and size of equipment...the visual effects...would be significant". We believe the former statement is more accurate. Union-19

Paragraph 1, page 4.9-4 states that a "...pumping unit, gas scrubber, oil and gas separator, steam generator, pipelines and tankage...remain on site for the life of the well". Typically, a well site will consist of only a pumping unit, or units, and associated pipelines. The other stated equipment will generally be centralized in one location to serve multiple well sites; each well site will not have this concentration of equipment. Therefore, this statement is inaccurate and should be changed to reflect actual operations. Union-20

Also in paragraph 1, reference is made to Figure 4.9-6 as an example of a completed well site. This photograph shows a pumping unit, H_2S gas scrubber system, vapor recovery system, header system and oil/gas separator and in the background a 500 BBL diluent oil storage tank. This concentration of equipment on one well location is atypical of operations. Normally, a well site will have only a pumping unit with associated pipelines similar to Figure 4.9-1. Figure 4.9-6 is a photograph of a well site situated adjacent to the Jesus Maria tank battery with its associated support facilities i.e. vapor recovery system, H_2S gas scrubber, etc. and should not be put forth as an example of a typical well site. Union-21

Figure 4.9-3 is incorrectly titled "H_2S Scrubber". This photograph actually depicts a steam generator. Union-22

6.0 LONG-TERM PRODUCTIVITY VERSUS SHORT-TERM USE OF THE ENVIRONMENT

6.6 Land Use

Since the Air Force took possession of VAFB subject to Union's prior reserved rights, we would request that the Air Force review the December 15, 1906, Deed from Union to H. S. Stephenson which Deed was recorded in Book 119, Page 51 of Deeds, Santa Barbara County, California. Union-23

The surface and water rights Union reserved in said Deed are extensive.

6.6.2 Existing Conditions

Union-24

The oil industry has proven over the years that by applying various mitigation measures oil industry projects can be made to be compatible with virtually any existing land use.

APPENDIX A - MINERAL RESOURCE MANAGEMENT PLAN (DEIS)

6.5 AIR QUALITY

6.5.1 General Guidelines

Page A-32 calls for offsets to be held in reserve to ensure that proposed development activities do not interfere with future mission operations. Page A-33 further states that a binding agreement will be entered into which will make these reserve offsets available to VAFB in the event that these offsets may be required for mission operations. Union Oil Company will be willing to entertain the possibility of selling or leasing emissions offsets to VAFB. Union will not, however, allow its offsets, and therefore its future expansion abilities, to be taken from up in the form of unwarranted permit conditions. Union-25 Again on page A-32, the MRMP attempts to rationalize the reserve offset approach by implying that OCS activity is deteriorating air quality by not supplying offsets for their emissions. This is simply not true. If the onshore portion of any OCS project triggers the SBAPCD offset requirement, offsets are provided at the required ratio. All new offshore emissions are offset at a 1:1 ratio.

6.5.2.1 Impact Analysis

Consistent with our general comments concerning air quality, COMPLEX II is not the model to use to project air quality impacts for inert pollutants in complex terrain. COMPLEX I is the SBAPCD model of choice. If VAFB allows this model to be used it will hamper their future plans as well as mineral resource Union-26 development on the base.

MINERAL RESOURCE MANAGEMENT PLAN (MRMP)

5.0 MINERAL RESOURCES

Figure 5-1 - Point Conception is incorrectly located Union-27

5.1.2.1 High potential Areas

Wells mentioned in Text should be located on the map referred to in 7.5.1 Methodology. Union-28

On page 5-16 it is indicated that Jesus Maria 83-19 was drilled in 1984. It was drilled in 1983. The reference to Jesus Maria A-25-29 is incorrect. It should be Jesus Maria A-25-20. Union-29

5.1.2.3 Low Potential Areas

Union-30

The Hosgri Fault referred to on page 5-26 dies out before reaching onshore and does not parallel the Santa Ynez River.

5.2.1.6. Special Drilling Problems

Not all junk in a hole needs to be returned, a well can be sidetracked. Union-31

6.0 ENVIRONMENTAL CHARACTERISTICS

6.2 Water Resources

6.2.5.2.2. Water Quality

The proposed requirement to have oil spill containment and cleanup equipment located at each well pad is unreasonable and not cost effective, nor will it enhance cleanup capabilities should a spill occur. In all spill response situations, the order of action is virtually the same: control, contain, cleanup. Adequate time is allotted in the control of the spill source to move in spill response equipment from a centralized storage area on VAFB to be equally effective as storage on each and every well pad. Union-32

6.3 Air Quality

Union-33

All references to the SBAPCD NSR rule as it relates to ozone should be deleted since this part of the county is in attainment for ozone, irrespective of what is speculated to happen in the future.

Page 6.3-23 identifies a trend of increasing ozone in the vicinity of the VAFB. As previously stated, a trend in increased ozone levels can only be identified with several years data. The authors of the DEIS are selectively using data to support the unreasonable air pollution control requirements and offsetting requirements outlined therein. Union-34

6.4 Biological Resources

6.4.5 Recommended Guidelines, Standards and Management Practices

6.4.5.1 General Measures

The requirement for a well abandonment plan within six months after production has begun is unrealistic at best. Experience has demonstrated the variability of each and every well from a production standpoint and to estimate a reasonable life span for each well based on initial production results would have no true value in the real world.

This section also includes the requirement that detailed post-construction and post-abandonment restoration plans for the proposed sites be approved by VAFB environmental staff at least 15 days prior to development. This guideline should be modified to require a generic post-construction plan for well pads because of the real potential for project modification/relocation as new reservoir information is made available from development drilling. Additionally, the post-abandonment plans should be required 6 months prior to abandonment so that a realistic plan, based on final, sit specific information, can be developed for each site. Union-35

On page 6.4-39 there is a recommendation that a cumulative impact analysis be required which is to include both mineral recovery developments on the Base along with VAFB missions, both existing and planned. This is a very ambitious proposal, yet no guidance is given as to what parameters are to be evaluated or to what extent the investigations are to be conducted. A more precise guideline should be developed in the final MRMP.

6.4.5.14 Revegetation

Item 2 states that "All construction shall occur during the summer season, prior to commencement of the rainy season." Construction limitations should be assigned to inclement weather and not, an entire "season". California's fall and winter seasons can be quite dry allowing for work to continue. Whereas, late winter and early spring is the "rainy season". Allowance should be made for construction to occur when weather is permitting. Union-36

Item 8 on page 6.4-49 states that "A revegetation performance bond shall be posted with VAFB...". With Union's mineral ownership, financial interest and corporate size this stipulation should not apply.

6.5 Cultural Resources

General Comments

The policies and guidelines detailed in the MRMP are extremely ambitious and if adopted would insure the economic viability of archaeological consulting firms in Santa Barbara County for decades to come. However, the extent of cultural resource evaluation is excessive in nature as related to potential oil and gas development projects on VAFB. As correctly discussed in section 5.2.2, "Development Phase", each and every project design is subject to change as new information on reservoir characteristics is made available to the development geologist and reservoir engineer as a result of exploratory/development drilling. This point cannot be over emphasized as it is the very nature of new development projects to continually undergo modification as development proceeds. Proposed surface facilities may need to be relocated or deleted as reservoir characteristics dictate. It does not require much imagination to foresee excessive waste in both time and money should the policies contained within this section be adopted carte blanche, especially in consideration of up front, full development scenario requests by VAFB. Since it is Air Force policy to avoid, where practical and possible, adverse impacts on significant cultural resources, it would seem a more reasonable cultural resource program could be developed in which individual project sites would undergo a preliminary cultural resource evaluation, the results of which to be discussed with the project proponent. Should direct or indirect impacts be indicated, the proponent should be allowed to modify the location so as to avoid the site altogether. Should relocation be impractical or impossible, additional site evaluation, e.g. subsurface surveys, could then be conducted to evaluate the significance of the site. Policies for cultural resource evaluation should not be adopted which automatically trip the requirement for extensive and expensive site investigations without the prior concurrence of the project proponent. Union-37

Cultural Resources - Specific Comments

Section 6.5.5 Recommended Guidelines Standards, and Management Practices

6.5.5.1.1 Archaeological Resources Union-38

No description is given as to what constitutes a project's area of potential environmental impact (APEI). An expanded definition of APEI is needed to make this concept clear to the project proponent.

On page 6.5-30, the statement is made that "regardless of the size of the APEI, the minimum size of a survey area will be no less than 40 acres" It is assumed that the intent of a survey area this size is to evaluate the potential for indirect impacts to a potential cultural resource site should a well pad be located nearby. However, one must take into consideration other requirements of

the MRMP when determining the size of the survey area. As identified on pages 6.2-27 and 6.2-28, each facility site shall be required to have in place control measures to contain surface drainage. Because of requirements such as these, there is little potential for indirect impacts beyond the immediate boundary of the surface location. Since the potential for actual impacts are related to grading activities, the area of survey should be reduced to a maximum of 10 acres unless adequate supporting documentation can be provided to justify the larger survey area. Again, it must be emphasized that proposed well pads may need to be relocated due to new reservoir information from production drilling. Based on that fact alone, the area of cultural resource survey should be restricted to what is realistically needed for project installation so as to avoid unnecessary expenditures by the project proponent. Union-38

6.5.5.1.2 Architectural Resources

Remove this policy guideline from the MRMP for similar reasons discussed in Modern Native American Resources (6.5.5.1.3). Union-39

6.5.5.1.3 Modern Native American Resources

It again must be pointed out that the impetus for conducting a cultural survey is to determine if there is the potential for direct or indirect impacts as a result of a project site. This determination can be made by field investigation of the APEI, i.e., 10 acre survey around each project site. This entire policy guideline should be removed from the MRMP because it completely ignores the accepted process of project proposal, direct/indirect impact analysis, site approval or denial. If Modern Native American Resources are discovered within the 10 acre survey area or 60 meter pipeline/roadway survey, they should be treated according to accepted methodologies. To conduct additional field surveys totally unrelated to the proposed project is lacking in merit and completely unsupported by existing regulatory guidelines similar in nature. Union-40

6.5.5.2 Resource Evaluation

All field studies should be restricted to surface surveys initially. The preliminary results should be presented to the project proponent to evaluate potential impacts to the proposed project. Subsurface surveys should only be conducted with the approval of the proponent as it may be preferable to the proponent to relocate the project site to avoid the cultural resource area altogether. Union-41

6.5.5.7 Peer Review Standards

The purpose of the cultural resource survey as part of the MRMP is to locate sites which could be impacted by a proposed project. Based upon the field surveys, sites are either avoided or mitigations developed to allow project Union-42

installation. It is a turnkey relationship in which the archaeological consultant produces a working document which gives guidance to the Air Force regarding a particular project proposal. Suggesting the formation of a committee would have merit if the efforts of the archaeologist where instead to evaluate a significant site as a research effort, i.e., the need for peer review. However, the archaeological effort as defined in the final MRMP should be project and not research oriented. Union-42

6.9 Visual Resources

6.9.2 Existing Conditions

In Paragraph 3 on page 6.9-2 reference is made to Figure 6.6-1 as depicting Punch Bowl, Mod III and Pine Canyon lakes as significant scenic resources. Figure 6.6-1 does not show the location of these lakes nor could a map be found in this document which readily identifies these resources. Union-43

6.9.4 Constraints

The end of the paragraph at the top of page 6.9-8 states that "If cut slopes are required for both the road and pad, visibility of the facility is increased". This is true; however, revegetation of those slopes will help to lessen their visibility and minimize and control erosion. Union-44

Paragraph 1 states that the duration and size of equipment utilized during the exploratory drilling phase would cause significant visual effects. Contrary to this statement, in Section 4.9 Visual Resources, page 4.9-4 of the Draft EIS, at the end of the paragraph at the top of the page, the statement is made that the "exploratory drilling phase would be short (and) the visual impact would not be significant. Which statement is correct? Union-45

Paragraph 2 states that a "...pumping unit, gas scrubber, oil and gas separator, steam generator, pipelines and tank age...remain on site for the life of the well". Typically, a well site will consist of only a pumping unit, or units, and associated pipelines. The other stated equipment will generally be centralized in one location to serve multiple well sites; each well site will not have this concentration of equipment. Therefore, this statement is inaccurate and should be changed to reflect actual operations. Union-46

Paragraph 3 states that "electrical equipment...and installation of pipelines...would also effect air quality". Considering the subject, there appears to be a typo and "visual" should be in place of "air" in the sentence. Figure 6.9-7 is incorrectly titled "H_2S Scrubber". This photograph depicts a steam generator. Union-47

Figure 6.9-10 titled "Production Well Site" shows a pumping unit, H_2S gas scrubbing system, vapor recovery system, header system with oil/gas separator Union-48

and in the background a 500 BBL diluent oil storage tank. This concentration of equipment on one well location is atypical of operations. Normally, a well site will have only a pumping unit and associated pipelines similar to Figure 6.9-5. Figure 6.9-10 is a photograph of well site situated adjacent to the Jesus Maria tank battery with its associated support facilities, i.e. vapor recovery system, H_2S gas scrubber, etc. and should not be put forth as an example of a normal well site. Union-48

6.9.5 Recommended Guidelines, Standards and Management Practices

Item 1 on page 6.9-12 states that Union shall "Provide a project development plan...for all phases of oil and gas exploration and production, including abandonment." Providing an accurate and valid plan may not be possible for all phases until an evaluation of the "first" phase production is conducted. Only once a better knowledge of oil reserves is available may a "total" plan be appropriate. Union-49

Item 1 on page 6.9-15 states that the drill rig should be removed or dismantled from the drill site "if operations remain idle for 30 days or longer". Since the drill rigs are usually on a per day contract, Union would not have the rig standing by idle for 30 days or longer unless there were extreme complications, this provision probably does not need to be included. Union-50

7.0 PLAN CRITERIA AND APPLICATION

7.5 Methodology and Recommended Zoning Union-51

What provision is available to upgrade classification of areas with low to very low potential as more data (seismic, wells, surface geology, etc.) becomes available.

7.5.1 Methodology

Can the data stored in the geographic information system (GIS) be supplied in a computer format? This would save review time and allow the applicant to adjust its well plans before submittal of an application. Union-52

Furthermore, the maps included in both MRMP and the DEIS are too small. It is difficult to locate wells and prospects on them. We would suggest that layer maps, perhaps a 1" = 4000' or some other standard scale, be used.

7.5.5. Application of Suitability Zones

Oil and gas fields occur where they are and must be developed at that location using adequate protection and mitigation. Application for oil and gas developments should not be discouraged even if all opportunities exist in Z one A. As stated numerous times in the DEIS and MRMP it is the policy of the Dept. Union-53

of Defense and the Dept. of the Air Force to make government lands available for mineral exploration and extraction to the maximum extent possible, consistent with military operations and national defense activities. Union-53

8.0 MRMP IMPLEMENTATION PROCESS

8.6 Application Fees

Union-54

As touched on during Union's oral testimony Union needs more information on the magnitude of these fees.

AIR QUALITY TECHNICAL APPENDIX

Tables 2-2, 2-5, 2-8, 2-11, 2-14, and 2-17 exaggerate the number of equipment that will be operating in the worst hour. For example, all the equipment listed in Table 2-2 probably couldn't even fit on a one acre site let alone accomplish any work. A more reasonable estimate of equipment working in the worst hour needs to be used. Union-55

Table 2-16 lists emissions for internal combustion engines which will supply power for the pumping units. Union's Environmental Assessment for the Northwest Lompoc/Jesus Maria Development Project (Dames and Moore, 1985) states that pumping units will be driven by electric motors. As such, all emissions associated with internal combustion emissions from pumping units should be eliminated and reflected in the subsequent modeling runs. Union-56

Tables 3-1 through 3-9 list the equipment which is operating during the worst and subsequently the modeled hour. Again, it would be very unlikely that all this equipment would be operating in the worst hour. For example, the bulldozer, compactor, grader, water truck and A-frame in Table 3-1 through 3-4 would not be able to operate at the load levels listed while in the same well pad. Also, the load factors listed in the various tables do not jibe with the exhaust temperatures used in modeling. Similar engines under higher loads will have higher exhaust temperatures. The exhaust temperatures in general look very low for internal combustion engines under load. Union-57

Table 3-13 through 3-15 details modeled impacts from different project phases. As has been previously mentioned the baseline concentrations for SO2, CO and PM10 are not appropriate for this study. Additionally, use of the Union Lompoc H.S.& P. data without its acceptance by the SBAPCD is not appropriate. Union-58

Additionally, it appears that the recommended policies and guidelines in the draft MRMP are similar to those which have recently been associated with offshore development, i.e., Pt. Pedernales, Pt. Arguello, etc. I believe the MRMP authors, URS, have borrowed extensively from their recent experiences with such projects in Santa Barbara. However, many of the recommended policies are inappropriate for onshore oil development for the following reasons: Union-59

Prior to submitting plans for onshore facilities, the offshore developer has already conducted extensive exploratory work and knows in advance if the reserves will support costly environmental impact analysis. In contrast, the MRMP requires extensive and costly impact analysis prior to allowing exploration and development activities on VAFB. As stated throughout these comments, well pad locations may need to be relocated as a result of new reservoir information from production drilling. A significant number of well pads will probably be deleted from the maximum development plan due to dry hole results. For these reasons alone, the extensive pre-project environmental impact analysis requirements should be reduced to a level of reasonableness.

Additionally, the economics are not the same in comparing offshore and onshore projects. Production rates offshore are typically an order of magnitude higher than onshore wells. Also, onshore facilities to support offshore development are normally located at a single surface location, not multiple locations as is the case for onshore development projects. Union-59

The Air Force, by way of the MRMP, is proposing that the project proponent spend extreme amounts of money on ambitious environmental impacts analysis similar to offshore development for onshore projects. For the reasons expressed above, a phased MRMP should be adopted, if one is adopted at all, which would allow reasonable levels of environmental analysis. Minimal impact analysis should be required for exploration wells with more extensive evaluations being required for realistic production proposals.

As is indicated in Union's comments above, Union believes that extensive revisions to the DEIS and the MRMP need to be made to accurately reflect the effects oil and gas development would actually have on VAFB. Since Union believes that the effects of oil and gas development on VAFB are grossly overstated, Union again recommends the No Action Alternative.

Very truly yours,

Richard J. Boyle

Richard J. Boyle

RJB:kad
Attachments
0596L

ATTACHMENT 1

COMPLEX I and II Model Performance Evaluation in Nevada and New Mexico

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The COMPLEX I and COMPLEX II Gaussian dispersion models for complex terrain applications have been made available by EPA. Various terrain treatment options under IOPT(25) can be selected for a particular application, one of which [IOPT(25) = 1] is an algorithm similar to that of the VALLEY model. A model performance evaluation exercise involving three of the available options with both COMPLEX models was carried out using SF_6 tracer measurements taken during worst-case stable impaction conditions in complex terrain at the Harry Allen Plant site in southern Nevada. The models did not reproduce observed concentrations on an event by event basis, as correlation coefficients for 1-h concentrations of 0–0.3 were exhibited. When observed and calculated cumulative frequency distributions for 1-h and 3-h concentrations were compared, a close correspondence between observations and concentrations calculated with COMPLEX I, IOPT(25) = 2 or 3 was noted; both options consistently overestimated observed concentrations. With IOPT(25) = 1, upper percentile (maximum) values in the calculated frequency distribution exceeded the corresponding IOPT(25) = 2 or 3 value by roughly a factor of 2, and observed values by 2.5–5. COMPLEX II typically produced maximum values 2–4 times as great as COMPLEX I for the same terrain treatment option. From these results it is concluded that: 1) the physically unrealistic sector-spread approach used in VALLEY and COMPLEX I under stable impaction conditions is a surrogate for wind direction variation, and 2) the doubling of the plume centerline concentration due to ground reflection under terrain impingement conditions that is included in IOPT(25) = 1 is inappropriate.

These findings were found to be consistent with an analysis of noncurrent observed and calculated SO_2 χ/Q frequency distributions for 1, 3, and 24 hours near the Four Corners Plant in New Mexico. The comparison involved a four-year calculated χ/Q data set and a two-year observed χ/Q data set at the worst-case high terrain impact location near the plant.

Dispersion modeling in a complex terrain setting is at the leading edge of air quality modeling science. Inherent difficulties in prescribing plume height, trajectory, and diffusion in complex terrain have prevented the development of standard models that enjoy wide acceptance within the modeling community. Several advanced modeling techniques that do not suffer from all of the deficiencies inherent in simple Gaussian models have undergone limited evaluation.[1-5] However, because of input data requirements and the high level of user sophistication needed, they have not enjoyed widespread use or general regulatory acceptability.

EPA has recently developed and made available a set of Gaussian models for performing impact estimates in complex terrain. The principal point of departure of the COMPLEX I and COMPLEX II models from the VALLEY model[6] is their capability of simulating hourly variations in the required meteorological inputs. The COMPLEX models also make available as user-exercised options, under IOPT(25), various approaches to the treatment of terrain. Because calculated concentrations are sensitive both to model selection (COMPLEX I or COMPLEX II) and the terrain treatment option [IOPT(25)], χ/Q values at a given receptor location can vary by a factor of 8 or more under the same meteorological condition. This variability suggests the need for model performance evaluation to support the eventual widespread use and acceptance of the COMPLEX codes. This paper reports on two such evaluations using SF_6 tracer data at the Harry Allen Plant site in southern Nevada and observed SO_2 χ/Q values at the worst-case high terrain location near the Four Corners Plant in New Mexico.

Formulation of the COMPLEX Models

The basic computer code on which the COMPLEX models are based is MPTER.[7] Thus, COMPLEX I and II have the capability of calculating concentrations for specified averaging periods at selected receptor points on the basis of sequential hourly (CRSTER-preprocessed)[8] surface and upper air data.

The principal difference between MPTER and COMPLEX is that the latter can calculate concentrations at terrain elevations greater than the lowest source stack height. When this situation is encountered, COMPLEX has available a set of options [IOPT(25)] for simulating plume dispersion, whereas MPTER terminates the run.

When the studies reported here were carried out, one of four values for IOPT(25) could be selected, each having the following meaning (as stated in the code):

- For IOPT(25) = 0, COMPLEX is identical to MPTER.
- For IOPT(25) = 1, plume heights are not allowed to be closer than a specified minimum height to receptors (10 m is recommended).

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- For IOPT(25) = 2, one calculation is made with the receptor at plume height over level terrain, and a second calculation is made with terrain, allowing the plume height to be no closer than a specified minimum height. The lesser of these two calculated values is used.
- For IOPT(25) = 3, concentrations are calculated as if there is no terrain, but that the receptor is at the same mean sea level height as with the terrain.

In the two studies reported here, calculated concentrations using options 1, 2, and 3 were compared with observed values. The versions of COMPLEX I and II now available in the UNAMAP series include two other options that are variations of options 1, 2, and 3. The current UNAMAP versions of COMPLEX also include with option 1 the linear decay with differential height to 400 m that corresponds with VALLEY.

In COMPLEX I, a 22.5° sector spread calculation is made (as with VALLEY) and in COMPLEX II, a Gaussian plume prof. e is applied in the horizontal (as with MPTER). Thus, COMPLEX I with IOPT(25) = 1 with a 10 m minimum separation distance is seen to be equivalent to the terrain treatment in VALLEY, excluding the assumption of 6 h of persistence in 24 h and including ground reflection. IOPT(25) = 2 is seen to be based on the hypothesis that the maximum concentration that can occur at any distance is the unreflected plume centerline concentration at that distance. IOPT(25) = 3 could be interpreted to represent approximately the flow of a plume around rather than over a terrain obstacle; option 3 also includes the preceding hypothesis.

Several other types of options are available in the COMPLEX models. A stability-dependent variable is used to specify the terrain adjustment factor, e.g., the value 0.5 corresponds to a half height adjustment. EPA recommends that 0.5 be specified for A, B, C, and D stability conditions, and that 0 be used for E and F. Other options include gradual versus final plume rise, a treatment of stack downwash, buoyancy induced dispersion, and stability dependent wind power law exponents.

Harry Allen SF_6 Tracer Studies

Sampling Protocol

Meteorology Research, Inc. carried out a field test program in the vicinity of the proposed Harry Allen Plant in southern Nevada to provide a site specific tracer and meteorological data set for the purpose of model evaluation.[9] This field observation program was designed to obtain concentration data at elevated terrain locations where plume impacts would be expected under stable, light wind conditions. SF_6 tracer was released at projected plume height elevation and sampled at a variety of locations and terrain elevations during 13 test periods with an average duration of about 10 hours. Meteorological data, including vertical profiles of winds and temperature and ground level winds, were collected by means of double theodolite pibals at the release site, two tethersonde stations, an acoustic sounder, and four mechanical weather stations downwind of the release site. An extensive monitoring network for aerometric data collection was established (Figure 1). The maximum relief at an SF_6 monitoring site relative to ground elevation at the release point was 413 m (at stations 25 and 27).

A total of 27 ground tracer sampling stations was used during the field program, but no more than 23 stations were in operation during any single test. The stations were located in order to provide an adequate density of coverage in or near the plume path to account for slight variations in the wind direction during any test period. All of the sampling sites were located within 13 km of the tracer release site. An unobstructed view of the release site was possible from each sampling station. Most of the sampling stations were situated on hilltops or prominent terrain features to detect tracer plume impingement.

Both automated and hand-bagger samplers were used in the field program. A pump and manifold system directed the sample air flow into the sample bags. The automated sampler used a step valve to switch the air to different bags every hour; a built-in timer activated the sampler at a preset time. The hand-baggers were manually activated and bags were changed after each hour. A pretest manufacturer's factory calibration and numerous field calibrations were performed on the gas chromatograph for each test during calibration gases of different concentrations. A quality assurance program and an independent field auditing program were conducted to assure the quality of the field data.

Selection of the test days was based on forecasts of stable conditions. Starting times of the releases were scheduled for either 0200 LST or 1400 LST. Stable conditions were defined as a potential temperature gradient of at least 0.01 K/m in the layer from the stack top of the proposed Harry Allen Plant to the estimated plume top. Tracer samplers began operation 1 h prior to the tracer release time and continued for at least 1–2 h after the termination of the release. Tethersonde profiles and a double theodolite pibal were taken 1 h prior to the scheduled release. Data from the tethersonde were used to estimate the potential plume rise and to help set the tracer release height. The SF_6 was released at average rates of about 6.5 kg/h through tubing held aloft by a tethered balloon system. Tracer releases were designed to last for 12 h.

A total of 13 complete tests were performed in the field between 12/17/79 and 2/12/80. Table I summarizes the characteristics of stable hours during each test

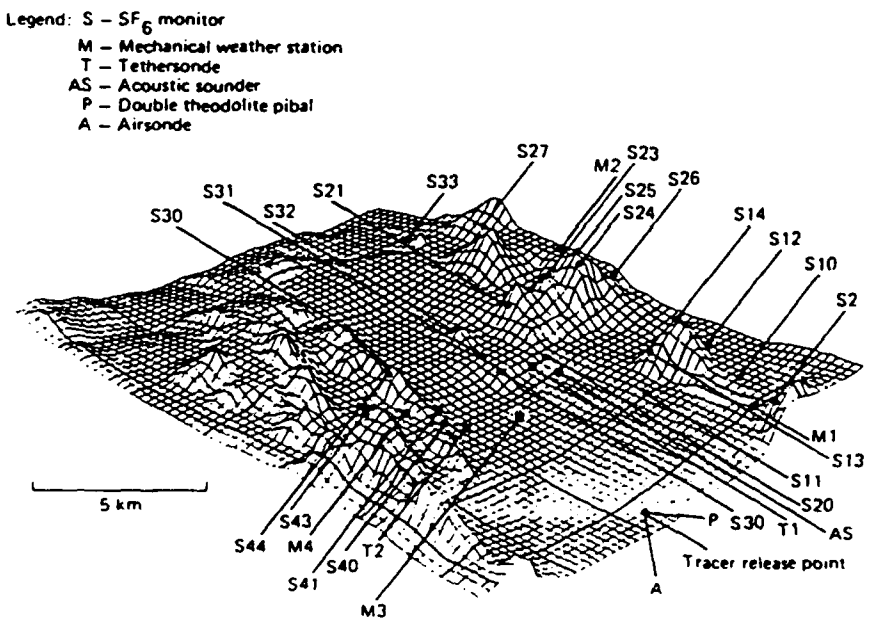

Figure 1. Terrain map of the Harry Allen Plant site, viewed from the northeast, with aerometric data sampling locations. The vertical scale is exaggerated fivefold

Date	Test	Stable hours (LST)	ΔT Stability	Range of wind speeds at release height (m/s)	Release height* (m, MSL)
12/17/79	A	0300–0800	E & F	2.4–3.4	899–914
12/19/79	B	0300–0800	E & F	2.3–3.1	930–942
01/16/80	C	0300–0800	E	0.7–1.4	890–914
01/23/80	D	0300–0800	E	4.6–7.1	853–914
01/24/80	E	0300–0800	E	5.2–8.1	896–975
01/25/80	F	0300–0800	E & F	6.7–9.0	899–914
02/01/80 to 02/02/80	H	2000–2400	E	1.1–1.8	1036–1055
02/02/80 to 02/03/80	I	1800–0100	E & F	0.9–2.9	914
02/04/80	J	0300–0800	E & F	3.1–6.4	850–975
02/06/80	K	0300–0800	E	0.9–1.7	914–945
02/10/80	L	0300–0800	E & F	1.9–3.8	975
02/11/80	M	0300–0800	E	2.4–2.6	960–1006
02/12/80	N	0300–0800	E	2.9–3.9	939–975

* Ground elevation at tracer release site was 619 m (2030 ft) MSL

Model Evaluation Procedure

COMPLEX model performance was evaluated only during the 65 hours of stable conditions observed during the 13 tracer tests. Pasquill-Gifford stability classes were assigned on the basis of the observed vertical potential temperature profile at the release point over the 100 m vertical layer that included the tracer plume. *E* stability was specified by $0.5 < \Delta T/\Delta Z < 1.5$ K/100 m and *F* stability was $\Delta T/\Delta Z \geq 1.5$.

Because the COMPLEX models assume steady state conditions, the 1-h average meteorological parameters for each hour prior to the SF_6 sampling hour were used as model input. Hence, a constant 1-h tracer plume traveling time was assumed. For most of the 65 stable hours examined, the average traveling times to the distances of interest were on the order of 1 h. By using this constant 1-h time lag assumption, the modeling results could be linked to the measured tracer data. A subsequent sensitivity analysis indicated that this assumption did not significantly influence the outcome of this model evaluation study.

Two different types of wind data were used as input to the COMPLEX codes. "Real" winds were the actual 1-h average wind speeds and directions measured at the release site. For "adjusted" winds, it was assumed that the actual wind direction was parallel to the line connecting the release site and the monitoring station with the highest observed tracer concentration.

The two COMPLEX models were applied with the three terrain options for each of the 65 stable dispersion hours. One-hour and overlapping 3-h concentrations were calculated at all 27 receptor sites for all six modeling options.

Model Evaluation Results

The COMPLEX modeling results were compared to the measured tracer concentrations. Both scatter plots and cumulative concentration frequency distribution plots were generated to present the results of the comparison.

Linear least squares regression plots were developed for the 1-h and 3-h averaging periods, with the real and adjusted winds as inputs. Table II shows the slopes of the best fit lines forced through the origin and the correlation coefficients between predicted and observed values. As can be seen, no correlation between observations and predictions exist for the simulations using the real winds as input. For the calculations using the adjusted winds, some 10% of the variations in observed 1-h concentrations and 15–25% for 3-h concentrations are explained by the models. Based upon the slopes of the regression lines, COMPLEX II overestimated on the average by factors of about 2.5–12, depending on the terrain treatment option, and COMPLEX I overestimated by factors of about 2.5–6. Correlograms and linear least square fits also were developed for the highest concentration/highest prediction pairs in each hour (65) and each 3-h period (37). The correlations and slope values were very similar to those presented in Table II for all data points.

The COMPLEX models are not planned for use as perfect simulators of physical reality. Rather, they are intended to be used in regulatory settings for the conservative specification of appropriate emission limits. The statistical comparison of observation/prediction pairs typically exacts demands that cannot be met adequately by Gaussian models in flat terrain settings, let alone where flow complexities are present, such as in complex terrain. Thus, the comparison of observed and calculated concentration frequency distributions has often been used to calculate model applicability or validity, as in the CRSTER validation studies.[10]

Figures 2 and 3 set forth the results for the 1-h concentrations based on adjusted and real winds, respectively. In both models all three terrain treatment options overestimate the observed concentrations. At the highest percentile values the range in which regulatory decisions typically are made, COMPLEX II overestimated by far greater factors than COMPLEX I, independent of wind input. For COMPLEX I, options 2 and 3 gave results that are both uniformly conservative and follow the observed distribution generally within a factor of 2, whereas option 1 overestimated considerably. As shown in Figure 4, similar results were obtained for 3-h average concentrations for the real wind cases.

Four Corners χ/Q Analysis

Aerometric Data Base

The Four Corners Power Plant is a 2150 MWe (megawatts electric) coal-fired plant located in a complex terrain setting in northwestern New Mexico. A number of modeling studies have indi-

Table II. Slopes of lines forced through origin (*b*) and correlation coefficients (*r*) from linear least squares regression analysis with Harry Allen tracer data (1099 1-h data points and 630 3-h (overlapping) data points).

COMPLEX Model	IOPT(25)	1-h concentrations: Adjusted wind *b*	1-h: Adjusted wind *r*	1-h: Real wind *b*	1-h: Real wind *r*	3-h concentrations: Adjusted wind *b*	3-h: Adjusted wind *r*	3-h: Real wind *b*	3-h: Real wind *r*
I	1	6.389	0.320	5.840	0.003	5.636	0.460	5.726	0.023
	2	3.508	0.324	3.352	−0.002	3.075	0.453	3.279	0.014
	3	2.682	0.282	2.470	0.006	2.371	0.409	2.400	0.027
II	1	13.616	0.364	5.750	−0.022	12.213	0.526	5.643	−0.053
	2	7.371	0.374	3.222	−0.023	6.789	0.544	3.148	−0.056
	3	5.649	0.317	2.522	−0.021	5.636	0.460	2.462	−0.050

C&R-96

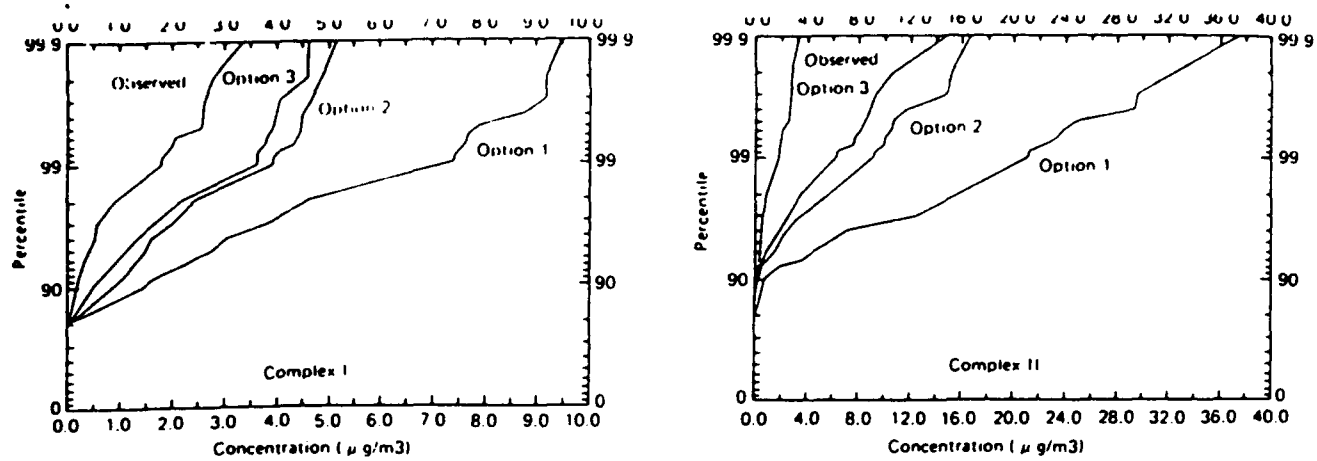

Figure 2. Cumulative frequency distribution of 1-h average predicted and observed tracer concentrations with adjusted winds (1099 data points)

cated that the location of the highest ground level SO_2 concentrations from the Four Corners Plant would occur on The Hogback, a volcanic intrusive ridge that rises precipitously for about 300 m above the surrounding flat terrain at some 10–15 km from the plant. Figure 5 displays the topography of the locale.

A continuous SO_2 monitor was installed at the predicted worst-case location atop The Hogback for a two-year period (9/16/78 to 9/16/80). The monitor was located 11 km from the Four Corners Plant at a bearing of 243° (true north). Another coal-fired plant, the 700 MWe (during the period of the monitoring program) San Juan Generating Station, is located at a bearing of 43° at a distance of 25 km from the Hogback monitoring site. During this monitoring period, hourly load factors for the five units at Four Corners, daily sulfur content values, and known SO_2 removal efficiencies were used to calculate hourly SO_2 emission rates. The hourly ambient SO_2 and emissions data were used to construct observed 1-h, 3-h, and 24-h χ/Q frequency distributions, under the assumption that all of the ambient SO_2 measured at the Hogback monitor was the result of emissions from the Four Corners Plant. During the measurement period, the SO_2 emissions from Four Corners exceeded those from San Juan by about a factor of 6.

Hourly data from the meteorological tower at the Four Corners Plant were available only for the four-year period ending 12/31/78. Thus, concurrent ambient SO_2 and meteorological data were available for only three and a half months (9/16/78 to 12/31/78). Continuous wind speed and direction data were taken at the Hogback site itself for the two-year period of record, but an analysis of these data during the 500 highest 1-h SO_2 concentrations indicated that their use as input to straight line Gaussian models, such as the COMPLEX codes, would not provide a reasonable representation of transport from the Four Corners Plant to the Hogback monitor. This generalized analysis, together with in-depth analyses of trajectories accompanying certain observed high concentrations, confirmed that any attempt to compare observed and calculated concentrations at The Hogback on an event by event basis using a Gaussian model would be unsuccessful. The flow patterns under stable impaction conditions are too complex in this area for such event by event comparisons. Therefore, the lack of a simultaneous meteorological and air quality data base was not considered an insurmountable obstacle to model evaluation, inasmuch as an evaluation could be made on the basis of multi-year concentration frequency distributions.

An hourly data base for COMPLEX modeling of the four-year period was developed from data collected at the Four Corners tower. Wind data at the 60 m level were regarded as most representative of plume dispersion from the stacks at Four Corners, which are 60–90 m high. Stability class was specified on the basis of the Pasquill-Turner method[11] using Farmington, New Mexico cloud cover and 10 m winds extrapolated from the 60 m level. Because an analysis of the tower winds at 6 m and 60 m supported the use of the RAMR[12] power law exponents rather than the CRSTER exponents, the former were used. Hourly mixing heights were specified as a con-

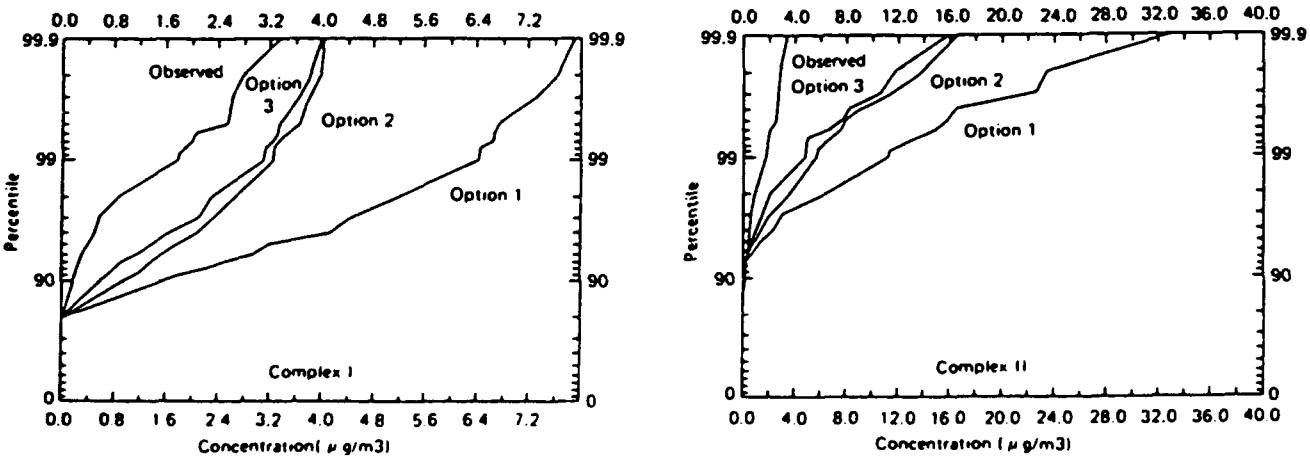

Figure 3. Cumulative frequency distribution of 1-h average predicted and observed tracer concentrations with real winds (1099 data points)

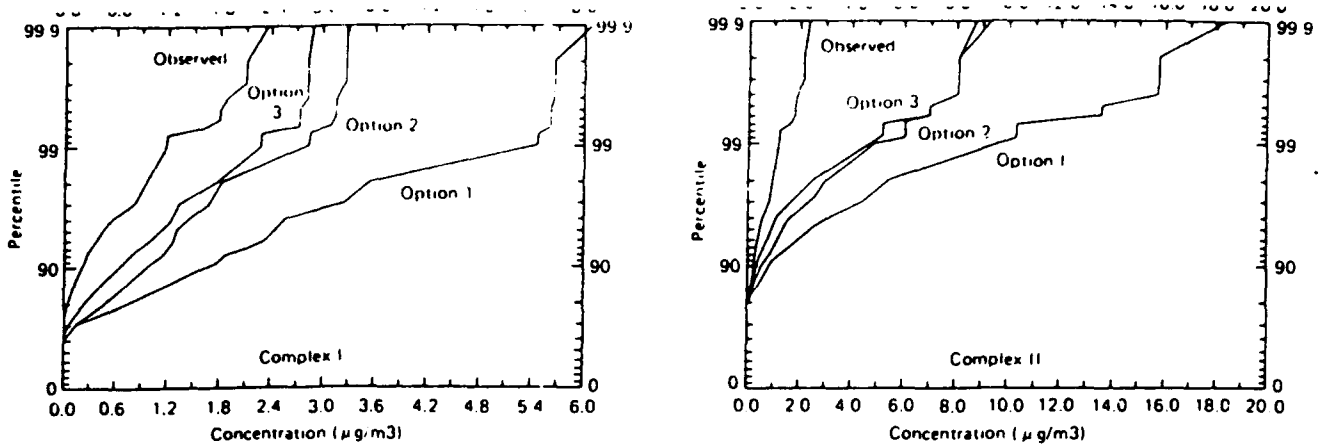

Figure 4. Cumulative frequency distribution of 3-h average predicted and observed tracer concentrations with real winds (630 data points).

stant value that would lead to maximum concentrations over high terrain under neutral and unstable conditions, but subsequent analysis showed calculated maximum χ/Q values on The Hogback to be completely insensitive to mixing height variation.

Preliminary modeling with various versions of the COMPLEX codes on the 1975–78 data base was then conducted, for comparison with observed SO_2 concentrations. The Four Corners Plant was modeled with all five units at full load. For all modeling options and for all averaging periods (1 h, 3 h, and 24 h), the calculated upper percentile concentrations were far higher than the corresponding observed concentrations. An analysis of load factors by unit during the two-year monitoring period disclosed that one or more units were frequently off line. Therefore, the model performance evaluation was carried out on the basis of χ/Q values.

Model Evaluation Procedure

Units 1, 2, and 3 at the Four Corners Plant have significantly lower effective stack heights and emission rates than units 4 and 5. To ascertain what source terms would be appropriate for modeling Four Corners with the four-year data set, the 10 highest 1-h, 3-h, and 24-h χ/Q values during each year of the two-year ambient data set were identified, and the contemporaneous load factors for each unit were noted. Units 1, 2, and 3 were generally on line at nearly full load either with unit 4 and/or unit 5 at full load or units 4 and 5 off line.

On this basis, two sets of source input terms were used to generate two distributions of calculated χ/Q values, i.e., all five units at full load or only units 1, 2, and 3 at full load. The χ/Q values for the latter source specification were typically higher than those for the former because the effective stack heights for units 4 and 5 are higher than the top of The Hogback more often than are those for units 1, 2, and 3.

Model Evaluation Results

The five highest observed χ/Q values for 1 h, 3 h, and 24 h for each of the two ambient data years were compared with the corresponding χ/Q values from each of the four modeling data years. Table III summarizes the results of this comparison. Each modeled χ/Q value represents the mean for that rank from the four-year meteorological input data set, and each observed value is the mean from the two-year ambient data set. The modeled values are the result of using all five plant units at full load as the source term. These results are typically lower than those for units 1, 2, and 3 only.

In most current regulatory applications for short-term concentrations, the highest second-highest value is the basis for decision-making. Using this criterion for the 1-h averaging period, COMPLEX I overestimated by factors of about 1.5–3, whereas COMPLEX II overestimated by factors of about 6–14 (see Table III). For the 3-h averaging period, COMPLEX I overestimated by factors of 2–4, and COMPLEX II by the same 6–14. For the 24-h averaging period, COMPLEX II overestimated by factors of about 3–8, and COMPLEX I by about 1.2–3.

Table III also shows an apparent decreasing degree of modeling conservatism as the averaging period increases. This is to be expected in this application because the contribution of background or other sources, such as the San Juan plant, is relatively greater in relation to the (lower) 24-h concentration. Thus, when the observed 24-h χ/Q value is calculated only on the basis of the Four Corners emissions, it will be too large by a greater factor than for 1-h and 3-h

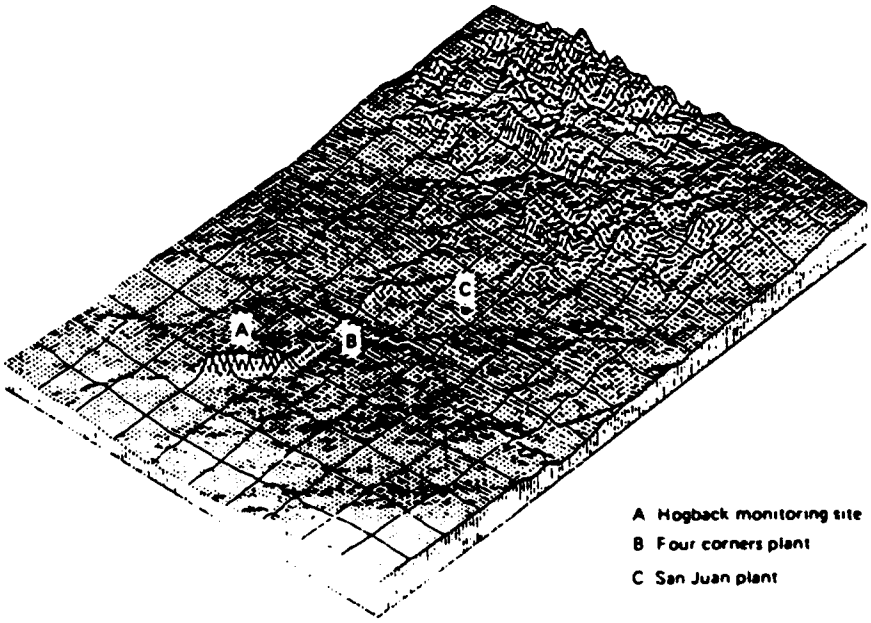

Figure 5. Four Corners area viewed from the southeast. The vertical scale is exaggerated twelvefold.

Table III. Comparison of observed and calculated χ/Q values in 10^{-5} s/m³. Each observed value is the mean for two ambient data years September 16, 1978–September 15, 1980. Each modeled value is the mean for four meteorological input data years, 1975–1978. Three-hour and 24-hour concentrations are all block averages.

Averaging period	Basis of χ/Q value	Annual χ/Q rank 1	2	3	4	5
1 hour	Complex I, 1	1.75	1.71	1.7	1.67	1.66
	Complex I, 2	0.95	0.94	0.93	0.93	0.92
	Complex I, 3	0.75	0.75	0.75	0.74	0.74
	Complex II, 1	8.89	7.29	6.16	5.36	5.11
	Complex II, 2	5.35	4.35	3.67	2.85	2.33
	Complex II, 3	3.97	3.28	2.77	2.35	2.16
	Observed	0.65	0.51	0.42	0.36	0.30
3 hours	Complex I, 1	0.94	0.82	0.71	0.65	0.62
	Complex I, 2	0.49	0.43	0.38	0.34	0.33
	Complex I, 3	0.41	0.35	0.31	0.28	0.27
	Complex II, 1	2.96	2.48	2.05	1.80	1.73
	Complex II, 2	1.78	1.45	1.22	0.95	0.90
	Complex II, 3	1.32	1.09	0.92	0.78	0.73
	Observed	0.34	0.18	0.16	0.14	0.13
24 hours	Complex I, 1	0.161	0.14	0.127	0.122	0.115
	Complex I, 2	0.088	0.074	0.069	0.066	0.061
	Complex I, 3	0.073	0.060	0.058	0.054	0.050
	Complex II, 1	0.372	0.333	0.272	0.255	0.226
	Complex II, 2	0.224	0.193	0.155	0.139	0.119
	Complex II, 3	0.167	0.152	0.120	0.122	0.095
	Observed	0.086	0.046	0.044	0.039	0.038

averaging periods. Moreover, it may be the case that better agreement is obtained for 24 h than for the shorter periods because less rare (composite) events are represented by the extremes.

Discussion

Neither of the two model evaluations reported here is ideal from the standpoint of study design. However, the consistency of the results cannot be ignored. At both locations for all averaging periods considered, COMPLEX II produced concentration estimates higher than observed values by factors of 5–10 and greater, for all three terrain treatment options. COMPLEX I (1) estimates were higher than observations by factors of 2.5–5; COMPLEX I (2) and (3) produced uniformly conservative results that nevertheless reasonably approximated observed concentration frequency distributions. The plausibility of these results, in view of the models' treatment of horizontal plume spread, ground reflection, and plume elevation, particularly for I(2) and I(3) relative to the other options, deserves explanation.

Horizontal Plume Spread

COMPLEX I cannot be regarded as representative of physical reality inasmuch as a pie shaped plume subtending a uniform arc of 22.5° is not observed in the atmosphere. The sector spread approach can be interpreted to be a surrogate for actual plume meander under worst-case conditions. Apparently the 1-h average horizontal plume spread calculated in accordance with stable Pasquill-Gifford (3–5 minute) coefficients does not take proper account either of horizontal dispersion due to wind direction meander or of enhanced mechanical turbulence in the vicinity of complex terrain, or both. Three separate analyses support the appropriateness of a sector spread approach.

First, during certain of the 13 test periods in the Harry Allen field program, aircraft observations of plume dimensions were made (in addition to the measurements of SF_6 concentrations at the 27 ground level monitors). Under light wind speeds, when the highest observed concentrations occurred (tests C, F, I, and K), plume widths of up to 3–4 km at downwind distances of 4–8 km were observed. This corresponds to sector widths in the range of 20–45°.

Second, an analysis of 10-min SO_2 data during the 10 highest 1-h concentrations at The Hogback showed peak to mean (10-min to 1-h) ratios of 1.4–3.3, with a mean value of 2.4. Although an examination of the 10-min subsets was not possible, it is likely that considerable fluctuations also occurred within this shorter period, as was suggested by a review of the simultaneous Hogback anemometer data. Peak to mean ratios of 2–3 may have occurred also within 10-min periods. COMPLEX II calculates (centerline) concentrations on the basis of 3–5 minute σ values. The observed data at The Hogback clearly show that these highest short-term values do not persist for more than a few minutes.

Third, visual observations from aircraft and ground level of the behavior of Four Corners plumes under light and moderate wind speeds and stably stratified air confirm that the plumes exhibited very substantial meandering with time. The observed meandering supports the appropriateness of a 22.5° sector spread.

Although the use of a 22.5° sector has a historical basis that may not be directly related to physical reality, it apparently approximates peak to mean effects that are currently not included in the formulation of the physically more realistic COMPLEX II.

Ground Reflection

Equation 3.1 in Turner is the basic equation contained in MPTER for the calculation of ground level concentrations and it includes ground reflection.[13] Ground reflection for a source having an effective stack height of H over flat terrain is simulated by locating an identical virtual source at $(0, 0, -H)$, which results in a doubling of ground level concentrations (at $z = 0$), i.e., the disappearance of the factor 2 in the denominator of the expression.

In VALLEY and in current applications of COMPLEX I(1) and II(1), whenever the receptor height exceeds the effective stack height, the effective stack height is assigned the minimum value of 10 m separation from the terrain. When this assumption is invoked at locations where the σ_z value significantly exceeds 10 m, i.e., at distances greater than 2 km for any stability class, the result is to approximately double the unreflected plume centerline (axial) concentration.

It can easily be shown with the actual codes (with option 1) that for a complex terrain case where the plume height is at the terrain height, the calculated plume

centerline concentration actually increases from the point just before impaction to the impaction point, as a result of the assumed ground reflection. This postulated reconcentration of material appears to be incompatible with theories of gaseous dispersion; it also implies a decrease of entropy, which is contrary to the second law of thermodynamics. Viewed in another way, the presence of terrain under the impaction-reflection approach is seen to cause an increase in the plume centerline concentration. In order for this to occur the contaminant material must be transported against the concentration gradient, which violates the basic diffusion theory underlying the Gaussian solution, i.e., the eddy analogy to Fickian diffusion.

A number of studies of dispersion in complex terrain have been carried out. One of the few universal results to arise from such studies is that (especially under stable conditions) complex terrain enhances dispersion as compared to that over flat terrain.[14] If this is the case, then the effect of complex terrain should be to cause more dilution, not reconcentration. The hypothesis embodied in terrain treatment options 2 and 3 is consistent with the foregoing, i.e., that the maximum concentration that can occur at any location is the unreflected plume centerline concentration.

Plume Elevation

The treatment of plume elevation in option 3 appears at first to be without physical basis. Option 3 is equivalent to assuming that no terrain is present to deflect the plume flow, and that therefore the receptor is in effect suspended from a tower or a spire at its actual x,y,z location. If in fact the plume is deflected around a terrain feature such that its height remains constant and its vertical distribution is unaffected, then the use of option 3 can be shown to approximate this effect, at least for small values of Δz. The appropriateness of option 3 thus depends on what the probable behavior of the plume height is under stable conditions in a given complex terrain setting.

A recent set of fluid modeling experiments by Hunt *et al.* sheds some light on this problem.[15] Hunt investigated the flow structure around a polynomial hill under stratified conditions, both by means of the EPA Water Channel/Towing Tank and the EPA Meteorological Wind Tunnel. The shape of the hill can be described as a rather flat normal curve, with a maximum slope of about one. Hunt found that under low Froude numbers, flow originally directed at the hill moved around the hill; for higher Froude numbers, it flowed over the hill. Criteria were developed for specifying flow behavior as a function of Froude number (F), hill height (h_t), and streamline height (H). The criterion for flow around a hill is the inequality

$$H < h_t(1 - F) \qquad (1)$$

where $F = u/Nh_t$ and N, the Brunt-Vaisala frequency, can be expressed as:

$$N = \left(\frac{g}{T}\frac{d\theta}{dz}\right)^{1/2} \qquad (2)$$

For F stability ($d\theta/dz$ = 2 K/100 m), wind speeds of 1–4 m/s, and a hill height of 300 m (equivalent to The Hogback), Froude numbers of 0.13–0.51 are calculated. Thus, according to the Hunt flow criterion, under the critical wind speeds of 1 and 2 m/s, if the effective stack height is 225 m or less, the plume will flow around a hill having a height of 300 m. For plume heights of 225–300 m, at least part of the plume may rise over the hill.

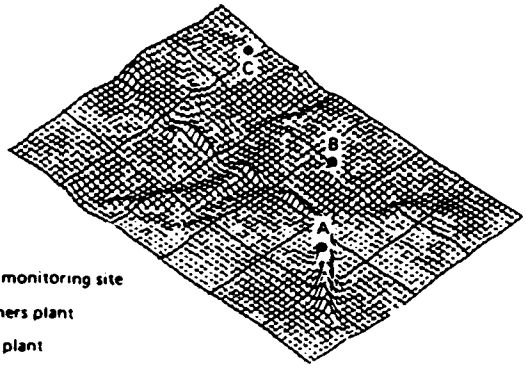

Figure 6. Four Corners area viewed from the southwest. The vertical scale is exaggerated twelvefold.

These results were reviewed as to their potential applicability to the Four Corners site. As shown in Figures 5 and 6, the aspect ratio of The Hogback in relation to the impaction flow vector (northeast) is seen to be very small. The aspect ratio is defined as

$$\lambda = b/L_0 \qquad (3)$$

where b is the horizontal half-width of the hill perpendicular to the flow direction and L_0 is the half-length of the hill in the X direction. For the Hunt experiments the aspect ratio was one, whereas for The Hogback the aspect ratio is on the order of 0.1–0.2. Intuition suggests that the less the aspect ratio, the greater will be the tendency for the flow to go around the terrain rather than over it.

Because of its low aspect ratio, The Hogback hardly presents any obstacle to northeast flow. Therefore, there is reason to believe that plumes in the height range 225–300 m also would flow around rather than over The Hogback. This representation of flow dynamics characteristics is what is simulated approximately by option 3, and thus option 3 is seen to have some physical representativeness at the Four Corners setting as well as at Harry Allen (see Figure 1).

Conclusions

The COMPLEX codes represent a significant advance over VALLEY, inasmuch as they can incorporate representative hourly meteorological data as input. This attribute not only produces more realistic estimates of 24-h concentrations, it permits estimates of 3-h and 1-h concentrations to be made.

For the two ambient data sets analyzed here, COMPLEX II typically overestimated upper percentile 1-h, 3-h, and 24-h average concentrations by factors of 5–10. COMPLEX I, IOPT(25) = 1 overestimated upper percentile observed concentrations by factors of 2.5–5. COMPLEX I, IOPT(25) = 2 or 3 consistently overestimated maximum concentrations, typically by factors of 1.2–2.5.

These results indicate that: 1) the artificial 22.5° sector spread used in COMPLEX I provides a reasonable surrogate for the variation of wind direction on a 1-h basis in complex terrain, and 2) the doubling of the plume centerline concentration under terrain impingement conditions in IOPT(25) = 1 is not appropriate.

Acknowledgments

The authors gratefully acknowledge the participation of several important contributors to this study. Dr. Louis Thanukos participated in the design of the analyses, Pradeep Saxena and Ralph E. Morris assisted with the computations, and Howard P. Beckman edited the manuscript. Special thanks are also due to Nevada Power Co., Pacific Gas and Electric Co., and Southern California Edison Co. for the use of the Harry Allen data.

References

1. R. B. Lantz, "Application of a Three-Dimensional Numerical Model to Air Pollutant Calculations," paper no. 72-141, presented at the 65th APCA Annual Meeting, Air Pollution Control Association, Miami Beach, FL, 1972.
2. A. Fabrick *et al.*, *User Guide to IMPACT*, Science Applications, Inc., Westlake Village, CA, 1977.
3. R. Lange, "ADPIC—A three-dimensional particle-in-cell model for the dispersal of atmospheric pollutants and its comparison to regional tracer studies," *J. Appl. Meteorol.* 17: 320 (1978).
4. A. K. Runchal, W. R. Goodin, K. J. Richmond, "Development and Validation of a Lagrangian, Random-Walk Model for Atmospheric Dispersion," TN-LA38, Dames & Moore, Advanced Technology Group, Los Angeles, CA, 1979.
5. T. W. Tesche, "Model Calculations of Air Quality Impacts from the Proposed South Geysers Power Plant under Limited Mixing and Fumigation," ES80-71, Systems Applications, Inc., San Rafael, CA, 1980.
6. E. W. Burt, *VALLEY Model User's Guide*, EPA-450/2-77-018, U.S. Environmental Protection Agency, Research Triangle Park, NC, 1977.
7. T. E. Pierce, D. B. Turner, *User's Guide for MPTER*, EPA-600/8-80-016, U.S. Environmental Protection Agency, Research Triangle Park, NC, 1980.
8. "User's Manual for Single Source Model," EPA-450/2-77-013, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC, 1977.
9. "Air Quality Analysis Study for Harry Allen Station," MRI-80 FR-1788, Meteorology Research, Inc., Altadena, CA, and Systems Applications, Inc., San Rafael, CA, 1980.
10. R. F. Lee, M. T. Mills, R. W. Stern, "Appendix F: Validation of a Single Course Dispersion Model," in *Proceedings of the Sixth International Technical Meeting on Air Pollution Modeling and Its Application*, NATO/CCMS, N. 41, 1975.
11. D. B. Turner, "A diffusion model for an urban area," *J. Appl. Meteorol.* 3: 83 (1964).
12. "User's Guide for RAM," EPA-600/8-78-016, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC, 1978.
13. D. B. Turner, "Workbook of Atmospheric Dispersion Estimates," PHS Publication No. 999-AP-26, U.S. Environmental Protection Agency, Research Triangle Park, NC, 1970.
14. G. E. Start, C. R. Dickson, L. L. Wendell, "Diffusion in a canyon within rough mountainous terrain," *J. Appl. Meteorol.* 14: 333 (1975).
15. J. C. R. Hunt, W. H. Snyder, R. E. Lawson, "Flow Structure and Turbulent Diffusion Around a Three-Dimensional Hill," EPA-600/4-78-041, U.S. Environmental Protection Agency, Research Triangle Park, NC, 1978.

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This paper was submitted for editorial review on November 3, 1982; the revised manuscript was received on April 25, 1983.

ATTACHMENT 2

COUNTY OF SANTA BARBARA • HEALTH CARE SERVICES
AIR POLLUTION CONTROL DISTRICT
315 CAMINO DEL REMEDIO, SANTA BARBARA, CALIFORNIA 93110 • PHONE (805) 964-8658

FAX NO. 805-967-4872

LAWRENCE HART, M.D., F.A.C.P.M.
DIRECTOR
HEALTH CARE SERVICES
AIR POLLUTION CONTROL OFFICER

JOHN B. ENGLISH
DIRECTOR, AIR POLLUTION CC

February 7, 1986

David Howekamp, Director
Environmental Protection Agency
Region IX
215 Fremont Street
San Francisco, CA 94105

1987 FEB 14
TO: AQTS, CCTS
FROM: TOM CORNWELL

Terry McGuire, Chief,
Technical Support Division
Air Resources Board
P.O. Box 2815
Sacramento, CA 95812

Dear Mr. Howekamp:

The purpose of this letter is to summarize the guidance provided during a February 6, 1986 conference call between the Santa Barbara County Air Pollution Control District, EPA Region IX and the California Air Resources Board regarding the appropriate method to model offshore and onshore emission sources. A list of participants involved in this conference call is attached. Our understanding of the modeling guidance provided by both the EPA and ARB is listed below.

Offshore Sources:

. For offshore sources, where the onshore receptors are located below the lowest stack height, the OCD model will be employed.

. For offshore sources, where the onshore receptors are located above the lowest stack height, the offshore portion of plume transport will be modeled using OCD. A vertual point source treatment will be employed to carry the plume onto shore using the Complex I model.

Onshore Sources:

For onshore sources, where the receptors are located below the lowest stack height, MPTER will be used.

For onshore sources, where the receptors are located above the lowest stack height, Complex I will be used.

We understand that both the EPA and ARB will accept the results of modeling, described above, when used by the APCD to perform the Air Quality Impact Analysis needed as the basis for permit issuance. The question was noted and understood by the EPA and ARB that the OCD model seems to underpredict the highest ranked concentrations. The specific hierarchy of the meteorological data to be used as input to OCD is to be determined by the appropriate regulatory agencies. We propose a meeting for February 28, 1986 at the District's new office location, 5540 Ekwill Street, Suite B, Santa Barbara, California, 93111, to discuss the development of this hierarchy.

Please confirm your agreement with the modeling method outlined in this letter for use in the APCB's Air Quality Impact modeling for permanent issuance. Also please confirm your ability to attend the February 28, 1986 meeting to discuss the OCD model input hierarchy. As of February 10th, APCD's new phone number will be (805) 964-8111. Thank you for your attention in this matter.

Very truly yours,

Dr. Lawrence Hart, M.D.
Air Pollution Control Officer

John B. English
Director, Air Pollution Control

JBE/mw
2757a.G
Attachment

cc: S. Ziman (Chevron)
D. Cornett (Exxon)
W. Grant (MMS)
T. McGuire (ARB)
J. Tikvart (EPA-OAQPS)
J. English (SBAPCD)
Mitch Baer, (MMS)

JAN 29 [illegible]

Mr. Lawrence Hart, M.D.
Air Pollution Control Officer
Santa Barbara Air Pollution
Control District
315 Camino Del Remedio
Santa Barbara, CA 93110

Dear Dr. Hart:

This is in further response to your request for guidance on the use of the OCD model in the permitting of new sources in Santa Barbara County. As you are probably aware under the Clean Air Act EPA's modeling criteria are applicable in the evaluation of major PSD/NSR sources. For smaller sources and for determining compliance with State Ambient Standards state and local agencies may use their own discretion in determining the appropriateness of various modeling approaches.

EPA's modeling criteria have been developed based upon extensive studies conducted onshore, which may not be wholly applicable to sources located over water. Thus, on the specific issues raised in your letter MMS's offshore studies provide practically the only data base with which to judge these complex technical issues. For this reason SAI's performance evaluation of OCD using MMS data are the basis for our comments.

The study showed very little difference between OCD's preferred and default methods for parameterizing offshore stability and determining hierarchy of meteorology data. Generally EPA prefers the use of available site specific data rather than default values wherever possible. However, the appropriate regulatory agencies should meet and agree on a specific hierachy for selecting input data. For all of the options tested the OCD model far out-performed the Complex II model when looking at the ten highest ranked concentrations. From a regulatory point of view, these are amongst the most important statistics since a model needs to be able to determine compliance with the national standards, which are not to be exceeded more than once per year. We have some concerns that on average, the OCD model seems to underpredict the highest ranked concentrations by about 10 to 20%. An effort should be made to continue to refine the OCD model as additional data becomes available and attempt to correct the apparent underprediction. However, given the far superior performance of OCD over any available alternative, we concur with the flat terrain

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use of OCD for permitting of offshore sources in both tidelands and OCS waters. As we noted in our letter of December 20, EPA is currently in the process of developing new recommendations on complex terrain modeling. Until that guidance is issued we will continue to recommend that COMPLEX I be used in determining concentrations from offshore sources for receptors located above the physical stack height. Hence for receptors above stack top OCD may be used with site specific or default over water dispersion parameters and using the terrain impaction algorothm currently used in COMPLEX I. Once the plume comes onshore EPA recommended sigmas should be used. This stipulation may entail a modification of COMPLEX I using a virtual point source treatment at the shoreline.

For sources located onshore OCD may also be used, however, all modeling paremeters must fully replicate the results of MPTER/COMPLEX I to ensure consistency with EPA national modeling criteria. Thus for onshore sources OCD must use the same set of sigma y and z values, anemometer height wind speed, vertical wind speed profiles, plume rise formulas etc., as MPTER/COMPLEX I.

If you have any further questions or comments please call me or Kevin Golden at (415) 974-7640.

Sincerely,

Original Signed By:
David P. Howekamp
David P. Howekamp
Director
Air Management Division

cc: S. Ziman (Chevron)
D. Cornett (Exxon)
W. Grant (MMS)
T. McGuire (ARB)
J. Tikvart (EPA-OAQPS)
J. English (SBAPCD)

RESPONSE TO COMMENTS
FROM
UNION OIL COMPANY OF CALIFORNIA (UNOCAL)

Union-1 Comment noted.

Union-2 Comment noted. The [illegible]TS addresses the potential effects of satisfying projected wate[illegible] [illegible]ands associated with oil and gas development at VAFB. This analysis of impacts has been performed based on existing use patterns for surface and groundwater as administered by appropriate state agencies. Impacts on surface and groundwater would not be affected by ownership of water rights, since the analysis implicitly assumes that water rights would be acquired consistent with the proposed water supply plan associated with a development proposal. In the case of Union Oil Company's rights, this is one less step in the development process which would need to be satisfied prior to surface water or groundwater use associated with oil and gas development at VAFB.

Union-3 The statement that "oil from the Arkley wells is not shipped to Union's Battle Plant but is transported via pipeline to Unocal's Mesa refinery west of Nipomo" is inconsistent with information provided by a Unocal representative at an on-site visit to gather oil and gas transportation data for this report.

Union-4 Even though NOMECO and Conoco have given up their leases, others can and probably will lease and produce from these locations at a future date. See comment and response NR-3.

The development scenario is believed to be feasible on VAFB and is based on the analyst's background and experience in exploring for oil and gas in the Santa Maria basin. It represents a picture of what *could* occur on VAFB, but it is not necessarily the *actual* scenario that will unfold over the next 40 years. The development scenario is at best a rough approximation and should be considered as such. Each well that is ultimately drilled, whether for exploration or development, will provide more information to the overall database. The information gained from just one well could completely alter the present understanding of any portion of the base. Therefore, the interpretation of the petroleum geology on VAFB is dynamic and is constantly being updated to gain a more accurate picture. This dynamic setting will either adversely or positively affect the ultimate petroleum development on the base.

Refer to section 4.0, Petroleum Resources Evaluation, in the Mineral Resources Report for a discussion of the specific methodology employed in evaluating the resource potential.

Union-5 As outlined in section 6.2.4.1 of the MRMP, water rights in California are administered by the Division of Water Rights. The appropriation of surface and groundwater withdrawals are

established pursuant to California water law as applicable to the body of water in question. Neither the MRMP nor the DEIS attempt to affect the priority of such diversions, but they both address potential impacts which may result from surface and groundwater withdrawals and propose measures to mitigate their effects.

Union-6 The referenced data have been accepted as valid by the Santa Barbara County APCD. The 14.1-pphm episode that occurred on March 27, 1987 is unusual, since it occurred at 6:00 A.M.

A review of the maximum ozone values monitored in the North County, given in Table 3.3-4 of the DEIS, clearly shows a trend toward higher values at most of the monitoring stations.

If the North County reaches the nonattainment level for ozone (defined as exceeding the federal standard more than three discontinuous times in three years), it is possible that the Santa Barbara County APCD may not have to wait for the EPA's official redesignation to initiate their new source review rules in the area. These rules include the requirement to demonstrate a net air quality benefit through emission offsets for any future source. The MRMP has therefore assumed that this will happen, as a worst case, by outlining similar requirements. Apparently, these are the "stringent mitigation measures" referred to in the comment.

Union-7 COMPLEX II was used to estimate the impact of stationary sources in complex terrain, as required by the Santa Barbara County APCD Air Quality Impact Analysis protocol of April 1, 1987. This model was used for the same purpose in Unocal's environmental assessment of oil development on VAFB.

Union-8 The Santa Barbara County APCD is generally in support of the offset requirements outlined in the MRMP, as stated in comment SBAAir-1. These mitigation measures are recommended to ensure that a proliferation of small development projects that do not trigger Santa Barbara County APCD mitigation thresholds by themselves, do not degrade regional air quality and limit future growth as a whole.

Union-9 This correction has been made in the FEIS (see the air quality errata). Please see the response to comment Union-6.

Union-10 Page 4.3-19, second paragraph of the DEIS identifies that the North County inventory used in the analysis is underestimated and that the offset pool is clearly larger than that indicated by Table 4.3-10. Page 4.3-19, paragraph four of the FEIS has been changed, beginning with:

"Although emissions for the three development scenarios may be somewhat overestimated, the analysis shows that the emission offset requirements for development of between 200 and 300 wells are on the same order of magnitude as the existing North County petroleum source emission inventory. As a result . . ."

A more reasonable analysis of offset requirements, based on revisions to development emissions and a 1.805-to-1 offset ratio requirement has been included in the FEIS (see the air quality errata).

Union-11 Comment noted. These changes have been incorporated in the FEIS (see the air quality errata).

Union-12 Using reasonable worst-case background pollutant values is an acceptable technique, commonly used by the Santa Barbara County APCD, in the absence of site-specific data. Please refer to Table 3.3-4 in the DEIS. With regard to SO_2, the Lompoc, Jalama Road station is in close proximity to VAFB. Higher SO_2 values were recorded at the three Santa Maria monitoring stations. For PM_{10}, the Santa Maria Library monitoring station was the only location in the North County during the baseline period of 1981 through 1985 where PM_{10} was measured. The value of 44 $\mu g/m^3$ used as a background level was the ninth highest value recorded at this location in 1985. For CO, the San Luis Obispo station was the closest monitor to have a complete database for the 1-hour and 8-hour averaging period during the baseline period. The use of this station has been qualified in the FEIS, stating that it is located in an urban setting (see the air quality errata). For the above reasons, it is felt that the background pollutant values used in the air quality modeling are reasonable.

Union-13 Please see the responses to comments Union-6 and Union-8.

Union-14 Comment noted. Please see the response to comment Union-10.

Union-15 The statement referenced in the comment is not meant to indicate a negative aspect of the project but only to show the difference between exploration and development phases of the project.

Union-16 The estimates presented in the DEIS are based mainly on information from development plans submitted by NOMECO, Conoco, and Union Oil companies. Although it is true that NOMECO and Conoco have "virtually given up their leases" since the DEIS was written, no formal indication of withdrawal of development plans has been made to the U.S. Air Force. The environmental analysis therefore continues to estimate potential production levels based on all three development plans.

Union-17 Comment noted.

Union-18 Section 6.9.5, Recommended Guidelines, Standards, and Management Practices, in the MRMP identifies mitigation measures, including landscape screening using trees and shrubs, that would reduce and minimize potential visual impacts caused by site preparation and road cuts.

Union-19 The DEIS evaluates the MRMP impacts and mitigation measures. The height and mass of exploratory drilling equipment identified in

short time that exploratory rigs would be operating, impacts are considered significant but short term. As identified in the DEIS, the effects of exploratory drilling are comparable to those addressed in the MRMP. We have concluded that findings in the MRMP are accurate, and the impacts in the DEIS should be consistent. The statement in section 4.9.2, Environmental Impacts and Mitigations, on page 4.9-4 has been changed in the EIS errata.

Union-20 As mentioned on page 4.9-4, paragraph 1, "The final production phase involves use of the pumping unit, gas scrubber, oil and gas separator, steam generator, pipelines, and tankage (see figures 4.9-3 and 4.9-4 for the typical site components)." As a general rule, these components are used in the final production phase. Clarification is required to distinguish between a typical well site and the support components associated with the site. A typical well site consists of a well pad where one or more pumping units and associated pipelines are located. The support components, such as a gas scrubber, oil and gas separator, steam generator, pipelines, and tankage could be located on one site that has a pumping unit (refer to Figure 4.9-6 in the DEIS) or concentrated in one area of the site (refer to Figure 4.9-4 in the DEIS) and serve several wells. The pumping unit or units and the associated support equipment would remain on site for the life of the well.

Based on your comment, the statement has been changed in the EIS errata to define the well site and the production components.

Union-21 The production well site (see Figure 4.9-6 in the DEIS) is located on VAFB and was used as an example depicting the potential worst-case visual impact of a well site with its support equipment. This well and associated support equipment (see Figure 4.9-6 in the DEIS) is located in the Jesus Maria oil field and would be considered a completed production well site that could serve one or more pumping units.

Union-22 The correction is noted in the EIS errata.

Union-23 Comment noted. Please see the response to comment Union-2.

Union-24 Although many land use impacts can be mitigated, some land uses are more sensitive to oil and gas development than others. The MRMP and DEIS identify conditions under which mitigations are likely to be required and the types of management practices that would reduce potential impacts.

Union-25 Comment noted.

Union-26 Please see the response to comment Union-7.

Union-27 The correction has been made. Please see the MRMP errata for section 5.0, Mineral Resources.

Union-28 All oil well locations have been entered into the Geographic Information System (GIS). Mapping has been conducted for the MRMP and EIS on a basewide scale. More detailed GIS mapping will be conducted on a site-specific basis, when individual project applications are submitted for review.

Union-29 Union's "Jesus Maria" 83-19 was drilled and completed as a producing well in 1983. Union's "Jesus Maria" A-25-29 is actually numbered A-25-20.

Union-30 Recent seismic interpretation of detailed geophysical surveys, conducted by the California State Lands Commission between Point Sal and Point Arguello, indicate that the Hosgri fault system does indeed change orientation to the southeast and east, offshore of Purisima Point. The Hosgri fault zone is intensely broken up into smaller faults in this area as they change orientation and come onshore in the area around Surf. The most recently published data are in Cummings and Gaal (1987).[1] Also, Hall (1981)[2] discusses the relation of the Hosgri fault zone to the onshore fault regimes.

Union-31 Comment noted.

Union-32 Section 6.2.5.2.2 of the MRMP has been amended to reflect the option of maintaining a central location for storage of oil spill response equipment on VAFB.

Union-33 Please see the response to comment Union-6.

Union-34 Please see the response to comment Union-6.

Union-35 The guidelines have been revised to include (1) a generic definition of well abandonment, (2) a preliminary estimate of abandonment dates that will be updated as new reservoir information is obtained, (3) a final abandonment date six months prior to abandonment, and (4) a preliminary set of procedures for abandonment (including site restoration) to be submitted prior to construction with the final set of procedures to be submitted six months prior to abandonment. The cumulative impact analysis has been further defined to include quantitative analyses of plant communities affected and qualitative (or quantitative if data are available) estimates of impacts on important species.

Union-36 The guidelines have been changed for wetlands and revegetation to indicate that summer is the preferred construction period but that some construction may be allowed during dry weather periods in winter on a case-by-case basis as approved by the U.S. Air Force. The guidelines include a revegetation performance bond since

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1. Cummings, D., and Gaal, R.A. 1987. Hosgri Fault Zone, Offshore Santa Maria River to Point Arguello, California. American Association of Petroleum Geologists 71(5): 544.

2. Hall, C.A. 1981. Journal of Geophysical Research 86(B2).

companies other than Union may be involved. This requirement could be waived by the U.S. Air Force.

Union-37 The MRMP represents extremely thorough documentation of all *existing* guidelines and regulations that are currently enforced on VAFB. The reader can verify this statement by reviewing the following laws, regulations, and documents that were consulted in compiling the MRMP cultural resources section:

1. Air Force Regulation 19-2. Environmental Impact Analysis Process.

2. Air Force Regulation 19-9. Interagency and Intergovernmental Coordination of Land, Facility and Environmental Plans, Programs, and Projects.

3. Air Force Manual 126-5. Natural Resources, Outdoor Recreation, and Cultural Values.

4. Air Force Policy Letter, 4 January 1982.

5. Air Force Policy Letter, 4 May 1984.

6. Air Force Policy Letter, 30 August 1984.

7. Memorandum of Understanding (MOU) for Space Shuttle Archaeological Activities.

8. Draft Curation Agreement between the Air Force Systems Command and the University of California, Santa Barbara.

9. Statement of Work for On-Call Cultural Resources Contractor (from VAFB).

10. Antiquities Act of 1906.

11. Historic Sites Act of 1935.

12. Reservoir Salvage Act of 1960.

13. National Historic Preservation Act of 1966.

14. Executive Order 11593.

15. Protection of Historic and Cultural Properties (36 CFR 800).

16. The National Environmental Policy Act of 1969.

17. Archaeological and Historical Preservation Act of 1974.

18. Archaeological Resources Protection Act of 1979.

19. American Indian Religious Freedom Act.

20. Coastal Zone Management Act of 1972.

21. Treatment of Archaeological Properties: a Handbook (from the Advisory Council on Historic Preservation).

22. Section 106, Step-by-Step (from the Advisory Council on Historic Preservation).

23. Section 106 Update/1. Supplementary Guidance: Preparation of Memoranda of Agreement (from the Advisory Council on Historic Preservation).

24. Section 106 Update/3. Manual of Mitigation Measures (MOMM) (from the Advisory Council on Historic Preservation).

25. Guidelines for the Disposition of Archaeological and Historical Human Remains (from the National Park Service).

26. Guidelines for the Consideration of Traditional Cultural Values in Historic Preservation Review (draft) (from the Advisory Council for Historic Preservation).

27. The Secretary of the Interior's Standards of Rehabilitation and Guidelines for Rehabilitating Historic Buildings.

28. The Secretary of the Interior's Standards of Historic Preservation Projects.

29. 36 CFR Part 800: Protection of Historic Properties (from the Advisory Council on Historic Preservation).

30. California Environmental Quality Act of 1970.

31. Section 21083.2 of the Public Resources Code (AB 952).

32. California Coastal Act of 1976.

33. Coastal Commission Guidelines for Permitting Archaeological Investigations (1981).

34. SHPO Checklist Guidelines.

35. California Senate Concurrent Resolution No. 43.

36. California Senate Bill 297.

There are no local regulations directly applicable to VAFB cultural resources. However, the reader may wish to examine the following documents to identify the standards that professional archaeologists are expected to maintain in Santa Barbara County:

37. Santa Barbara County Comprehensive Heritage Management Plan (now in preparation).

38. Santa Barbara County Coastal Plan.

39. Criteria for Determining the Significance of Architectural and Historic Resources as Applied by the Santa Barbara County Comprehensive Cultural Resources Plan and Guidelines (now in preparation).

40. County of Santa Barbara Regulations Governing Archaeological and Historical Projects Undertaken in Conformance with the California Environmental Quality Act and Related Laws.

41. Requirements and Procedures for Assessing Ethnic Cultural Resources and Concerns in Compliance with the California Environmental Quality Act (from Santa Barbara County).

43. Environmental Impact Analysis Guidelines and Significant Threshold Criteria (from Santa Barbara County).

It should be emphasized that the cultural resource section of the MRMP does not intend to create regulations where none existed. The guidelines and policies are based on procedures developed by 1STRAD/ET over several years and on the existing regulatory environment.

The comment also states that the MRMP does not allow for modification of individual project designs to avoid extensive and expensive site investigations. In fact, the MRMP explicitly sets out compliance activities that focus on avoidance of impacts through redesign *prior* to excavation. For example, Figure 6.5-4 (Flow Chart B) of the MRMP indicates that if a site is present in a project area, it should be avoided through project redesign if possible. Misunderstanding of the procedures may have arisen because this flow chart shows that site avoidance would take place after site boundaries are defined. This is the normal procedure when a redesigned area of potential environmental impact (APEI) is near a site. However, if a project could be redesigned so that the APEI would no longer lie near a known cultural resource, 1STRAD/ET might decide that boundary definition is not necessary. See section 6.5, Cultural Resources, of the MRMP errata for a discussion of when boundary definition may not be necessary.

The U.S. Air Force, as emphasized in the MRMP (e.g., section 6.5.5.3.1), encourages project redesign to avoid costly cultural resource

investigations. Project applicants should consult closely with the U.S. Air Force so that project redesign can be initiated as early as possible. Figure 6.5-3 (Flow Chart A) of the MRMP has been modified to show that avoidance can be implemented after the preapplication conference between the U.S. Air Force and project applicant and before boundary definition is necessary. In this way, an efficient process would be assured. Please see the MRMP errata for section 6.5, Cultural Resources.

Union-38 The APEI includes all areas that can be directly or indirectly affected by project development, construction, use, maintenance, or abandonment. Common agents of disturbance to cultural resources include seismic surveys, bore hole excavations, clearing, grading, filling, compacting, well pad installation, trenching, pipelaying, heavy equipment traffic, backfilling trenches, and regrading after pipeline installation. Indirect impacts to cultural resources can be caused by artifact collecting, off-road vehicle use, vandalism, project-induced land development, and erosion. The nature of a project's APEI is discussed in detail in section 4.5.1 of the DEIS.

The 40-acre minimum survey area has been a long-standing requirement of VAFB and various federal agencies. The 40-acre minimum is preferred over a 10-acre minimum in part because two persons can perform a surface survey of 40 acres in one day. Also, 10 acres is too small a survey area to allow knowledgeable redesign of an APEI. With a 40-acre survey area, project designers would have a clear picture of where the APEI could be relocated within the parcel to avoid cultural resources.

Union-39 The concern of this comment is that the MRMP appears to require extensive architectural background studies before it is known whether there are any architectural resources present in the APEI. The requirements of section 6.5.5.1.2 of the MRMP are not unreasonable because architectural resource identification can be performed at the same time as the identification of historic archaeological resources. Of course, preliminary on-site inspection of the APEI and information obtained during the preapplication conference between the U.S. Air Force and the project applicant may indicate that no architectural resources exist. If this is the case, then the requirements of section 6.5.5.1.2 need not apply unless such resources are discovered at a later date. The U.S. Air Force contends that if there are known or suspected architectural resources in a project area, the guidelines specified in section 6.5.5.1.2 will apply.

Union-40 The requirements discussed in section 6.5.5.1.3 of the MRMP are consistent with the agreements outlined in the proposed MOU between VAFB and Native Americans. The guidelines in section 6.5.5.1.3 are intended to ensure that a project applicant's cultural resource specialist will be informed about known modern Native American resources on VAFB and about the types of locations or objects that may be significant to modern Native Americans. Field survey alone is not an adequate method for identifying these

resources, because a modern Native American resource may not be apparent to non-Native Americans. It cannot be assumed that such a resource would be recognized in the field by someone who has not consulted with Native Americans. However, background research entailing brief interviews with informed Native Americans may be sufficient to confirm that there is no reason to expect modern Native American resources in a project area, and additional archival research might not be necessary.

Union-41 The MRMP policies and guidelines are in complete agreement with this comment, and flow charts B, C, and D (Figures 6.5-23, 6.5-24, and 6.5-25) have been modified to show more clearly that project redesign may be implemented prior to the performance of subsurface survey. Please see the MRMP errata for section 6.5, Cultural Resources.

Union-42 This comment reflects a misunderstanding of the role of the proposed peer-review committee. This committee will serve primarily to ensure that minimum standards of performance by cultural resource specialists are met. Peer review will protect the cultural resources on VAFB and will also protect project applicants from the problems that arise when cultural resource consultants perform poorly or submit inadequate reports. Peer review can also ensure that the 1STRAD/ET workload is not made excessive by nonmilitary projects. The 1STRAD/ET archaeological staff is currently working full-time on existing projects. The committee would be involved primarily with reviewing resource evaluation reports, treatment plans, and draft reports of mitigation projects. It is unlikely that the committee would be concerned with resource identification reports.

This comment also suggests that the needs of scientific or historical research should be separate from the needs of a project. To the contrary, compliance with federal and state laws, guidelines, and policies requires in many cases that research be conducted to meet project needs. For example, during resource evaluation, the significance of most archaeological resources is assessed in terms of their potential for contributing information important to prehistory or history. During data recovery, determining what, where, and how much to excavate depends on how a site can contribute to scientific knowledge.

It is important to note that archaeological research should be scaled to the needs of the project. In no case would the committee require that in-depth archaeological, historical, ethnographic, or architectural research be undertaken before there is a demonstrable, legally mandated justification for doing so. For example, the project applicant would never be expected to pay for intensive archival research unless there was evidence that potentially significant ethnohistoric or historic cultural resources existed in the area. Also, the peer-review committee may conclude that the research design of a data recovery program is too extensive or too costly given the scope of the proposed action.

Union-43 The reference to "Figure 6.6-1" for recreation areas such as Punch Bowl, Mod III, and Pine Canyon Lakes should have read "Figure 6.6-2, Existing Land Use (basewide features)," on page 6.6-5 in the MRMP. Due to the scale of the GIS, this figure is used for general information purposes only and labeling of each feature was not feasible. The legend in Figure 6.6-2 depicts land uses which include these lakes and other recreational resources. If additional detailed maps and data are needed, they can be requested from 1STRAD/ET. The references to Figure 6.6-1 in section 6.9, on page 6.9-2, have been changed in the MRMP errata. This change also applies to references to Figure 3.6-1 in the DEIS, section 3.9.4.1, North Vandenberg, on page 3.9-2. This reference has been changed in the EIS errata.

Union-44 Refer to the response to comment Union-18. This response is applicable to both comments Union-18 and Union-44.

Union-45 The Union-45 response is similar to Union-19. Refer to the response to comment Union-19 for the response to this comment.

Union-46 Refer to the response to comment Union-20.

Union-47 Your comment is addressed in the MRMP errata. The word "air" in the sentence has been changed to "visual," and Figure 6.9-7 has been correctly titled, as shown in the MRMP errata.

Union-48 Refer to the response to comment Union-21.

Union-49 The purpose of the recommended policy is to ensure that all proposed oil and gas development is planned for each phase and that its potential effects are identified on the physical environment as it relates to visual resources. The protection and mitigation of potential visual impacts on sensitive and valuable scenic resources on and adjacent to VAFB are of primary concern. Preparing a development plan could assist in planning and act as a guideline to minimize and reduce potential visual impacts.

Union-50 This provision was recommended to minimize visual impacts and protect the visual quality of the area. A drill rig that remains idle (i.e., activities associated with exploration or production operations cease) for 30 days or longer could cause potential visual impacts on receptors or resources that are sensitive to the duration of an adverse visual intrusion. Although most drilling operations are on a contract basis and may not be typical, this would ensure that exploration or production activities be performed in a timely manner, thus reducing or minimizing visual impacts.

Union-51 The plan utilizes data available to the U.S. Air Force reviewing agency on an automated database. This database can be updated to reflect changes in environmental and mission circumstances. Additional information regarding petroleum reserves collected by the applicant can be submitted separately to 1STRAD/ET on VAFB or

with an application. ISTRAD/ET will update their database accordingly and make recommendations for area reclassifications as required.

Union-52 Information available on the GIS is available on disk in ASCII for use in multiple computer formats. Maps can be provided at various scales as required. Requests for additional maps and appropriate scales should be made to ISTRAD/ET.

Union-53 The zone categories do not preclude an application but establish the criteria to be applied to the application. It is the intent of the U.S. Air Force to review all applicants equally and assume all property as potential oil reserves.

Union-54 The fee structure has not yet been established. Public notice will be given prior to adoption of fees. Fees, if applied, will be determined by the U.S. Air Force.

Union-55 Comment noted. The column heading in these tables titled "Number Active in Peak Hour" has been changed to "Typical Number Active Per Day," with a footnote stating that the equipment will not be operating simultaneously. Your comment has been taken into consideration, as shown by the model inputs in tables 3-1 through 3-12.

Union-56 The Unocal environmental assessment states that the pumping units will be driven by electric motors during the second year of production. Natural gas-fired pumping units were used in the well production modeling as a worst-case scenario, since it is not known whether electricity can be supplied to all wells on VAFB. A more thorough analysis of production emissions has been included in tables 4.3-7 and 4.3-8 of the FEIS, which also eliminates emissions from gas-fired well pumps. Future model runs for production were not deemed necessary, since this revised emission analysis would be expected to eliminate the only modeled standard violation for production, the 24-hour PM_{10} standard. This has been stated in the FEIS (see the air quality errata).

Union-57 Mobile sources were modeled with ISCST and treated as volume sources, consistent with Santa Barbara County APCD protocol. The ISCST model does not calculate plume rise from volume sources; therefore, stack gas temperature is not considered. The equipment load factors were considered to be reasonable worst-case scenarios.

Union-58 Please see the responses to comments Union-9 and Union-12.

Union-59 Comments noted. The MRMP will be used as a tool by applicants to access the environmental database and GIS compiled to date. When utilized by the applicant to avoid sensitive areas, these data will minimize potential environmental impacts and will minimize extensive environmental impact analysis costs. Thus, applicants will be able to use the MRMP to identify and analyze potential

environmental constraints when assessing the economic potential of either an exploratory or development program.

Each application will be reviewed on its own merit, whether the project is for a few exploratory wells or for a large number of development wells. Each application will be reviewed for key environmental issues. Environmental impact analysis costs will be directly related to the magnitude and scope of each project. For example, an exploratory program will disturb or impact a smaller area than a development drilling program; therefore, the potential impact analysis costs will probably be less for the exploratory program.

The offshore and onshore environments are distinctly different and require different assessment approaches. Offshore assessments include additional environmental components such as marine water quality, marine biology, commercial fishing, offshore geology, and more extensive system safety information. The magnitude of impacts for offshore development is greater in most instances. However, data collection methods and types of analysis in most cases are the same for onshore aspects of both types of projects. The MRMP focuses on environmental analysis of potential site-specific project areas and associated regional impacts proposed by the applicant.

County of Santa Barbara

RESOURCE MANAGEMENT DEPARTMENT

Dianne Guzman, AICP, Director

July 27, 1987

William R. Newell, Colonel, USAF
Chief, Development Division
Environmental Task Force
1 STRAD/ETP
Vandenberg AFB, CA 93437-5000

RE: Proposed Mineral Resource Management Plan and Draft Environmental Impact Statement.

Dear Col. Newell:

The Resource Management Department staff of the County of Santa Barbara has reviewed the proposed Mineral Resource Management Plan (MRMP) and Draft Environmental Impact Statement (DEIS). We congratulate you and your consultant, URS, for the production of a concise and relatively complete document that addresses the potential impacts of onshore oil development on Vandenberg Air Force Base (VAFB).

Our comments on the proposed MRMP and the DEIS focus, in part, on potential off-base impacts that were not fully recognized or adequately addressed. We request that off-base impacts be recognized in the DEIS and that, in light of this recognition, the process of project application review outlined in the proposed MRMP be modified to include earlier and more formal participation by both affected local agencies and the affected public. Our primary concerns regarding oil and gas development on VAFB are summarized as follows: RMD-1

1. The documents do not adequately address off-base impacts to air quality (including new off-base emission sources such as trucks introduced as a result of increased on-base production). Nor do the documents adequately address off-base impacts to water resources and public safety -- the latter issue area focusing primarily on increased risks associated with transportation of gas liquids through the County. RMD-2

2. The documents do not clearly develop substantive product transportation guidelines. Of particular concern, the documents should attempt to identify a production threshold at which time development of a consolidated pipeline infrastructure would be environmentally preferred to increased truck transportation. RMD-3

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3. The documents should assess the alternative of on-base processing of projected oil, gas, and gas liquids production so that the reader and decision-makers have a clear understanding of the environmental trade-offs between on-base and off-base processing. The County's current policies for consolidation of processing facilities apply only to processing of offshore production. Referring to Sections 35-295 and 35-319 of the County's Article III Zoning Ordinance, facilities necessary or incidental to the separation of oil, gas, and water obtained from an onshore field are generally permitted for colocation on the drill site. In the near future, we expect to conduct a comprehensive review of our policies for onshore oil and gas production. The concept of consolidated processing will be a key focus of this review. RMD-4

Enclosed are our detailed comments on both the DEIS and the proposed MRMP. Please feel free to contact Laurie Tamura in our North County office (934-6259) or Doug Anthony in our Energy Division office (963-7103) if you have any questions regarding our comments.

We support the efforts of the department of the Air Force to establish long-range management policies for potential resource development on Vandenberg AFB. We also support resource management policies that require full mitigation of project and cumulative environmental impacts to the maximum extent feasible.

We are deferring support for one or more alternative actions analyzed in the Draft EIS until we have the opportunity to review the final environmental analysis. Once the Final EIS has been issued for review, we urge you to provide Santa Barbara County and other concerned commentators a formal channel to express support a specific alternative action prior to the Findings of No Significant Impacts statement. RMD-5

Sincerely,

DIANNE GUZMAN
Director

LT:DA:da:2918e

Enclosure

cc: Brian Shafritz, Santa Barbara County APCD,
Kim Fulton-Bennett, Santa Barbara County - Cities Area Planning Council,
Susan Hansch, California Coastal Commission.

Santa Barbara County
Resource Management Department
Comments to Draft Environmental Impact Statement

July 27, 1987

1. Page S-1. The U. S. Dep't of Defense and the Air Force make government land available for mineral exploration and extraction. If this plan is intended to cover all mineral development, then more attention needs to be given to other mining activities (e.g. diatomaceous earth mining). The application processing and review is not designed to accommodate mining activities. RMD-6

2. Figure 1-1. This figure should include more detail north arrow, scale, identify VAFB, Lompoc, Santa Maria S-20 is now Highway 1. RMD-7

3. Sec. 1.3.1, page 1-4, (entire section). How were the petroleum resource percentages and categories determined? The basis for these determinations, data used and methodology should be presented or cited. RMD-8

4. Sec. 1.3.2.1, page 1-4, 5th paragraph, 4th sentence. Which Unocal Lompoc facility are you referring to and what is its gas processing capacity? RMD-9

5. Sec. 1.3.2.1, page 1-4, 7th sentence. When was 6" gas line installed? 10th sentence. When was the 12" oil line installed? RMD-10

6. Table 1-1, page 1-7. Provide the locations of the oil and gas reserves on a map or reference the map(s) these are located on. RMD-11

7. Sec. 1.3.2.1, page 1-9, 1st paragraph, 3rd sentence. To where is the oil and water being trucked? RMD-12

8. Sec. 1.3.2.1., page 1-9, 1st paragraph, 1st sentence. Is Conoco's well in the Casmalia state designated oil field? RMD-13

9. Sec. 1.3.2.1, page 1-9, 5th paragraph. Other local fields include northwest Harris Canyon and Careaga (see Attachment A). Contact California Division of Oil and Gas for most up-to-date information. RMD-14

10. Sec. 1.3.2.2, 1st paragraph. Please show this pipeline route on a map to the Lompoc facility. RMD-15

11. Sec. 1.3.2.2, page 1-10, 1st paragraph. The reference to the two processing facilities and pipelines should be mapped to illustrate location, in relation to the VAFB. RMD-16

12. Sec. 1.3.2.2, page 1-10, 1st paragraph, 6th sentence. It appears from this statement that, as a condition of approval by the VAFB, all companies must pipeline their products to these two facilities. Has Unocal agreed to this arrangement? What is the maximum capacity for these two facilities? RMD-17

13. Sec. 1.3.2.2, 2nd paragraph, 10th sentence. The previous pages referred to pipelines going to the Lompoc facility. This line states the facility is designed to accommodate offshore oil only. Although there are two different processing facilities that Unocal operates near Lompoc, one is for offhore production while the other is for onshore. Please distinguish between these two facilities and show their location on a map. RMD-18

14. Sec. 1.3.2.2, page 1-10, 4th paragraph, 4th sentence. If the capacity of the Unocal processing facility is exceeded, then other options should be considered including on-base processing or consolidated processing at a different location. RMD-19

15. Sec. 1.3.2.2, page 1-10, 4th paragraph. Does Unocal's processing facility for onshore production near Lompoc accept oil from tanker trucks? If so, what percentage of oil processed is received by truck? RMD-20

16. Sec. 1.5, page 1-11, 2nd paragraph, 1st sentence. It should be recognized that the development of oil and gas reserves on VAFB could result in environmental impacts that could adversely affect the quality of the environment off the base. These potentially adverse effects should be addressed. RMD-21

17. Figure 1-5 should include the pipeline routes to the Lompoc onshore processing facility and the approximate location of the Jesus Maria field Unocals wells, and Conoco oil well and pipelines. All existing other well sites should be mapped. RMD-22

18. Sec. 2.1, page 2-2, 5th full paragraph. This paragraph mentions that project conditions are applied through a Memorandum of Agreement (MOA); however, the MRMP only makes mention of a Memorandum of Understanding (MOU). Please clarify. RMD-23

19. Sec. 2.1, page 2-2, 5th full paragraph. This paragraph describes the application process, conditions, and the MOA. Please elaborate on what conditions would effect a decision for denial. RMD-24

20. Sec. 2.4.1, General. A) Several substantive issues are associated with transportation of crude oil and gas liquids from the point of processing to refinery or market destinations. Transportation of gas liquids (LPG & NGL) is well-documented as the worst potential hazard to public safety RMD-25

that is associated with oil and gas development. From a cumulative perspective, transportation of these products represents a significant risk. Consequently, the EIS must analyze risks that arise after processing due to transportation. RMD-25

B) Please discuss the impact of produced water disposal if applicable. RMD-26

21. Sec. 2.4.1, page 2-13, last paragraph, 18th sentence. Please expand this statement in more detail of existing processing facilities and their capacity. RMD-27

22. Sec. 2.4.1, page 2-13, last paragraph. In most or all onshore oil and gas fields in the County, small processing facilities are generally located at the field, while long-distance transportation of production prior to processing is limimted on the offshore production. The EIS should either assess the alternative of on-base processing of oil and gas or state why this alternative is not analyzed. In the latter case, clearly explain why on-base processing is not a feasible option worthy of environmental analysis. RMD-28

23. Sec. 2.4.1, page 2-13, last paragraph. Please include reference the County's policies for pipeline and pipeline corridor consolidation (re: Article III Zoning Ordinance, Sec. 290.4 as revised 4/87). RMD-29

24. Sec. 2.4.1, page 2-15, paragraph 1. Please specify deposition of natural gas if not enough is produced to be processed. RMD-30

25. Sec. 2.4.2, page 2-14. Santa Barbara County supports the pipeline policy stated in this section. RMD-31

26. Sec. 2.4.2, page 2-14, paragraph 1. Considering the extensive area of land on VAFB property, we think that the assumption of only one off-base processing facility (i.e., Lompoc) is not sufficient. Unocal operates other processing facilities next to onshore fields at Lompoc Hills, Orcutt Hills, and Casmalia Hills, although these facilities are smaller than the Lompoc facility that serves offshore production from the Pt. Pedernales field. Additionally, smaller processing facilities for smaller onshore fields generally are built at the field. Why hasn't the EIS mentioned or analyzed on-base processing? RMD-32

27. Sec. 2.4.4, page 2-17, paragraph 1. Oil and gas production from the federal OCS offshore from VAFB is not expected to peak until mid-to-late 1990s. Recent MMS forecasts indicate that oil and gas production in the central Santa Maria Basin may peak in 1998 and 1999 respectively; oil and gas production in the northern Santa Maria Basin is estimated to peak in 1997. These estimates are subject to continuous adjustments, considering the complexity of variables that affect the timing and volume of offshore production. RMD-33

28. Sec. 2.5, page 2-17. Please address safety and environmental concerns associated with crude oil and gas liquids transportation after processing. RMD-34

29. Table 2-1, pages 2-18, page 1 of 2. Please explain why no wells will be drilled after year 2007. RMD-35

30. Table 2-1, pages 2-18 and 2-19. Please include production estimates of natural gas, gas liquids (condensate), and produced water. RMD-36

31. Comment 31 has been deleted.

32. Sec. 3.1.2, page 3.1-1, 2nd paragraph. The region of influence should not be limited to areas within the base boundaries. Off-base geologic factors such as faults and seismicity can affect both on- and off-base sites. RMD 37

33. Sec. 3.1.3, page 3.1-1, 3rd paragraph. Please refer also to the Union Point Pedernales Project EIS/R to verify consistency. RMD-38

34. Sec. 3.1.4.2, page 3.1-4. Areas which have not been mapped in the Soil Conservation Service's Soils Series Maps need to be completed if projects are to be considered in that area. Soils mapping of a project area could be included as a requirement for application submittal. RMD-39

35. Figure 3.1-3, page 3.1-7. A) Please include a definition of prime agricultural lands (see attachment B).

B) A discussion of soil primeness by soils classification should be included along with the descriptions. The following soil types from the list on page 3.1-7 potentially carry a prime classification (Class I or II: Sorrento, Mocho, Camarillo, Botella, Pleasanton, Elder, Garey, and Ballard.

C) A map of prime agricultural areas should be included showing both areas of prime soils and prime crops. RMD-40

D) The Soil Association Map appears cluttered and is difficult to read. Please simplify and provide a clear legend. Also, numbers should be related to descriptions on the pages that follow.

36. Sec. 3.1.4.3.2, page 3.1-11, 1st full paragraph, 4th sentence. "Pacific" fault should be Pacifico fault. RMD-41

37. Sec. 3.1.4.3.3, page 3.1-11, 4th full paragraph. Provide a reference for the information on the offshore Hosgri fault, and the onshore fault "splays." RMD-42

38. Sec. 3.1.4.3.3, page 3.1-11, 5th full paragraph, 2nd and 3rd sentences. The range of ages listed for the Santa Ynez River fault would include the fault among active faults. RMD-43

39. Sec. 3.1.4.3.3, page 3.1-14, 1st paragraph, last sentence. Provide a reference for the statement that all of the mayor and very minor faults should loosely be considered offshoots of the Hosgri fault system. RMD-44

40. Sec. 3.2.1, page 3.2-1, 2nd paragraph, 4th sentence. The main channels of the San Antonio Creek and Santa Ynez River have a mostly intermittent flow. RMD-45

41. Sec. 3.2.2, page 3.2-1, 3rd paragraph. The region of influence shouldn't be limited to areas within base boundaries, but should encompass all water basins to be used for the oil and gas development. Oil and gas development on VAFB has the potential to adversely impact the water supply or quality of water resources for off-base users or potential users as well. RMD-46

42. Sec. 3.2.4.1.1, page 3.2-5, 4th full paragraph, 2nd sentence. Please place the gauge stations on the referenced figure. RMD-47

43. Sec. 3.2.4.1.1, page 3.2-5, 5th full paragraph, 1st and 2nd sentences. These two sentences contradict one another. If average flows were not available for the Santa Ynez River basin due to extensive regulation of the river, how come they were provided in Table 3.2-2? RMD-48

44. Sec. 3.2.4.1.2, page 3.2-11, 1st (incomplete) paragraph, last sentence. The purpose of adjudication is to make the distribution of water supplies more equitable. This can be considered an increase in water supplies. Please exlain the point that groundwater supplies could be reduced if an adjudication of groundwater resources occurred. RMD-49

45. Sec. 3.2.4.1.2, page 3.2-11, 2nd full paragraph, 3rd sentence. Santa Barbara County figures for these three basins' total working storage are 230,000 af with a gross safe yield of 23,300 afy, not 300,000 af with a safe yield of 33,000 afy. RMD-50

46. Sec. 3.2.4.1.2, page 3.2-11, 2nd full paragraph, 4th sentence. Santa Barbara County figures show that demands for lower Santa Ynez subarea in 1980 were estimated at 28,700 afy. RMD-51

47. Sec. 3.2.4.1.2, page 3.2-11, 2nd full paragraph, 5th sentence. Santa Barbara County estimates that pumpage exceeds the estimated safe yield of the groundwater basins by about 4,200 afy. RMD-52

48. Sec. 3.2.4.1.2, page 3.2-12, 1st full paragraph. Because both Lompoc Upland and Lompoc Terrace are hydraulically connected to the Lompoc Plain (both the "Upland" and the "Terrace" make underflow contribution the "Plain") the Resource Management Department views the Lompoc basin as a single hydrologic unit composed of 3 substorage areas. Hence we would use an overall basin safe yield and an overall overdraft figure. RMD-53

49. Sec. 3.2.4.1.2, page 3.2-12, 1st (uncomplete) paragaraph. The Santa Barbara County Water Resources Agency estimate for annual natural recharge to the Lompoc Plain should be 23,300 afy, not 15,000 afy. RMD-54

50. Sec. 3.2.4.1.2, page 3.2-12, 2nd full paragraph, last sentence. Nevertheless, the increase in water demand on the Lompoc Plain would have effect on and be affected by the overdraft in the "Upland" because they are hydraulically connected. RMD-55

51. Sec. 3.2.4.1.2, page 3.2-12, 3rd full paragraph, last sentence. As stated in the above comment, the increase in water demand on the Lompoc Plain would have effection and be affected by the overdraft in the "Terrace" because they are hydraulically connected. RMD-56

52. Sec. 3.2.4.2.1, page 3.2-13, 1st paragraph, 3rd sentence. Waters closer to Barka Slough are less turbid than what? RMD-57

53. Pages 3.4-1 to 3.4-24 & 4.4-1 to 4.4-8. In general, the biological information appears to be very thorough and well prepared. However, the mitigation measures should be expanded to provide more complete protection to valuable biological resources. Other than the no-project alternative, the Resource Management Department supports Alternative 3 as the environmentally superior alternative. RMD-58

54. Page 3.4-7, Table 3.4-1, page 4 of 4. The inclusion of Roderick's fritillaria in the list of candidate species is unclear since the notes for this species indicate that it is known only from Mendocino County; the common and scientific names listed for this species should be checked. RMD-59

55. Page 3.4-9, Figure 3.4-1. Concentrated occurrences of sensitive plant species should be indicated for areas of Burton Mesa Chaparral, since *Arctostaphylos rudis* is generally found in this habitat. RMD-60

56. Page 3.4-11, Figure 3.4-2. The County's Coastal Resources maps show more environmentally sensitive habitat areas than are included in Figure 3.4-2; these maps should be consulted and the omitted resources should be added. Examples of resources which were overlooked include seabird roosting sites at Point Sal, reefs, and rocky intertidal areas. RMD-61

57. Sec. 3.4.4.5, page 3.4-16, Wetlands subsection. The discussion of the unarmored three spine stickleback in the wetlands section should reference recent studies regarding the exact taxonomy of the *Gasterosteus* population in San Antonio Creek. RMD-62

58. Page 3.4-17, Figure 3.4-4. The code for the unarmored three spine stickleback is not clear. The mouth of Honda Creek should be shown as habitat for this species. RMD-63

59. Page 3.4-21, Figure 3.4-5. Oak and riparian woodlands should be mapped as another sensitive plant community in Figure 3.4-5. RMD-64

60. Sec. 3.6.4, page 3.6-2, paragraph 6. Please map areas of cropland (575 acres). Also describe the pattern of leases. RMD-65

61. Sec. 3.7, General. We support the comments submitted to you by the Area Planning Council, Santa Barbara County-Cities. RMD-66

62. Sec. 3.7.4, Page 3.7-3, Population, Employment, and Income subsection. Please include employment associated with offshore oil and gas activities in the population projection. RMD-67

63. Sec. 3.9.1, page 3.9-1, paragraphs 1 and 2. This description does not include the features on the base that are visible from County land such as the "white ball" stations, and rural roads. RMD-68

64. Sec. 3.11.1, Page 3.11-1, paragraph 2, Sentence 1. Accidents can also occur at storage. RMD-69

65. Sec. 3.11.2, Page 3.11-1, paragraph 5. Please correct to indicate that the risks associated with transportation of gas liquids encompass a much larger region. RMD-70

66. Sec. 3.11.4.1.2, General. The County's Emergency Response Plan will soon be replaced by the "Multi-Hazard Functional Planning Guide," which is a multi-agency approach to coordinating response to any emergency affecting the County. The forthcoming planning guide will include a specialized "Oil and Gas Annex." Among other things, the planning guide will delineate both administrative and functional responsibilities among various departments and government agencies involved with oil and gas emergencies. Please mention the forthcoming guide in the EIS and briefly discuss avenues for interagency emergency response planning (i.e., between VAFB and SBC). RMD-71

67. Sec. 4.0 - General. Nowhere are potential impacts to Paleontological Resources analyzed. This resource should be addressed. RMD-72

68. Sec. 4.1.1.1, page 4.1-1, 1st paragraph. Provide a comprehensive list of all of the geology significance criteria. RMD-73

69. Sec. 4.1.2, page 4.1-3, 1st full paragraph, 1st sentence. Demonstrate why seismic hazards are not considered a serious threat to the VAFB region. The discussion only presents a conclusion and does not provide the basis. RMD-74

70. Sec. 4.1.2.1, page 4.1-3, 3rd full paragraph, 1st bullet. What are the referenced VAFB standards? RMD-75

71. Sec. 4.1.2.1.2, page 4.1-6, 3rd paragraph. (This also applies to sections 4.1.2.2.2, 4.1.2.3.2., and 4.1.2.4.2.). Mitigation measures for soil contamination as a result of oil spills, and potential damage to RMD-76

paleontological resources, as well as design features for maximum credible earthquakes should be addressed. Also, the MRMP or primary mitigation should include avoidance of stream crossings and gullies. RMD-76

72. Sec. 4.1.4, page 4.1-9. Subsidence should be addressed. RMD-77

73. Sec. 4.1.4, page 4.1-9, 6th paragraph, 3rd sentence. Why are only new off-base processing facilities considered? RMD-78

74. Sec. 4.2.1.1, page 4.2-1, Significance Criteria, 1st bullet. RMD-79
A) This should state: "Reduce water availability to, or interfere with the supply of, existing or potential users.
B) What is the significance threshold used to determine this?

75. Sec. 4.2.1.1, page 4.2-1, Significance Criteria. The significance criteria should also include one which concerns threats to biological productivity. RMD-80

76. Sec. 4.2.2, page 4.2-2. The impact of the additional water use for oil and gas processing that would result from increased oil and gas development on VAFB, whether the processing occurs on- or off-base must be addressed. The amount of water needed and the impact that represents should be estimated for each alternative. This applies to sections 4.2.2.1.1, 4.2.2.2.1, 4.2.2.3.2, and 4.2.2.4.2. RMD-81

77. Sec. 4.2.2.1, page 4.2-4, all bullets. Unfortunately, the MRMP guidelines as currently written are not as strongly worded as this section of the DEIS would lead one to believe. Other comments in this letter suggest revising the MRMP (specifically, Sec. 6.2.5.2) so that it would be as strong as implied by this section of the DEIS. RMD-82

78. Sec.s 4.2.2.3.1 and 4.2.2.4.1, pages 4.2-6 and 4.2-7. The discussions of the impacts of Alternatives 2 and 3 are not logically consistent with the MRMP. These alternatives would prohibit mineral resource development in areas with "high" environmental constraints. The MRMP identifies overdrafted water resources within the San Antonio and Lompoc groundwater basins as a "high" environmental constraint (MRMP, Sec. 6.2.4.1, p. 6.2-21, middle of first full paragraph; Sec. 7.3.3.2, p. 7-6). Therefore, by definition, Alternatives 2 and 3 should preclude further overdrafting of these basins, and impacts on water availability and use would not be "essentially as described for the proposed action." RMD-83

79. Sec. 4.2.3, pages 4.2-8, first paragraph. It is stated that the MRMP "will not have the authority to prevent an overdraft [of groundwater resources] on VAFB lands." Under either Alternative 2 or Alternative 3, the MRMP would prevent further overdraft. RMD-84

80. Sec. 4.2.3, pages 4.2-8, second paragraph, last sentence. This does not make sense as currently worded. Perhaps the last two words ("were adopted") need to be deleted? RMD-85

81. Sec. 4.2.3, pages 4.2-8, third paragraph, second sentence. As discussed in prior comments, a logical interpretation of Alternatives 2 and 3 indicate that development would be restricted in areas where overdrafted groundwater resources would be affected. RMD-86

82. Sec. 4.2.4.1, page 4.2-8, 6th paragraph, second sentence. The word "counties" should be changed to "county," since only Santa Barbara County would be directly affected by groundwater overdraft related to this project. RMD-87

83. Sec. 4.3, General. We support the comments submitted by the County Air Pollution Control District and also request the following expanded analyses: 1) Please expand the emission's inventory to include secondary emissions associated with oil and gas development on VAFB, and 2) electrification of production equipment, including limitations on current grid power sources, and the use of other potential cogeneration sources, should be given more detailed attention. RMD-88

84. Sec. 4.4.2.1, page 4.4-3, 1st paragraph. The mitigation measure requiring site-specific surveys should specify that these surveys must be conducted by a qualified biologist. RMD-89

85. Sec. 4.4.2.1.1, page 4.4-4, 3rd paragraph. The guidelines proposed to avoid impacts to wetlands should be specified or summarized in this section. Unless these guidelines include mandatory setbacks of 100' or more from the edge of any wetland, berming of oil well pads, and other measures, the residual impacts to biological resources would be potentially significant. RMD-90

The guidelines and management practices proposed to avoid impacts to coastal dunes and other habitats supporting rare and endangered species should be specified or referenced.

86. Sec. 4.4.2.4, page 4.4-6, 3rd paragraph. Other than the no project alternative, Alternative 3 is clearly the environmentally superior alternative; this should be specified. RMD-91

87. Sec. 4.4.4, page 4.4-8, 4th paragraph. The cumulative impact section should note that residential development in the Vandenberg Village and Mission Hills areas continues to result in the removal of Burton Mesa chaparral. RMD-92

88. Sec. 4.6.2.1.1, page 4.6-1. I agree with the identification of agriculture as a significant impact i.e., conflicts with fed, state, and local laws, standards, regulations, and policies and project is incompatible with prime agricultural uses. RMD-93

89. Sec. 4.6.2.1.1, page 4.6-5, 2nd paragraph. Are not most residential, community services, administrative and industrial uses located in the RMD-94

cantonment buffer zone? This section should be first to state that the buffer area and all uses inside this area would not be available for oil development. RMD-94

90. Sec. 4.6.2.1.1, page 4.6-5, paragraphs 4-5. Trucking vs. Pipeline. This section needs to discuss the costs and benefits of truck vs. pipeline including air quality, traffic, grading etc. RMD-95

91. Sec. 4.6.2.11, page 4.6-6, 1st paragraph. Off-base Processing Facilities. There is no discussion of the potential of not transporting the oil off-base and the possible need for processing facilities on the base including gas, oil and water separation. RMD-96

92. Sec. 4.7, General. We support the comments submitted by the Area Planning Council, Santa Barbara County-Cities. RMD-97

93. Figure 4.7-1, page 4.7-4. Please indicate how the production curve is consistent with the latest information available. RMD-98

94. Sec. 4.7.2.2.2, page 4.7-7. Please expand on the concept of using a program similar to SEMP as mitigation. Who would administer the program? Additional mitigation measures for schools, police, fire, water and other public service levels should be discussed. RMD-99

95. Sec. 4.11.4, page 4.11-16, paragraph 9, sentences 2 and 4. These statements are incorrect. Transportation of gas liquids, particularly by truck, has been identified by several EIS/Rs as the single most significant risk associated with oil and gas projects; as the number of trucks on the road increases, so does the probability of an accident. The EIS should address such potential hazards in enough detail to provide decision-makers and the public with sufficient information of risks involved with oil and gas development. RMD-100

96. Sec. 4.11.4, page 4.11-17, paragraph 2, sentence 3. The sentence implies that increased emergency response capability would reduce the impact of an accident. If so, please include increased emergency response capability as a mitigation under each alternative management plan on the previous pages and specify how much of an increase in which type of response capabilities would minimize which impacts to what extent. RMD-101

97. Sec. 5.1.3.1, page 5.35, paragraphs 6 & 7. The Plan states that several deposits have been mapped and that commercial potential exists. The MRMP does not address permitting of mined sites. Are permits available? RMD-102

98. Sec. 5.3.1.3, pages 5-75. The County's experience has been that a more objective environmental assessment is possible when the consultant is chosen and managed by the permitting agency. RMD-103

99. Sec. 5.0, page 5-1, second paragraph, first line. Should read, "The Santa Barbara County Comprehensive Plan Land Use Element ..." RMD-104

100. Sec. 6.0, page 6.1, first paragraph. With a forecasted peak production of 18,150 barrels per day in the year 2007 (p. 5-1, last paragraph) please document to what extent oil and gas production on VAfB will "reduce reliance on foreign oil ... result in national security benefits," and/or "reduce the nation's trade deficit." RMD-105

101. Sec. 7.7.11, page 7-27, paragraph 2. The Plan states that an applicant shall be required to conform with all federal, state and County regulations which concern a number of constraint areas. How shall compliance be achieved as part of the application process? Will County of Santa Barbara permits or reviews be an intregal part of the process? RMD-106

102. Distribution list, page 5. Please correct the following spelling errors. David Elbans should read David Elbaum, Bill Onsdorff should read Bill Orndorff. RMD-107

103. Appendix A, Sec. 4.0, page A-2, paragraph 3. How often will the Plan be updated? The Plan states that a desirable level of development will be targeted. What is that level? Will any controls, other than MOA conditions and mapped constraints, be placed on the timeing or density of projects? RMD-108

104. Appendix A, Sec. 4.0, page A-2, paragraph 3. Goals and objectives of the MRMP include the identification of areas unsuitable for development, yet Alternative I does not exclude High Constraint Areas. This is a conflict between the goals and implementation of the Plan. RMD-109

105. Appendix A, page A-12, Transportation Constraints. Truck transportation of gas liquids would cumulatively impact transportation systems throughout the County. Certainly, additional trucks on Route 101 bound for destinations in Ventura County or further south would impact the Santa Barbara/Goleta circulation area. RMD-110

106. Appendix A, page A-30, page 7. Valve placement near areas of notable environmental sensitivity also help to minimize the amount of oil spilled in the event of a pipeline rupture or leak. RMD-111

107. Appendix A, page A-76, paragraph 2, sentence 2. Please include reference to public safety risks regarding potential land use conflicts. RMD-112

108. Appendix A, page A-93. Participation of local agencies in application review is not adequately defined. What agencies are notified? What time period will local agencies have to review applications? What is the forum to comment on an application from outside agencies? What opportunities are there for public comment on projects that may have off-base impacts? RMD-113

109. Appendix A, page A-94, paragraph 3. Significant off-base impacts would require an Environmental Impact Report pursuant to the requirements established by the California Environmental Quality Act. RMD-114

Santa Barbara County
Resource Management Department
Comments to Proposed MRMP

1. Table 1-2, pages 1-7, Surface and Groundwater Quality, 3rd Guideline. This implies that wastes would only be stored at approved on- or off-base sites. Wastes should be properly treated and disposed at approved facilities, not simply stored. RMD-115

2. Table 1-2, pages 1-8, 100-year Flood Plain and Flood Hazards Guidelines. A guideline should be added to bury pipelines well below scour depths of 100-year flood events in streams and rivers. RMD-116

3. Sec. 2.2, page 2-1, 6th paragraph. Please include reference to offshore fields as well. The Point Pedernales and Point Arguello fields are established. Other known reserves offshore include the San Miguel, Point Sal, Bonito, Electra, Rocky Point, and Jalama fields (plus one unnamed field on OCS-P0443) in the federal OCS waters. RMD-117

4. Sec. 6.2.2.1.2, page 6.2-6, last line. States that San Antonio Valley contains sediments "up to 10,000 feet thick"; draft Conservation Element text* (p. B-36) indicates a maximum sediment thickness of about 3000 feet. RMD-118

5. Sec. 6.2.2.1.2, page 6.2-10, end of second paragraph. States that "working storage capacity" of the San Antonio Basin is about 500,000 acre-feet (AF); draft Conservation Element text* (p. B-37) lists the "available storage" at about 800,000 AF. RMD-119

6. Sec. 6.2.2.1.2, page 6.2-10, subsection header. The County calls this the "Lompoc Basin" rather than the "Santa Ynez Basin" or "Santa Ynez River subbasin." This avoids confusing the Lompoc Basin with either the Santa Ynez Uplands Basin or the Santa Ynez River riparian basins. RMD-120

7. Sec. 6.2.2.1.2, page 6.2-10, last full paragraph, line 7. States that "working storage capacity" of the Lompoc Basin is about 300,000 AF; draft Conservation Element text* (p. B-32) lists the "available storage" at about 230,000 AF. RMD-121

8. Sec. 6.2.4.1, page 6.2-21, fourth paragraph. The referenced County Zoning Ordinance section 35-213, Development Standards related to flood hazards, is a simple reiteration of policies contained in the Comprehensive Plan's Land Use Element (at pp. 88 and 89); these Land Use Element policies should be cited as the primary reference. Also important are the County's "Flood Plain Management" and "Development Along Watercourses" ordinances (respectively, Chapters 15A and 15B of the Santa Barbara County Code). RMD-122

9. Sec. 6.2.5.2, pages 6.2-25 through 6.2-30. There are some very good development standards contained in this section. However, in order to be RMD-123

truly useful, they need to be worded in stronger terms. Occurrences of the words "should," "could," and "may" need to be changed to "shall" or "must," and any occurrence of the phrase "should be discouraged" needs to read "shall be prohibited." RMD-123

10. Sec. 6.2.5.2.1, page 6.2-25, first bullet. It is stated that "A water supply plan should be provided to ... Santa Barbara County ..." Specific County agencies reviewing such a report need to be identified as the Water Agency and the Resource Management Department, Environmental Review Division. RMD-124

11. Sec. 6.2.5.2.1, page 6.2-26, third bullet on page. "Records of water use categorized by well location" also must be referred to the Santa Barbara County Water Agency and the Resource Management Department, Environmental Review Division. RMD-125

12. Sec. 6.2.5.2.2, pages 6.2-26 through 6.2-29. It is important to coordinate water quality protection and spill cleanup plans with the Santa Barbara County Department of Health Care Services, Environmental Health Services (EHS) Division. RMD-126

13. Sec. 6.2.5.2.2, page 6.2-28, fourth bullet. The waste disposal plan referral specifically must be to Santa Barbara County EHS. RMD-127

14. Sec. 6.2.5.2.3, pages 6.2-29 and 6.2-30, "Flood Hazards." Coordination of efforts with the Santa Barbara County Flood Control and Water Conservation District is important, and must be noted in the MRMP. RMD-128

15. Sec. 8.2.3, page 8-9, last paragraph, sentence 2. The extent of analysis must take into account concerns that extend beyond site-specific concerns. Preliminary analysis should make a reasonable attempt to identify impacts associated with product transportation, storage, and processing. (Please note that Unocal must modify its permit for the Lompoc dehydration plant if it processes crude oil from sources other than the Point Pedernales field.) Early consultation with local agencies on such matters is highly recommended, particularly to ensure that a project is analyzed in its entirety and, when required, joint NEPA/CEQA documents can be pursued to save the applicant time and money. RMD-129

16. Sec. 8.2.3, page 8-11, figure 8-3. Please elaborate on process of notifying local agencies. Will agencies have the opportunity to comment? Also, what forum has been established for public comment? RMD-130

17. Sec. 8.5, page 8-16, paragraph 6. Earlier and more extensive consultation with affected state and local jurisdictions is desirable, particularly considering off-base impacts that stem from processing and transportation of crude oil, natural gas, and gas liquids. Considering on-base impacts, we note a recent U.S. Supreme Court decision (March 1987), California Coastal Commission, et. al. v. Granite Rock Company, in which the Court held by a 5-4 decision that the California Coastal RMD-131

Commission could require a company to obtain a permit for its limestone mining operations on federally owned land (see Attachment C). RMD-131

18. Figure 7.2, page 7-7. The LEGEND block is empty; either Legend text must be added, or the block must be removed. Also, this figure should include all lands within the Lompoc and San Antonio Groundwater Basins, since overdrafted groundwater resources are acknowledged in the text as a "high environmental constraint (see e.g. Sec. 6.2.4.1, p. 6.2-21, middle of first full paragraph; Sec. 7.3.3.2, p. 7-6). RMD-132

19. Appendix B, Sec. 2.3.1, page B-19, paragraph 2. AF Reg 126-1 Conservation and Management of Natural Resources provides for protection and identificaton of prime and unique farmlands; such farmlands may not be committed to uses that curtail their future use for agricultural purposes unless overriding military needs exist. Therefore: RMD-133
    - identify soils on unmapped areas.
    - remove prime lands from consideration
    - include areas designated as unique, or farmlands of state or local importance as shown on the Important Farmlands Map for Santa Barbara County.

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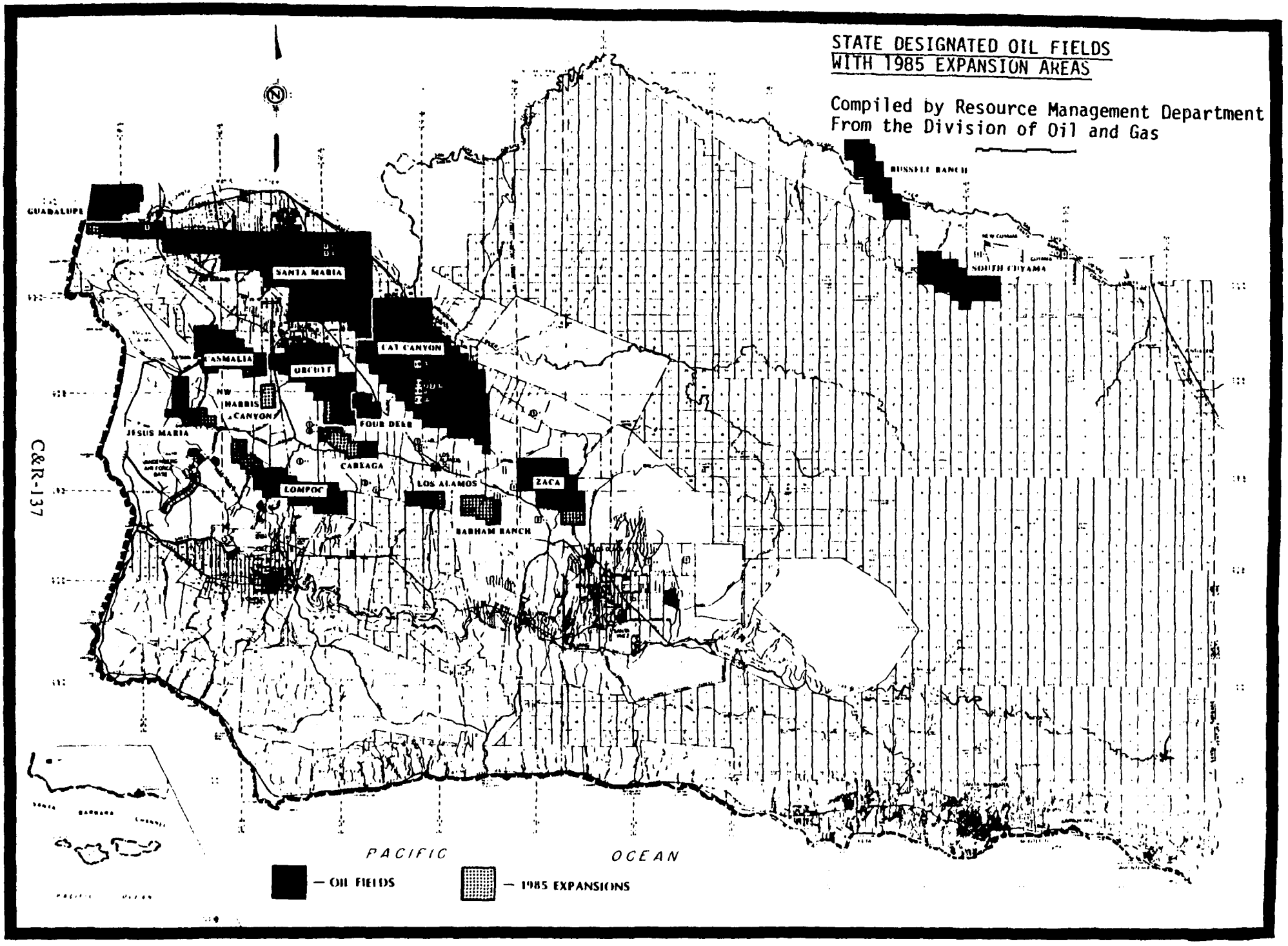
* Santa Barbara County Resource Management Department, May 1987, "Initial Public Draft, Santa Barbara County Comprehensive Plan Conservation Element, Groundwater Resources Section."

DA:aw:2893E

Attachment A

STATE DESIGNATED OIL FIELDS
WITH 1985 EXPANSION AREAS


STATE DESIGNATED OIL FIELDS
WITH 1985 EXPANSION AREAS
Compiled by Resource Management Department
From the Division of Oil and Gas
GUADALUPE
SANTA MARIA
CAT CANYON
TAFT
ORCUTT
NW HARRIS CANYON
JESUS MARIA
FOUR DEER
CABEAGA
LOMPOC
LOS ALAMOS
ZACA
BARHAM RANCH
RUSSELL RANCH
SOUTH CUYAMA
PACIFIC
OCEAN
— OIL FIELDS
— 1985 EXPANSIONS

Attachment B

SANTA BARBARA COUNTY
AGRICULTURAL PRESERVE, UNIFORM RULES

&

ABBREVIATED DEFINITIONS FOR
IMPORTANT FARMLANDS

2.4 DEFINITIONS

Agricultural lands to be eligible for coverage under the provisions of the California Land Conservation Act of 1965, as amended, need to be classified as prime or non-prime (*1). As an aid in determining these classes, the following definitions and examples are presented for Santa Barbara County conditions:

PRIME LAND

To qualify for "prime agricultural land" the act sets up five standards, any one of which can be used (*2):

1. "All land which qualifies for rating as Class I or Class II in the Soil Conservation Service Land Use Capability Classification" (*3)

   These are defined locally as:

   Class I - Soils that are very good for crops and have few limitations that restrict their use. These soils are very deep, over 60 inches, and range in texture from sandy loam to clay loam. The soils are well-drained and are on slopes of less than 2%. They occur on recent alluvial fans and low terraces.

   Class II - Soils that have some limitations that reduce the choice of crops or that require some special management practices. The soils are deep, over 36 inches, have textures that range from loamy sand to clay and may be gravelly. They are usually well-drained, but may have slight problems of flooding or high water table. The soils are often gently sloping but never more than 9%. Some minor problems of erosion and slow subsoil permeability are common. They occur on recent alluvial fans, low terraces or flood plains.

   Example: Typical soil series of Classes I and II found in Santa Barbara County are listed below. Consult a Soil Survey Map for your series and class.

Aqueda	Cropley	Panoche	Yolo
Bayshore	Elder	Salinas	
Ballard	Metz	San Emigdio	
Botella	Mocho	Sorrento	

(*1) Government Code Sections 51200 to 51295

(*2) Section 51201(c)

(*3) Definitions and examples prepared by Lewis C. Leifer, Area Soils Specialist, USDA, Soil Conservation Service, Santa Barbara, California

2.4 Definitions (continued)

2. "Land which qualifies for rating 80 through 100 in Storie Index Rating"

This method of soil rating is based on soil characteristics that govern the land's potential utlization and general productive capacity.

Percentage values are assigned to characteristics of the soil itself - profile features, texture of surface soil, slope and other factors such as drainage, alkali nutrient level and erosion. The most favorable or ideal conditions are rated 100%. The percentage values of these factors are multiplied to obtain the Storie Index. A rating of above 80 generally is found only on the best soils for agricultural use.

3. "Land which supports livestock used for the production of food and fiber and which has an annual carrying capacity equivalent to at least one animal unit per acre as defined by the United States Department of Agriculture"

Intensive use of poorer lands for dairy and other food producing livestock pasturage qualifies for prime land when it provides feed value enough for one full-sized cow equivalent per acre for a whole year.

4. "Land planted with fruit- or nut-bearing trees, vines, bushes or crops which have a non-bearing period of less than five years and during the commercial bearing period will normally return on an annual basis from the production of unprocessed agricultural plant production not less than two hundred dollars ($200) per acre"

Young orchard or vineyard plantings on poorer soil can be considered "prime" because of their potential income-producing value as defined in the following standard "5".

5. "Land which has returned from the production of unprocessed agricultural plant products an annual gross value of not less than two hundred dollars ($200) per acre for three of the previous five years"

The individual farmer's gross agricultural crop returns per acre are the legal basis for qualification.

For general guidance, the following ranking of major Santa Barbara County crops is presented as the past five-year average gross value per acre from unprocessed crops: (The values include harvesting, grading and packaging - but no processing or altering of the natural form of the crop.)

Abreviated Definitions for

IMPORTANT FARMLAND MAP

of Santa Barbara County, California

The Important Farmland Map for Santa Barbara County, completed in the summer of 1983, is based on the following definitions:*

Prime Farmland

Deep (at least 40 inches) well drained, non-saline, non rocky, not subject to floods, and not easily eroded soil. A dependable water supply is available. Appropriate temperatures and climate occur. Well suited to a wide variety of commodities, without serious limitations.

Farmland of Statewide Importance

Good farmlands that cannot meet the requirements for Prime Farmland. A dependable water supply is available. Slight amounts of salinity, rockiness, erodibility, and flooding are allowed. Usually includes those soils that are shallower than 40 inches and/or have permeability problems. Many commodities can be grown only with special management practices.

Unique Farmland

Land used for the production of high valued food and fiber crops that is not mapped as Prime or Statewide Important Farmlands. Examples are avocados, grapes, citrus, flowers, vegetables, and strawberries. A dependable water supply is available.

Farmland of Local Importance

Currently cultivated crop land that does not qualify for Prime, Statewide, or Unique Farmland is placed in this class. It is mostly dry farmed cropland, used for cereal grains and beans. Also included are a few miscellaneous agricultural uses, such as dairies, feedlots, greenhouses, and agricultural processing.

Grazing Land

Land with existing vegetation, whether natural or managed, and actually grazed by livestock. ~~and which has the capacity of sustaining, on the average, one animal unit month for each four acres~~.

Urban and Built-Up Land

Used for residential, industrial, commercial, and other urban related users. Units must be a least 10 acres and have a density of at least 1 structure per 1.5 acres.

Attachment C

McCutchen Update, April 22, 1987,
U.S. SUPREME COURT RULES THAT STATES MAY
IMPOSE ENVIRONMENTAL CONTROLS ON ACTIVITIES
OCCURRING ON FEDERAL LANDS

McCutchen Doyle Brown & Enersen

McCutchen Update

Legal developments of importance to our clients

RECEIVED
APR 30 1987
S. C. COUNTY
RESOURCE MGT. DEPT.

April 22, 1987

U.S. SUPREME COURT RULES THAT STATES MAY IMPOSE ENVIRONMENTAL CONTROLS ON ACTIVITIES OCCURRING ON FEDERAL LANDS

The U.S. Supreme Court, in a 5-4 decision in California Coastal Commission, et al. v. Granite Rock Company, (decided March 24, 1987) held that the California Coastal Commission could require a company to obtain a permit for its limestone mining operations in the Big Sur region of the federally owned Los Padres National Forest. The decision represents a victory for states, particularly western states with substantial acreage owned by the federal government. It allows them to subject private mining operations conducted on federal lands to state environmental regulations. The decision may have a far broader reach, for the Court has distinguished "land use" decisions from "environmental regulation," saying states may impose "environmental regulations" even where they have no authority to make "land use" decisions.

Granite Rock arose in the following manner: In 1981 the Forest Service prepared an Environmental Assessment of the initial mining plan submitted by Granite Rock Company. The plan was modified and approved by the Forest Service. Granite Rock began exploratory mining. Two years later the Coastal Commission demanded that Granite Rock apply for a coastal development permit to continue mining. Granite Rock sued the Coastal Commission, asserting that the state could not regulate its activity on federal land.

The Ninth Circuit Court of Appeals agreed with Granite Rock. It ruled that the Coastal Commission's independent permit system would undermine, and was thereby preempted by, the U.S. Forest Service permit regulations establishing environmental standards within federal forests

The Supreme Court reversed. It determined that the Coastal Commission's permit process was not preempted by U.S. Forest Service Mining Act regulations or any other federal

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statute. Instead, the Court determined that the Forest Service regulations contemplated that mining plans would comply with state law. The majority opinion also rejected Granite Rock's assertion that the federal statutes demonstrated a legislative intent to limit states to merely an advisory role with respect to federal land management decisions.

Most important, the Court distinguished "environmental regulations" from "land use" restrictions. The Court described land use planning as the determination of uses appropriate for a particular property; it described "environmental regulations," as those which say that "however the land is used, damage to the environment is kept within the prescribed limits." The Court held that the Coastal Commission may impose "environmental regulations" on mining activities by means of a separate permit procedure or other regulatory process.

The majority opinion is cautiously written and seems not to intend to permit a state to reverse a federal "land use" decision in the guise of "environmental regulation." Nonetheless, the decision leaves open many issues, including whether a particular state regulation should properly be characterized as either "environmental" or "land use." In addition, the question remains open whether other private activities such as cattle grazing, timber harvesting and private concession activities on federal lands will be subject to state regulation.

The dissent vigorously attacked the distinction between environmental regulation and land use decisions; calling the distinction "divorced from reality." It warned that, by effectively permitting states to veto projects on federal land, the environmental views of state regulators could prevail over federal interests.

At the federal level, the decision may lead to attempts to enact legislation reversing Granite Rock. In fact, Justice Powell's dissent called for Congress to enact a single comprehensive statute for the regulation of federal lands. On the other hand, following Granite Rock, states, counties and cities will, under the banner of environmental regulation, be more likely to attempt to impose conditions affecting projects conducted on federal lands.

* * * *

For further information regarding this case or similar federal environmental issues, please contact Barry Goode, Robert Uram or Karen Nardi of the San Francisco office (415) 393-2000, Chris Berka of the Washington, D.C. office (202) 628-4900, or Daniel J. Curtin, Jr. or David A. Gold of the Walnut Creek office (415) 937-8000.

RESPONSE TO COMMENTS
FROM THE
SANTA BARBARA COUNTY RESOURCE MANAGEMENT DEPARTMENT

RMD-1 See the response to SLC-1.

RMD-2 The off-base impacts on a regional scale were assessed by determining if there were sufficient emission offsets in the North County to mitigate hypothetical project emissions, as required by the MRMP. This is assumed to be an adequate assessment, due to the lack of specific project design information from the developers, which would make an assessment of other theoretical development scenarios unworthy. The impacts of oil processing off base were not analyzed but have been included in the FEIS (see the air quality errata). Please see the response to comment SBAAir-3.

Off-base impacts on water resources were assessed as a result of considering the potential demand on the water supply serving oil and gas development on VAFB. This demand potential may be met through proposed water-supply development either on or off base. Potential water supplies are limited to those described in section 3.2.4 of the DEIS. Potential impacts on water resources and their method of mitigation are described in section 4.2.2 of the DEIS for an area covering a broader geographic region than VAFB. Response to comment CCC-29 provides additional information pertaining to water supply impacts, mitigation measures, and standards for approval of oil and gas development proposals which may have the potential for significant impacts. These standards are proposed to apply to either on-base or off-base water supply development which serves oil and gas development on VAFB.

Regarding transportation of hazardous liquids through the county, see pages 4.11-13 and 4.11-14 under section 4.11.2.1.1, Trucking Accidents, of the DEIS. After identification of possible impacts, the conclusion of the section is that "regarding off-base truck routes, the MRMP requires coordination between oil developers, Santa Barbara County, and the City of Lompoc."

RMD-3 We are not specifically assessing the transporting of oil by truck. For a general discussion of transporting oil by truck, refer to section 2.4.2, Trucking versus Pipelines, in the DEIS. Whether or not trucking or pipelines are used would be determined when site-specific applications for projects are submitted to the U.S. Air Force for review. Each project that will be developed on VAFB will need to be assessed to determine whether the volume of production is large enough to justify the economic cost of constructing a pipeline. Furthermore, each project will need to be assessed on its own merit because it is not always economically feasible to require pipelines if the level of production is small.

RMD-4 This programmatic EIS did assume that oil and gas would not be treated on site because all the land surface on VAFB is owned by the federal government and there is no desire to surplus (sell) or lease property for private uses. The U.S. Air Force is not eliminating the possibility that an applicant may desire on-site processing. When and if that occurs, it will be considered. However, in discussions with Unocal, they indicated that their *onshore* processing facilities would be treating a reduced volume of oil and gas over time and could handle additional loads. For purposes of this programmatic EIS, we assumed that the plant could be expanded or a new plant built in the county and identified the types of impacts that could be associated with that. If a new plant were built in Santa Barbara County, the county would process the application, assess impacts, and provide the required permits if the plant is determined acceptable. Depending on whether a plant is located on base or off base, additional environmental assessment may be required and would be coordinated with both VAFB and Santa Barbara County. Impacts will be analyzed by both jurisdictions wherever the plant is located.

VAFB is very interested in the county's future studies and policies regarding consolidation of on shore processing facilities. Please keep us informed.

RMD-5 Comment noted. See also response SLC-1. There is no additional formal public comment on this EIS. After completion of the EIS, final copies will be distributed to the public agencies. A record of decision will be approved no earlier than 30 days after such distribution.

RMD-6 The focus of this EIS is on the exploration and development of oil and gas resources. However, the MRMP can be used for all types of development. It identifies environmentally sensitive areas and appropriate standards and management practices for protection of those resources.

RMD-7 This figure is provided for purposes of locating the region only. It is not intended to show distinct cities and roadways in the inset. There is an arrow pointing north in the lower left-hand corner of the figure's inset. Other figures showing VAFB, Lompoc, Santa Maria, and existing roadways in detail are located throughout the DEIS. Please refer to Figure 3.8-1 in the EIS errata for section 3.8, Transportation. This figure indicates recently changed route numbers, including Santa Maria S-20 which is now Highway 1.

RMD-8 The methodology employed to assess the petroleum potential of VAFB is addressed in section 5.1.2, Petroleum Resources Evaluation, of the MRMP and in section 4.0, Petroleum Resources Evaluation, of the Mineral Resources Report.

RMD-9 The facility that is referred to in the DEIS is the onshore processing facility owned and operated by Unocal in their Lompoc oil field.

RMD-10 The 6-inch gas and 12-inch oil pipelines were installed by Unocal after production was established for the area.

RMD-11 Specific areas of oil and gas reserves will not be known until exploratory and development drilling programs have delineated the accumulations. These data will be proprietary information owned by the respective oil companies operating on VAFB. These data will not be available for public review and analysis until the applicant decides to release the data or until the CDOG releases them after a two-year confidentiality period. Refer to Figure 1-2, Potential Economic Oil Reserves, in the DEIS on page 1-5 for a qualitative interpretation of potential oil reserves.

RMD-12 Site-specific analysis of oil, gas, and water production and the corresponding processing, refinement, and disposal thereof, will be addressed during the review process after individual project applications are submitted to the U.S. Air Force. There are several processing facilities where oil can be trucked in the Santa Maria area (e.g., Orcutt, Casmalia, Lompoc, Santa Maria, and Cat Canyon fields).

RMD-13 The Conoco well is in a production-testing phase to determine the commercial, long-term viability of the well.

RMD-14 Comment noted. The most current information will be used when individual project applications are submitted to the U.S. Air Force.

RMD-15 Site-specific analysis of particular areas of VAFB will have all pertinent data, including pipeline routes, processing facilities, and well locations, input on the GIS mapping program at the time that individual project applications are received by the U.S. Air Force for review.

RMD-16 See response to comment RMD-15.

RMD-17 Pipeline routes for unprocessed and processed hydrocarbon products, as well as processing facility capacities, will be analyzed during the application review process for individual projects proposed on VAFB. No agreements have been reached or made with any oil operator at this time.

RMD-18 The most accessible processing facilities on VAFB are located at Unocal's onshore Lompoc site and Casmalia site. Pipelines will eventually connect these processing facilities with on-base oil and gas production. The excess capacity at these sites will be utilized. Expansion or construction of new facilities will be addressed and analyzed as the need arises.

RMD-19 Other options (i.e., on-base processing or consolidated processing at a different location) will be addressed as individual project applications are reviewed by the U.S. Air Force.

RMD-20 Unocal's onshore processing facility located in the Lompoc oil field is connected by pipes to the individual wells producing oil in the field.

RMD-21 The purpose of the MRMP is to address the potential impacts of oil and gas development on and off VAFB. Off-base impacts are discussed in section 2.4.1, Off-Base Impacts, and in sections 4.1.4, 4.1.2.2.1, 4.2.2, 4.2.4, 4.3.1.2.2, 4.3.1.2.4, 4.3.2.1.3, 4.3.2.1.4, 4.3.4, 4.4.2.1.1, 4.4.4, 4.5.2.1, 4.5.4, 4.6.2.1.1, 4.6.4, 4.7.2, 4.7.4, 4.8.2, 4.8.4, 4.9.2, 4.9.4, 4.10.2, 4.10.4, 4.11.2, 4.11.4, and 5.0. Any off-base impacts will be assessed when individual, site-specific project applications are submitted to the U.S. Air Force.

RMD-22 See response to comment RMD-15.

RMD-23 Section 2.1, page 2-2, in the fifth full paragraph, "Memorandum of Agreement (MOA)" should read "Memorandum of Understanding (MOU). This MOU serves . . ." This change also applies to the DEIS on page A-94, section 7.2.4, second paragraph. See the EIS errata for section 2.0 and Appendix A.

RMD-24 In the event that the applicant was unable to comply with the required mitigation or the proposed project conflicted with the base mission, a denial of application could be made.

RMD-25 It is agreed that truck transportation of gas liquids (LPG and NGL) has been well documented as presenting a significant impact to public safety. Gas development on VAFB will result in the gas being processed somewhere else, thereby requiring the transportation of gas liquids. Santa Barbara County is presently initiating a study to analyze gas liquids' transportation, including trucking, train transportation, and pipelines, for the purpose of establishing county policy.

RMD-26 Please refer to response to comment WQCB-4.

RMD-27 For a detailed review of present and future processing needs, refer to section 5.2.3.2, Production Wells and Associated Facilities, in the MRMP and refer to section 1.3.2.2, Processing Facilities, Onshore Oil and Gas Development, in the DEIS.

RMD-28 See the response to comment RMD-4.

RMD-29 Comment noted. See the EIS errata regarding section 2.4.1.

RMD-30 Natural gas, though not a major exploratory objective in the Santa Maria basin and VAFB, in particular, is sometimes found in sufficiently large quantities to produce. The most common usage of the small quantities of gas that are produced with oil is to power the surface pumping units. At times, not even small quantities of gas are produced in Santa Maria basin wells.

RMD-31 Comment noted.

RMD-32 Oil and gas production on VAFB will be processed at undetermined locations. Site-specific analysis of a project will be necessary to ascertain where and how products should be treated. This analysis will occur when individual project applications are submitted to the U.S. Air Force for review. At present, the nearest large oil processing facilities for onshore production are located at the Lompoc, Casmalia, and Orcutt fields. All three of these facilities are owned and operated by Unocal.

RMD-33 Comment noted.

RMD-34 Project-specific safety and environmental issues associated with the transportation of crude oil and gas liquids after processing will be addressed during the review of individual project applications submitted to the U.S. Air Force.

RMD-35 The oil production projections for VAFB in Table 2-1 of the DEIS were developed only to show how petroleum development and production *could* occur over the next 40 years. For this scenario, it was anticipated that no additional wells would be drilled after the year 2007 and that all exploration and development projects would be completed on VAFB. This development scenario is dynamic and will continue to change as additional wells are drilled and geotechnical data are obtained.

RMD-36 The purpose of the oil production projections was to provide a reasonable scenario for oil development to occur on VAFB (see also response to comment RMD-35). In this part of the Santa Maria basin, gas and gas condensate typically occur in low volumes. It is anticipated that this trend will continue with additional development and exploratory drilling on VAFB. There is a chance that a few wells will be strictly gas, but the vast majority will produce oil. If a gas-prone geologic structure or trap is identified, then a gas development scenario would be developed for it. However, formulating this type of scenario would occur only during the review process of an individual project's application.

RMD-37 The region of analysis for geology was not limited to just the VAFB area. Geological factors such as seismicity, tsunami inundation, and active faulting were all assessed for the central California region. For additional information, see section 3.1, Geology, in the DEIS, and section 6.1, Surface Geology, in the MRMP for these discussions.

RMD-38 The Union Point Pedernales Project EIS/R was reviewed.

RMD-39 Recommending additional soil mapping on south VAFB is mentioned in section 6.1.5.3, Soil Erosion, in the MRMP.

RMD-40 (A) Air Force Regulation 126-1, Conservation and Management of Natural Resources, section 3.3, defines prime farmland as "land that

has the best combination of chemical and physical characteristics for producing food, feed, forage, fiber, and oil-seed crops, and is also available or potentially available for these uses. It has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops economically when treated and managed, including water management, according to modern farming methods. Existing pastureland, rangeland, forest land, or other land not in an urban built-up condition is considered eligible for designation as prime farmland, providing it meets the other characteristics."

(B) and (C) A map of prime agricultural lands on VAFB is presented in Figure 6.6-3 of the MRMP. These areas were previously identified by the Soil Conservation Service in Santa Maria. There are no unique farmlands on VAFB. Most soils on VAFB are Class II soils, with only a small amount of soils being Class I. As indicated in the soil surveys for Santa Barbara County, Class I soils have few limitations that restrict their use for most kinds of field crops, whereas Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices. These capability classes are often used to determine the potential of soils to carry a prime agricultural classification. This information is available in the soil surveys and was not included in the DEIS since prime agricultural lands on VAFB have already been designated. The areas of VAFB that are unmapped for soils (generally south of Surf) have low potential for oil and gas development and low potential for agriculture. These areas would be surveyed before development occurs.

(D) The Soil Association Map, Figure 3.1-3, on page 3.1-7 of the DEIS, has been simplified by the Soil Conservation Service and is used as is in this report.

RMD-41 Comment noted. The revision has been made in the EIS errata for section 3.1, Geology.

RMD-42 Refer to geology references in the DEIS (Hall 1981 and 1982 and Sylvester and Darrow 1979) for specific analysis of the Hosgri fault zone. The most recent published data are in Cummings and Gaal (1987).[1]

RMD-43 Comment noted. Please refer to geology references in the DEIS (Sylvester and Darrow 1979) for additional discussion of the recency of faulting on the Santa Ynez River fault.

RMD-44 Please see the response to comment RMD-42 for the reference.

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1. Cummings, D., and Gaal, R.A. 1987. Hosgri Fault Zone, Offshore Santa Maria River to Point Arguello, California. American Association of Petroleum Engineers 71(5): 544.

RMD-45 The comment does not conflict with the DEIS characterization of the two referenced channels as having highly variable flows with seasonal patterns. However, very limited portions of San Antonio Creek are supported by groundwater inflows; therefore, these segments would not be characterized as intermittent. All other stream segments are intermittent as noted in the comment.

RMD-46 The region of influence evaluated for water resource impacts in the DEIS exceeds the base boundaries of VAFB and includes surface water and groundwater resources which may be affected by oil and gas development activities on base.

RMD-47 The USGS gaging station locations are shown on Figure 3.2-1.

RMD-48 The purpose of the first sentence referenced is to indicate that stream flows for the entire basin cannot be characterized by a single gaging station because of the high degree of regulation of stream flow and the variability of stream flow across the length of the channel. Information available at the Pine Canyon gage only characterizes monthly stream flows at that location and is not reflective of the yield of the entire Santa Ynez River basin.

RMD-49 An adjudication of water rights would determine the permitted level of groundwater withdrawals. While this may reduce the overdraft of a groundwater basin, it may affect the ability of a particular user to withdraw water at current levels. Water supplies for a particular groundwater user would thereby be reduced while the rate of depletion of groundwater in storage would also be reduced. The referenced statement was not intended to indicate that the level of water supply in groundwater would be reduced, but rather that existing demand levels may not be satisfied.

RMD-50 The DEIS acknowledges that there are a variety of estimates of groundwater storage and safe yields as suggested by the commentor. However, the conclusion drawn from the alternative estimate would be the same as drawn in the DEIS. The rate of withdrawal of groundwater exceeds the annual safe yield of the three groundwater basins. The information provided by Santa Barbara County suggests the severity of the existing situation is more acute than the level stated in the DEIS.

RMD-51 See the response to comment RMD-50.

RMD-52 See the response to comment RMD-50.

RMD-53 The DEIS acknowledges that the three sub-basins are hydraulically interconnected. They are treated separately only to indicate the total estimated groundwater in storage by subunit.

RMD-54 See the response to comment RMD-50.

RMD-55 See the response to comment RMD-53.

RMD-56 See the response to comment RMD-53.

RMD-57 Waters in San Antonio Creek closer to Barka Slough are less turbid than water in the same drainage located farther downstream. Water quality is therefore degraded downstream of Barka Slough.

RMD-58 Detailed mitigation measures are included in the EIS, Appendix A, and the MRMP, section 6.4.5, for avoiding or minimizing the potential for impacts on sensitive biological resources.

RMD-59 There is presently some confusion regarding the taxonomy of Roderick's fritillary. The taxon that is state-listed as endangered is *Fritillaria roderickii*, commonly called Roderick's fritillary (CDFG list of designated endangered or rare plants, August 1986). It occurs only in Mendocino County (CDFG status report 1979). However, the USFWS has included *Fritillaria grayana*, which also has a common name of Roderick's fritillary, as a candidate 2 species in their 1985 Notice of Review of Plant Taxa (Federal Register, September 27, 1985) and as a possible candidate species that may occur in the VAFB area (letter from N. Kaufman, USFWS, to T. Mulroy, URS Corporation, September 23, 1985). All evidence indicates that *F. roderickii* and *F. grayana* are synonyms, but neither is expected to occur on VAFB. The confusion results from the fact that *Fritillaria biflora*, which is known from the south coast area, was once, apparently incorrectly, considered to be a synonym for *F. grayana* (personal communication, J. Bartel, USFWS, September 4, 1987). Since it is generally agreed that the rare taxon occurs in Mendocino County, the species does not warrant further consideration in the MRMP and DEIS.

RMD-60 *Arctostaphylos rudis* is commonly found in Burton Mesa chaparral; however, Burton Mesa chaparral is mapped as a sensitive or unusual plant community in Figure 3.4-5, on page 3.4-21 of the DEIS, and it is considered to be at the same constraint level as candidate plant species. The areas mapped as concentrated occurrences in Figure 3.4-1 are locations where several rare species are present in close proximity, making the mapping of individual sites unclear at the scale presented.

RMD-61 Resources such as subtidal reefs, rocky intertidal habitat, and seabird roosts (other than for threatened or endangered species) were considered to have low sensitivity to mineral development on VAFB because no direct impacts were anticipated other than the remote possibility of an onshore oil spill reaching the coastline. Consequently, these resources were not mapped.

RMD-62 Although there is some question as to whether the unarmored threespine stickleback is genetically the same as populations in the Santa Clara River drainage, the former population is currently listed as endangered and thus requires protection. If, at some later date, the taxonomic status of this population is changed, it is likely that

the new subspecies would also be listed as endangered due to its very restricted range and the high potential for extinction, particularly if overdrafting of the San Antonio aquifer continues. Thus, the issue of its taxonomic status does not change in the MRMP.

RMD-63 The lines representing San Antonio Creek and Honda Creek show the distribution of the stickleback. The detailed data, originally in color, show this much better but could not be reproduced in the DEIS. The figure (in color) has been sent to you under separate cover. Stickleback range in Honda Creek does not extend to the shoreline because the stream does not flow that far most of the year.

RMD-64 Oak and riparian woodlands were not mapped for lack of good data for VAFB. In many cases, riparian woodlands are included in wetlands, but oak woodlands seldom are.

RMD-65 Areas of prime farmland are mapped in Figure 6.6-3 of the MRMP. Agricultural management areas on VAFB are described in Table 3.6-1, which provides information on the total number of acres, animal unit months (AUMs), AUMs per acre, and acres of cropland and rangeland in each of the six management areas. A range management plan for VAFB was issued by the Soil Conservation Service in 1978. There are three agricultural outleases on VAFB consisting of approximately 36,000 total acres. The outleases consist of two private leases and one lease to the federal penitentiary.

RMD-66 Please see the responses to comments APC-1 through APC-7.

RMD-67 Offshore oil and gas activities are not considered part of the baseline for this environmental analysis; therefore, discussion of employment and population from offshore oil and gas projects is discussed in section 4.7.4, Cumulative Impacts, of the DEIS.

RMD-68 Section 3.9.4, Existing Conditions, addresses the developed areas of the base, including the roads, highways, and base facilities. Detailed descriptions of operations and support systems, such as tracking stations, guidance and monitoring systems, radar and telemetry, and other buildings, are discussed in sections 3.9.4.1 and 3.9.4.2 of the DEIS for both north and south Vandenberg.

RMD-69 It is agreed that accidents can also involve the storage of petroleum, petroleum products, or other hazardous materials. The text has been appropriately modified. Please see the EIS errata for section 3.11, System Safety.

RMD-70 The region of influence for the transportation of liquids includes public roads and highways to the various markets. Potential market areas include Bakersfield and the Los Angeles areas, as well as the potential local area market.

RMD-71 A new paragraph has been added to section 3.11.4.1.2 to discuss these points. Please see the EIS errata for section 3.11, System Safety.

RMD-72 The treatment of paleontological resources is discussed in the MRMP errata, section 6.5, Cultural Resources.

RMD-73 For a detailed discussion of significance criteria, refer to section 6.1.4, Constraints, in the MRMP.

RMD-74 Refer to section 6.1.2.3.2, Seismicity/Strong Ground Motion, in the MRMP for a detailed discussion of the basis for rating the hazard of seismic events.

RMD-75 Refer to section 6.1.3.1, Air Force Regulations, Guidelines, and Policies, in the MRMP for a discussion of the U.S. Air Force regulations related to grading practices.

RMD-76 Refer to sections 6.1.5 and 6.2.5, Recommended Guidelines, Standards, and Management Practices, in the MRMP for detailed mitigation measures for geology and water resources which could be affected by spills.

RMD-77 Refer to section 5.1.4.1, Subsidence, in the MRMP for a detailed discussion on subsidence-related issues.

RMD-78 The need for additional processing facilities and other related facilities will be addressed during the review of specific project applications submitted to the U.S. Air Force. It is not feasible at this point to address or analyze the impacts associated with new processing facilities. The present assumption is that new oil production will utilize the existing, excess capacity of processing facilities located at Lompoc and Casmalia which are the closest to VAFB. When a need for additional facilities arises, both on-base and off-base sites will be assessed.

RMD-79 Potential users were not included in the significance criteria because of the difficulty in measuring the degree of conflict with potential users who are presently undefined. The threshold utilized in determining significance was any further increase in water withdrawal from overdrafted groundwater basins.

RMD-80 This comment has been noted. The FEIS includes significance criteria which include biological resources related to hydrologic features. The assessment of impacts was performed utilizing this criterion, and no additional impacts would be identified as a result of this clarification.

RMD-81 The impact assessment was based on consumption and assumed all facilities were on base. The location of processing facilities either on or off base would therefore not affect projected consumption.

RMD-82 The MRMP has been amended to include language consistent with the intent of the wording of the referenced section of the DEIS.

RMD-83 Preclusion of oil development in groundwater basins which are overdrafted would not preclude further overdrafting of the groundwater basins. The locations of water withdrawals are not dependent on the locations of the oil field developments since water can be transported to the site. The total water demand and extent of impact on water resources would therefore not appreciably differ between the alternatives in regard to the geographic locations of oil and gas development.

RMD-84 See response to Comment RMD-83.

RMD-85 This comment has been noted. The errata for the FEIS reflects this correction.

RMD-86 See response to comment RMD-83.

RMD-87 The intention of using counties in the plural sense was to include the concerns of San Luis Obispo County regarding surface water sources. These may be indirectly affected by alternatives for meeting anticipated demands for water supply at VAFB, such as extension of the State Water Project.

RMD-88 (1) Please see the response to comment SBAAir-3. (2) Please see the response to comment SBAAir-1. Since the power requirements for a single producing well are very low, the availability of this power was not considered to be an issue.

RMD-89 Provisions for site-specific surveys by qualified biologists are included in section 6.6.1 of Appendix A, along with a definition of a qualified biologist.

RMD-90 The guidelines for protecting wetlands, coastal dunes, and other sensitive habitats and species are listed in Appendix A of the DEIS and in the MRMP, section 6.4.5. Reference to Appendix A is made on page 4.4-3 of the DEIS.

RMD-91 As stated in the DEIS, section 4.4.2.4.1, alternative 3 would protect more habitats than either alternative 1 or alternative 2, but this may result in spatial concentration of oil development, which could have as great or greater biological impact than development in high constraint areas. Thus, it is not clear that alternative 3 is actually environmentally preferable.

RMD-92 The text has been changed to reflect cumulative impacts on Burton Mesa chaparral.

RMD-93 Comment noted.

RMD-94 The cantonment buffer zone is a corridor 1,000 to 3,000 feet wide separating urban land uses in the base support area from facilities in the technical support area. Under the proposed action, implementation of the MRMP, neither the buffer zone nor the

cantonment area would be precluded from use. Development proposals in these areas would first be evaluated to determine how any anticipated incompatibilities would be mitigated.

RMD-95 Please refer to the respective resource sections of the DEIS for these discussions (i.e., air quality, transportation, and geology).

RMD-96 Potential on-base processing on VAFB will be addressed when individual, site-specific applications are submitted to the U.S. Air Force for review.

RMD-97 Please refer to the responses to comments APC-8 through APC-18.

RMD-98 At the time the DEIS was written, the most recent information available from the CDOG included data for the full year of 1985. This information was published in 1986 and is already presented in the note and source of the figure to which you refer.

RMD-99 The text has been revised to incorporate this comment. Please see the EIS errata for section 4.7, Socioeconomics.

RMD-100 The statements are correct as presented; additional trucking from VAFB will increase the probability of an accident but will not increase the size of a hazard footprint from an accident. In general, the probability of a trucking accident is directly proportional to the number of miles traveled. See response to comment RMD-25 for additional information on the transportation of gas liquids. An expansion of an existing gas processing facility or the construction of a new gas processing facility would almost assuredly require the preparation of an EIR addressing the particulars of gas liquids' transportation. As a rough estimate, it is expected that there will be between 1,000 and 4,000 gallons of gas liquids per million standard cubic feet of gas produced. A truck holds approximately 9,000 gallons of liquid.

RMD-101 This statement was intended to show that it is possible that, as the level of oil and gas development increases, the emergency-response capability may actually improve. Not only is the area of coverage expanded, but because there are more potentially hazardous facilities, a higher level of protection can be justified. Therefore, as the probability of an accident increases, the impacts from an accident may actually decrease because of the added emergency-response capability.

The level of emergency-response services and planning presently required of the oil companies by laws and regulations is, in general, adequate. Both VAFB and Santa Barbara County are continuously updating their emergency-response planning and capability, and it is assumed that they will continue to do so as the need arises.

RMD-102 All the mineral resources were assessed for the preparation of the Mineral Resources Report for VAFB. However, the application and review processes developed in the MRMP and assessed in the DEIS are only for oil- and gas-related development projects. VAFB would need to be contacted directly regarding the availability of mining permits.

RMD-103 Comment noted.

RMD-104 The correction has been made in the MRMP errata for section 5.0, Mineral Resources.

RMD-105 The decline in the United States' domestic petroleum production will be slightly offset by the additional oil and gas reserves produced from VAFB. Therefore, the United States will depend slightly less on foreign oil supplies because of the additional production from VAFB wells.

RMD-106 Applicants will be required to comply with federal, state, and county regulations applicable to those items listed in paragraph 2 of section 7.7.11 on page 7-27 of the MRMP and referenced in section 6.0 of the MRMP. The U.S. Air Force will incorporate those regulations. See also response to comment SLC-1. Any studies of off-base development or impacts for projects will need to be reviewed and approved by the county before the project can proceed. The Santa Barbara County APCD will be the agency processing all applications for both on- and off-base projects.

RMD-107 The correction has been made. Please see the EIS errata for the Distribution List.

RMD-108 The plan's database (GIS) is updated with each application or as additional information becomes available. The typical base comprehensive master plan is updated every five years. The MRMP can be updated on the same schedule as an element of the comprehensive master plan.

RMD-109 High constraint areas could have been excluded from development; however, the U.S. Air Force has agreed to review individual applications in light of mission constraints at the time of their submittal. The U.S. Air Force does not want to preclude applications in high constraint areas without thorough review.

RMD-110 Comment noted.

RMD-111 Valve placement has been suggested in areas near water courses which are considered to be environmentally sensitive.

RMD-112 Appendix A, page A-76, paragraph 2, sentence 2 has been changed as follows: "This determination should be based upon off-base areas that would be affected by public safety risks, noise, traffic, odor,

visual incompatibility, or other 'nuisance' effects associated with oil and gas development." Please see the EIS errata for Appendix A.

RMD-113 See the responses to comments SLC-1 and RMD-4.

RMD-114 Comment noted.

RMD-115 The MRMP has been amended to reflect a requirement to both store and dispose of wastes at approved facilities.

RMD-116 This comment has been noted. The MRMP errata, in regard to section 6.2.5.2 (Flood Hazards), clarifies the requirements of the guidelines. The MRMP now requires that pipelines be buried below the scour depth of the 100-year flood event where pipelines cross streams or rivers.

RMD-117 This comment has been noted.

RMD-118 The USGS (1980) cites the total depth of alluvial deposits in the San Antonio Valley as 10,000 feet. However, only the first approximately 3,000 feet of the alluvial deposits have significant water-bearing capacities.

RMD-119 This difference is partially explained by the fact that working storage and available storage are two different terms. Also, as noted in response to comment RMD-50, the DEIS and MRMP acknowledge that estimates of storage and other groundwater characteristics vary depending on the source of information.

RMD-120 This comment has been noted.

RMD-121 See the response to comment RMD-119.

RMD-122 This comment has been noted. Appropriate modifications have been included in the MRMP errata.

RMD-123 This comment has been noted.

RMD-124 This comment has been noted. Revisions to the MRMP indicate the appropriate county agencies. See the MRMP errata.

RMD-125 See the response to comment RMD-124.

RMD-126 See the response to comment RMD-124.

RMD-127 See the response to comment RMD-124.

RMD-128 See the response to comment RMD-124.

RMD-129 Regarding the Lompoc processing plant identified in the DEIS, Unocal indicated that an existing processing facility for onshore oil and gas would be used, and not the new facility for offshore processing. See also the responses to comments RMD-2 and SLC-1.

RMD-130 See the response to comment SLC-1. Public commenting depends on the NEPA/CEQA regulatory requirements. If, for instance, a future proposal is such that it will have a significant impact on the environment, the public will be able to comment.

RMD-131 See the response to comment SLC-1.

RMD-132 The legend is unnecessary and has been deleted from Figure 7-2. Please see the MRMP errata for section 7.0, Plan Criteria and Application. The referenced map gives information on locations of oil and gas facilities which may be constrained by water resource attributes. As noted in the response to comment RMD-83, the location of oil field development is not geographically tied to the location of the water source which would supply the facility. The purpose of this figure is to provide geographic information on constraints of oil and gas development on base.

RMD-133 Please see the response to comment RMD-40, parts (B) and (C).

LEAGUE OF WOMEN VOTERS
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July 24, 1987

To: Vandenburg Air Force Base, CA 93437-5000

Attention: Col. William R. Newell, 1 STRAD/ETD

Re: Review/Comments, Draft Environmental Impact Statement, Mineral Resource Management Plan for Potential Exploration, Development, and Production of Oil and Gas Resources, Vandenburg Air Force Base

The South Central Regional Task Force of the League of Women Voters submits for your consideration the attached commentary on the above cited DEIS:

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Thank you for this opportunity to submit input.

Marty Blum

Marty Blum, Chair
LWV South Central Regional Task Force

ETF

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July 24, 1987

Review/Comments
DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)
for the
MINERAL RESOURCE MANAGEMENT PLAN (MRMP)
for
Potential Exploration, Development and Production of Oil and Gas Resources
VANDENBURG AIR FORCE BASE (VAFB)

I INTRODUCTION

- Purpose

The purpose of these comments by the South Central Regional Task Force of the League of Women Voters (the League) is to analyze/evaluate the adequacy of the referenced DEIS as a working, effective tool for local/state/federal decision makers and for involved, interested public.

- Methodology/Sources

The League reviewed and studied in some depth not only the DEIS but its companion volume, the Mineral Resource Management Plan, also the preliminary document, i.e. the VAFB Scoping Memorandum dated August 22, 1986.

During the review process the League had occasion to refer frequently to other League commentaries on EISs/EIRs, e.g. Santa Barbara League comments 1) to the Minerals Management Service, Department of the Interior, May 5, 1986, on the DEIS for the Proposed 5-year OCS Leasing Program, and 2) to the State Lands Commission, October 28, 1986, on the DEIR/S for ARCO's Coal Oil Point Project.

II FINDINGS

A) Source Data. Tables of contents for the two companion volumes released by VAFB on June 5, 1987, provide a point of departure for DEIS analysis:

Mineral Resource Management Plan	Draft Environmental Impact Statement
1.0 Summary	1.0 Purpose of and need for Action
2.0 Introduction	2.0 Proposed Action & Alternatives
3.0 VAFB Mission Characteristics	3.0 Affected Environment
4.0 Mineral Rights Ownership	4.0 Environmental Consequences
5.0 Mineral Resources	5.0 Growth-inducing impacts of Proposed Action
6.0 Environmental Characteristics	6.0 Long-term Productivity vs Short-term Uses of the Environment
7.0 Plan Criteria and Application	7.0 Irreversible & Irretrievable Commitment of Resources
8.0 Implementation Process	Appendices: A MRMP (a summary)
9.0 Conclusions & Recommendations	B Regulatory Setting
List of Abbreviations	
List of Terms	
References	

B) Environmental Setting, VAFB

VAFB covers 98,400 acres, approximately 6% of Santa Barbara County's total land base. VAFB is located just west of the city of Lompoc, along 35 miles

of Pacific coastline between Point Sal and Point Conception, - 35 miles northwest of the city of Santa Barbara, and 36 miles south of the city of San Luis Obispo.

Within the base's confines are 166 miles of streams, over 5,000 acres of wetlands, 9,000 acres of dune habitat, 41,150 acres of coast live oak woodland, and 60 acres of tanbark oak woodland. A number of rare, threatened, and endangered species are found on the base. Barka Slough, one of the few remaining cloughs in Central California, is located in the center of the installation; it represents one of the most important ecological resources of the area. VAFB is located in the transition zone of the northern and southern California coastal ecosystems, with many plant communities that exemplify some of the best quality habitats on the central and south coast.

In addition there are over 600 identified archaeological and historic sites on the base, and two urban/cantonment areas. The main cantonment is comprised mostly of industrial, administrative, and community-type facilities including housing for base personnel. The other cantonment is basically an industrial area. In all there are over 9.4 million square feet of buildings and approximately 279 miles of paved roadway on the base. (MRMP, 7.3; DEIS, 1-1)

C) Oil/Gas Reserves on VAFB

VAFB is situated on a proven oil and gas reserve, the western segment of what the MRMP designates as the Santa Maria Basin. There are ten established oil fields scattered throughout the Basin (North Santa Barbara County); they are the Guadalupe, Santa Maria Valley, Jesus Maris, Casmalia, Orcutt, Cat Canyon, Four Deer, Careaga Canyon, Los Alamos and Lompoc fields. Of these, the Jesus Maria and portions of the Lompoc and Casmalia fields are within base boundaries. (MRMP, Section 5.0)

D) Mineral Rights

The federal government holds title to mineral rights on only 15% of the base's acreage; 85% of the mineral rights, i.e. on 83,000 acres, are privately owned. Unocal, for instance, has title to mineral rights on approximately 41,000 acres. (MRMP, Section 4.0)

E) Past/Present Oil/Gas Activity on VAFB

Although oil/gas activity on VAFB dates back to 1904 it has actually been very limited in number of wells drilled and in amount of oil/gas produced. (See Table 5-1, MRMP)

Since 1979 there have been only four oil and gas operators who have drilled wells on VAFB, - Unocal, Conoco, Nomeco, Grace (DEIS, p.1-4). MRMP's Table 5-1 shows that as of the end of 1984 Unocal had 8 producing wells, Nomeco 2 producing wells and Conoco one (DEIS data, pp 1-4,9 don't quite tally with MRMP figures). In 1984 Grace drilled but abandoned its well (DEIS, p. 1-9).

The percent of VAFB acreage presently developed for oil/gas production is 0.2 - i.e. 260 acres out of 98,400 acres. (DEIS, Table 1-2, p. 1-8)

F) Anticipated Oil/Gas Activity: Genesis of the MRMP

The DEIS Scoping Memorandum indicated the possibility of some 800 wells being drilled on as many as 200 pads, based on proposals on file. VAFB's growing concern about how best to accommodate to large-scale oil/gas activity prompted

the base to develop a Mineral Resource Management Plan that would determine not only the actual extent of oil reserves on the base but the impacts of oil/gas extraction on base operations and on the environment. (MRMP, p. 4-5)

The MRMP states, "The adoption of a plan is crucial for the improvement of the VAFB planning process, as it relates to oil and gas development on the base, as well as leasing and development of federally owned oil and gas resources.... The MRMP should be incorporated into the development of the Base Comprehensive Master Plan, serving as the Mineral Resources Element of the Master Plan." (MRMP, p. 9-1)

G) Oil/Gas Resources on the Base

The MRMP made what is categorized as an initial investigation of the petroleum potential of the VAFB subsurface. The results are recorded on a map of the base, dividing the base into High-Potential, Moderate-Potential, Low-Potential and Very-Low-Potential areas (H, M, L, VL). Sub-areas were also identified for each of the four categories, "1" representing the highest potential in each case. A summary follows below. (MRMP, p. 5-10; Figure 5.5; also DEIS, Figure 1-2; Tables 1-1, 1-2 map in Scoping Memorandum)

High Potential Areas		13,000 acres	13%
H-1 Jesus Maria (Unocal)	6,500		
H-2 South Casmalia (Conoco)	2,500		
H-3 Southeast Casmalia (Nomeco)	1,500		
H-4 Lions Head Fault (Conoco)	2,500		
Moderate Potential Areas*		14,000 acres	14%
M-1 West Jesus Maria (Unocal)	10,000		
M-2 San Antonio Valley (Conoco,Nomeco)	4,000		
Low Potential Areas		52,400 acres	53%
L-1 Burton Mesa (Unocal)	24,000		
L-2 Southwest Casmalia	1,500		
L-3 Lompoc Terrace	16,000		
L-4 Sudden Ranch Coastal Strip	10,900		
Very Low Potential Areas		19,000 acres	20%
VL-1 Santa Ynez Mountains Uplift	13,000		
VL-2 Casmalia Hills Uplift (Unocal)	6,000		
TOTAL		98,400 acres	100%

H) Zones Suitable for Oil/Gas Development

In Section 3 the MRMP analyzes VAFB's mission characteristies, - mission direction, development pattern, hazards, constraints. In Section 6 ten separate environmental resource areas are analyzed, - existing conditions, regulatory setting, constraints, recommended standards. In Section 7.2 composite mission constraints are mapped for the entire base; and in Section 7.3 composite environmental constraints are mapped.

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* M-1 and M-2 designations on DEIS Figure 1-2 and MRMP Figure 5-5 must be transposed. According to cited maps, M-1 lies east of H-1; yet the description of M-1 in the MRMP (p. 5-23) belies that fact; it reads: "Area M-1, West Jesus Maria....It covers the area from the coastline inland to the Jesus Maria oil field....There is also a section of this area north of the Jesus Maria oil field which extends east to the Lompoc-Casmalia highway."

Based on the foregoing data the MRMP delineates three "suitability zones" for oil/gas development on VAFB: Zone A is the most suitable, Zone B the second most suitable, and Zone C is the least suitable (MRMP Figure 7-3). Zone A also encompasses the areas of high petroleum resource potential. (MRMP, p.7-12)

I) DEIS: Scope, Purpose

The DEIS is a programmatic, not a project specific environmental impact statement; it is for adoption of the proposed Mineral Resource Management Plan for Vandenburg Air Force Base. Site-specific assessments for individual applications may be needed to supplement the DEIS. (DEIS, S-1)

J) "A Most Likely Scenario" for Oil/Gas Development on VAFB. Early on in the programmatic DEIS, "a most likely feasible scenario for mineral development on VAFB" emerged, primarily for use in the cumulative impact analysis. This scenario zeroes in on oil/gas development in High Potential areas, with the possibility of some development in the neighboring M-1 area. In effect it features leases held primarily by Unocal, and secondarily by Conoco and Nomeco.

The assumed scenario envisions a gradual increase in the number of producing wells (on 104 pads) from five in 1988 to a total of 242 in the peak year, 2007, followed by a steady decline down to but 12 producing wells in the year 2027. Maximum production is estimated to reach 18,150 barrels per day, 2007, down to 300 bpd in the year 2027. (DEIS, pp. 2-17,18,19; Table 2-1)

K) DEIS Alternatives

- Proposed Action would implement the MRMP and exclude none of the base from development, but various development restrictions (standards and guidelines contained in the MRMP) would be applied.
- Alternative 1 would exclude areas of very high and high mission constraints; would allow development elsewhere under MRMP conditions.
- Alternative 2 would exclude areas of mapped high environmental constraints; remainder of base would be available for oil and gas activities under MRMP conditions.
- Alternative 3 would exclude areas with very high and high mission constraints and high environmental constraints (thus excluding 50% of total base acreage); remainder of base would be open for development under MRMP conditions.
- Alternative 4 would exclude all of the base from oil/gas development; existing exploration on base would also be curtailed; wells drilled would be abandoned, pads regraded; Air Force would have to compensate owners for fair market value of property rights taken.
- NO ACTION ALTERNATIVE would continue current development process: MRMP would not be implemented; existing review process established in 1979 would continue, - applicant would apply for a memorandum of agreement; authority to approval an MOA would be on a case-by-case basis, with base commander executing the final decision to approve the MOA. (DEIS, pp. 2-1,2,3,4)

L) Comparison of Alternatives: Environmental Consequences

- Proposed Action (implementation of MRMP) would reduce or eliminate potential significant impacts for air quality, for cultural, biological and water

resources, for land use and system safety; would have insignificant impacts on socioeconomic, transportation and geological resources; noise and visual impacts would remain same with or without the MRMP.

- Alternatives 1, 2, 3 would all exclude different portions of the base from oil/gas development; as a result would slightly reduce impacts for land use and cultural resources, but the potential for concentrating development activities would increase potential for and/or severity of impacts on geological and biological resources; would slightly reduce system safety impacts; environmental consequences re remaining resources would not substantially change.

- Alternative 4, by precluding all mineral development, would eliminate potential for impacts, would result in beneficial impacts on air quality and on water resources.

- No Action Alternative: MRMP would not be approved/implemented; without a set of approved guidelines, ensuring consistency in requirements placed on developers would be difficult, and cumulative effects of total mineral development would not be considered and managed to minimize impacts. Socioeconomics, transportation, noise and visual impacts would be similar to those identified for the proposed project (not significant). For all remaining resources, probability of impacts would be greater, impacts could even increase in severity.

- In summary, Alternative 4 would produce the fewest environmental impacts, while the No Action Alternative would result in the most severe. "Alternatives 1, 2, and 3 are not substantially different from the proposed action in terms of their effects on the environment....While oil and gas development on VAFB has the potential to produce significant environmental impacts, the proposed action, with implementation of the MRMP, would eliminate or reduce the severity of these impacts." (DEIS, pp. 2-12,13)

M) Other Assessment Issues Considered in the EIS

- Off-Base Impacts: "Because of various supporting facilities, oil and gas development would not be entirely contained within the base. Because areas of northern Santa Barbara County (North County) would be impacted indirectly and, potentially, directly...the MRMP also requires the applicant(s) to follow county regulations, ordinances, and policies in order to minimize any off-site impacts associated with a development proposal...." (DEIS, p. 2-13)

- Trucking versus Pipelines: "It is generally recognized that pipelines provide a safer means of transportation than trucking. Trucks are susceptible to incidents which may result in the release of the oil onto the roadway and surrounding area....From the standpoint of air quality, pipelines are preferred over trucking. From a cultural resource perspective, however, trucking of oil is preferred over the use of pipelines....If pipelines are used to move oil from VAFB, Santa Barbara County regulations and development standards must be applied. These include an updated emergency response plan...a revegetation or restoration plan....If the wells on VAFB produce enough natural gas to process, it would be transported by pipeline...." (DEIS, pp. 2-14,15)

- Consolidation and Colocation of Oil and Gas Processing Facilities: "Consolidation and colocation policies for the North County have not yet been adopted, but they are in the process of being formulated....The proposed

policies address both oil and gas processing....all development permits for oil and gas development on VAFB would include conditions to develop plans for transportation and processing which are consistent with Santa Barbara County policies." (DEIS, p. 2-16)

- Phasing: "Phasing, in the context of the proposed action on VAFB, is defined as the regulated exploration, development, and production of oil and gas resources at a consciously slower pace than existing development procedures might warrant....The principal objection to phasing is that the substitution of a planning process for the market process may alter the economic feasibility and limit competitive advantage....If implemented, phasing could mitigate or avoid cumulative impacts that could occur through unrestrained development." (DEIS, p. 2-16)

N) Affected Environment/Environmental Consequences, Oil/Gas Development, VAFB

In Section 3, the DEIS addresses in considerable detail the same ten facets of the environment singled out and analyzed in the MRMP: Geology, Water Resources, Air Quality, Biological Resources, Cultural Resources, Land Use, Socioeconomics, Transportation, Visual Resources, Noise. In addition, the DEIS addresses an eleventh facet, System Safety.

The methodology followed in Section 3 is the same for all eleven facets: 1) Description of the Resource; 2) Region of Influence; 3) Data Sources; 4) Existing Conditions.

The DEIS then proceeds in Section 4 to identify environmental consequences of oil/gas development, again facet by facet, following the same format for each facet: 1) Significance Criteria; 2) Environmental Impacts and Mitigations for the Proposed Action and for four Alternatives; 3) Unavoidable Adverse Impacts; 4) Cumulative Impacts.

No summary impact tables are provided in the DEIS: impacts are not categorized according to Class I, Class II, Class III and Class IV as is the case in most other environmental impact reports on energy projects.

O) Unavoidable Adverse Impacts

The DEIS sub-sections on unavoidable adverse impacts are generally quite short, varying in length from a one-liner (Socioeconomics: "No unavoidable impacts are expected") to no more than a half page. Six of the eleven facets show little or no significant unavoidable adverse impacts. The five that do are Water Resources, Air Quality, Biological Resources, Cultural Resources (of concern to some, but not all Native Americans"), and System Safety. (DEIS, 4.0)

P) Cumulative Impacts

The following excerpt applies to all eleven facets of the environment addressed in subsections on cumulative impacts:

"Cumulative environmental impacts are those resulting from the project in combination with other related projects and plans planned for the near and reasonably foreseeable future. These other projects and plans involve oil-related development, nonoil-related development (both Air Force and private), and local governmental plans and policies. Little information is available on future military development...(Emphasis added)

"The MRMP was developed in consideration of local plans, policies, and procedures. The proposed action would provide a mechanism for application and development review similar to that used by local agencies. This would

be a significant beneficial effect as it would ensure planned development." (DEIS 4.1-9,10)

Several of the cumulative impact subsections refer to "a most likely scenario" for oil/gas development on the base, and/or to "a feasible development scenario," e.g. "A feasible development scenario (as many as 297 wells) associated with the proposed action and alternatives...." (DEIS, 4.8-10), - or "The scenario assumes a todal buildout of wells throughout VAFB. Concentrations of well activity would occur where high-potential reserves are located. Buildout would also include pipelines and the use or expansion of an existing facility, or construction of a new facility...." (DEIS, 4.9-10)

The eleven subsections on cumulative impacts vary in length, commanding from a third of a page to two full pages. Cumulative impacts are considered especially significant for seven facets of the environment:

- Water Resources: "....Cumulative impacts on water availability and use can be mitigated by commitments from oil and gas developers to secure alternative water supplies instead of relying on overdrafted groundwater basins or depleted surface waters. ...regional planning is needed to assure that cumulative risks do not increase as the number of facilities increases or as facilities age...." (DEIS, 4.2-11)
- Air Quality: "Major projects, such as offshore oil and gas development, will result in the greatest cumulative impact due to the relatively large emission offsets required for these activities. Thus, oil and gas development on VAFB may be further limited....The extent of petroleum development that may be accommodated will be a function both of the mitigations applied to future projects and of the identification of additional offset sources or innovative methods of control." (DEIS, 4.3-24)
- Biological Resources: "Several listed endangered or threatened species could be affected....Oil development on the base has the potential to degrade wetlands and coastal dunes. There is a significant potential for oil spill impacts on Barka Slough and San Antonio Creek, and construction disturbance of coastal dunes...." (DEIS, 4.4-8)
- Cultural Resources: "...developments will not only cause direct impacts from construction-related activities, they will induce population immigration and a related expansion of residential, commercial, and infrastructural development, all of which may disturb or destroy cultural resources....The proposed action will not significantly add to direct cumulative impacts, with the exception of those impacts of concern to some Native Americans." (DEIS, 4.5-15)
- Socioeconomics: Direct, indirect, and induced employment in Santa Barbara County from cumulative oil and gas development is projected to peak in 1990, a 6.1% increase. This level of cumulative employment growth is anticipated to create the potential for significant impacts on housing, public services, and finance in Northern Santa Barbara County (most of the jobs would be created in North County).

  These projections have been confirmed by other oil/gas related DEIRs cited in the subsection. "These studies have suggested that the employment and expenditure levels of oil and gas development be monitored by local government officials....Each of the referenced environmental documents indicates that the significant socioeconomic impacts of cumulative growth could be mitigated if a monitoring program were implemented and used to identify

needed mitigations. In summary, when considered, when considered cumulatively, the employment growth associated with oil and gas development on VAFB could have significant impacts on North County housing, public services, and finances. The proposed action itself, however, would make only a minor contribution to that growth and could ease a projected reduction in employment associated with onshore oil and gas development in the Santa Maria Basin." (DEIS, 4.7-9,10)

Visual Resources: "The effects of oil and gas development on VAFB...could produce cumulative impacts. Industrialization of an area and the region surrounding VAFB, typically associated with open lands and agriculture, could modify the visual character and change the expectations of on- and off-base population. The potential for visual impacts on the open lands and coastal areas increase as oil development increases in the Santa Maria Basin and on the Central Coast...." (DEIS 4.9-10)

- Noise: "New sources of noise would be introduced to VAFB with the development of oil and gas facilities....Noise levels are expected to be greatest during the first phases of development....The proposed action and alternatives could have cumulative effects if oil well spacing and activities are close together....Concentration of well activity would occur where high-potential reserves are located and could result in cumulative effects.... The contribution to increased noise levels from total buildout of VAFB oil and gas development would be minor when compared to other activities on Vandenburg." (DEIS, 4.10-3, 10)

Q) DEIS Appendices

- Appendix A, MRMP (106 pp) is a digest of the original MRMP, which fills a volume the size of the DEIS itself. The introduction to Appendix A reads: "This appendix presents all of the guidelines in the Mineral Resource Management Plan that have been developed for the various natural or human resources. It identifies the purpose, goals, and objectives of the plan and outlines the implementation process." (A-1)

  The following four sections of the digest pretty much duplicate counterparts in the MRMP. Section 6 of Appendix A, however, is new; it is entitled "Recommended Guidelines, Standards, and Management Practices," and runs from page A-20 through A-81. These pages replace the seven-page Table 7-2 in the MRMP volume.

  Recommended guidelines, standards and management practices are given in detail for each of the eleven environments analyzed in the DEIS. They are frequently based on Santa Barbara County's Comprehensive Plan policies and Local Coastal Plan policies (e.g. Geology, p. A-20; Biological Resources, p. A-38). None of the MRMP's conclusions and recommendations are repeated in the digest.

- Appendix B, Regulatory Setting (43 pp) is also new. General Regulations are listed first, followed by a detailed listing of regulations for each of the eleven facets of the environment addressed in the DEIS.

III CONCLUSIONS, RECOMMENDATIONS

Foreword: The League's Regional Task Force, in meeting held July 23, 1987, reviewed Findings, and mulled over the implications of the introduction in DEIS' Sections 1 and 2 of "a most likely feasible scenario," as pinpointed in the following Figures and Tables:

Figure 1-2 Map, Potential Economic Oil Reserves
Table 1-1 Location of Potentially Economic Oil or Gas Reserves
Table 1-2 Percentage of VAFB with Potentially Economic Oil or Gas Reserves

Figure 2-1 Map, Alternative 1: Exclude Areas of Very High and High Mission Constraints
Figure 2-2 Map, Alternative 2: Exclude Areas of High Environmental Constraints
Figure 2-3 Map, Alternative 3: Exclude Areas of Very High and High Mission Constraints and Areas of High Environmental Constraints
Figure A-3 Map in Appendix A, Suitability Zones for Oil and Gas Development (based on Figures 2-1, 2-2, 2-3)
Table 2-1 Oil Production Projections for VAFB, 1988-2027

Many questions emerged, e.g.

Which comes first, the certification of the EIS or the approval of the proposed MRMP? Normally EIS certification precedes approval of a program, but in this case could certification possibly carry with it approval of the program being addressed?

More specifically, will certification automatically mean Air Force approval of "a most likely feasible scenario" as identified in Sections 1 and 2 of the DEIS? If so, would certification imply approval of Alternative 3? Then, if that is the case, will not certification be tantamount to approval of the MRMP (amended ?) as the Mineral Resource Element of the Base Comprehensive Master Plan? LWV-1

Conclusions: Based on Findings noted in Section II of this commentary, and on League familiarity with related EIS/Rs, the League's Regional Task Force concludes

THAT the DEIS for the Mineral Resource Management Plan is inadequate because, in effect, it misses the point; it fails to address the real issue, i.e. the Plan itself.

The MRMP is documented in detail in DEIS' companion volume. If approved, the Plan, essentially, restricts oil/gas development on VAFB to "potentially economic oil and gas reserves" lying outside areas of "very high and high mission constraints." The MRMP zones the base accordingly, with Zone A (the base's eastern bulge) pinpointed as the area most suitable for oil/gas development. LWV-2

The DEIS itself ignores Zone A, does not recognize that it exists. There is no mention in the Summary, or in Section 1. The DEIS format blocked out in Section 2 allows for no consideration of MRMP's limited target area: the Proposed Action excludes none of the base from development; Alternative #3 comes closest to what the Plan determines to be the geographic parameters of oil/gas development since it excludes areas with very high/high mission constraints as well as areas of high environmental constraints. However, Section 2 does refer to "a most likely scenario" that leaves no

doubt about its location on a known oil/gas reserve, but again Zone A is not referenced. Section 3, Affected Environment, the meat of the DEIS, only incidentally refers to the base's eastern bulge as the most likely area of oil/gas development. Section 4, Environmental Consequences, gets bogged down in analysis by alternatives, no one of which refers to Zone A, not even to that general geographic area as an entity in itself. LWV-2

The net effect, the League submits, is that for all its wealth of environmental data, - the extent and depth of coverage are impressive indeed, - the DEIS misses the point; it does not adequately address a Plan that calls for oil/gas development in a very constricted area of the base.

- THAT the FEIS should be area-specific, that Zone A not the base as a whole, should be the primary target. Of necessity the FEIS would proceed to address impacts of Zone A development(s) on the base as a whole, on the rest of North County, on Santa Barbara County as a whole, and on the tri-county region. LWV-3

- THAT Zone A deserves the EIS spotlight, as so graphically documented here and there throughout DEIS environmental data.

Zone A is geologically and economically part and parcel of North County's Santa Maria Basin oilfields which have been in operation since the turn of the century. As such it is an integral segment of an area that has been, is undergoing rapid industrialization, not only from on-shore oil/gas production but from a plethora of other industrial developments, e.g. Casmalia Resources, diotomite mining (Santa Maria Aggregate), Unocal's onshore processing facility for OCS production, other planned onshore support facilities for stepped up OCS production in the Santa Maria Basin. LWV-4

The League notes, and commends, what DEIS efforts there are to correlate VAFB oil/gas development with ongoing/future oil/gas development in contiguous North County. The North County data presented in the DEIS make valuable contributions to a growing North County data base, hopefully leading to a much needed North County Master Environmental Assessment.

- THAT a series of site-specific environmental assessments such as may be required on a case-by-case basis as applications come in, will not fill the void now existing in the present overly programmatic DEIS. LWV-5

- THAT the DEIS is inadequate as a programmatic document:

Subsections on "unavoidable adverse impacts" are too brief, too cursory to be of any practical use. Few mitigations are identified; the one most frequently resorted to calls for the implementation of the MRMP.

The League paid special attention to subsections on cumulative impacts, since their analysis was one of the areas pinpointed by the League in scoping input submitted to VAFB last September. Though these subsections are more extensive than those dealing with unavoidable adverse impacts, and though they do provide interesting and valuable data and conclusions, they too are overgeneralized, rarely if ever "area specific" in terms of Zone A. The League notes that DEIS data in these subsections do frequently go beyond base boundaries, into North County, also into tri-county territory. LWV-6

The League also notes that the DEIS concedes that consolidation of oil/gas activities in designated areas could result in an air quality hot spot, could accentuate already existing water resource problems, and could have both beneficial and adverse socioeconomic impacts.

That phasing is the sine qua non of oil/gas development permits. The League notes, and commends, implied VAFB commitment to a phasing policy (Table 2-1, LWV-7

Oil Production Projections for VAFB, 1988-2027; Figure 4.7-1, Santa Maria Basin Oil Production, including VAFB, 1940-2000). LWV-7

- THAT close collaboration of the base with other governmental agencies, particularly with the County of Santa Barbara, must also be a sine qua non of VAFB's permitting process. Again the League notes, and heartily endorses the base's commitment to such close collaboration. VAFB's recognition that oil/gas development on the base engenders issues of concern well beyond the base's boundaries is most gratifying to an interested and involved public. LWV-8

Recommendations: Based on the foregoing conclusions the League's Regional Task Force recommends

- THAT the FEIS reorient the DEIS' comprehensive environmental data toward the specific geographic area that the MRMP designates as the zone most suitable for oil/gas development on the base, i.e. Zone A; that the Proposed Action be so amended, and that the only alternative be the NO ACTION Alternative, with its adverse consequences fully delineated. LWV-9
- THAT the necessarily rewritten Summary also be revised to be more of a public information instrument that could be issued separately, to be widely disseminated. The public should not be expected to have to cope with two hefty volumes of complex data, nor should "interested persons" have to have PhDs or law degrees to interpret the data. LWV-10
- THAT the FEIS Summary include detailed "Summary Impact Tables" showing area-specific (Zone A) and cumulative impacts, also specific mitigations for each of those two categories, for four classes of impacts: Class I, Significant Environmental Impacts Which Cannot Be Mitigated to Insignificance; Class II, Significant Environmental Impacts Which Can Be Mitigated to Insignificance; Class III, Other Environmental Impacts Which Are Adverse But Not Significant; Class IV: Beneficial Environmental Impacts. LWV-11
- Appendix A, the so-called digest of the MRMP, should be brought to the attention of the reader early on, say in Section 1, even in the Summary, not left to accidental discovery, with emphasis on the Plan's new pages, A-20 - A-80, expanded Recommended Guidelines, Standards, and Management Practices, for each of eleven facets of the environment. LWV-12
- THAT public workshops and hearings be held throughout the tri-county area not just in Lompoc and Santa Maria. If such were held in Santa Barbara the Regional Task Force would be able to attend; also, of course, the County's decision makers are based in the city of Santa Barbara. LWV-13
- THAT VAFB build on its existing comprehensive environmental data on North County by encouraging oil companies with extensive mineral rights in high potential areas (e.g. Unocal, Conoco, Nomeco) to contribute financially and otherwise to the compilation of a definitive state-of-the-art Master Environmental Assessment for North County, with provisions, of course, for continuous updating. LWV-14

In closing, the League thanks VAFB again for inviting public input to the DEIS, - also for repeated assurances of the base's willingness and desire to be a good neighbor. Issues of oil/gas development onshore and offshore are many and can only be resolved through coordination of efforts by the many agencies involved.

Contact: Ruth Saadi, LWV Regional Task Force, - 805:569-1231

Ruth Saadi

RESPONSE TO COMMENTS FROM THE LEAGUE OF WOMEN VOTERS

LWV-1 A Record of Decision will be drafted after the FEIS is published. This record of decision will identify the alternative that is selected. The no action and no development alternatives do not involve adoption of the MRMP. A decision to accept any of the other alternatives would amount to a formal adoption of the MRMP (see the response to comment RMD-5).

LWV-2 The suitability zones referred to in section 7.0 are generalized zones that were presented to give a conceptual overview of the constraints and opportunities of development. The generalized boundaries of zones A to C are based on environmental and mission constraints, but zones A to C do not have any direct bearing on the guidelines presented in the MRMP or on the impact analysis in the DEIS. The generalized zones were drawn to indicate where development could most easily occur without conflicting much with mission or environmental concerns. The guidelines are based on individual resource constraints that are mapped, when possible. These mapped constraints define the different alternatives. The DEIS addresses the effects of implementing the MRMP under the conditions of the different alternatives.

LWV-3 One of the purposes of the MRMP is to (1) identify areas that could constrain development for various environmental reasons and (2) provide adequate guidelines for development regardless of the alternative chosen. It is, therefore, necessary to address the entire base and to state the effects of implementation on each resource area. The effects on VAFB, the North County area, Santa Barbara County, and the Tri-County region, if applicable, should be considered.

LWV-4 This is done to the extent possible, given that this is a programmatic EIS.

LWV-5 The Air Force has and will continue to follow the NEPA process in accordance with the Council on Environmental Quality Regulations.

LWV-6 Unavoidable adverse impacts are discussed to the extent possible, given the programmatic nature of this EIS. Detailed mitigations that would reduce the impacts of oil and gas development on certain resources are presented in the MRMP guidelines. Mitigations that would reduce the impacts of different alternatives are essentially the same as those presented on a resource-specific basis.

Zone A is not and need not be addressed as a unit in the DEIS, as expressed in response LWV-2.

LWV-7 Comment noted.

LWV-8 Comment noted.

LWV-9 Comment noted.

LWV-10 Comment noted.

LWV-11 Comment noted.

LWV-12 Comment noted. Reference has been made to Appendix A in the DEIS summary (p. S-1), and in Section 2.0 (p. 2-1).

LWV-13 Comment noted. Hearings were advertised in the Santa Barbara News-Press, as well as the Lompoc Record and the Santa Maria Times. Hearings were held in cities such as Santa Maria and Lompoc because of their proximity to VAFB and their potential for being affected by oil and gas development.

LWV-14 Comment noted.

423 North "G" St.
Lompoc, Calif.
93436
July 27,1987

Colonel William R. Newell
1 STRAD?ETD
Vandenberg AFB, CA 93437-5000

Response To:

Draft EIS Mineral Resources M.P.

Dear Sir:

My analysis of the Draft Document leads me to strongly support the NO-ACTION ALTERNATIVE. Should this not prevail, I would then support the PROPOSED ACTION. ALTERNATIVES 2,3&4 are not acceptable.

I strongly object to the designation of areas according to: POTENTIAL FOR DEVELOPMENT and SUITABILITY FOR DEVELOPMENT. I feel that such action is prejudicial and that such determinations are best left to the developers involved, and analysis on a case by case basis. LS-1

I am further concerned that the importance given to the UNARMORED THREESPINE STICKLEBACK population in Honda Creek cannot be justified. This population was introduced by transplantation apparently without benefit of an Environmental Impact Statement and certainly without notification to adjoining property owners. This action will have a significant adverse impact on adjacent properties. LS-2

Further the Land Use and Maintenance constraints which this population places on this area of VAFB Property will lead to further deterioration of the natural grasslands. Lack of creek maintenance will also lead to serious Soil Erosion.

Restriction of Cattle Grazing, for example, allows the buildup of excessive undergrowth which creates a "damming effect" on the creek resulting in erosion when it washes around the obstruction. LS-3

Further the restriction of Cattle Grazing allows the takeover of natural grasslands by Non-native brush species and also serves as a generator of many detrimental weed species in the area. The prevailing winds then carry them to the adjoining properties.

This extensive brush buildup also creates a serious FIRE HAZARD both to the base as well as adjoining properties.

JUL 1987

Sincerely,

LeRoy Scolari

LeRoy Scolari
Trustee
Scolari Family Trusts

C&R-174

RESPONSE TO COMMENTS FROM LEROY SCOLARI

LS-1 Comment noted.

LS-2 Addressing the effects of the unarmored threespine stickleback transplant to Honda Creek on adjacent properties or on VAFB land management practices is beyond the scope of the MRMP and DEIS because this action is not a part of future mineral development plans on the base. The presence of this species in Honda Creek will pose constraints on mineral development projects, if any are proposed within the drainage area of Honda Creek on VAFB.

LS-3 The MRMP and DEIS do not discuss the impacts of restricting cattle grazing on VAFB since no such restrictions are planned as part of mineral development. Even if mineral development were to occur on south Vandenberg, cattle grazing would probably not be restricted other than at the well pads (each pad could take up to 1.5 acres). These impacts would be addressed in site-specific studies for individual mineral development proposals.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, Ca. 94105
06 [illegible] 1987

Colonel William R. Newell, USAF
Chief, Development Division
Environmental Task Force
1 STRAD/ETD
Vandenberg AFB, California 93437-5000

Dear Colonel Newell:

EPA submitted a preliminary review of the Draft Environmental Impact Statement (DEIS) titled POTENTIAL EXPLORATION, DEVELOPMENT, AND PRODUCTION OF OIL AND GAS RESOURCES; VANDENBERG AIR FORCE BASE, CALIFORNIA to the USAF on July 27, 1987. This second letter superscedes our previous letter. It classifies the DEIS, and modifies and augments our former comments.

Section 309 of the Clean Air Act requires that EPA review National Environmental Policy Act documents. Our review is based on the Council on Environmental Quality (CEQ) Regulations (40 CFR Parts 1500-1508). EPA-1

We have classified this DEIS as Category EC-2, Environmental concerns - Insufficient Information (see attached "Summary of Rating Definitions and Follow-Up Action"). This DEIS is rated EC-2 because additional information is needed on water and air quality impacts and mitigation measures.

We appreciate the opportunity to review this DEIS. Please send four copies of the Final Environmental Impact Statement (FEIS) to this office at the same time it is officially filed with our Washington, D.C. office. If you have any questions, please contact Harriet Hill, Office of External Affairs, at (415) 974-8193 or FTS 454-8193.

Sincerely,

for Deanna M. Wieman, Director
Office of External Affairs

Enclosure (four pages)

cc: Santa Barbara County-Cities Council, G. Lorden
Santa Barbara County APCD, J. Ryerson

RECEIVED
ETF
98

Water Quality Comments

Surface Water

The FEIS should state that future projects will comply with limits for dissolved oxygen and temperature recommended in the Water Quality Control Plan for the Central Coastal Basin (Basin Plan). EPA-2

The DEIS states (page 4.2-5) that impacts to water availability and use could cause increases in temperatures and amounts of total dissolved solids in San Antonio Creek. The Basin Plan contains water quality objectives that protect the designated beneficial uses of waters in the basin. It lists recommended limits for total dissolved solids at 500 mg/l and recommends that temperature comply with the adopted State Policy Regarding the Control of Temperature in Coastal and Interstate Waters and Enclosed Bays and Estuaries of California." EPA-3

Groundwater

The FEIS should:

1. Describe the recharge characteristics of the San Antonio groundwater basin. For example, does recharge occur uniformly throughout the basin or is it concentrated in discrete areas? If the latter is true, what are the sizes and locations of these areas?

   Spills in or near recharge areas would pose the most danger to the groundwater basin. This is especially true for the San Antonio basin, since, unlike the Lompoc Plain basin, it apparently contains no protective confining layer. Recharge areas could be classified "highly constraining" in the Mineral Resources Management Plan to ensure that siting of wells or transport of oil or gas in these areas is very carefully monitored. EPA-4

2. Determine if overdraft of the Lompoc Plain basin could be exacerbated by project withdrawals to the extent that water would be induced to migrate from the upper to the lower aquifer. This could contaminate the lower aquifer, since the higher aquifer contains water of poorer quality (as described on page 3.2-11 of the DEIS). The FEIS should discuss the potential for this to occur and any necessary measures to prevent it. EPA-5

3. Discuss how water produced from oil field operations will be treated and disposed of. EPA-6

4. Refer to the Draft State of California Groundwater Protection Strategy in the discussion of State Statutes and Regulations. Since the final version of this document should be out before the end of 1987, it will pertain to Vandenberg Air Force Base (VAFB) projects in the near future. EPA-7

Section 404

1. The DEIS notes on page A-31 that U.S. Army Corps of Engineers should be contacted to determine the need for a Section 404 discharge permit for projects proposed in streams or wetlands on VAFB. If a permit is required, EPA will review the project for compliance with Federal Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR 230), promulaged pursuant to Section 404(b)(1) of the Clean Water Act. Our scoping letter to you (February 18, 1986) explains these regulations further, and discusses how EPA evaluates such projects. EPA-8

Air Quality Comments

We commend the U.S. Air Force for the thorough presentation of air quality impacts and mitigation measures in the DEIS. However, the FEIS should also:

1. Further discuss conformity with the Santa Barbara County Air Quality Attainment Plan (see p. 1-12 of the DEIS). A letter from the Santa Barbara County Air Pollution Control District to Vandenberg Air Force Base (March 31, 1986) states that projected emissions for the project are not accounted for by the Air Quality Plan. Therefore, the unavoidable adverse impacts listed on p. 4-3-23 of the DEIS may well not be consistent with the Plan. EPA-9

   The Air Pollution Control District and the Santa Barbara County-Cities Area Planning Council should be consulted to assist with this task. We have attached a checklist of State Implementation Plan Conformity Criteria to be addressed.

2. Outline a complete Mitigation Plan which specifies: EPA-10

   - all intended mitigation measures, and
   - mechanisms to implement and enforce these measures.

SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION*

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."

Conformity Procedures For Federal Activities

The main purpose of the SIP is to attain and maintain the National Ambient Air Quality Standards (NAAQS). In order to accomplish this requirement, the following criteria are to be used in determining conformity of plans, programs and projects with the SIP:

1. The facility or the activity complies with the procedural and substantive provisions (e.g., emission limitations and operating requirements) of the SIP for the review and permitting of new or expanding stationary sources.

2. The population projections used in the supporting data for the facility or activity are consistent with the population projections used in the SIP.

3. The major stationary source, mobile source, and area wide emissions growth rates that are provided in the supporting data for the facility or activity are consistent with the emissions growth rates used in the SIP.

4. The increased direct and indirect emissions resulting from the facility or activity do not conflict with the emissions reduction requirements of the SIP necessary to demonstrate reasonable further progress toward attainment of all NAAQS by required deadlines.

5. The increased direct and indirect emissions resulting from the facility or activity do not exceed any PSD increment or conflict with Class I area visibility protection.

6. The increased direct and indirect emissions resulting from the facility or activity do not contribute to the violation of any NAAQS.

7. The facility or activity is consistent with the transportation control measures that are provided for in the SIP.

8. The facility or activity complies with all other special provisions and requirements of the SIP.

It is the affirmative responsibilty of all Federal agencies to insure that their own plans, programs and projects meet these criteria. The most important concept is that new projects or modified facilities cannot generate new violations of the standards or exacerbate existing violations, or delay attainment.

For projects requiring EIS's or that may have significant environmental impacts, a technical analysis consistent with the nature of the pollutant examined will be required in order to determine final conformity with the SIP.

RESPONSE TO COMMENTS FROM THE ENVIRONMENTAL PROTECTION AGENCY

EPA-1 Comment noted. Please see the responses to comments EPA-2 through EPA-10.

EPA-2 Comment noted. Revisions in the FEIS have been incorporated to reflect the comment.

EPA-3 See response to comment EPA-2.

EPA-4 There are not sufficient available data to characterize the groundwater recharge characteristics of the San Antonio groundwater basin in detail. However, it is known that recharge occurs solely within the drainage boundaries of San Antonio Creek and that the main area of recharge is in the Solomon Hills. Consolidated tertiary rocks border the valley on the south side and limit the amount of groundwater contributed by lateral movement. The most important known recharge areas are therefore located outside the VAFB boundary. Defining recharge areas as highly constraining would therefore have no effect on development on base.

EPA-5 The shallow water body continues into the deep water body only at the mouths of side canyons along the southern portion of the Lompoc Plain, eastward from Lompoc Canyon (USGS 1959). Elsewhere, the shallow body is effectively isolated from the deep aquifer by overlapping lenses of relatively impermeable material. Degradation of water quality as a result of water migration from the upper to lower aquifers is therefore unlikely, unless the point of withdrawal is located at a point where there is continuity between the two aquifers. Given the location and limited extent of these areas, such an interchange is highly unlikely to be associated with water development serving oil and gas facilities at VAFB.

EPA-6 Section 5.2.2.2 of the MRMP discusses the treatment and disposal of produced water.

EPA-7 The MRMP errata for section 6.2.3.3 includes a new discussion of the state groundwater protection strategy.

EPA-8 The EIS errata for Appendix A, section 6.4.2.4 has been amended to reflect the EPA's role under the Clean Water Act in dredge and fill activities.

EPA-9 It is true that emissions from future oil development on VAFB have not been taken into consideration by the present AQAP. Due to the uncertainty of the ozone attainment status in the future for the North County, an AQAP update and its offset requirements are mere speculation. The MRMP has taken this into consideration by requiring a net air quality benefit from the proposed sources of oil

development on VAFB, in addition to reserving offsets, as stated in section 4.3.2.1 of the DEIS. The rationale for these requirements is given in section 6.5 of the DEIS and is referenced in section 4.3.2.1 of the FEIS (see the EIS errata for section 4.3, Air Quality).

EPA-10 A clearer picture of the mitigation requirements and implementation procedures has been included in section 6.5 of the FEIS and MRMP (see the air quality errata).

United States Department of the Interior

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

August 7, 1987

Colonel Ken Kolthoff
Director, Environmental Task Force
1 STRAD/ET
Vandenberg AFB, CA 93437-5000

Dear Colonel Kolthoff:

The Department of Interior has reviewed the draft environmental impact statement for the Mineral Resources Management Plan, Potential Exploration, Development, and Production of Oil and Gas Reserves, Vandenberg Air Force Base. The National Park Service, the Fish and Wildlife Service, and the Bureau of Land Management have offered the following comments:

Cultural Resources

The historic and archeological overview of the Vandenberg Air Force Base area is generally very well done, however, there are several omissions: OEPR-1

1. The EIS acknowledges that major cultural resources investigations were accomplished in connection with the MX Project on North Vandenberg, but does not indicate that the majority of work at the Base was conducted over many years in connection with the Space Shuttle effort.

2. The document does not distinguish between the former U.S. Coast Guard Rescue Station which has been determined to be eligible for nomination to the National Register of Historic Places, and the U.S. Coast Guard Loran Station (transferred to the U.S. Air Force), a separate and later complex of structures that may also be eligible for nomination to the Register. OEPR-2

3. The document also does not discuss historic wrecks and other coastal disasters that occurred in Vandenberg waters, or the potential for offshore cultural resources. OEPR-3

4. The presence of archeological sites on San Antonio Terrace is noted, however, the overview and alternatives do not mention or discuss the San Antonio Discontiguous National Register District. OEPR-4

5. The final EIS should include maps for the alternative prepared to the same scale as the maps depicting archeological surveys and known cultural resources to facilitate understanding of which and how many resources potentially may be impacted. The cultural resources section of each alternative should list by site number the potentially impacted resources. It should also include a general discussion of the sites and whether or not any of them have been determined to be eligible for nomination to the National Register. The cultural resources discussion for each alternative should also indicate what percentage of each impact area has been surveyed and the year in which each survey was accomplished. OEPR-5

6. The final EIS should also address the National Historic Preservation Act's Section 106 compliance procedures and provide a step-by-step mitigation plan for dealing with potential impacts to cultural resources that may be present in the selected alternative. OEPR-6

Fish and Wildlife Concerns

Figure 2-2, Map depicting areas of high environmental constraints, Page 2-7.

While this map provides a generalized view of areas to be excluded for high environmental constraints, it would not be useful in field determinations of sensitive sites. Are there plans to incorporate the locations of these resources onto 7.5 minute topographic maps which would be used by Base environmental personnel and oil and gas companies to avoid sensitive areas? If so, these maps should identify the sensitive resource(s) present and include appropriate setbacks, depending on the type of resource. These setbacks should be determined by Base environmental personnel in conjunction with the Service and the California Department of Fish and Game. OEPR-7

Section 4.2.2.1. Water Resources, Proposed Action, Page 4.2-4.

The statements that oil-related activities will not deplete surface or ground water supplies is very vague. Who will determine acceptable minimum flows for habitat preservation? What additional overdrafting of groundwater supplies will "strain" the aquifers? In-stream flow studies need to be implemented prior to Plan adoption to determine acceptable minimum flows, while all efforts should be made to reverse the overdraft situation, particularly in the San Antonio Creek basin. Additionally, any mitigation programs to offset impacts to the Base's water resources should be developed prior to implementation of the Plan and included in that document. OEPR-8

Biological Resource Constraints, Page A-11.

The Service has some disagreement with the moderately constraining rating given to seabird nest sites, waterfowl wintering areas, riparian woodlands OEPR-9

and oakwood woodlands. All four areas can support high concentrations of migratory birds. Therefore, any oil-related impacts to these habitats would result in serious losses of wildlife resources. Additionally, loss of individual birds due to oil-related activities could conceivably be a violation of the Federal Migratory Bird Treaty Act. Finally, wetland areas have been reduced to only a small fraction of their former extent in California. For these reasons, the Service believes that seabird nest sites, waterfowl wintering areas, riparian woodlands, and oak woodlands should be designated as posing high constraints to oil and gas development. OEPR-9

Water Resources, Specific Measures, Page A-27.

Maintenance of surface water flows during low-flow months may not be possible if wet season pumping continues to drop groundwater levels. Continued depletion of groundwaters could result in stream levels falling to levels which are unable to sustain aquatic life during the summer months even if no water diversions are occurring at that time. OEPR-10

Many of the specific mitigation measures in this section are designed to document losses of water resources, but do nothing to mitigate these losses. Measures to replace all use of groundwater should be investigated, such as use of treated and processed water, and implementation of Base-wide and local water conservation measures.

Water Resources, Water Quality, Page A-30.

The installation of block and check values should be discussed thoroughly in the Plan and included at all stream crossings and in and near wetland areas. OEPR-11

Section 6.4.2.4. Regulatory Setting, Page A-31.

Streambed Alteration Agreements of the California Department of Fish and Game should be included in this section. OEPR-12

Section 6.6.2.2. Wetlands, Page A-44.

Dry season construction raises the possibility of destroying nesting birds, eggs, and their nests, a violation of Federal Migratory Bird Treaty Act and a loss of wildlife resource values. The Service agrees that dry season construction is preferable, but encourages the development of some methods of reducing or eliminating the loss of breeding wildlife to construction activity. Additionally, our goal when reviewing potential projects in wetland areas is no net loss of in-kind habitat values. Therefore, we urge the Base to avoid impacts in wetlands such as diking, dredging, and filling, or failing this, to mitigate for such impacts by creating like habitats at a ratio of at least one acre replaced for every acre affected. OEPR-13

Section 6.6.2.5. Candidates for Federal Listing and State Listed Species. Page A-46.

The Service encourages the Base to include areas used by northern harriers, as well as black-shouldered kites, in exclusion areas. This species has shown serious declines throughout southern California. OEPR-14

Mineral Resources and Planning

The assessment of mineral potential and the mitigation in each of the alternatives is presented very clearly. The document also shows some innovative planning to allow for multiple-resource use and enjoyment. The contractor and Vandenberg are complimented on their efforts. OEPR-15

We appreciate the opportunity to comment on this document.

Sincerely,

Patricia Sanderson Port
Regional Environmental Officer

cc:
Regional Director, NPS
Regional Director, FWS
State Director, BLM

RESPONSE TO COMMENTS FROM THE OFFICE OF ENVIRONMENTAL PROJECT REVIEW

OEPR-1 Thank you for your comment. On page 3.5-7 of the DEIS, there is a reference to cultural resource investigations related to the construction of Space Shuttle facilities.

OEPR-2 Comment noted. The former U.S. Coast Guard Rescue Station, commonly called the Boathouse, is located just south of Point Arguello and has been determined eligible for nomination to the National Register of Historic Places. The U.S. Coast Guard Loran Station is located on Point Arguello and has not yet been considered for nomination to the National Register.

OEPR-3 The MRMP considers only onshore oil and gas development and was not intended to consider offshore development or offshore cultural resources.

OEPR-4 The application for the San Antonio Terrace Discontiguous National Register District was never completed and is not being worked on at this time. However, several individual sites occurring in the proposed district are considered eligible for nomination to the National Register.

OEPR-5 The maps presented in the DEIS were intended only to illustrate broad patterns, not to serve as a planning tool. The GIS from which these maps were derived should be consulted to obtain large-scale maps suitable for answering the questions raised in this comment. Additional information can be obtained from the Central Coast Information Center of the California Archaeological Site Survey at the University of California, Santa Barbara and from 1STRAD/ET.

Sites on VAFB that are on or are considered eligible for nomination to the National Register of Historic Places are presented in the MRMP errata, regarding section 6.5, Cultural Resources.

OEPR-6 Section 6.5.3.5 of the MRMP discusses Section 106 compliance procedures. Additional information can be found in *Section 106, Step-by-Step*, prepared by the Advisory Council on Historic Preservation.

It is premature to provide a step-by-step mitigation plan for dealing with potential impacts on cultural resources present from any alternative. There are probably many undiscovered cultural resources on VAFB; few sites have been evaluated in terms of National Register criteria, and precise locations for oil and gas development on VAFB are not known (and would probably change if they were known). Also, under any of the alternatives, oil and gas development will proceed over many years. Suitable mitigation plans

can be expected to change over time as our understanding of the historic and prehistoric occupations of the central coast improves.

OEPR-7 The constraint data are on 7.5-minute topographic maps available at VAFB and they are also contained in a computerized GIS database that VAFB staff will use. Individual species and habitat information is mapped according to existing data. Furthermore, additional site-specific data will be expanded when the 1986/1987 biological monitoring study is completed. The MRMP specifies that setbacks will be determined on a case-by-case basis and that the USFWS and CDFG will be consulted for all proposed mineral developments.

OEPR-8 Refer to the response to comment CCC-29 for clarification on the proposed requirements of the MRMP with regard to withdrawals from overdrafted groundwater basins. Further depletion of overdrafted groundwater basins will not be permitted to result from oil and gas development. Use of feasible options utilizing alternative water supplies for oil and gas development will be required. A finding that no net increase in groundwater withdrawals from overdrafted groundwater basins will also be required. It should be noted, however, that these requirements will not eliminate existing impacts to surface water and groundwater resources due to non-oil-related withdrawals.

In evaluating impacts to surface flows and biological resources resulting from proposed groundwater withdrawals, the U.S. Air Force will consult with other state and federal agencies. In-stream flow studies would be coordinated with the USFWS and the CDFG. These studies are only anticipated to address site- or stream-segment specific issues associated with a particular point of withdrawal that may affect stream flow at a given location.

OEPR-9 Seabird nest sites, waterfowl wintering areas, riparian woodlands, and oak woodlands were placed in the moderate constraint category because these resources did not meet all of the criteria set forth in the definition of the high-constraint category. In particular, these biological resources would likely recover from disturbance, and mineral development is unlikely to affect a substantial portion of the resources on VAFB. Furthermore, waterfowl wintering areas and most riparian woodlands are within wetlands which are in the high constraint category. Seabird nest sites are unlikely to be affected by mineral development since potential for economic reserves is low to very low near nesting sites. Impacts to oak woodlands could be avoided or mitigated, and thus, this habitat is only moderately constraining.

OEPR-10 See the responses to comments CCC-29 and OEPR-8. The FEIS and MRMP have been amended to reflect specific standards for mitigation of water development activities associated with oil and gas development.

OEPR-11 This comment has been noted. The erratas for the EIS and MRMP include a requirement to provide block or check valves at stream crossings and areas bordering wetlands.

OEPR-12 This comment has been noted and an appropriate change in the FEIS has been made referencing the streambed alteration requirements of the CDFG.

OEPR-13 The text has been changed to include protection of wildlife breeding in wetlands. The MRMP guidelines specify on page A-45 that dredging and filling in of wetlands be minimized and that restoration plans be approved by the U.S. Air Force, USFWS, and CDFG.

OEPR-14 Specific areas used by the black-shouldered kite and northern harrier were not mapped due to lack of data for VAFB. Potential nesting or roosting sites in riparian woodlands would probably be included in the wetland category and thus be protected. Grassland foraging areas, however, are not specifically protected in the MRMP. Specific field data would be necessary in order to designate exact locations to be protected.

OEPR-15 Thank you for your comment.

MINERAL RESOURCE MANAGEMENT PLAN (MRMP) ERRATA

ERRATA FOR THE MRMP FOR THE POTENTIAL EXPLORATION, DEVELOPMENT, AND PRODUCTION OF OIL AND GAS RESOURCES ON VANDENBERG AIR FORCE BASE

Section 1.0, Summary

Table 1-2, Environmental Standards and Guidelines; page 1-7, final line of page now reads "Haul all wastes to approved storage and disposal sites."

Table 1-2 Environmental Standards and Guidelines; page 1-9, first paragraph of second column now reads ". . . for offsets to demonstrate a net air quality benefit."

Section 5.0, Mineral Resources

Section 5.0; page 5-1, second paragraph, first line, the words "Comprehensive Plan" have been added between the words "Santa Barbara County" and "Land Use Element."

Figure 5-1 on page 5-2 has been revised. The words "Point Conception" no longer appear (see the attached figure).

Section 6.2, Water Resources

Section 6.2.4.1, Restrictive Mapped Constraints; page 6.2-21, second sentence of the third full paragraph from top of page, will now read "The County zoning ordinance (Section 35-213) and the land use element of the County comprehensive plan also regulates development within the 100-year floodplain."

Section 6.2.5.2.1, Water Availability and Use; page 6.2-25, first sentence of first bullet will now read "A water supply plan should be provided to the real property officer, to the Santa Barbara County Water Agency, to the Environmental Review Division of the Santa Barbara County Resource Management Department, and to the California Water Resources Control Board, and should outline the location of water withdrawals, the timing and amount of water withdrawals, the method of withdrawal, the distribution of withdrawn water, the place of use of such waters, and the disposition of such waters after use."

Section 6.2.5.2.1, Water Availability and Use; page 6.2-25, fifth bullet beginning "A water supply plan . . ." add the following text to the conclusion of the paragraph: "Prior to the issuance of a Memorandum of Understanding, the Air Force will make a finding that the water supply plan has incorporated the use of alternative nonpotable water sources to the maximum feasible extent. In the case of proposed withdrawals from groundwater basins which are overdrafted or are projected to be overdrafted, it will also require a finding that there is no net increase in withdrawal of groundwater resources resulting from the proposed water supply plan for the proposed oil and gas development activity."

Section 6.2.5.2.2, Water Quality; page 6.2-26, seventh complete bullet, second sentence will be replaced with "Oil developers should present the plan to base personnel and will be responsible for coordinating their response activities with those of the Environmental Health Services Division of the Santa Barbara County

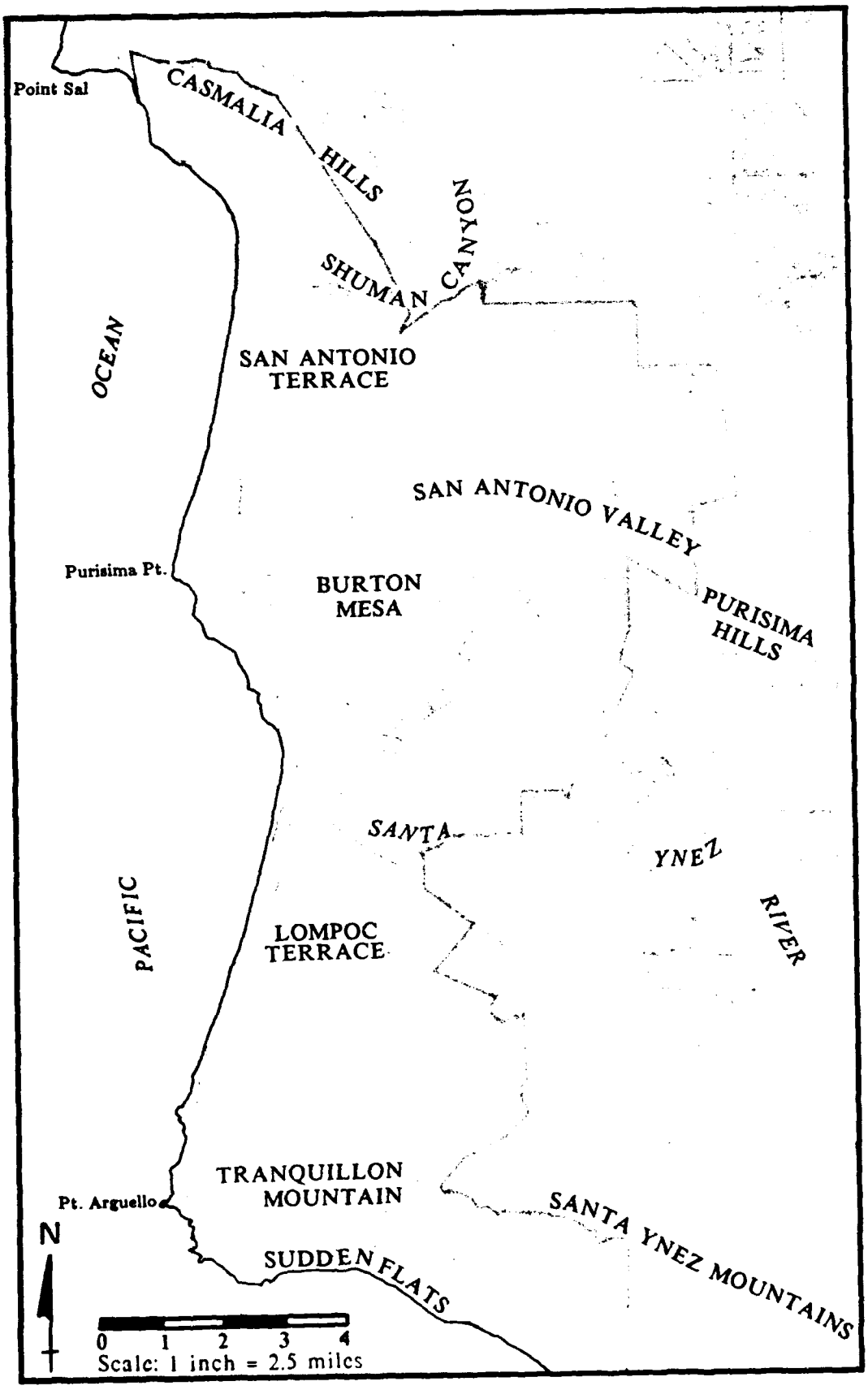


Figure 5-1

PHYSIOGRAPHIC FEATURES

MRMP-2

Health Care Services Department. The purpose of presenting these plans to VAFB personnel is to acquaint them with oil company practices for inspecting, reporting, containing, and cleaning up any spills."

Section 6.2.5.2.2, Water Quality; page 6.2-27, second complete bullet from the top of the page will read as follows:

> "Each well pad will provide sufficient oil spill containment facilities on site. Oil spill clean-up equipment will be reserved for oil spill response operations and will also be maintained at the well pad site or in an alternative centralized location on VAFB approved by the Air Force."

Section 6.2.5.2.2, Water Quality; page 6.2-28, fourth bullet from the top of page, first sentence "Santa Barbara County" is replaced with "Santa Barbara County, Environmental Health Services Division, Health Care Services Department".

Section 6.2.5.2.3, Flood Hazards; page 6.2-29, second bullet will now read as follows:

> "o Pipeline crossing and road fills or crossings should be located to minimize impacts on existing natural drainage ways. Pipeline crossings should be made in areas of low scour potential and buried below the scour depth for a 100-year flood event."

Section 6.2.5.2.3, Flood Hazards; page 6.2-30, add second bullet as follows:

> "o Stream channel alterations and drainage improvements which affect upstream or downstream areas should be coordinated with plans and activities of the Santa Barbara County Flood Control District."

<u>Section 6.3. Air Quality</u>

Section 6.3.2.2; page 6.3-4, fourth paragraph, the fifth sentence has been changed as follows:

"A nonattainment designation means that a federal primary standard has been exceeded more than three discontinuous times in three years in a given area."

Section 6.3.2.2; page 6.3-6, second paragraph, the first sentence has been changed as follows:

"A summary of the maximum pollutant concentrations measured in northern Santa Barbara and southern San Luis Obispo counties from 1981 to 1986 (1986 incomplete) are given in Table 6.3-3."

Section 6.3.2.2; page 6.3-6, second paragraph, the following sentence has been inserted after the second sentence:

"The southern border of San Luis Obispo County is approximately 12 miles from the area of high potential oil development on VAFB."

Section 6.3.2.2; page 6.3-6, second paragraph, the third to the last sentence in this paragraph, the Union Lompoc site in this sentence has been renamed as the Union Lompoc HS&P site.

Section 6.3.2.2; page 6.3-6, second paragraph, the last sentence has been changed as follows:

"Although the transport of ozone and ozone precursors (NO_x and RHC) from the Los Angeles Basin into Santa Barbara County can play a role in North County ozone events, the trend towards higher ozone impacts is also influenced by increased motor vehicle emissions and sources not regulated by local agencies, such as internal combustion (I.C.) engines and OCS development."

Section 6.3.2.2; page 6.3-8, the TSP nonattainment area in Figure 6.3-2 has been corrected to only include the 15-mile radius portion of Santa Barbara County.

Page 6.3-9, Table 6.3-3, the Lompoc, Union Station monitor has been deleted. The 1985 ozone data associated with this station in the table was actually recorded at the Lompoc, Union HS&P Station and has been included in the 1985 ozone data for that station. Data from the Nipomo monitoring station in San Luis Obispo County has also been included in this table. See the attached table.

Page 6.3-10, Figure 6.3-3 has been changed to include the Nipomo monitoring station in San Luis Obispo County.

Page 6.3-11, Table 3.3-4, the Union Sugar, Union Asphalt, and Union Battles Gas Plant have been listed separately instead of under one heading, since they are owned independently.

Section 6.3.3.2; page 6.3-15, paragraph two, last sentence has been changed as follows:

"A pollutant is considered in nonattainment if its federal primary standard has been exceeded in a geographic area more than three discontinuous times in three years."

Section 6.3.4.2; page 6.3-19, the following paragraph has been added after the third paragraph:

"The requirements of the Coastal Act, Public Resource Code sections 30105.5, 30250(a), 30253(3), 30260, and 30262 include assessing the cumulative effects of a proposed project with the effects of past, present, and probable future projects. Proposed projects must be mitigated to the maximum extent feasible, and will not be located where significant adverse effects will occur, either individually, or cumulatively on coastal resources. New development shall be consistent with the requirements of the local APCD or the CARB."

Section 6.3.4.3; page 6.3-20, the second paragraph has been changed as follows:

"The Santa Barbara County APCD PSD review for attainment pollutants generally includes the federal PSD requirements mentioned above, but the following criteria for triggering requirements are somewhat different:"

Table 6.3-3

MAXIMUM POLLUTANT CONCENTRATIONS MONITORED IN NORTHERN SANTA BARBARA COUNTY

(1981 - 1985)

Pollutant/ Monitoring Station	Averaging Time	Unit of Measure	MAXIMUM CONCENTRATION BY YEAR 1981	1982	1983	1984	1985	1986
Ozone	1-hour	pphm						
Lompoc, G Street			7	10	--	--	--	--
Lompoc, H Street			--	--	9	9	11	--
Lompoc, Union HS&P Station**			--	--	--	--	*12.7	*14.1
~~Lompoc, Union Station~~							~~*12.7~~	
Santa Maria, McClelland Street			10	10	8	9	9	--
Santa Ynez Airport			11	11	12	10	*15	--
VAFB, Herado Road			--	10	9	11	11	--
VAFB, Watt Road			--	--	11	11	12	--
Nipomo			10	10	11	11	11	--
Carbon Monoxide	1-hour	ppm						
Lompoc, H Street			--	--	6	10	7	--
VAFB, Herado Road			--	2	3	3	3	--
VAFB, Watt Road			--	--	1	1	1	--
Hydrogen Sulfide	1-hour	pphm						
Santa Maria, Glacier Lane			--	--	--	--	6	--
Nitrogen Dioxide	1-hour	pphm						
Lompoc, H Street			--	--	5	5	6	--
Santa Maria, Glacier Lane			4	5	4	4	5	--
VAFB, Herado Road			--	4	4	5	8	--
VAFB, Watt Road			--	--	11	8	9	--
Nipomo			5	4	5	5	7	--
Sulfur Dioxide	1-hour	pphm						
Lompoc, G Street			--	2	--	--	--	--
Lompoc, H Street			--	--	1	1	2	--
Lompoc, Jalama Road			4	2	2	4	5	--
Santa Maria, Briarwood Drive			9	4	4	6	7	--
Santa Maria, Glacier Lane			6	12	5	8	3	--
Santa Maria, McClelland Street			2	6	8	4	8	--
VAFB, Herado Road			--	1	2	1	1	--
VAFB, Watt Road			--	--	2	1	2	--
Nipomo			17	27	8	9	13	--
Total Suspended Particulates	24-hour	ug/m^3						
Lompoc, H Street			--	--	101	135	192	--
Lompoc, Jalama Road			106	96	85	128	147	--
Santa Maria, Briarwood Drive			*518	*263	*536	*345	*297	--
Santa Maria Library			*416	260	190	*266	204	--
VAFB, Herado Road			--	83	72	146	153	--
VAFB, Watt Road			--	--	116	99	125	--
Nipomo			135	90	85	132	121	--

Source: Santa Barbara County APCD 1985 Annual Report. PM_{10} data not available to date.

** This station also recorded federal ozone standard violations of 13.6 pphm on February 26, 1986 and 12.5 pphm on March 23, 1986.

* Exceeds the federal standard.

Section 6.3.4.3; page 6.3-20, the following bullets have been included after the second full bullet:

"o An air quality modeling incremental analysis and an analysis of the impairment to visibility, soils, and vegetation is required of any source that emits in its entirety more than 20 pounds per hour of any attainment pollutant.

o No source shall cause the violation of an ambient air quality standard or lead to the violation of any air quality increment."

Page 6.3-21, Table 6.3-8, the 3-hour SO_2 air quality standard has been corrected to read 1,300 $\mu g/m^3$. See the attached table.

Section 6.3.4.3; page 6.3-22, the following two paragraphs have been inserted after the last bullet:

"The APCD is currently revising Rule 202, which exempts internal combustion (IC) engines from the Authority to Construct or Permit to Operate requirements. This rule change will require existing IC engines of an undetermined size to be permitted. Future proposed IC engines, based on a size threshold, may eventually be required to conform to APCD NSR/PSD Rule 205.C.

Communications with the Santa Barbara County APCD have determined that oil development emission sources on VAFB may be regulated by combining peak-hour production emissions from proposed and existing stationary sources on each oil lease, minus emissions from IC engines. Once a regulatory requirement is triggered (such as BACT), it will apply to all existing and future emission sources on that lease, including IC engines."

Section 6.3.4.3; page 6.3-22, the second to the last paragraph, sentence five has been replaced with the following text:

"Interpollutant tradeoffs, such as NO_x for RHC, are allowed by the Santa Barbara County APCD on a case-by-case basis to assure a net air quality benefit. However, the Santa Barbara County APCD encourages intrapollutant tradeoffs. A minimum offset ratio of 1.2:1 is required for interpollutant tradeoffs."

Section 6.3.6.1; page 6.3-26, paragraph five has been changed as follows:

"Offsets must be provided for NO_x, SO_2, RHC, TSP, and PM_{10} in excess of project emissions to satisfy regulatory requirements and to ensure a net air quality benefit. Consistent with Santa Barbara County APCD rule 205.C, offsets will be provided at a minimum ratio of 1.2:1 for intrapollutant tradeoffs (e.g., NOx for NOx), and the ratios will increase with distance from the proposed activity. The APCD may also allow interpollutant tradeoffs (e.g., NO_x for RHC), but only on a case-by-case basis to assure a net air quality benefit. A minimum offset ratio of 1.2:1 is required for interpollutant tradeoffs. Since an accurate AQAP update is not available for the northern areas of Santa Barbara County, the required offset ratios for demonstrating a net air quality benefit cannot be definitively assessed for any type of pollutant tradeoff. Emissions from less stringently regulated sources in the air

Table 6.3-8

PSD AIR QUALITY INCREMENTS
(SBCAPCD RULE 205.C)

Pollutant: *Monitoring Interval*	MAXIMUM ALLOWABLE INCREASE *(micrograms/cu meter)* *Class I*	*Class II*	*Baseline Date*	*Air Quality Standard*
As established in the Clean Air Act Section 163(b)				
Particulate Matter:				
Annual Geometric Mean	5	19	8/7/78	75
24-hour Maximum	10	37		260
Sulfur Dioxide:				
Annual Arithmetic Mean	2	20	8/7/78	80
24-hour Maximum	5	91		365
3-hour Maximum	25	512		1,300
Carbon Monoxide:				
8-hour Maximum	200	2,500	1/1/84	10,000
1-hour Maximum	800	10,000		40,000
Nitrogen Dioxide:				
Annual Arithmetic Mean	2	25 - 100	1/1/84	100
1-hour Maximum	10	100 - 470		470
Reactive Organic Compounds:				
3-hour Maximum	3	40 - 160	1/1/84	160
Particulate Matter 10:				
24-hour Maximum	2	12 - 50	1/1/84	50

basin, such as motor vehicles and OCS oil development, for which offset emissions are not required, may result in a requirement for higher offset ratios for strictly regulated future onshore sources. Thus, VAFB must adopt a policy requiring that offset sources be legally encumbered for each project and held in reserve in the event that offset ratios increase due to future AQAP update analyses."

Section 6.3.6.1; page 6.3-27, the first sentence of the third paragraph has been changed as follows:

"Due to the uncertainty of determining adequate offset ratios for interpollutant tradeoffs without a representative AQAP update, mineral rights holders may not use inter-pollutant tradeoffs unless a net air quality benefit is demonstrated and accepted by the APCD."

Section 6.3.6.1; page 6.3-27, the second sentence in paragraph four has been changed to the following:

"To significantly limit NO_x and RHC emissions from oil development on VAFB, it is recommended that all wells incorporate a baseline design that includes a drill rig with low NO_x-emitting engines, pipeline transportation of oil and gas, electrification of crude oil pumps, vapor-recovery controls on crude storage tanks and tank-truck loading facilities, and low-NO_x burners on enhanced oil recovery steam boilers."

Section 6.3.6.1; page 6.3-27, the following sentence has been inserted after the second sentence of paragraph four:

"This baseline design could also minimize potential regulatory requirements for the developer, such as emission offsets."

Section 6.3.6.2.1; page 6.3-28, second paragraph, the last sentence has been changed to the following:

"The proposed project emission scenarios must reflect the incorporation of BACT into project design, in accordance with APCD rule 205.C, and the baseline well design and mitigation measures described in the previous section."

Section 6.3.6.2.1; page 6.3-28, the first sentence of the last paragraph has been changed to:

"Photochemical modeling for determining ozone impacts will be required if precursor emissions from the project can reasonably be expected to result in exceedances of the ozone standards or exacerbation of existing ozone standard violations within or outside of Santa Barbara County, including San Luis Obispo County."

Section 6.3.6.2.1; page 6.3-30, the paragraph before the last bullet has been changed to:

"For standard violations resulting from drilling and operational emissions, potential mitigations in addition to the baseline well design outlined in section 6.3.6.1 may include:"

Page 6.3-31, the following two bullets have been inserted before section 6.3.6.2.2:

"o Initiate an inspection and maintenance program to control fugitive hydrocarbons.

o Use an electronic flare ignition system to reduce inert pollutants."

Section 6.3.6.2.2; page 6.3-31, in the first sentence, "CO," has been deleted.

Section 6.3.6.2.4; page 6.3-33, the first sentence of the first paragraph has been changed to the following:

"Odor, fugitive dust, and noise resulting from emissions associated with construction and operation are most likely to cause nuisance complaints."

Section 6.3.6.2.4; page 6.3-33, the last sentence of the first paragraph has been changed to the following:

"The primary contaminant of concern is H_2S, which has an olfactory threshold of approximately 0.47 ppb or 0.65 ug/m^3 (Leonardos, et al., 1969)."

Section 6.3.6.2.4; page 6.3-33, the third sentence of the second paragraph has been changed to the following:

"Watering the soil or applying organic mulches or soil stabilizers during construction can eliminate most fugitive dust (TSP and PM_{10})."

Section 6.3.6.2.5; page 6.3-33, the third sentence in the fourth complete paragraph has been deleted.

Section 6.3.6.2.5; page 6.3-33, the second sentence of the last paragraph has been changed as follows:

"Mineral rights holders may satisfy the net air quality benefit requirement by mitigating proposed development projects to the extent feasible and providing offsets as outlined in section 6.3.6.2.2."

Section 6.4, Biological Resources

Section 6.4.5.1, General Measures; page 6.4-38, the second complete bullet (both paragraphs) has been replaced with the following:

"The applicant shall generically define well abandonment in terms of production level (volume/time and percent of operating time) or minimum period of nonproduction in their first application to VAFB. For each proposed pad site, the applicant shall provide a preliminary estimate of calendar time from initial drilling to abandonment. These estimates will be updated as new reservoir information is obtained.

Verification: The developer shall provide the Air Force with estimated times for abandonment of all wells within six months after production has begun and update these estimates every two to five years as new information becomes available. A final estimated date shall be given to the Air Force six months prior to abandonment. A copy of the final abandonment letter and well site survey issued by the state Division of Oil and Gas and BLM (if federally owned mineral rights) shall be provided once abandonment has been completed."

Section 6.4.5.1; page 6.4-38, third complete bullet, replace *Verification* with the following:

"*Verification*: The applicant shall prepare preliminary written procedures for facility abandonment and submit them to the Air Force for approval six months prior to initiation of construction. A final site-specific set of procedures shall be submitted six months prior to abandonment. The Air Force will review the procedures and approve them or request further information within 30 days of their receipt."

Page 6.4-39, second bullet, add at the end of the first paragraph: "At a minimum, total areas of specific plant communities and estimated numbers of important species (e.g., rare, threatened, or endangered) that could be affected by cumulative development shall be determined."

Section 6.4.5.2.2, Wetlands Guidelines; page 6.4-43, replace fourth bullet with the following:

"Perform all construction through or adjacent to wetlands during the dry season unless important wildlife breeding areas would be affected. Fall or early winter may be the environmentally preferred construction period in this case. Short duration (less than about one week) construction projects may be performed during dry weather periods in winter on a case-by-case basis with Air Force approval."

Section 6.4.5.2.14, Revegetation Guidelines; page 6.4-48, add the following to the second complete bullet:

". . . unless important wildlife breeding areas would be affected. Fall or early winter may be the environmentally preferred construction period in this case. Short duration (less than about one week) construction projects may be performed during dry weather periods in winter on a case-by-case basis with Air Force approval (refer to Wetlands section)."

<u>Section 6.5. Cultural Resources</u>

Section 6.5.2; page 6.5-7, insert the following after the last bullet:

"Only one cultural resource in VAFB is listed in the National Register of Historic Places. This is Space Launch Complex Ten (SLC-10).

Fifty cultural resources have been determined eligible for nomination to the National Register of Historic Places. These are the U.S. Coast Guard Rescue Station near Point Arguello, SBa-212, SBa-513, SBa-534, SBa-539, SBa-551, SBa-603, SBa-654, SBa-662, SBa-670, SBa-678, SBa-680, SBa-682, SBa-687, SBa-689, SBa-712, SBa-785-H (Olivera Adobe), SBa-913, SBa-914, SBa-931, SBa-932, SBa-939, SBa-978, SBa-1007, SBa-1008, SBa-1019, SBa-1020, SBa-1060, SBa-1109, SBa-1111, SBa-1117, SBa-1128, SBa-1129, SBa-1145, SBa-1542, SBa-1544, SBa-1547, SBa-1743, SBa-1762, SBa-1853, SBa-1860, SBa-1888, SBa-1891, SBa-1896, SBa-1917, SBa-1991, SBa-1992, SBa-1993, SBa-1994, and SBa-1996."

Page 6.5-22, Figure 6.5-3 is replaced with the attached.

Page 6.5-23, Figure 6.5-4 is replaced with the attached.

Page 6.5-24, Figure 6.5-5 is replaced with the attached.

Page 6.5-25, Figure 6.5-6 is replaced with the attached.

Insert the following on page 6.5-31 of MRMP at the end of section 6.5.5.1.1:

"The applicant may wish to initiate avoidance measures prior to any subsurface boundary definition efforts. This is permissible, but it is impossible to establish a predetermined distance at which a resource is safely avoided. The margin of safety would depend on the nature of the site, the level of surface visibility, the probability of buried cultural deposits, and the quality of survey in the surrounding area. If the applicant proposes to avoid a site for which boundaries have not been defined, ISTRAD/ET will determine on a case-by-case basis whether boundary definition will be necessary."

Insert the following on page 6.5-52, at the end of section 6.5:

6.5.6 Paleontological Resources

"Paleontological resources on VAFB include the remains of vertebrate and invertebrate animals. Any rock material that yields fossils has the potential of yielding fossils that are unique or significant to science. However, invertebrate fossils found in marine sediments are often widespread, in predictable locations, abundant, and well preserved. Vertebrate fossils are much rarer and are often poorly preserved. Therefore, vertebrate fossils are generally considered more likely to be a significant resource than invertebrate fossils, and geological formations having the potential to contain vertebrate fossils are considered the most sensitive.

Two localities on or near VAFB are known to contain significant paleontological remains. At Point Sal State Park at the northern edge of VAFB, fossil remains of ground sloths, mammoths, and possibly horses and camels have been found in Quaternary deposits dating back 45,000 years. On Sudden Ranch, about three kilometers north of Jalama Beach near the southern edge of VAFB, mammoth and horse remains have been found in Quaternary deposits.

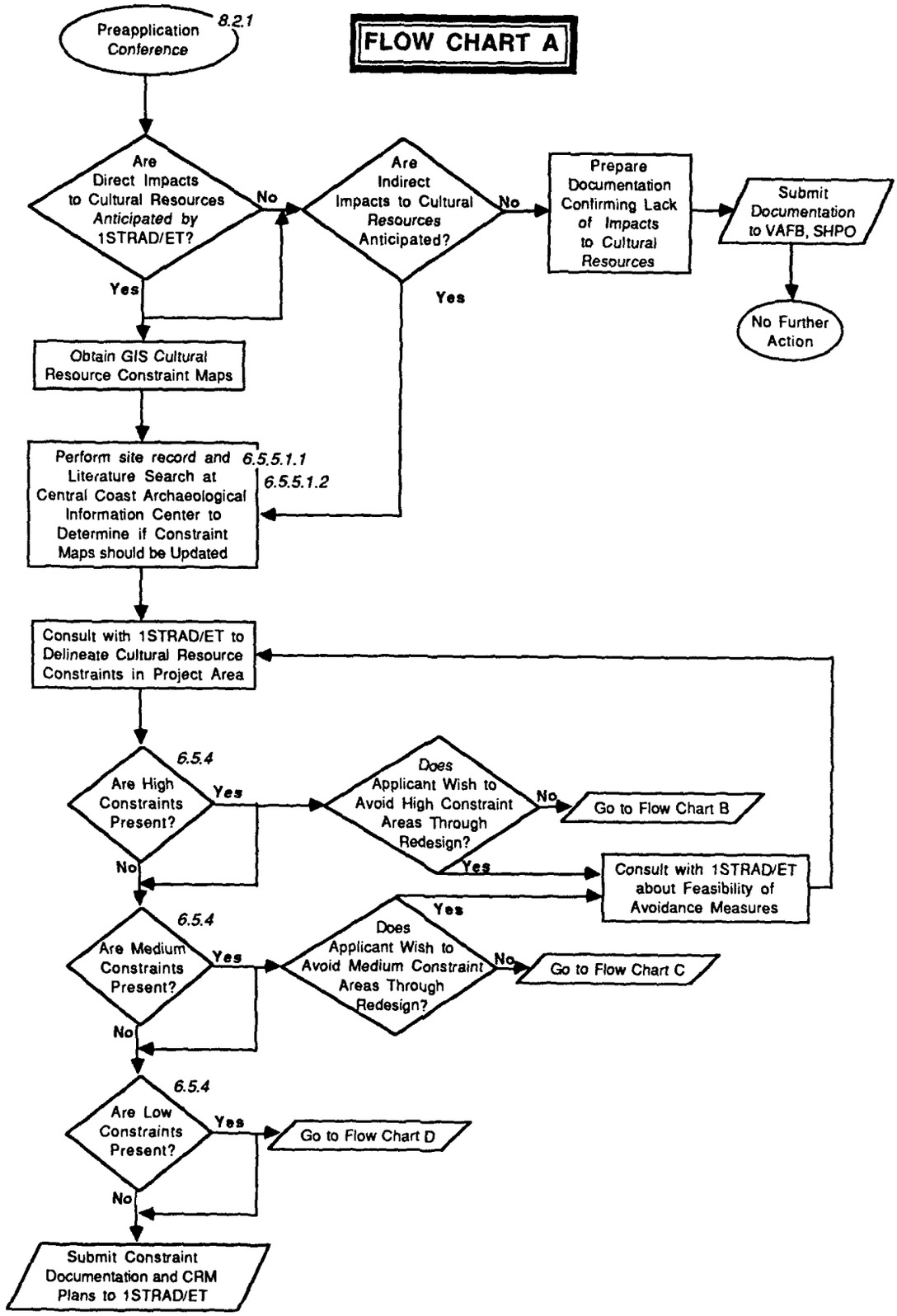


Figure 6.5-3

INITIAL COMPLIANCE ACTIVITIES

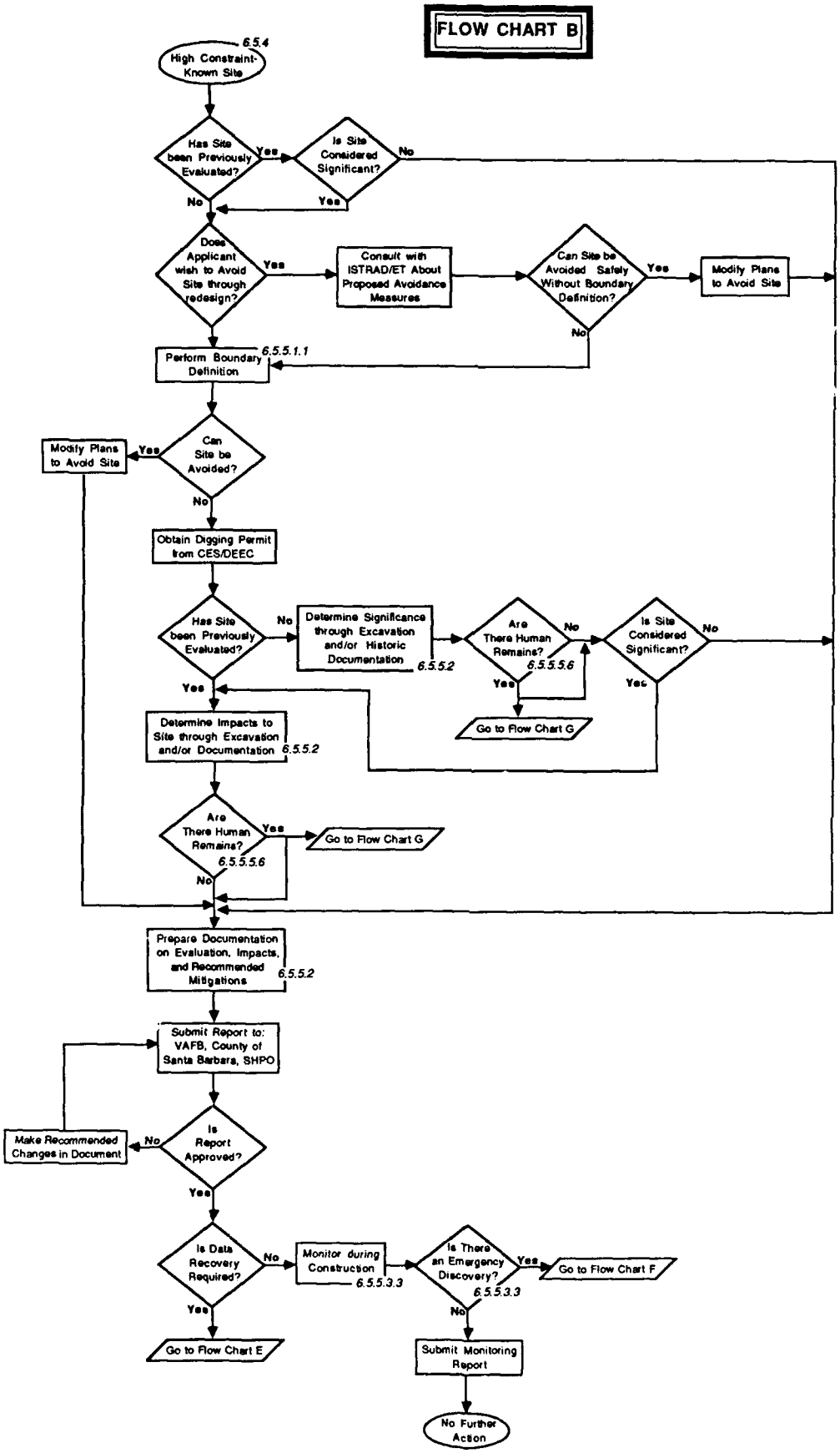


Figure 6.5-4

COMPLIANCE ACTIVITIES IN MEDIUM CONSTRAINT AREAS

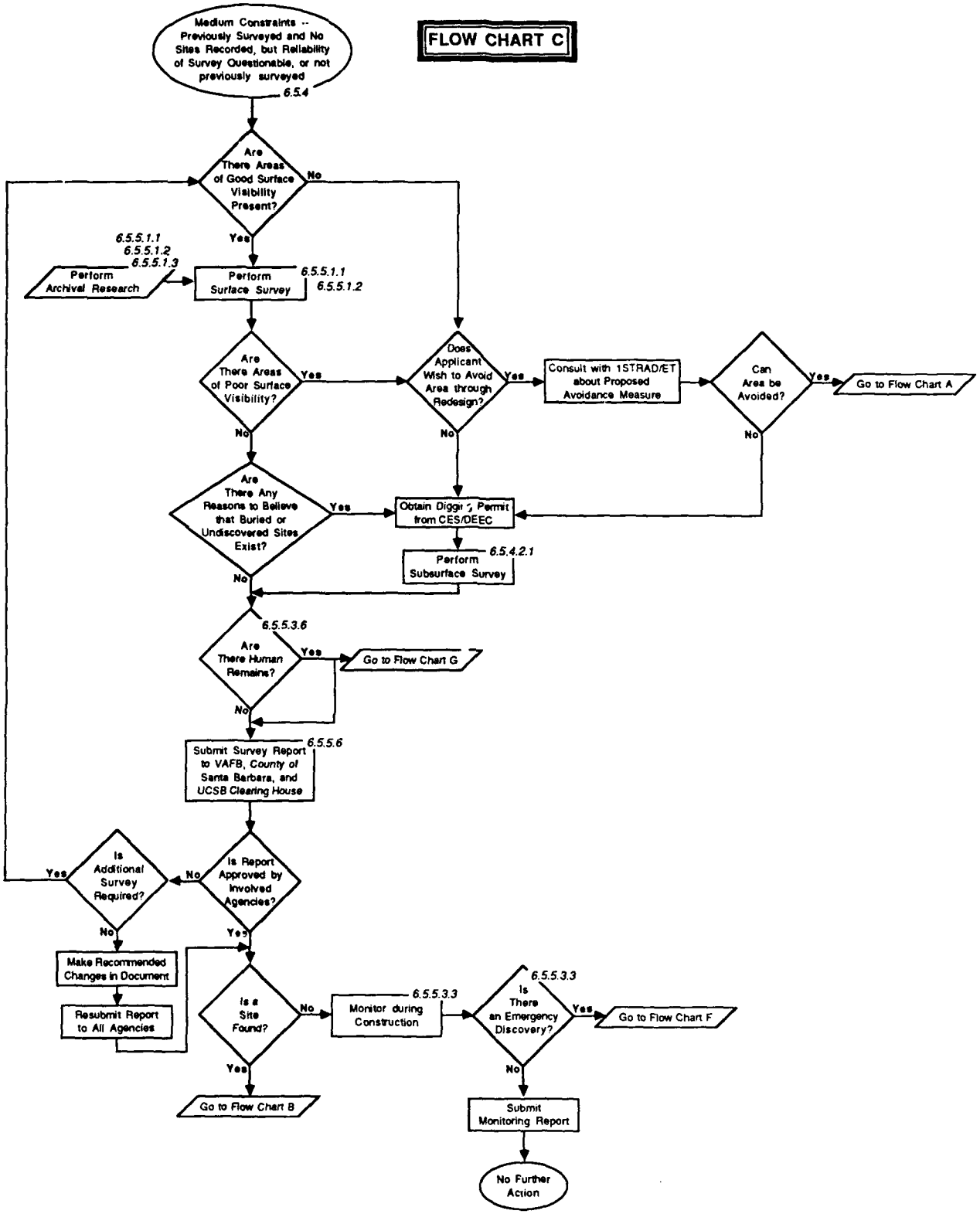


Figure 6.5-5

COMPLIANCE ACTIVITIES IN MEDIUM CONSTRAINT AREAS

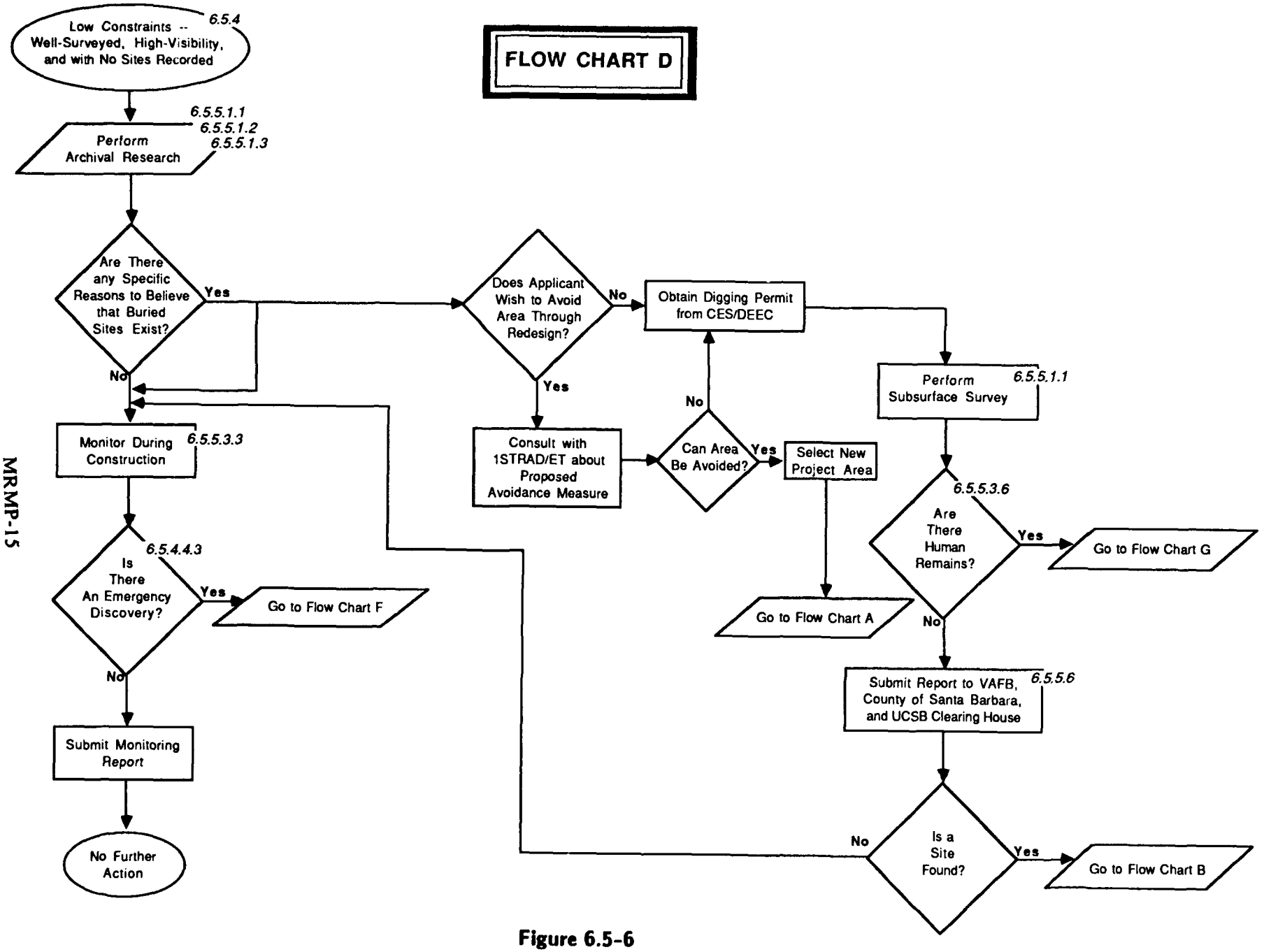


Figure 6.5-6

COMPLIANCE ACTIVITIES IN LOW CONSTRAINT AREAS

Gray (1985; personal communication 1987) has identified several rock units on VAFB that have low-to-moderate, moderate, or moderate-to-high potential for producing vertebrate fossils. These include the following:

1. Upper Pleistocene alluvial terrace deposits. On VAFB, these deposits can be found exposed near Point Sal, near Point Arguello, and in the Sudden Ranch area.

2. The Sisquoc Formation, which is exposed in the Casmalia Hills, near Shuman Canyon, on San Antonio Terrace, along San Antonio Creek, on Burton Mesa, on Lompoc Terrace, and along the shore north of Point Arguello.

3. The Monterey Formation, which is widespread in the region. On VAFB, this formation is exposed in the Casmalia Hills, in selected locations on Burton Mesa and Lompoc Terrace, and extensively in the Santa Ynez Mountains north of Point Conception.

More detailed information about the potential of various formations for containing vertebrate fossils and the distribution of the formations can be found in Table 6.5-4 and in Figure 6.5-10 (see the attached table and figure). Note that in Figure 6.5-10, the map unit **Qm** includes both marine and continental terrace deposits that are symbolized by QT_1, QT_2, and QT_3 in Table 6.5-4.

Establishing guidelines for the treatment of fossil remains on VAFB is hampered by the fact that paleontological resources are not as well protected by federal and state legislation as other resources, nor are the guidelines for their preservation and recovery as specific.

At the federal level, the *Antiquities Act of 1906* is concerned with the destruction of paleontological sites and establishes a system for issuing permits for conducting paleontological investigations on federal land. The *National Environmental Policy Act of 1969* specifies the goal of preserving important historical, cultural, and natural aspects of our national heritage, but establishes no guidelines for incorporating paleontological information into EIS reports.

State laws applying to fossil remains include the *California Environmental Quality Act* (CEQA) (1970) and the *Coastal Zone Conservation Act* (1972). CEQA requires that an agency determine whether a project will have an effect upon paleontological resources and whether these resources are unique or significant. The Coastal Act specifies that, "Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures will be required." In neither case do guidelines specify appropriate identification, evaluation, or mitigation measures.

Paleontological sites normally are exposed only in cliffs, ledges, steep gullies, or badlands where a vertical profile of strata can be viewed. Horizontal land surfaces rarely reveal paleontological resources. Therefore, during the pre-application conference, the applicant will notify ISTRAD/ET of any construction activities that will take place on or near vertical exposures of any of the above formations or that will create vertical profiles of these formations. Road

Table 6.5-4

PALEONTOLOGICAL POTENTIAL OF ROCK UNITS IN VANDENBERG AIR FORCE BASE AREA

(page 1 of 2)

Geologic Age	Formation	Symbol	Description of Rock Unit	Vertebrate Fossil Material	Potential for Vertebrate Fossils
Holocene	Alluvium	Qal	Undissected, unconsolidated, uncemented gravel, sand and silt and rock fragments of recent flood plains.	Archaeological data.	Low; vertebrate fossils considered in rock units older than Holocene.
(Recent) (±11,000 years)	Beach Sand	Qs	Unconsolidated uncemented sands.	None	Low; rock unit too young for vertebrate fossils.
Upper Pleistocene	Terrace Deposits	Qm_1 (Marine)	Semi-consolidated, clean to clayey, well sorted sands on beveled bedrock surface of wave-cut platform (marine terrace -- 120,000 yrs/85,000 yrs; marine.	Some bone material of marine origin. (?)	low; most deposits contain invertebrate marine fossils.
		Qm_2 (continental)	Semi-consolidated, silty to clayey sands, clayey silts, gravels in silty sand matrix on a wave-cut platform and its mantle of marine terrace deposits (85,000 yrs/45,000 yrs); non-marine.	Mastodon, mammoth, camel, horse, ground sloth, micro-vertebrae.	Moderate to high where dissected and exposed; low when covered and buried.
		Qm_3 (stream)	Semi-consolidated rock material similar to Qm_2; deposited in abandoned flood plains and on alluviated surfaces (85,000 yrs/45,000 yrs); non-marine.	Mastodon, mammoth, camel, horse, ground sloth, rodents, rabbits.	Moderate to high where dissected and exposed; low when covered and buried.
Middle Pleistocene	Orcutt Sand	Qc	Semi-consolidated, wind-blown (?) sands, and clayey sands; pebble conglomerate at base; inclined terrace deposits; non-marine.	None; questionable bone chips.	Low; ancient dune sand (Dibblee, 1950).

Table 6.5-4

PALEONTOLOGICAL POTENTIAL OF ROCK UNITS IN VANDENBERG AIR FORCE BASE AREA

(page 2 of 2)

Geologic Age	Formation	Symbol	Description of Rock Unit	Vertebrate Fossil Material	Potential for Vertebrate Fossils
Lower Pleistocene/ Upper Pliocene	Paso Robles Formation	Qp	Poorly consolidated, gravels, sands, and pebbly clays or silts; porcelaneous debris common; tilted; non-marine.	Questionable horse and mastodon remains.	Low; essentially no bone material reported from unit.
Upper-Middle Pliocene	Careaga Formation	Pu	Semi-consolidated, yellow-buff sandstone, littoral, beach and dune sand deposits; marine.	Some seal bones; questionable whale bone fragments.	Low: essentially a rich marine invertebrate near-shore fauna.
	Foxen Mudstone	Pml	Consolidated; mudstone and clayey silt-stone; diatomaceous muds; marine.	None reported.	Low; considered a marine embayment with potential for marine vertebrate.
Lower Pliocene	Sisquoc Formation	Mu	Laminated diatomite and diatomaceous mudstone with porcelaneous shales; marine.	Numerous fish fossil material; some whale and porpoise.	Low to moderate; little bone material of marine mammals has been found at Mansville and Grefco quarries.
Upper Miocene	Monterey Formation	Mm	Consolidated; diatomaceous mudstone, porcelaneous shales, chert lenses, siltstone, some limestones; marine.	Numerous fish fossil material; whale, porpoise.	Moderate; good marine mammal bones; best found in limestone unit; considerable fish material, whole fish fossils located along bedding planes widespread in So. California.

Sources: Gray 1985, personal communication 1987; modified from Dibblee, 1950.

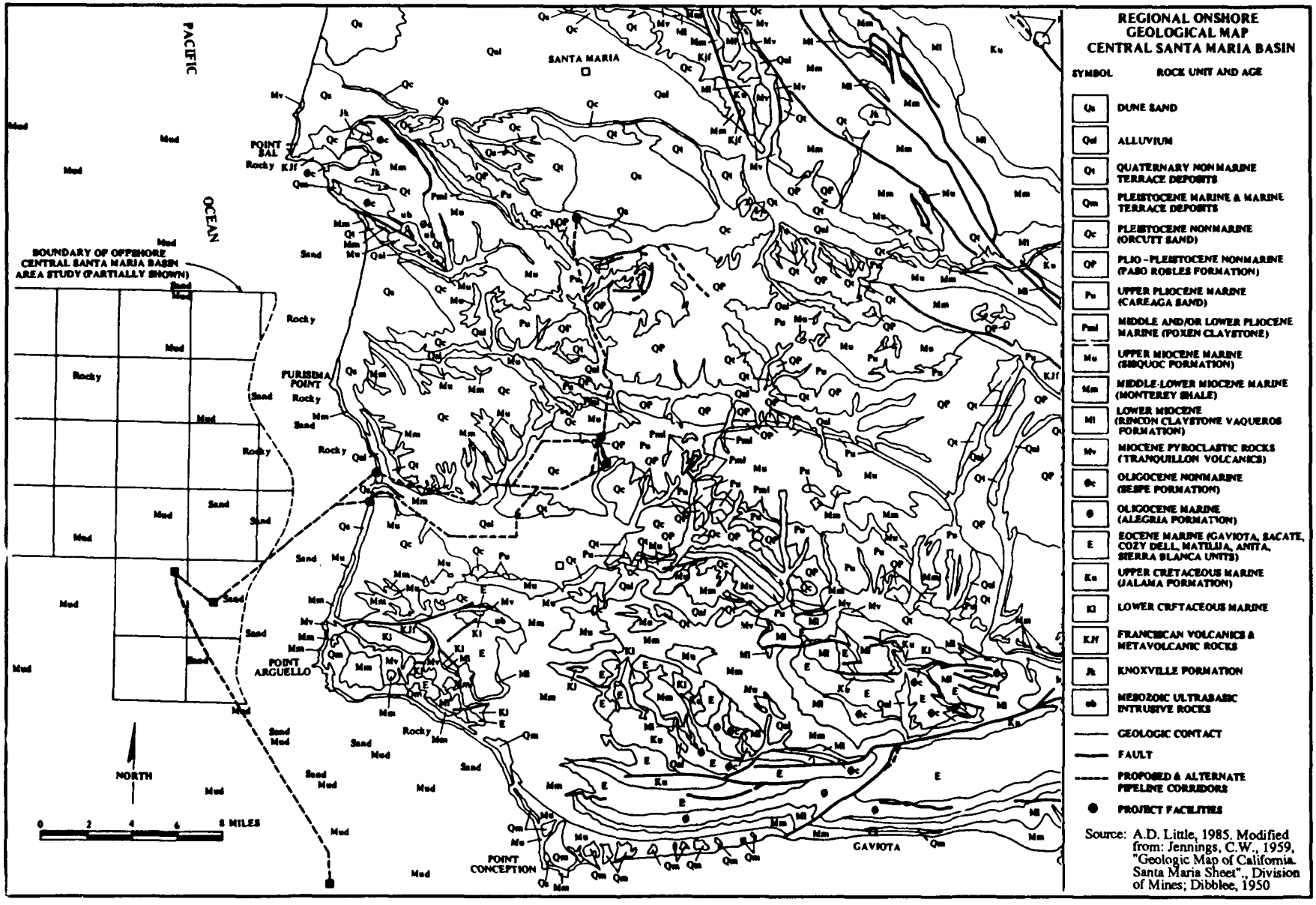


Figure 6.5-10

REGIONAL ONSHORE GEOLOGICAL MAP
Central Santa Maria Basin

construction, trenching, or grading in these deposits may be deemed a significant impact by 1STRAD/ET. Drilling through these formations results in minor disturbances and is not considered a significant impact.

Based on previous findings in these formations, the applicant may be required by 1STRAD/ET to perform a paleontological survey either prior to construction activities or after vertical profiles have been exposed. The consultant employed by the applicant must be a professional paleontologist familiar with local paleontology.

The significance of any paleontological remains discovered will be determined by the type of the fossil(s), the age of the remains, the assemblage association, its geologic setting, and its rarity or uniqueness.

If fossils determined significant by a paleontological consultant and by 1STRAD/ET are found, then the preferred mitigation measure will be preservation. In many cases, however, preservation by avoidance is not an appropriate measure because fossils exposed on the surface are subject to rapid deterioration. If 1STRAD/ET determines that avoidance may result in the destruction of the resource, the applicant may be required by 1STRAD/ET to conduct further paleontological investigations of the discovery.

Emergency discoveries of vertebrate remains during construction activities are not explicitly protected by legislation. However, if such a discovery is made, the applicant must notify 1STRAD/ET immediately. 1STRAD/ET will then:

1. Determine whether the remains are of paleontological or archaeological origin;

2. Determine whether the remains, if paleontological, should and can be avoided without causing harm to the resource; and

3. determine appropriate mitigation measures if the remains cannot be avoided safely.

Paleontological remains recovered from localities on VAFB should be curated at the Santa Barbara Museum of Natural History or at Santa Barbara City College."

Section 6.6, Land Use

Section 6.6.4; page 6.6-10, change bullet six to read as follows:

"o Approximately 575 acres of cropland in the vicinity of the Santa Ynez River have been designated as prime agricultural lands by the U.S. Soil Conservation Service and are reserved for agriculture. There are no other prime agricultural lands on VAFB and no unique farmlands."

Section 6.6.5.1, page 6.6-16, bullet one, change the word "operation" to "operations"; and in bullet three, second sentence, change the word "used" to "uses." Also, change bullet six to read as follows:

"o When an area is proposed for oil and gas development, the applicant shall identify the location of off-base lands that would be affected by development and describe the nature and timing of the impacts on those areas. This determination should be based on (1) off-base areas that would be affected by public safety risks, noise, traffic, odor, visual incompatibility, or other "nuisance" effects associated with oil and gas development; (2) requirements for new construction or expansion of off-base oil- and gas-related transportation, treatment, processing, storage, or refinery facilities; (3) growth inducement, that is, project-related and cumulative employment and population increases that could result in requirements for new housing and public facilities; and (4) compatibility with federal, state, and local land use laws."

Section 6.6.5.2; page 6.6-17, bullet three, regarding prime agriculture, insert the following sentence after the first full sentence: "Prime agricultural lands on VAFB have already been identified by the U.S. Soil Conservation Service."

Section 6.9, Visual Resources

Section 6.9.2, Existing Conditions; page 6.9-2, paragraph three, sentence one and paragraph four, sentence two, "Figure 6.6-1" has been changed to "Figure 6.6-2."

Section 6.9-4, Constraints; page 6.9-8, paragraph three, sentence one has been corrected and now reads "The electrical equipment needed at certain well pads and installation of the pipelines connecting well pads would also affect visual quality."

Figure 6.9-7 on page 6.9-10 has been retitled "Steam Generator" as shown on the attached figure.

Section 7.0, Plan Criteria and Application

A legend is unnecessary for Figure 7-2, Composite Environmental High-Constraint Areas, on page 7-7; therefore, the legend inset has been removed. See attached figure.

References

On page 8 under the heading "Section 6.3, Air Quality," add the following reference:

Leonardo, Kendall, G., D.A., and Barnard, N., 1969. Odor Threshold Determinations of 53 Odorant Chemicals. *Journal of the Air Pollution Control Association*, St. Louis, Missouri, June 14-18, 1970.

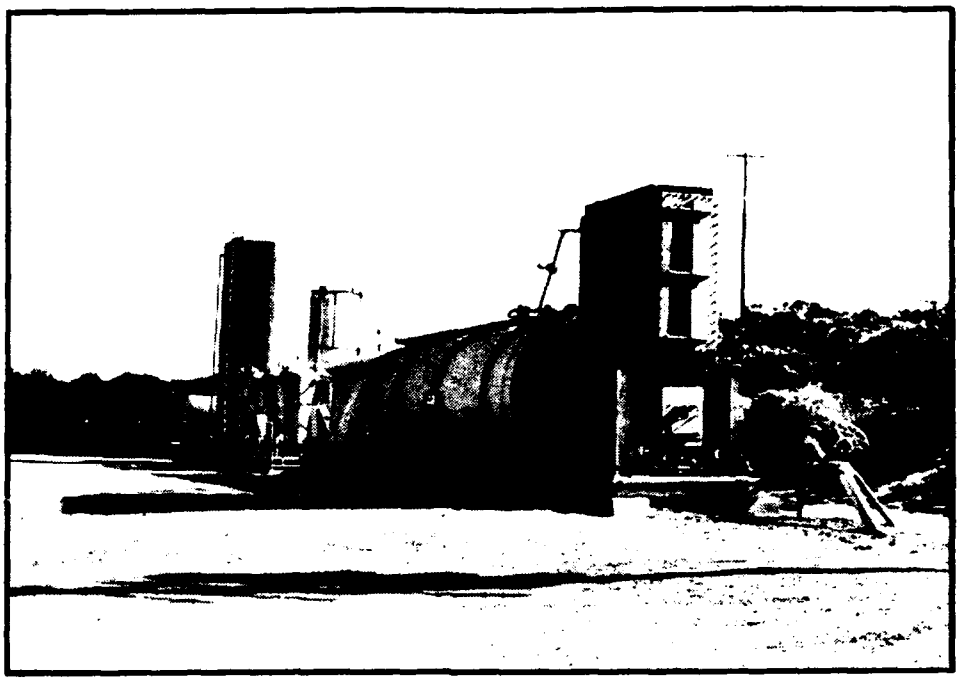
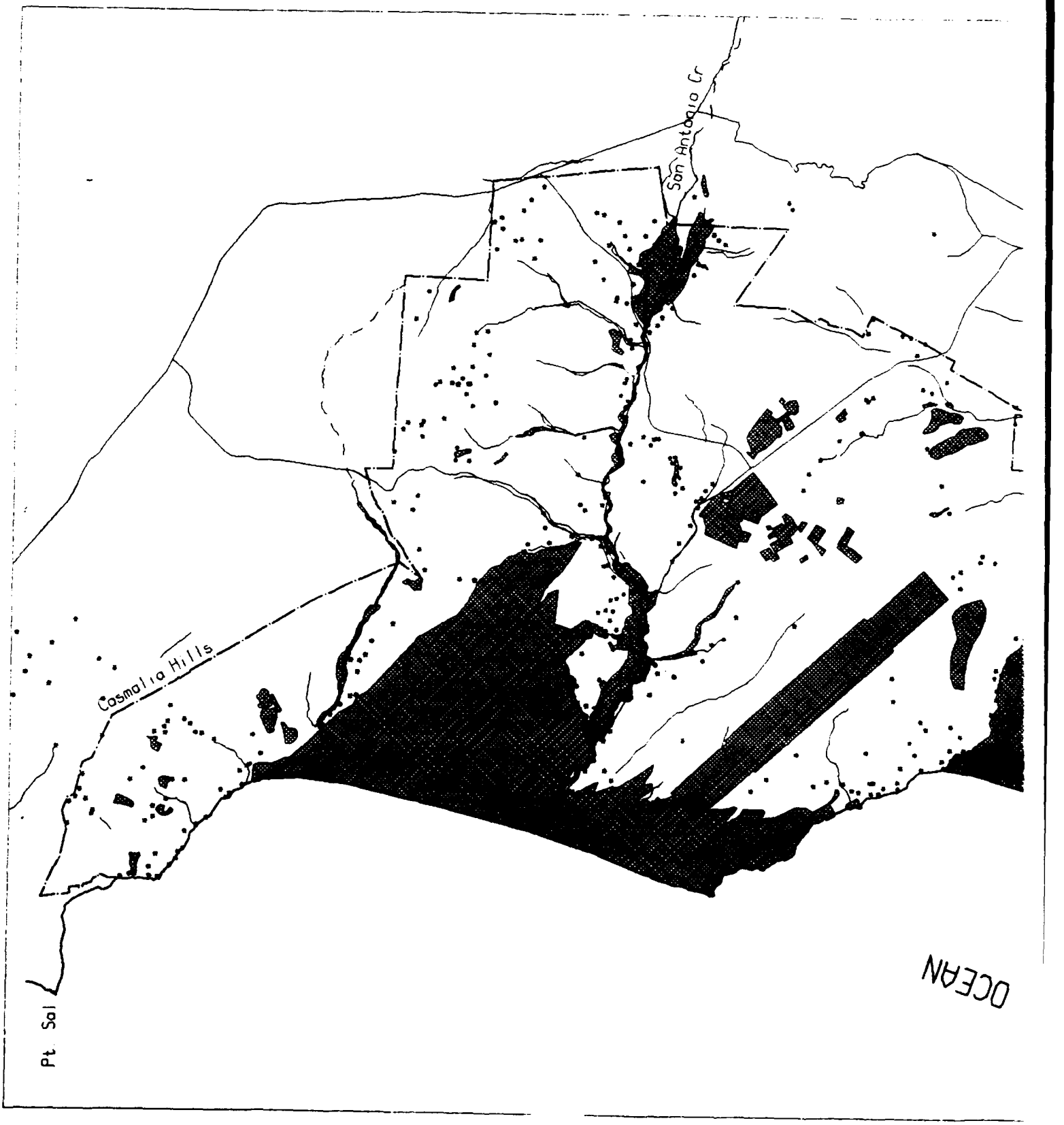


Figure 6.9-7

STEAM GENERATOR

Figure 6.9-8

PRODUCTION TANKAGE



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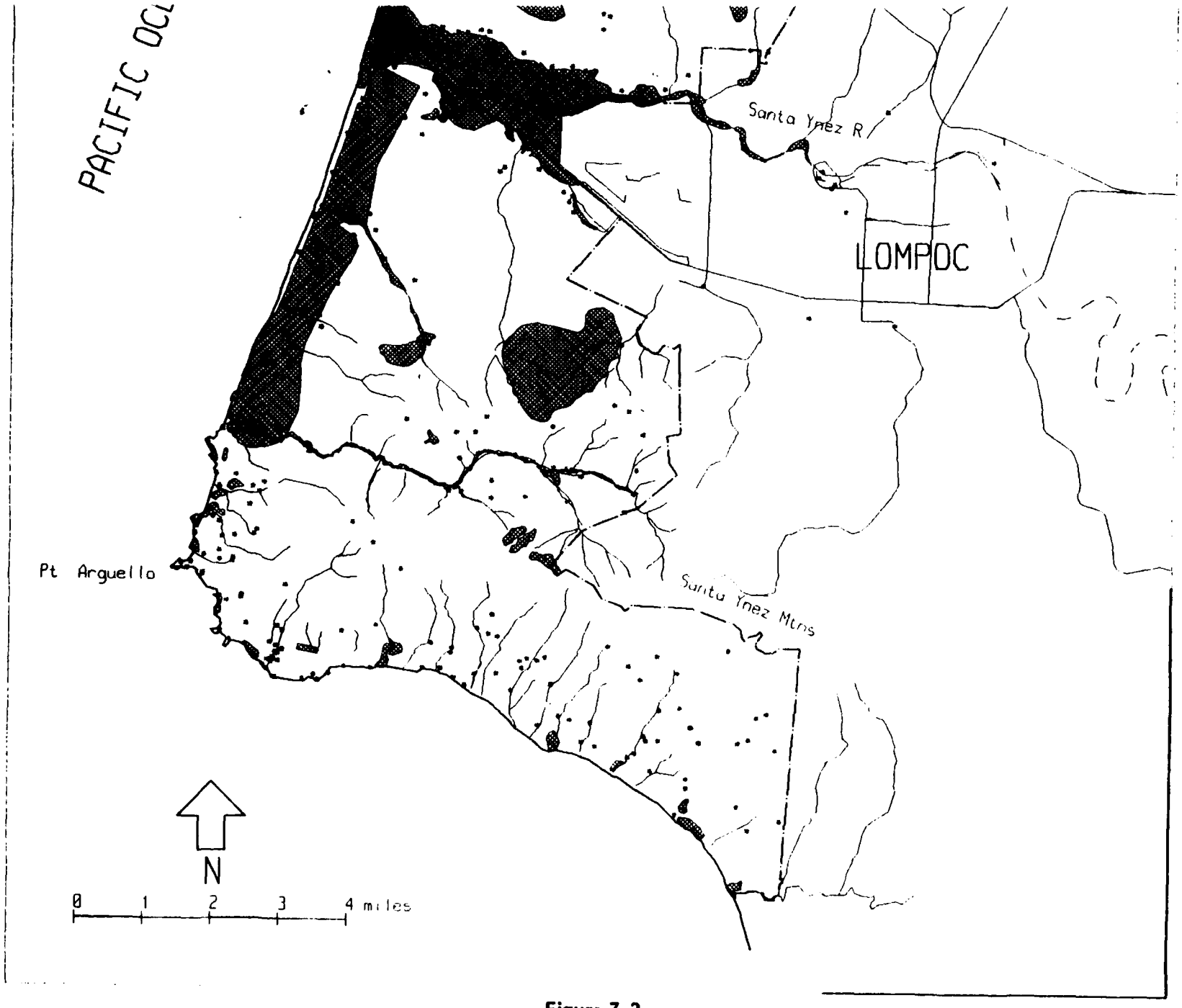

Figure 7-2

COMPOSITE ENVIRONMENTAL HIGH-CONSTRAINT AREAS