FERC/EIS—0002F

Western LNG Project

VOL. III-COMMENTS AND APPENDICES

Final Environmental Impact Statement

FEDERAL ENERGY REGULATORY COMMISSION
OFFICE OF PIPELINE
AND PRODUCER REGULATION

South central

FERC/EIS-0002F

FEDERAL ENERGY REGULATORY COMMISSION
OFFICE OF PIPELINE AND PRODUCER REGULATION
WASHINGTON, D.C. 20426

WESTERN LNG PROJECT
FINAL ENVIRONMENTAL IMPACT STATEMENT

VOLUME III

COMMENTS AND APPENDICES

Pacific Alaska LNG Associates
Docket No. CP75-140

October 1978

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COMMENTS ON THE DEIS AND THE STAFF'S RESPONSES

FEDERAL

STATE

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COMMENTS ON THE DEIS AND THE STAFF'S RESPONSES

Advisory Council on
Historic Preservation
1522 K Street N.W.
Washington, D.C. 20005

June 27, 1978

Mr. Kenneth F. Plumb
Secretary
Federal Energy Regulatory Commission
Washington, D. C. 20426

Dear Mr. Plumb:

Thank you for your request of April 21, 1978, for comments on the draft environmental statement (DES) for the Western LNG Project, California and Alaska. Pursuant to Section 102(2)(C) of the National Environmental Policy Act of 1969 and the Council's "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 800), we have determined that your DES mentions properties of cultural and/or historical significance; however, we need more information in order to evaluate the effects of the undertaking on these resources. Please furnish additional data indicating:

Compliance with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f, as amended, 90 Stat. 1320).

The environmental statement must demonstrate that either of the following conditions exists:

1. No properties included in, that may be eligible for inclusion in, or determined on the authority of the Secretary of the Interior to be eligible for inclusion in the National Register of Historic Places are located within the area of environmental impact, and the undertaking will not affect any such property. In making this determination, the Council requires:

--evidence that you have consulted the latest edition of the National Register (Federal Register, February 7, 1978, and its monthly supplements);

--evidence of identification of properties eligible for inclusion in the National Register, including evidence of contact with the appropriate State Historic Preservation Officers, whose comments should be included in the final environmental statement. The State Historic Preservation Officer for California is Dr. Knox Mellon, Department of Parks and Recreation,

As stated in both volumes of the DEIS, the National Register has been consulted; no listed properties would be affected.

Both the California and Alaska SHPO were sent copies of the DEIS for comments. To date, the California SHPO has submitted comments; the Alaska SHPO has not.

P. O. Box 2390, Sacramento, California 95841, and for Alaska is Mr. William S. Hanable, Division of Parks, Department of Natural Resources, 619 Warehouse Avenue, Suite 210, Anchorage, Alaska 99501.

2. Properties included in, that may be eligible for inclusion in, or determined on the authority of the Secretary of the Interior to be eligible for inclusion in the National Register of Historic Places are located within the area of environmental impact, and the undertaking will or will not affect any such property. In cases where there will be an effect, the final environmental impact statement should contain evidence of compliance with Section 106 of the National Historic Preservation Act through the Council's "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 800).

Should you have any questions, please call Brit Allan Storey at (303) 234-4946, an FTS number.

Sincerely yours,

Louis S. Wall
Assistant Director, Office of
Review and Compliance, Denver

As described in Appendix K of Volume I of the DEIS, the environmental staff has recommended that the applicant follow a detailed program to insure that cultural resources are preserved in accordance with Section 106 of the National Historic Preservation Act. A careful reading of Sections B.10 and C.10 of Volume II of the DEIS and FEIS would show that numerous cultural properties which may be eligible for the National would be impacted. Determinations of eligibility have not yet been requested for these properties.

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DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P. O. BOX 2711
LOS ANGELES, CALIFORNIA 90053

SPLED-E

30 May 1978

Mr. Kenneth F. Plumb, Secretary
Federal Energy Regulatory Commission
Washington, D.C. 20426

Dear Mr. Plumb:

This is in response to a letter from your office dated 21 April 1978 which requested review and comments on the draft environmental impact statement (DEIS) for the Western LNG Project, Western LNG Terminal Associates Docket No. CP75-83-2. Our comments, which apply to Volume II of the DEIS, are as follows:

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a. Page 3, paragraph 2 (a): It is stated that "the project would extend 4,600 feet to a depth of 60 feet mean lower low water (MLLW)." However, a construction permit application filed with this office as of May 1978 states "that the trestle for the project would be 5,025 feet in length extending to a depth of 50 feet MLLW." These statements should be reconciled and clarified in the appropriate documents wherever necessary.

Applicant's latest filing states a length of 4,600 feet at a water depth of 52-56 feet MLLW.

b. Page 3, paragraph 2 (a): It is noted that the proposed facility will be located four (4) miles east of Point Conception. Since this location could conceivably interfere with military operations and the proposed Space Shuttle facilities at nearby Vandenberg Air Force Base (VAFB), we suggest that the location, etc., be coordinated with VAFB. This, with respect to missile firings, etc., also applies to page 218, Analysis of Public Safety.

Comment reflected in Section C-12 of Volume II of the FEIS.

c. Page 6, 1st paragraph, 2nd sentence: In lieu of the reference to "mean sea level" this sentence, and other similar references in the body of the DEIS, should be amended to refer to a "MLLW" datum.

Comment reflected in Section A of Volume II of the FEIS.

d. Page 6, 3rd paragraph: The reference to a 4,600 foot trestle should be coordinated with comment 'a' above; discrepancies should be corrected wherever required.

See staff response above.

e. Page 6, 3rd paragraph, last sentence: The statement that "trestle support would be provided by four-pile jacketed structures at 133-foot intervals" is contradicted by the cited permit application

Comment reflected in Section A of Volume II of the FEIS.

which states that "trestle supports would be spaced at 160 foot intervals with each support containing six piles." Correlation and/or correction is needed.

f. Page 6, 4th paragraph: The "small boat harbor" cited therein is not referenced in the permit application mentioned in comment 'a'. Correlation and/or coordination is definitely required.

Comment reflected in Section A of Volume II of the FEIS.

g. Page 9, 3rd paragraph: A 25-foot dike would be capable of holding the entire contents of a tank. However, no mention is made of the amount of liquid LNG which would vaporize; this, and the associated impacts, should be addressed in the EIS.

Previously addressed in Section C-12 of Volume II of the DEIS.

h. Page 9, 4th paragraph: It is stated that "the vaporization plant would require an average of 108,000 gallons per minute of seawater which would be transported through a pipeline extending 2,500 feet into the ocean and returned via an 8-foot diameter pipeline 4,600 feet into the ocean at a depth of 500 feet MLLW." On the contrary, the permit application notes that "operation of the terminal would require the use of 188,000 gallons per minute of seawater, the water to be taken from the ocean via an intake structure located 2,600 feet offshore in a kelp bed, and further, that a 7-foot diameter seawater outfall would extend about 5,000 feet at a depth of approximately 50 feet MLLW." These discrepancies should be correlated throughout the EIS.

Comment reflected in Section A of Volume II of the FEIS.

i. The "Proposed Facilities", Section 2, should include mention of the fish return facility cited elsewhere in the DEIS.

ibid.

j. Page 11, Construction Procedures: References should be included pertinent to dredging plans and types of dredging intended for use. The method of trestle construction proposed should also be mentioned.

ibid.

k. Page 13, 2nd paragraph: The ocean should be cited as a source of water for hydrostatic testing in accordance with the permit application previously cited which states that "seawater will be used and discharged through the constructed seawater discharge system."

ibid.

l. Page 14, Operation, Maintenance and Emergency Procedures: We believe that this section of the DEIS should, if not already done, be coordinated with the 11th Coast Guard District for review and comment.

The Coast Guard was sent copies of the DEIS for review and comment.

m. Page 21, 2nd paragraph: Visibility at Point Conception is restricted approximately one-third of the time because of non-clear days. We suggest that the Coast Guard would wish to establish safety procedures and conditions under these circumstances.

It is likely that the Coast Guard will develop procedures for days of limited visibility.

n. Page 36, paragraph b, Stratigraphy: The specific material to be dredged should be described with relation to its physical and chemical properties.

This information is not currently available; however, see Section C-5 of Volume II of the FEIS.

o. Page 39, paragraph c, Seismicity: This section should incorporate the recent purported discovery of an earthquake fault at the proposed LNG site; this should be verified and analyzed. This also applies to page 143, 5th paragraph.

Comment reflected in Section B-3 of Volume II of the FEIS.

p. Pages 67 and 72: Discussion should be presented regarding the effect that unclear days and heavy sea conditions will have on tanker docking operations at the terminal.

Comment reflected in Section C-5b of Volume II of the FEIS.

q. Page 83, paragraph ii, Pipeline: The proposed pipeline route crosses the Santa Ynez River and as such, will require a Section 404 Permit from the Corps of Engineers as required by Public Law 92-500.

No response required.

r. Page 141, paragraph 1, Climate: This paragraph should quantify the term "strong gusty winds" and specify the frequency of occurrence of such conditions. The impacts of unfavorable conditions such as dense fog should also be analyzed. It is stated that "during hurricane-force winds LNG tankers would vacate their berths and proceed to clear waters." These clear waters should be cited in the EIS.

Comment reflected in Section C-1 of Volume II of FEIS.

6

s. Page 142, 1st paragraph: Where will the breakwater and small craft harbor be located? See also comment 'f' above.

Comment reflected in Sections C-2 and C-3 of Volume II of the FEIS.

t. Page 142, 5th paragraph: The Sisquoc River may be subject to a Section 404 action as required by Public Law 92-500. This should be verified with this office.

No response required.

u. Page 158, last paragraph: The impacts of the 60,000 gpm tanker seawater discharge at the site, which would be about 20°F above ambient seawater temperature, should be investigated and discussed. Also, the synergistic effects of simultaneous discharges of hot and cold waters in the area should be investigated and discussed.

Comment reflected in Section C-5b of Volume II of the FEIS.

v. Page 160, 1st paragraph: In the event of release of Bunker-C fuel oil during a tanker or barge collision, what would happen to the LNG on board? This, and any environmental impacts, should be discussed in the EIS.

Comment reflected in Section C-7b of Volume II of the FEIS.

w. Page 171: Relocation of the outfall, fish return, and intake lines north to an area devoid of kelp should reduce the impacts on fish entrainment. This alternative should be investigated and discussed in the EIS.

Comment reflected in Sections A and D of Volume II of the FEIS.

x. Page 185: The impacts of a thermal discharge from the berthed tankers on the aquatic biota should be investigated and presented in the EIS.

Comment reflected in Section C-5b of Volume II of the FEIS.

SPLED-E 30 May 1978
Mr. Kenneth F. Plumb

y. Page 246, 3rd paragraph: The placement of ocean outfalls and marina breakwaters in the marine environment should be considered "long-term" impacts. The EIS should be amended accordingly.

Should you have any questions regarding requirements for Section 404 permit applications, etc., please feel free to contact Mr. Craig Holland, Chief, Environmental Quality Section, telephone (213) 688-2934.

Thank you for the opportunity to review and comment on this DEIS.

Sincerely yours,

NORMAN ARNO
Chief, Engineering Division

7

Comment either reflected in FEIS or previously discussed in Section E of DEIS.

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P. O. BOX 2711
LOS ANGELES, CALIFORNIA 90053

SPLED-EQ

26 July 1978

Mr. Kenneth F. Plumb, Secretary
Federal Energy Regulatory Commission
Washington, D.C. 20426

Dear Mr. Plumb:

We are forwarding a copy of the review comments pertaining to the Draft Environmental Impact Statement (DEIS) for the Western LNG Project, NIKISKI, Alaska and Point Conception, California, prepared by the Alaska District Corps of Engineers. They were not received in time to be included in our letter of comments dated 30 May 1978.

We hope that these comments will be of help in preparation of the cited DEIS.

Sincerely yours,

for Walter Paketich

NORMAN ARNO
Chief, Engineering Division

1 Incl
as

DEPARTMENT OF THE ARMY
ALASKA DISTRICT, CORPS OF ENGINEERS
P.O. BOX 7002
ANCHORAGE, ALASKA 99510

RECEIVED
JUL 31 1 34 PM '78
FEDERAL POWER COMMISSION

REPLY TO ATTENTION OF:

NPAEN-PR-EN

5 JUN 1978

SUBJECT: Review of Draft EIS, Federal Energy Regulatory Commission, Western LNG Project, NIKISKI, Alaska and Point Conception, California

District Engineer, Los Angeles District
P.O. Box 2711
Los Angeles, California 90053

1. The Alaska District has reviewed subject EIS. In accordance with DAEN-CWR-P directive of 3 May 1978, we suggest incorporation of the following comments in your coordinated agency reply:

a. General - The impacts of actions which will require Corps of Engineers permits are not adequately addressed in the draft EIS. The final document should respond more fully to NEPA requirements. The latest guidance and requirements for Sections 10 and 404 permit compliance should be furnished to FERC for use in preparing the final document.

b. Specific to the draft EIS

(1) Page 94/para 3 - There have not been any severe winters in the recent past.

(2) Page 97/para 5 - Suggest 'trout' be deleted after grayling.

(3) Page 118/para 4 - The types of recreational uses common to the Kenai Peninsula should be identified and discussed.

6

Information pertaining to the suitability of the Cook Inlet dredge spoil for disposal in the ocean or navigable waterways has not been provided by the applicant. An addition has been made to Section C.5 pertaining to the proposed haul road spoil.

The only navigable waterways crossed by the proposed pipeline are the Lewis, Theodore, Beluga, and Chuitna Rivers and Threemile Creek. According to the applicant, these waterways are only used for recreational boating. Construction would not significantly interfere with the use of these rivers for boating purposes because of the short period of time required to install the pipeline. Following construction no interference would be anticipated because the pipeline would be buried beneath the riverbed.

No response required.

Comment accepted.

The staff believes that the general discussion on page 120 of the DEIS in Volume I is sufficient.

NPAEN-PR-EN
SUBJECT: Review of Draft EIS, Federal Energy Regulatory Commission, Western LNG Project, NIKISKI, Alaska and Point Conception, California

(4) Page 155/para 2 - The cumulative impacts of additional industrial development should be discussed. While it may be true that impacts from an adjacent facility may overshadow those of the LNG plant, there will be cumulative impacts from this and other similar future developments.

Comment reflected in Section C.7 of Volume I of the FEIS.

(5) Page 155/para 4 - In order for preferred vegetation, such as willow, to become established in the right-of-way, it is necessary for the soil to be scarified. It might be pointed out that rights-of-way corridors also provide excellent wolf passages.

Comment reflected in Section C.7 of Volume I of the FEIS.

(6) Page 156/para 1 - We question the use of the word "defiantly" in describing some moose which become vehicle casualties.

Comment reflected in Section C.7 of Volume I of the FEIS.

10

(7) Page 158/para 2 - Suggest the last sentence of the paragraph discussing eutrophication be deleted.

The staff sees no need to eliminate this sentence.

(8) Page 158/para 3 - Include the possible impacts on resident fish.

The statement made in this paragraph concerning "freshwater biota" would include resident fish.

(9) Page 158/para 4 - Contaminants that could be immediately toxic to aquatic life may not necessarily be temporary.

The statement made in the DEIS is that "most of this impact would be temporary," leaving open the possibility for those cases where it may not be temporary.

(10) Page 159/para 2 - The impacts of biotic community changes should be discussed as well as possible mitigation measures which might be taken to minimize adverse impacts.

It would be pure speculation as to what specific changes would take place. This statement merely identifies the possibility.

(11) Page 159/para 3 - Suggest a discussion of when the two species may be present in the impacted area and possible timing of blasting.

Comment reflected in Section I of Volume I of the FEIS. The applicant will be required to consult with the ADFG concerning protected marine organisms.

(12) Page 169/para 2 - A thorough discussion on impacts of all types of recreational activities should be included.

The staff believes the discussion presented is sufficient.

5 JUN 1978

NPAEN-PR-EN
SUBJECT: Review of Draft EIS, Federal Energy Regulatory Commission, Western LNG Project, NIKISKI, Alaska and Point Conception, California

(13) Page 207/para 2 - Both pink and chum salmon spawn close to the mouths of streams.

(14) Page 208/para 2 - The use of portable waste treatment plants should be discussed thoroughly, The facilities within the work camps (shower facilities, cooking, etc.) have a great impact on water use and disposal.

(15) Page 208/para 4 - The use of gravel pads with respect to restoration should be discussed.

(16) Page 209/para 4 - Suggest discussion of the impact of a major rupture on both the terrestrial and aquatic communities.

GEORGE R. ROBERTSON
Colonel, Corps of Engineers
District Engineer

11

Comment reflected in Section D.2 of Volume I of the FEIS.

The portable waste treatment plants are discussed in Section C.5 of Volume I of the FEIS. The applicant has indicated that they will obtain all necessary local permits for such activities.

At this time it is not known how the applicant proposes to restore gravel pads. However, the applicant would have to carry out such activities according to all local and state permits.

Comment reflected in Section D.2 of Volume I of the FEIS.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
LOS ANGELES AREA OFFICE
2500 WILSHIRE BOULEVARD, LOS ANGELES, CALIFORNIA 90057

REGION IX
450 Golden Gate Avenue
P.O. Box 36003
San Francisco, California 94102

IN REPLY REFER TO:
9.252

Mr. Kenneth F. Plumb, Secretary
Federal Energy Regulatory Commission
825 North Capitol Street, NE
Washington, D. C. 20426

Dear Mr. Plumb:

Subject: Draft Environmental Impact Statement
Western LNG Project
OPPR-PCCD/EEB (April 1978)
Docket No. CP75-83-2

We have completed a review of the subject draft environmental impact statement. Our comments are limited to coastal zone land planning and housing concerns.

The California Coastal Plan of December 1975 recommends only one LNG terminal be located in California (Page 9) and such site shall be remote from heavily populated areas until public safety risks of such facilities are satisfied. Page 136 of this Plan cites physical criteria for LNG Facility siting.

Housing resources should be addressed in your final impact statement. Such a housing element should identify housing needs by segments of the population, i.e., range of household sizes and income. Needs expected between temporary and permanent as well as owners and tenants. And needs as to housing type, i.e., mobile homes, single family housing and multifamily housing. To assist you in this endeavor in regards to the Oxnard area we enclose a copy of our Economists 1977 study of the Ventura County Housing Market.

If we can be of any assistance to you regarding the above, please do not hesitate to call upon us.

Sincerely,

John E. Bonkoski
Environmental Clearance Officer

Enclosure

12

It is staff opinion that a detailed risk analysis is necessary (not solely a population density criteria) prior to any conclusion on site acceptability.

Comment reflected in Section C-8 of Volume II of the FEIS; however, the level of detail suggested by this comment is beyond the scope of this FEIS.

HUD-95 (7-75) PREVIOUS EDITION MAY BE USED

Memorandum

U.S. DEPARTMENT OF
HOUSING AND URBAN DEVELOPMENT

RECEIVED
APR 21 11 40 AM '78
REGIONAL PLANNER
COMMISSION

TO : Roland E. Camfield, Jr., Area Director, 9.2S
Attention: Donald G. Phillips, Chief Underwriter, 9.2F
Los Angeles Area Office

DATE: April 20, 1977

IN REPLY REFER TO:
9.2M

FROM : Howard C. Bricker, Economic and Market Analysis Division

SUBJECT: EMAD Review of the Ventura County, California,
Housing Market Area as of January 1, 1977

Summary:

The housing market in Ventura County is generally tightening in all sectors (single family detached, attached single family, and rental units) of the market. Single family detached houses are selling at extremely high rates. Lotteries are often held at the opening of new housing tracts in order to select the purchasers for the homes and to hold down speculation. With the increased demand for housing, especially in the Thousand Oaks/Simi Valley area, has also come the increased selling prices. The developers have bid up the value of the desirable, vacant tracts of land, thus eventually leading to higher site costs for the finished homes. This increased demand for housing in the Thousand Oaks/Simi Valley area has also put a squeeze on the available school facilities. Some of the students, especially in the Simi Valley School District, are on part day sessions. Smaller households and relatively lower prices, have helped to absorb the large unsold inventory of attached housing units which had been slow sellers for the past couple of years. The decline in the number of multi-family units being permitted in 1974 and 1975 have caused the vacancy rate in rental units to drop significantly since the peak of over-building of rental units in 1974. The current strong market is expected to continue at least through January 1979.

Housing Market Area:

The Ventura County, California, Housing Market Area (HMA) consists of the Oxnard-Simi Valley-Ventura Standard Metropolitan Statistical Area (SMSA) as defined by the Office of Management and Budget. As of January 1, 1977, EMAD has estimated the total HMA population to be 462,300 persons. This represents an annual 3.0 percent (12,721 persons) population increase since the 1970 Census. The bulk of the population is concentrated in two areas. One area is Oxnard/Port Hueneme-Ventura-Camarillo and the other area is Simi Valley-Thousand Oaks. The northern portion of the HMA is largely uninhabited.

San Buenaventura (sometimes referred to as Ventura in this report) continues to be the governmental center of the HMA. Oxnard/Port Hueneme is the military, port, and industrial center for the HMA. Both San Buenaventura and Oxnard/Port Hueneme are trade and service centers for the agricultural communities in the HMA. Camarillo has developed as a bedroom community for the Oxnard/Ventura area and more recently for parts of the San Fernando Valley. The Thousand Oaks/Simi Valley area has developed as a bedroom community for the San Fernando Valley and parts of the industrial areas of the remaining parts of Los Angeles County.

Demographic Factors

Employment:

The annual average number of persons employed (by residence) in Ventura County reached an all time high during 1976, but the number of unemployed (by residence) in Ventura County was also at an all time high. The annual average number of persons employed (by residence) was 158,700 in 1976 as compared with 157,600 in 1975. The corresponding number of persons unemployed (by residence) was 15,500 in 1976 and 14,800 in 1975. The main cause of the increased unemployment was the increase in the labor force from 172,400 in 1975 to 174,200 in 1976. See Table I for detailed employment data.

Total nonagricultural wage and salary employment increased from 112,300 in 1975 to 113,800 in 1976. The increased nonagricultural wage and salary employment was the result of small employment increases in durable goods manufacturing, mining, trans/comm/utilities, trade, services, and government.

Agricultural employment in 1976 averaged 14,700 which was just slightly less than the 14,800 average in 1975. Because of the drought situation in California in 1977, the number of agricultural and food products jobs might show a decrease in 1977 and 1978.

Journey to Work:

According to the 1975 Special Census for Ventura County, over 25,000 persons who lived in Ventura County commuted to other counties for employment. This represented over 21 percent of the principal wage earners in Ventura County. The majority of these commuters lived in Thousand Oaks or Simi Valley and they were commuting into Los Angeles County. Sources in the Planning Department in San Buenaventura indicated that some of their increased population was the result of building slowdown and employment in Santa Barbara County. Because of the building slowdown in Santa Barbara County, the housing prices in Santa Barbara County are much higher than comparable housing in most parts of Ventura County.

Population and Households:

The January 1, 1977 population for Ventura County was estimated to be 462,300 persons which represented a 12,721 (3.0 percent) person gain per year since the 1970 Census. EMAD has projected the January 1, 1979 population to be approximately 495,200 persons which would represent a 16,450 person (3.4 percent) annual gain between January 1, 1977 and January 1, 1979. The incorporated areas and the land adjacent to the incorporated areas will receive most of the population gains because of the county policy of trying to only allow building of new subdivisions in land which is adjacent to incorporated areas. The county is trying to preserve agricultural lands and the county does not want to have utilities spread through miles of vacant land.

The Thousand Oaks area is expected to have the largest annual population growth (7.7 percent) during the next two years. The population growth in Thousand Oaks will be caused by the following factors: 1) the area is in close proximity to the San Fernando Valley; 2) the housing prices are generally lower than the San Fernando Valley; 3) several areas in and around Thousand Oaks offer a semi-rural environment; 4) the school bussing question in the City of Los Angeles will cause many families to move from the San Fernando Valley regardless of what the outcome is; 5) Thousand Oaks is attracting employment; and 6) Westlake is attracting water orientated families and individuals.

EMAD has estimated that there were 148,250 households in Ventura County as of January 1, 1977. This represented a 4.9 percent (6,190 households) annual gain in households since the 1970 Census. EMAD has also estimated that the annual rate of new households will increase to 5.4 percent (8,425) between January 1, 1977 and January 1, 1979. The households will be increasing at a faster rate than the growth in population because of the decline in household sizes. All of the large cities in Ventura are expected to achieve above a 3.0 percent growth rate in new households between January 1, 1977 and January 1, 1979. Thousand Oaks is expected to have the largest percentage increase in households (10.7 percent annually) for the next two years. See Table II for detailed population and household data.

Schools

The school situation is a critical problem in some parts of Ventura County, especially Simi Valley. The growth in some of these areas has caused a need for many new school buildings which in turn has caused some of the school districts to reach their bonding capacity. The current mood of the voters is to turn down all school bond issues. The lack of school facilities has caused many schools to be either overcrowded or go on half day sessions. The school integration problem in the Los Angeles City schools has increased and will continue to aggrevate the school problem in Ventura County, especially in the Thousand Oaks/Simi Valley area adjacent to the Los Angeles County line. The families fleeing the Los Angeles Unified School District will not tolerate mandatory bussing for racial integration.

Income:

The median incomes for all families in Ventura County increased by 138.8 percent from the annual median earnings in 1969 of $11,314 to the annual median earnings in 1976 of $15,700. The median income for renter households increased from $7,962 in 1969 to $11,049 in 1976. See Table III for detailed figures.

Housing Factors

Vacancy Rates:

Overall idle meter (electrical) trends in Ventura County have shown a significant decline since the high point of 4.1 percent in 1973. The overall 1976 rate was down to 1.8 percent. The single family idle meters dropped from 1.9 percent in December 1974 to 1.1 percent in December 1976. At the same time, the multifamily idle meter rate dropped from 7.5 percent in December 1974 to 3.4 percent in December 1976. EMAD has estimated that the January 1, 1977 homeowner vacancy rate for available units was 1.2 percent (1,200 units) and the January 1, 1977 rental vacancy rate was 2.7 percent (1,450 units). See Table V for details.

Single Family Detached Market:

The sales of single family detached homes and single attached homes in Ventura County has been exceptional strong during 1976. The total number of real estate loans made in Ventura County increased from 11,771 in 1970 to 30,550 in 1976. The 1976 loans were up significantly from the 19,999 loans in 1975. The annual number of deeds recorded increased from 20,064 in 1971 to 32,070 in 1976. The 1976 deeds recorded were up from the 24,846 level in 1975. The largest segment of the for sale housing market has traditionally been the single family detached house. Many of the new single family detached housing development, especially near the Los Angeles County line, have had to resort to lotteries in order to distribute the homes among potential buyers. Although, there are still some homes being built under $40,000 in Ventura County, the majority of the new single family detached homes are priced above $50,000. In a survey taken during December 1976, all of the completed new single family detached homes in Ventura County were sold and only 15 percent of those under construction were unsold.

During the year 1976, 6,021 single family detached units were permitted in Ventura County. This represented a significant jump in the number of single family permits from the 1975 figure of 3,608. The number of single family permits issued during 1976 was the largest number of single family permits ever issued in Ventura County (See Table IV for detailed information). The increased single family detached permit activity was the result of: 1) the demand created by the relatively lower selling prices for new homes in Ventura County as opposed to Los Angeles County; 2) the availability of gasoline which is needed for the workers to commute to other counties for their places of work; 3) the school integration plan for the Los Angeles School District which has caused several San Fernando Valley households to seek

housing in areas outside the Los Angeles School District including Ventura County; 4) the limited growth policy in Santa Barbara County has caused some of the Santa Barbara County workers to seek affordable housing in Ventura County; 5) the artificial demand created by speculators; 6) the waiting lists for new homes; 7) some permits were taken out to beat the changes in the coastal regulations; 8) tax rates which are lower than most parts of Los Angeles County are available in the incorporated areas of Ventura County; 9) the semi-rural nature of parts of the county have created a demand among the Los Angeles households who are tired of "congested" city living; and 10) the significant drop in the unsold inventory of single family detached homes has brought in home developers from Los Angeles County.

Attached Single Family Housing/Condominiums:

Sales of attached single family housing units and condominiums were slow until 1976. In December 1974, 51 percent of the completed units and 100 percent of the units under construction were unsold compared with 17 percent of the completed units and 28 percent of the under construction units unsold in December 1976. The decreasing unsold percentages were the result of the drop in attached units being permitted, the higher prices of alternative single family detached housing, smaller average persons per household, the availability of gasoline, and to some extent, the Los Angeles City school bussing situation.

In 1976, it is estimated that attached housing units comprised about 10 percent of the multifamily unit permits. The majority of the attached housing units in 1976 were permitted in Thousand Oaks, Oxnard, and Simi Valley. In Thousand Oaks, attached housing units comprised over 81 percent of the multifamily permits.

Rising Home Prices:

There are four basic reasons for the rising home prices in Ventura County. These reasons are: 1) the competing demand among developers has bid up the price of the available land, and thus it eventually results in higher finished site costs; 2) delays in getting the projects under way (e.g. EIRs, zoning changes, coastal commission approvals, etc.); 3) speculators in the market place; and 4) the strong demand for single family housing by households who work in Los Angeles and Santa Barbara Counties.

Rental Market:

The rental market has tightened considerably since the 1970 Census and especially since the peak of the overbuilding of multifamily units in 1974. The rental vacancy rate in 1970 was 4.9 percent and the January 1, 1977 rental vacancy rate was estimated to be 2.7 percent.(See Table V for details). The majority of the vacant rental units are in the incorporated areas. The cities with the highest rental vacancy rates are Port Hueneme and Oxnard. In addition to regular rental units, places like Port Hueneme and Oxnard have condominiums

which were purchased by speculators or second home buyers who are renting out the units until they either gain enough appreciation to sell or until they are ready to retire and move into the units. Because these condominiums have to rent at rates which are usually higher than conventional rental units, they are often the last units to be rented up.

The drop in the rental vacancy rate was partially caused by the significant drop in multifamily units being permitted in 1974 and 1975 (888 and 1291 respectively). The number of multifamily units being permitted in 1976 was over double the number of units permitted in 1975, but was still considerably lower than the peak years from 1970 to 1973. It should also be remembered that at least 10 percent of the multifamily permits were units for sale as opposed to rental units. See Table IV for detailed information.

The rents in Ventura County have been rising during the past year because of the following factors: 1) rising property taxes; 2) rising utility costs; 3) rising maintenance costs; and 4) lower vacancy rates have permitted the owners to pass along more of their costs to the tenants.

Anticipated Demand for Housing:

Both the rental and sales markets are expected to remain strong for the next two years unless gasoline becomes unavailable or rises significantly in cost. Between January 1, 1977 and January 1, 1979, EMAD estimates that the annual rate of demand for ownership units will be 6,750 units and the annual rate of demand for rental units will be 2,400 units. It should be noted that this is the annual rate for non-subsidized units. The 1976 rate of building permits is about the level required to meet the projected demand for rental and for sale housing.

The majority of the ownership housing will be single family detached units. The remainder will be attached units with the most popular style being the townhouse unit where there is no one living above or below anyone else.

Subsidized Housing:

EMAD has estimated the annual occupancy potential for Section 8 lower income housing in Ventura County to be 1,138 units (361 units for the elderly, 478 units for families and 299 units for large families). The majority of potential households are currently paying more than 25 percent of their income for rent (including utilities). The subsidized multifamily units and the low-rent public conventional housing units in Ventura County are shown on Table VI. In addition to the subsidized units shown on Table VI, there are currently 417 Section 235 cases in force.

Submarkets

Oxnard-Ventura-Camarillo:

The rental vacancy rate in Oxnard has improved significantly since the peak of oversupply in 1974. The main reason for the improved vacancy rate was the sharp drop in multifamily units being permitted. The condominiums which

have also been a problem for the past few years appear to be overcoming their oversupply problem due in part to the purchase of these units by speculators. Houses in San Buenaventura and Camarillo appear to be selling at higher price levels than comparable units in Oxnard and Port Hueneme because these areas have a better image.

Thousand Oaks-Simi Valley:

Thousand Oaks is the main growth area for the HMA because of its proximity to jobs in the San Fernando Valley and the other job centers in Los Angeles County. During the next two years, Thousand Oaks is projected to have the largest percentage increase in both population and households. Most of the new single family detached housing in this submarket has an asking price over $50,000. The attached housing market picked up considerably during 1976, with most of the sales being in the Thousand Oaks/Westlake area. Drawings are being held at most of the single family detached projects in Thousand Oaks because of the large number of prospective buyers.

Remainder of Ventura County:

The remainder of the inhabited HMA consists of the Ojai/Santa Paula/Fillmore area. This area is chiefly agricultural in nature, with some recreation and retirement facilities. The housing markets in these areas are not very active and there are very few large rental projects in these areas. Because of the lower land prices and less union influence, housing in these areas is generally less expensive than in the other areas of the HMA.

Military

The two major defense installations located in the HMA are the Naval Construction Battalion at Port Hueneme and the Pacific Missile Range at Point Mugu. Between June 1974 and September 1975, the combined military and civilian personnel strength at these two bases declined slightly from 12,386 in 1974 to 12,177 in 1975. No major changes in the military and civilian strength at the two bases is anticipated through January 1979.

Howard C. Bicker

Area Economist

Enclosures

Table I

Resident Civilian Work Force Components
Job Based Employment by Industry
Ventura County, California, HMA, 1970 - 1976
(Annual Averages in Thousands) 1/

	1970	1971	1972	1973	1974	1975	1976
Residence Based:							
Civilian labor force a/	148.0	153.4	159.1	166.3	169.8	172.4	174.2
Unemployment	10.3	12.0	10.6	9.9	12.4	14.8	15.5
Rate (Percent)	7.0%	7.8%	6.7%	6.0%	7.3%	8.6%	8.8%
Total civilian employment	137.7	141.4	148.5	156.4	157.4	157.6	158.7
Job Based:							
Nonagricultural wage & salary b/	93.0	95.2	100.8	106.0	110.9	112.3	113.8
Manufacturing	13.7	13.2	14.2	15.3	16.7	16.1	16.3
Durable goods	8.6	7.7	8.4	9.6	10.3	10.0	10.3
Machinery	3.2	2.7	2.9	3.5	4.2	4.0	4.1
Ord/trans. equipment	3.4	2.8	3.1	3.8	3.4	3.4	3.5
Other	2.0	2.2	2.4	2.3	2.7	2.6	2.7
Nondurable goods	5.1	5.5	5.8	5.7	6.4	6.1	5.9
Food products	1.7	1.7	1.7	1.8	2.7	2.0	2.0
Other	3.4	3.8	4.1	3.9	3.7	4.0	3.9
Nonmanufacturing	79.3	82.0	86.6	90.7	94.2	96.2	97.5
Mining	1.8	1.7	1.6	1.6	1.8	1.7	1.8
Construction	4.6	4.8	4.8	4.8	4.8	4.1	3.5
Trans/comm/utilities	4.0	4.3	4.4	4.6	4.3	4.4	4.5
Trade	22.0	22.7	24.0	25.1	25.0	25.5	26.5
Fin/ins/real estate	3.3	3.4	3.5	3.6	4.0	4.2	4.2
Services	14.8	15.3	17.3	19.3	19.9	20.7	21.1
Government	28.8	29.8	31.0	31.7	34.4	35.6	36.1
Agriculture employment c/	11.2	12.1	11.9	12.9	13.4	14.8	14.7

F O O T N O T E S

1/ Totals may not add as a result of rounding.

a/ Total labor force (and components) by place of residence and including workers involved in trade disputes. Employment includes self-employed, unpaid family, and domestic workers.

b/ Employment reported by place of work.excluding workers involved in labor disputes.

c/ Includes farmers, employees, and unpaid family workers.

Source: California State Employment Development Department.

Table II

Population and Household Trends
Ventura County, California, Housing Market Area

April 1, 1960 - January 1, 1979

	April 1, 1969	April 1, 1970	January 1, 1977	January 1, 1979	Average Annual Changes 1960-1970 Number	1960-1970 Rate 1/	1970-1977 Number	1970-1977 Rate 1/	1977-1979 Number	1977-1979 Rate 1/
POPULATION										
HMA TOTAL	199,138	376,430	462,300	495,200	17,729	6.4%	12,721	3.0%	16,450	3.4%
Oxnard a/	51,332	85,520	112,350	121,800	3,419	5.1%	3,975	4.0%	4,575	3.9%
Simi Valley	2,107	56,464	72,950	76,950	5,436	-	2,442	3.8%	2,000	2.7%
Ventura	29,114	55,797	67,300	72,650	2,668	6.5%	1,704	2.8%	2,675	3.8%
Thousand Oaks	2,934	36,334	62,350	72,700	3,340	-	3,854	8.0%	5,175	7.7%
Remainder	113,651	142,315	147,350	151,100	2,866	2.2%	746	.5%	2,025	1.4%
Military b/	29,500	43,200	37,000	35,700	1,370	3.8%	- 919	-2.3%	- 650	-1.8%
Non-military	169,638	333,230	425,300	459,500	16,359	6.8%	13,640	3.6%	17,100	3.9%
HOUSEHOLDS										
HMA TOTAL	54,747	106,469	148,250	165,100	5,172	6.6%	6,190	4.9%	8,425	5.4%
Oxnard a/	12,991	23,947	36,050	40,300	1,095	6.1%	1,793	6.1%	2,125	5.6%
Simi Valley	466	13,554	19,050	20,600	1,309	-	814	5.0%	775	3.9%
Ventura	9,828	18,657	25,000	27,950	883	6.4%	940	4.3%	1,475	5.8%
Thousand Oaks	939	9,711	20,200	25,000	877	-	1,554	10.9%	2,400	10.7%
Remainder	30,523	40,600	47,950	51,250	1,008	2.9%	1,089	2.5%	1,650	3.3%
Military b/	6,900	10,900	9,100	9,100	400	4.5%	- 267	-2.7%	0	0.0%
Non-military	47,847	95,569	139,150	156,000	4,772	6.9%	6,456	5.6%	8,425	5.7%

1/ Derived through the use of a formula designed to calculate the percentage rate change on a compound basis.

a/ Includes Port Hueneme City.
b/ Includes military personnel, dependents, and military-connected population.

Source: 1960 and 1970 Census of Housing and Population: 1977 and 1979 estimated by Economist.

Table III

1969 and Estimated 1976 Decile Distribution of Family Income, 2 Persons or More Renter Households, and 1 and 2 Person Households with a Member 62 Years of Age or Older. (These represent the incomes earned from January to December of the Years 1969 and 1976

Deciles *	All Family		Renter Households**		Elderly Households ***	
	1969	1976	1969	1976	1969	1976
1.0	3789.	5258.	2658.	3688.	1029.	1428.
2.0	6174.	8567.	4204.	5834.	2035.	2824.
3.0	8033.	11147.	5537.	7683.	2661.	3693.
4.0	9700.	13460.	6724.	9331.	3463.	4805.
5.0	11314.	15700.	7962.	11049.	4477.	6213.
6.0	12917.	17924.	9296.	12900.	5798.	8046.
7.0	14519.	20147	11020.	15292.	7446.	10333.
8.0	18153.	25190.	13178.	18287.	9868.	13693.
9.0	22658.	31442.	16013.	22221.	14147.	19631.
9.5	24910.	34567.	18266.	26735.	18843.	26148.

1976 Incomes = 1969 Income Times 1.388

*Each whole decile = 10 percent(e.g.the 2.0 decile is equal to 20 percent)
**Renter Households = Two plus person renter households
***Elderly households = one and two person households with member 62 years of age or older.

Prepared by EMAD (C.O.)

Table IV

Housing Units Authorized by Building Permits 1/
Ventura County, California, Housing Market Area

1965 - 1976

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
VENTURA COUNTY HMA	5937	2609	2899	4776	5991	5115	8145	7451	5603	2696	4899	8536
Single Family	4219	2088	2302	4060	4201	2407	3267	4044	2565	1808	3608	6021
Multifamily	1718	521	597	716	1790	2708	4878	3407	3038	888	1291	2515
Camarillo	a/	86	218	a/	679	143	553	313	537	201	319	958
Single Family		86	175		446	98	282	261	507	201	315	932
Multifamily		0	43		233	45	271	52	30	0	4	26
Fillmore	47	68	15	39	24	48	82	171	41	90	80	94
Single Family	17	38	4	26	9	22	72	155	41	66	51	68
Multifamily	30	30	11	13	15	26	10	16	0	24	29	26
Ojai	10	21	8	32	10	12	82	95	45	56	49	171
Single Family	10	7	8	32	10	12	36	9	33	10	44	61
Multifamily	0	14	0	0	0	0	46	86	12	46	5	110
Oxnard	849	303	700	827	1404	1604	1922	1370	1149	679	1234	1658
Single Family	401	47	311	518	625	690	729	754	355	297	678	800
Multifamily	448	256	389	309	779	914	1193	616	794	382	556	858
Port Hueneme	119	15	21	98	76	270	381	1033	355	1	223	448
Single Family	6	5	1	96	76	41	1	34	0	1	44	204
Multifamily	113	10	20	2	0	229	380	999	355	0	179	244
Santa Paula	243	145	37	30	29	117	143	186	108	58	25	135
Single Family	140	67	23	23	13	43	14	163	62	56	25	106
Multifamily	103	78	14	7	16	74	129	23	46	2	0	29
Simi Valley	a/	a/	a/	a/	a/	304	1086	991	371	159	473	915
Single Family						201	920	736	251	63	445	469
Multifamily						103	176	255	120	96	28	446

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Thousands Oaks	a/	122	333	1192	1927	1314	2331	1824	1209	520	1495	1923
Single Family		122	333	1103	1614	455	509	906	651	359	1197	1711
Multifamily		0	0	89	313	859	1822	918	558	161	298	212
Ventura	1342	404	242	548	703	603	1078	848	1397	631	581	1260
Single Family	613	303	184	323	298	145	231	540	322	470	405	739
Multifamily	729	101	58	225	405	458	847	308	1075	161	176	521
Unincorporated Area	3327	1445	1325	2010	1139	700	477	620	391	301	420	974
Single Family	3032	1413	1263	1939	1110	700	473	486	343	285	404	931
Multifamily	295	32	62	71	29	0	4	134	48	16	16	43

1/ Nearly all of the County is covered by building permit systems.

a/ Included in Unincorporated Area.

Source: Security Pacific Bank

Table V

Components of Housing Inventory
Ventura County, California, Housing Market Area

April 1, 1960 - January 1977

Component	April 1960	April 1970	January 1977
Total Housing Inventory	60,698	112,133	156,550
Total Occupied Units	53,747	106,469	148,250
Owner Occupied	33,232	69,966	96,100
Percent	60.7	65.7	64.8
Renter Occupied	21,515	36,503	52,150
Percent	39.3	34.3	35.2
Total Vacant Units	5,951	5,664	5,300
Available Units	3,043	3,434	2,650
For sale only	1,098	1,538	1,200
Homeowners Vacancy Rate	3.2%	2.2%	1.2%
For rent or sale	1,945	1,896	1,450
Rental Vacancy Rate	8.3%	4.9%	2.7%
Other Vacant a/	2,908	2,230	2,650

a/ Includes dilapidated units, seasonal units, units rented or sold and awaiting occupancy, and units held off the market for absentee owners or other reasons.

Source: 1960 and 1970 Censuses of Housing, 1977 estimated by Economist.

Table VI

Section 236

Project Number	Name and Address	Total Units	Total Units Vacant
122-44014	Ventura Terrace 6600 Telephone Road Ventura, California	130	1
122-44081	Port Hueneme Redevelopment Hsg. 100 Seaview Street Port Hueneme, California	90	N/A
122-44084	Channel Island Park Apts. Channel Island Blvd. & Albany Oxnard, California	152	5
122-44100	Rancho Ellen S. 2434 Alvarado Road/Old Conejo Rd. Oxnard, California	168	3
122-44530	Los Arboles Calle Haya & E/S Montclef Thousand Oaks, California	43	0
122-44562	Mountclef Apartments Thousand Oaks, California	18	0

Section 221(d)(3)

122-35045	Brighton Park Colonia Road/Gibraltar Oxnard, California	96	0
122-55008	Ventura Village Green 6500 East Telegraph Road Ventura, California	150	2
122-55017	Rose Gardens Apartments #1 1941 San Gorgonio Avenue Oxnard, California	156	0
122-35368	Mission Park Apartments Santa Clara & Ventura Streets Ventura City, California	53	N/A

Low Rent and Section 23

Oxnard	Low Rent Public Housing	220 Elderly 560 Families
	Section 23	13 Elderly 137 Families
Port Hueneme	Low Rent Public Housing	60 Elderly 50 Families
	Section 23	50
	Section 8	50
San Buenaventura	Low Rent Public Housing	370
	Section 23	274
	Section 8	50
Santa Paula	Section 23	200
	Section 8	50
Ventura County	Section 23	150
	Section 8	580

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
REGIONAL OFFICE
ARCADE PLAZA BUILDING, 1321 SECOND AVENUE
SEATTLE, WASHINGTON 98101

RECEIVED
May 24, 1978

REGION X
Office of Community
Planning & Development

MAY 30 10 26 AM '78
FEDERAL POWER COMMISSION

IN REPLY REFER TO
10D M/S 317

Mr. Kenneth F. Plumb
Secretary
Federal Energy Regulatory Commission
Office of Pipeline and Producer Regulation
Washington, D. C. 20426

Subject: Construction and Operation of an LNG Liquefaction Terminal at Nikiski, Alaska; Docket No. CP75-140

Dear Secretary Plumb:

We have reviewed the impact statement submitted with your April 21, 1978 letter.

We are limiting our comments to the Liquefaction Terminal at Nikiski, Alaska. The receiving terminal at Point Conception, California, is not within our region.

You indicate that the LNG facility at Nikiski would limit future recreational and residential development within sight and sound of the facility. We suggest that the areas not suitable for housing be better defined on the land use map. We believe future housing should not be allowed in the abandoned trailer park adjacent to the facility. We also feel that the unoccupied subdivision adjacent to the storage area be considered inappropriate for future housing. We also suggest that if any of the present residences are in a potential hazard area the residents be so informed and plans be made to relocate them in a safe area.

Required safety measures during design and construction are not within our areas of expertise. Thus, we defer to others to comment on these matters.

Thank you for the opportunity to comment.

Sincerely,

Robert C. Scalia

Robert C. Scalia
Director

FEDERAL ENERGY REGULATORY COMMISSION
DOCKETED
MAY 30 1978
C7
DOCKET SECTION

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28

Areas not suitable for housing in the immediate area of the LNG plant would be designated by local zoning codes.

A recommendation in Section I of Volume I of the FEIS requests that the applicant include in their Operations Guide - Nikiski Marine Terminal Complex procedures that require the notification of local residents in the case of a major accident.

DEPARTMENT OF THE NAVY
WESTERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
P.O. BOX 727
SAN BRUNO, CALIFORNIA 94066

IN REPLY REFER TO:
2022.1:RRT:cv
Ser P2-321
2 JUN 1978

Federal Energy Regulatory Commission
825 N. Capitol Street, Room 6112
Washington, DC 20426

Attention: Kenneth Plumb, Secretary

Subj: OPPR-PCCD/EEB Western LNG Terminal Company, Docket No. CP75-
(LNG Receiving Terminal at Point Conception, California)

Dear Sir:

This letter constitutes the Navy's official comments on the Draft Environmental Impact Statement (DEIS) for the subject project. Our comments relate to the consideration in the DEIS of Marine Corps Base (MCB), Camp Pendleton as an alternate site. The DEIS indicates that your staff has rejected Camp Pendleton as a site on the basis of operational incompatibility and for other reasons as stated on page 284 of the report. The Navy and the Marine Corps wholeheartedly support this position and request that your Commission take whatever action is necessary to remove Camp Pendleton from further consideration as a site for LNG facilities either onshore or offshore.

The California Coastal Commission, however, at its May 24th meeting, voted to recommend to the California Public Utilities Comission that Camp Pendleton be approved as the first-ranked LNG site for this state. This action was taken despite repeated efforts by the Department of the Navy to have Camp Pendleton deleted from consideration. Enclosed are copies of statements made at public hearings by Navy and Marine Corps representatives and of related correspondence. Included among these documents is a telegram dated 12 May 1978, from the Chairman of the House Armed Services Committee to the Chairman of the Coastal Commission. It strongly supports retention of the Base as a prime amphibious training area.

Thank you for the opportunity to comment on the Point Conception LNG Receiving Terminal DEIS.

Sincerely,

PAUL D. OLSON
Captain, CEC, USN
Commanding Officer

Enclosures

No response required.

The enclosures, along with other previous letters from the Navy, are attached as a separate appendix to the FEIS.

2022.1:RRT:cv
Ser P2-321

2 JUN 1978

Copy to:
Public Utilities Commission (w/encls)
State of California
State Building
350 McAllister Street
San Francisco, California 94102

Comprehensive Planning Organization (w/o encls)
San Diego Region
Suite 524
Security Pacific Plaza
1200 Third Avenue
San Diego, California 92101

Office of Planning & Research (w/o encls)
State Clearinghouse
1400 - 10th Street
Sacramento, California 95814

Santa Barbara County (w/o encls)
City Area Planning Agency
1306 Santa Barbara Street
Santa Barbara, California 93101

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (G-WS/73)
WASHINGTON, D.C. 20590
PHONE: (202) 426-2262

JUN 29 '78
FEDERAL POWER COMMISSION

30 JUN 1978

Mr. Kenneth F. Plumb
Secretary
Federal Energy Regulatory Commission
Washington, D. C. 20426

RECEIVED
JUL 6 1978
OFFICE OF ELECTRIC POWER REGULATION

Dear Mr. Plumb:

This is in response to your letter of 21 April 1978 concerning a draft environmental impact statement on the Western LNG Project.

The material submitted has been reviewed by the concerned operating administrations and staff of the Department of Transporcation. The Coast Guard had the following comments to offer:

"A. Volume I

Section A(3), p. 23 and B(5) e(ii), p 64. In discussing dredging operations and the bathymetry adjacent to the Nikiski Site, information should be provided describing existing hazards and how dredging operations will minimize the possibility of groundings and otherwise insure safe navigation. In particular, a discussion should be included on tanker approaches to the proposed terminal, areas of high grounding risks, and dangers to navigation along the tanker approaches at MLLW.

A proposed navigation plan has been included in Figure 18 of Volume I of the FEIS. Grounding risks and other navigational hazards are discussed in Attachment A of Volume II of the FEIS.

Section A(4), p. 26. Paragraph three states "the present volume of ship traffic in Cook Inlet is relatively low, 2 /''. The footnote refers to approximately 700 arrivals of ships (300 tons or more) from October 1971 through September 1972. This information is inadequate and outdated. Vessel densities in the area are rather low compared with other U. S. waterways; however, due to the potential hazards associated with the proposal, quantitative data should be provided on present and projected shipping volumes. Substantial increases in vessel traffic are possible in consideration of OCS exploratory activity in Lower Cook Inlet which has increased 200 percent since 1974. Vessel traffic estimates should include smaller vessels in the area such as fishing and pleasure craft. It should also be noted the statement '..... shipping lanes have not been established' (in Cook Inlet) is only partially correct.

Comment reflected in Section C.9 of Volume I of the FEIS.

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OFFICE OF ELECTRIC POWER REGULATION

SPEED LIMIT 55
It's a law we can live with.

The Coast Guard has not established designated (mandatory) shipping lanes in Cook Inlet. However, voluntary shipping lanes have been established in Kachemak Bay to resolve conflicts between fishing and non-fishing vessels.

Section G(5) p. 143. The discussion of oil spill containment and cleanup measures described for the construction phase indicates adequate foresight and planning for construction of the LNG facility. However, there is no mention of oil spill contingency planning for potential spills associated with construction of the pipeline. Since the proposed pipeline will make approximately 94 waterccurse crossings, it is important to provide for mitigation of spills. At a minimum, construction crews should have on hand supply of oil sorbent pads or rolls and preferably have immediate access to some boom material. Experience gained during construction of the Trans-Alaska Oil Pipeline clearly supports such contingency measures.

A recommendation in compliance with this comment has been included in Section I of Volume I of this FEIS.

LNG facility. Construction and operation of the LNG facility must comply with Waterfront Facility Regulations, 33 CFR 126 (see Federal Register of April 10, 1978, Vol 42, No 69, Part V which proposed updating and consolidation of these and other applicable regulations). Additionally, it is recommended the applicant be required to install shoreside reception facilities for both sanitary wastes and bilge slops.

Applicable regulations are listed in Appendix C of Volume I of the FEIS. The disposal of sanitary wastes and bilge slops is discussed in Section D.3.

Bridge permits. Coast Guard bridge permits may be required in several instances involving pipeline construction. The Coast Guard has jurisdiction for permitting bridge crossings over all navigable waterways as defined in 33 CFR 2.05.25, including pipelines. Submerged pipelines are under the jurisdiction of the Corps of Engineers; however, bridge permits from the Coast Guard are required for access bridges or other temporary or permanent bridges needed during construction. Additionally, public lands used for or affected by the pipelines construction as a result of Coast Guard permitting actions, which are managed as or used significantly as parks, wildlife refuges or recreation areas, or are of historical significance, may be subject to requirements of section 4(f) of the Department of Transportation Act (49 USCG 1653 (f)). This Act prohibits use of or affecting these areas unless it is demonstrated there is no feasible and prudent alternative and all possible effort has been made to minimize harm to the affected areas. Early coordination with the Seventeenth Coast Guard District Aids to Navigation Branch will facilitate issuance of any required permits and prevent unnecessary project delays.

Comment reflected in Appendix C of Volume I of the FEIS.

B. Volume II

Sections A(4) p. 14 and D(2) p. 241. The Coast Guard objects to the practice of LNG vessels avoiding the Traffic Separation Scheme (TSS). It is recommended they be routed in to the Southbound lane of the Santa Barbara Channel TSS and make a right angle departure from the TSS. This procedure is in accordance with Rule 10 of the International Regulations for Preventing Collisions at Sea, 1972.

Comment reflected in Sections A and D of Volume II of the FEIS.

Section A(4) p. 15. The Coast Guard will review and approve detailed plans for the LNG facility encompassing fire protection systems, transfer systems, etc., that are within the purview of the Coast Guard.

Comment noted.

Section B(5) p. 72, ii. In the discussion on waves it would be useful to state the percentage of time of occurrence of 6 foot waves as similar information is provided for 4 and 10 foot waves.

Comment reflected in Section B-5b of Volume II of the FEIS.

Section C. (1) p. 141. A discussion should be provided describing the exact weather limits under which a vessel could depart the dock or be better off delaying departure.

Comment reflected in Section C-1 of Volume II or the FEIS.

Section C(5) p. 164. In the discussion on estimates of berth downtime, the limiting criteria for visibility will be one mile.

Comment reflected in Section C-5b of Volume II of the FEIS.

Section C(5) p. 165. It is unclear as to whether the table depicting percent of berth downtime by month considers the cumulative effects of weather. If wind and waves are just under the limits, but in combination create unacceptable conditions, does the data presented in the table account for this? Swells should also be considered in the analysis. In addition, it is anticipated the Coast Guard will only allow vessel approaches with at least one mile visibility.

Comment reflected in Section C-5b of Volume II of the FEIS.

Section C(7) p. 187. Under the discussion on Toxic and LNG Spills it should be noted a spill contingency plan will be required by the Coast Guard.

Comment reflected in Section C-7b of Volume II of the FEIS.

Section C(11) p. 203. Under the discussion on in-port tanker emissions it's a near-certainty that LNG boil off will be consumed in the ship's boilers, thereby decreasing Bunker-C consumption and resulting emissions.

Comment reflected in Section C-11 of Volume II of the FEIS.

Section E, p. 247. Although LNG traffic would increase vessel traffic in the Point Conception area, it would add only 258 transits per year to the present rate of 4380. Unless a more quantitative discussion is presented in the EIS, terms such as "pronounced increase" are of little use beyond feeding reactionary groups who are unaware or choose to ignore the facts. Furthermore, stating the project would cause long term disruption to pleasure boats and commercial craft is overstating the case.

Comment reflected in Section E of Volume II of the FEIS.

Section E, p. 248. It is not clear how the integrity of the Point Conception Lighthouse setting would be altered since the proposed LNG facility would be located over three nautical miles away.

Ibid.

Section A, p. 398. On February 26, 1978, the fishing vessel Chelan collided with the tanker Sansinema II while in the vessel traffic lanes and sank. This is the only accident in the last eight years known to the Coast Guard involving a vessel over 100 DWT in the Traffic Separation Scheme.

Comment reflected in Attachment A to the FEIS.

Attachment A - General Comments. Uncertainties inherent in using mean accident rates and precisely stated accident reduction factors in calculating accident probabilities should be discussed. An evaluation or statement concerning uncertainties in using tanker accident historical data to predict risk of future LNG ship accidents and cargo releases and in application of various 'accident reduction factors' should be provided (Refer to pp. 35-37 of the enclosed paper).

While this approach may be useful in comparing new risks resulting from the proposed project to risks that are commonly tolerated and accepted by the general public, it is not of much use in identifying specific hazards associated with the marine transportation aspects of this project or specific measures which may be of use in eliminating or controlling such hazards. In this connection, the concepts and procedures outlined in the enclosed paper may be of use on analyzing LNG risks associated with this paper and in developing strategies to control such risks.

The Department of Transportation has no other comments to offer nor do we have any objection to this project. The final statement, however, should address the concerns of the Coast Guard.

The opportunity to review this draft statement is appreciated.

Sincerely,

F. P. SCHUBERT
Captain, U. S. Coast Guard
Acting Chief, Office of Marine
Environment and Systems

Enclosure
(Retained in OEPR/DLP/EA

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The enclosed paper with this letter of comment was indeed informative. Staff is at present developing methods to quantitatively analyze uncertainties in the risk numbers set forth in the DEIS. This sensitivity analysis work will not however be ready by the time the FEIS is published. Staff does however agree with the comment.

ROBERT J. LAGOMARSINO
19TH DISTRICT, CALIFORNIA

1117 LONGWORTH BUILDING
WASHINGTON, D.C. 20515
202-225-3601

ASSISTANT REGIONAL WHIP

Congress of the United States
House of Representatives
Washington, D.C. 20515

COMMITTEE ON
INTERNATIONAL RELATIONS

SUBCOMMITTEE:
INTER-AMERICAN AFFAIRS

COMMITTEE ON
INTERIOR AND INSULAR
AFFAIRS

SUBCOMMITTEES:
NATIONAL PARKS AND INSULAR AFFAIRS
SPECIAL INVESTIGATIONS

July 21, 1978

Mr. Richard L. Dunham
Chairman
Federal Power Commission
825 North Capitol Street
Washington, D.C. 20426

Dear Mr. Dunham:

Enclosed is a self-explanatory letter from my constituent, Chief Greywolf. As you will note, he is quite concerned about the possible location of a liquid natural gas factory at Point Conception.

I would appreciate any information that you may be able to provide.

Sincerely,

ROBERT J. LAGOMARSINO
Member of Congress

RJL:sle
Enclosure

RECEIVED
AUG 2 2 15 PM '78
BUREAU OF
NATURAL GAS
ADMINISTRATIVE
OFFICE

BUREAU OF
NATURAL GAS
ADMINISTRATIVE
OFFICE

JUL 2 12 42 PM '78
FEDERAL ENERGY
REGULATORY
COMMISSION

OFFICE OF THE CHAIRMAN
RECEIVED

Letter accepted as comment to the DEIS and considered in preparation of the FEIS.

Indian Legal Service - Spiritual Counselors Inc.

Honorable Congressman
Robert Lagomarsino
1117 Longworth Building
Washington D.C. 20515

American Bear Nation
United American Indian Refugees
United Coosawattee Cherokee Tribe
of California and Nevada

July 13th 78

Dear Congressman Lagomarsino.

This is a goverment petition, sent to you, in behalf of the United States Congress, which is sent under our legal right to petition, with the public interest in view and written with out malice, as this is a moral issue invaled and this moral issue is our Religious Liberty and Religious church site is being taken from all american indians at Point Conception here in Santa Barbara County, in the State of Calif. and across America

It is our belief that the general welfare of the public and the public's safety is also an issue, and that the technology of this point in time, will be unable to see the dangers of placing a L N G factory upon a earth quake fault, a small epample, you are camping and have dug a pit and have built your camp fire in this pit and along comes someone who sets a pan of liquid gas right dab in the center of it - guess what happens ? this is what will happen at Point Conception ; during an earth quake.

Remember we indians understood the word was

Chief Greywolf: Director P.O. Box 2369. Santa Barbara. Ca 93102 (805) 966-1125

Indian Legal Service - Spiritual Counselors Inc.

American Bear Nation
United American Indian Refugees
United Coosawattee Cherokee Tribe
of California and Nevada

round for thousands of years, and we don't need to use technological processes to tell us these truths.

our organization understands Police Powers are usually thought as reserved powers of a state, but we also know its a legal fact that Congress of the United States has police powers above and over all states in the United States and its many territories, therefore we know you have the right and the powers to help us, concerning this issue.

We are also Spiritual Counselors of the Bill of Rights in the United States Constitution and we state our religious freedom of all Indians and persons with Indian Hearts, are being denied here at Point Conception.

This is an Indian Spiritual Site of all Indians from the dim dawn of remembering. I Greywolf came here to Santa Barbara over five years ago to be near Point Conception, as I have gone there in Spirit, many times, and use it as a Spiritual Point of Concentration in my Spiritual meditations every day.

It is so sacred that I would not dare to walk with out taking off my shoes,

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Indian Legal Service - Spiritual Counselors Inc.

American Bear Nation
United American Indian Refugees
United Coosawattee Cherokee Tribe
of California and Nevada

and fasting and having been in Spiritual Concentration of there, for many days, before thinking about going into this area in my physical body, altho in my Spiritual Body of Light I go there every day during worships.

We are requesting that you contact the U.S. Dept. of the Interior, Division of Grazing Control and get us a copy of the lease that the Holister Ranch has been issued or a copy of the Grazing license, we want to see if they are committing any violation to same, in allowing LNG to come upon this land. We request this answer.

We also are requesting that you contact the Santa Barbara County Board of Supervisors and find out what authority they have over land that is under the Dept. of Interior, Bureau of Land Management and under the Division of Grazing Control. We request this answer.

We request that you contact the Federal Power Commission in Washington D.C. which is an independent agency of the federal government, for operation purposes, but which is still under the Dept of Transportation and

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of California and Nevada

under the administrative powers of the Congress and the Presidents administrative Cabient and which regulates the State of Calefornia Public-utility Commissioners, We want you to request that the Federal Power Commission look into this issue and give you there report and we request you send us a copy of this answer.

We also request that you Contact the Calif. State Public utility Commissioners and give them the moral issue envoled, which is denying american indians there freedom of religion under the United States Constitution and also the fact that their twentyth century Technology is too primitive at this point in time, to detect the dangers of placing a L N G site upon Point Conception a earth quake fault.

as Point Conception is suppose to be protected by the United States Constitution, since it is in fact of law; a american indian religious Church site, belonging to all american indians and in fact all peoples of the indian Race.

Chief Greywolf: Director P.O. Box 2369. Santa Barbara. Ca 93102 (805) 966-1125

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American Bear Nation
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United Coosawattee Cherokee Tribe
of California and Nevada

My Grandfather told me, it is where our Mother Earth opened up herself and Spiritually received the gift of life from her husband our Sun. I was told that only here at this Sacred Point of Conception could I pray for the healing of our Mother Earth and the spiritual up lifting of the human race. It was explained to me by Grandfather that we are the oldest race of man and this Point Conception was where the Indian was born, but in those times we were only called People and not Indians, by our Divine Parents, as is all life forms call people and once we could talk with all of nature Creatures and life forms and our Mother Earth and Father Sun, but a false vision came upon our people first, then the white men came, and this psychic power was taken away, but some of us can do these things still, our medicine men can do this still, and can

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American Bear Nation
United American Indian Refugees
United Coosawattee Cherokee Tribe
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travel in our Spiritual bodies to worship at Point Conception. For we have kept these truths, even after the demeaning situations your christian religions put upon our people. The falsifications of these teachings have always been understood by us Indians, who tend the Circle of Life. That our People were Keepers of these lands for the Great Spirit We already knew we were part of nature and nature was part of us, long before your white race understood this, and now many of you still are mentally unable to understand this is a Spiritual World and a Spiritual Life and under Spiritual Laws and to violate the point of Conception between our Mother Earth and our Father Sun, would be the most evil act the non Indian will of committed against the Indian People and Mother Earth and this violation is also against the Great Spirit which is the very God who Created you at some point in time, through Point Conception, would you close your own door to the Spirit World Forever, for

Chief Greywolf: Director P.O. Box 2369. Santa Barbara. Ca 93102 (805) 966-1125

7.

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United American Indian Refugees
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of California and Nevada

this is what our grandfathers have told us, that indians will be on the mountain tops, and watching the land burning in this area from the white men's disrespect of the Great Spirit and the Mystery of the Great Spirit.

That Point conception should be left as the Great Spirit made it. Please in your letter to the Calif. Public - utility's commission tell of this. Please send us a copy of their answer to you, as this religious issue concerns our organization and our membership. We are american indians who feel this is an indian church and worship land area of religious sacredness.

We have sent this to you as american citizens, looking to you for help, as you are our elected offical and our federal representative in congress.

We thank you greatfully for your time spent in reading this petition and your time, that will be spent in helping us with this problem.

Respectfully Chief Arthur Greywolf

Chief Greywolf: Director P.O. Box 2369. Santa Barbara. Ca 93102 (805) 966-1125

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

FILED
OFFICE OF THE SECRETARY
JUN 7 10 57 AM '78
FEDERAL
POWER COMMISSION

P.O. Box 2417
Washington, DC 20013

1950

JUN 6 1978

Honorable Kenneth A. Plumb, Secretary
Federal Energy Regulatory Commission
Washington, DC 20426

Dear Mr. Plumb:

We have reviewed the Draft Environmental Impact Statement for the Western LNG Project, FERC/EIS-0002. Our comments are limited to Volume II, Construction and Operation of an LNG Receiving Terminal at Point Conception, California.

Alternative pipeline routes, some of which would cross the Los Padres National Forest, are associated with the various alternative terminal sites.

The analysis in this case is complicated by the passage in 1977 of the California LNG Terminal Act. The FERC DEIS, Vol. II, states (page 347):

> "Of the potential LNG sites analyzed in this study, Oxnard emerges as the clear choice on environmental grounds. The California siting law would eliminate this site on what appears to be an arbitrary criteria of population density."

The Rattlesnake Canyon site is the "next best environmental choice." Siting at Point Conception would produce significant environmental impact, according to the DEIS, and ranks below Rattlesnake Canyon.

Despite passage of the 1977 Act, siting of the LNG terminal continues to be an issue in California with recommendations and studies by the State Coastal Commission and the Public Utilities Commission.

Page 360 of the DEIS states, "Although the proposed site at Point Conception is inferior to the alternate Oxnard and Rattlesnake Canyon sites, the staff does not believe that an LNG terminal at Point Conception would be environmentally unacceptable if certain mitigating measures are taken." The DEIS then lists 46 possible mitigation measures applicable to the LNG terminal or the pipeline route. If Point Conception is the selected alternative for the LNG terminal, the Los Padres National Forest would want to work closely with the Bureau of Land Management (the agency responsible for issuing the pipeline right-of-way)

43

No response required.

6200-11 (1/69)

to strengthen and make more specific the required mitigation measures. We particularly recommend sub-alternative pipeline route B (see page 364, item 22, and pages 260-1), which follows Highway 166, be the adopted route.

Regarding this route, my letter of January 22, 1976, to the Federal Power Commission commenting on the Alaska Natural Gas Transportation Systems DEIS, stated:

> "The proposed pipeline route alternatives originating from the Point Conception area that crosses Los Padres National Forest would be environmentally unacceptable. The area along the proposed routes is extremely unstable and subject to mass failures. It would not be wise to allow major construction here...
>
> "The most feasible route through the area would be the FPC staff alternative B, which is partially within the constructed right-of-way of State Highway 166. The highway is an existing scar on the landscape and a source of environmental damage from landsliding and reservoir siltation. However, it is slowly stabilizing, and additional major damage would probably not occur along Highway 166 if the pipeline route were restricted to the road prism.
>
> "Based on the preponderance of information available to us, any of the proposed pipeline routes across the Los Padres National Forest would cause major adverse impacts. If the LNG proposal is the alternative selected for Arctic gas transportation, we would concur with FPC staff that the Oxnard site should be the route choice."

No response required.

Although effects to National Forest lands will be limited by the choice of pipeline alternative B, effects to non-National Forest lands and resources may still be significant, as noted in the following comments on effects to fish, wildlife and cultural resources.

The impact of the proposed LNG plant at Point Conception and its associated pipeline would have minimal impact on the fish and wildlife resources of the Los Padres National Forest. The pipeline corridor should be surveyed for sensitive plant and animal species before a right-of-way is granted. No conflict is expected. Measures should also be used to ensure the rapid revegetation of the corridor with plants of benefit to wildlife populations.

No response required.

The Point Conception site does not appear to be the most suitable site when lands outside of the National Forests are considered. As pointed out in the EIS, the Oxnard site poses the smallest threat to fish and wildlife values. If the Oxnard site is selected, adequate

No response required.

measures should be employed to protect the least tern nesting colony and the salt marsh adjacent to the LNG plant. It would be desirable for the project to include measures that would enhance these valuable wildlife areas.

A summary of our cultural resource recommendations follows. We are also enclosing the full report of the Los Padres National Forest Archaeologist as we feel its contents may be helpful to your staff.

The major shortcoming of available information concerning the effect of the project on cultural resources is the lack of adequate surveys of access roads and power transmission lines. On the basis of this fact, we offer the following recommendations.

1. A plan for protection of cultural resources should be developed for the entire project. The plan should stress avoidance where possible.

Staff believes Recommendation 42 of the DEIS satisfies the suggestion for such a plan.

2. A thorough survey of alternate access roads.

See Recommendation 42(e) of the DEIS.

3. Adoption of alternate plans where feasible. Also, where possible, existing routes for access should be selected.

See Recommendation 42(a) of the DEIS.

4. The following additions and changes in conditions be adopted:

a. Hiring of a cultural resource manager for the duration of construction. This will facilitate planning of avoidance.

Provisions for the appropriate agencies to approve procedures to carry out revised staff Recommendation 42 of the DEIS would accommodate this suggestion.

b. Archaeological sites should be individually fenced to prevent inadvertent disturbance by vehicles and construction activities.

Recommendation 42(b) has been modified to meet this suggestion.

c. Salvage excavation, where this is the only feasible mitigation, is recommended only for the National Register (36 CFR 63.3). Sites which do not meet the integrity standards of the National Register 36 CFR 800.10 (a) are still valuable as sources for potentially important scientific and cultural information. Salvage excavation of ineligible sites should be undertaken where avoidance is not feasible.

Comment reflected in Section I of Volume II of the FEIS.

d. Consultation with Chumash descendants to (1) determine ethnic significance of sites, and (2) identify specific areas of concern to these people. This work should be conducted by an

Comment reflected in Section I of Volume II of the FEIS.

4

ethnographer with expertise in California Indian religion, such as Dr. Lowell Bean, California State University, Hayward.

We appreciate the opportunity to review and comment on this Draft Environmental Impact Statement.

Sincerely,

R. MAX PETERSON
Deputy Chief

Enclosure

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

SO

REPLY TO: 2360

May 10, 1978

SUBJECT: Comments on Cultural Resources - DEIS
Western LNG Project

TO: Forest Supervisor

I have given the DEIS a careful reading. In my opinion, it is a good document. I have the following comments regarding the cultural resources component.

General Comment on Survey Coverage

Paragraph three, p. 124, describes archaeological coverage. The CPUC survey covered the western portion of the Edison property. The CPUC survey of the eastern half of the Edison property was restricted to a proposed pipeline corridor. The survey done by UCLA of the eastern half was based on the erroneous notion that the proposed terminal location was to be constructed near Bananca Honda and Canada del Cojo. the reference in line 10, p. 127, should read "eastern half" rather than "western half."

47

Areas of Inadequacy

The power line corridor has not been surveyed by either the CPUC or UCLA teams. This survey needs to be done, since the impact of access roads associated with power transmission lines can be considerable (reference p. 127).

The proposed access roads to the terminal site are incompletely surveyed. Impacts to cultural resources and appropriate mitigation measures cannot be adequately determined on the basis of available information. Based on the known distribution of sites in the area, the currently planned access road would have extensive impacts on cultural resources (reference p. 177).

The pipeline survey was a surface survey. Where the corridor passes near site areas, as at Ytias and Tepusquet Canyons, subsurface testing should be undertaken. Specific and explicit protection plans need to be designed for sites near pipeline construction areas (reference p. 128).

Comment reflected in Section B-10 of Volume II of the FEIS.

Comment reflected in Section I of Volume II of the FEIS.

Ibid.

Ibid.

The potential eligibility for the National Register of sites at Canada del Cojo, and Ytias and Tepusquet Canyons is, in my opinion, correct. The potential eligibility of known sites with integrity and scientific value near the power transmission corridor has not been recognized (reference p. 133). It is very likely that the integrity, research value and cultural value of the known cultural resources is sufficiently high to warrant nomination to the National Register as an archaeological district. One criteria which should be explicitly addressed in any consideration of National Register eligibility should be the great sacred meaning of the area and of certain of the sites.

No response required.

Impacts

The issue of the sacred meaning of the area to descendants of Chumash Indians needs to be emphasized beyond that done in paragraph 2, p. 197. There are at least two kinds of sacred meaning which attend this area: 1 - As a place of mythic, otherworldly importance and 2 - as the place where specific sacred ceremonies were conducted on or adjacent to the large midden areas as late as 1804. It is my sense of Indian opinion that the LNG facility would be incompatible with the area's sacred nature.

Comment reflected in Section C-10 of Volume II of the FEIS.

Mitigation at Terminal Area

The document does not present any specific guidance about which of the two proposed mitigation measures (excavation or relocation) is most desirable (reference pp. 237-238).

Comment reflected in Section D of Volume II of the FEIS.

Relocation: The document (reference p. 238) indicates that construction yards and other construction-related activities would occur on the sites even if the facility is redesigned to avoid impact. In my view, this use of the archaeological sites is unnecessary because land toward the east of the facility could be used for yarding. No major cultural resources were located during the CPUC survey of the area adjacent to the proposed facility on the east. The archaeological sites should be fenced and alternate areas should be used for construction-related activities. Fencing and use of alternate areas should be detailed in an explicit protection plan.

Excavation: Excavation is not a satisfactory mitigation option for the following reasons: 1 - Alternate space almost free of cultural resources is available on the property, 2 - there are enormous costs associated with excavations of entire villages. The time estimates for excavation provided by CPUC are much more realistic than those provided by the applicant's consultant, 3 - opposition of Indian groups to excavation of village sites and cemeteries. The issue of cemetery excavation is particularly sensitive, especially to the descendants of the Chumash Indians.

Section D of the FEIS describes measures proposed by the applicant. Section I contains staff's recommendations over and above the applicant's mitigation measures. Federal policy mandates avoidance as the preferred mitigating measure, as called for in Recommendation 42(a) of the DEIS.

For both options, a plan should be developed to deal with the eventuality of accidental discoveries of significant cultural resources.

Comment reflected in Section I of Volume II of the FEIS.

Pipeline Mitigation

The discussion of mitigation along the pipeline corridor is ambiguous (reference p. 242 and 249). The document states (reference p. 242), "an archaeologist would follow construction along the proposed pipeline to preserve any artifacts discovered, although the archaeological sites themselves might be destroyed." In my opinion, this is not a proper technique for mitigation of impacts. The document (reference paragraphs 3 and 4, p. 128) implies that the pipeline can be re-routed to avoid sites. Realignment of the pipeline corridor is preferable to a cat skinner giving an archaeologist a handful of artifacts.

Staff agrees.

Alternative Pipeline Routes

Expected impacts to cultural resources of Alternatives A, B and C are approximately comparable with the following exceptions (reference p. 256):

1. Alternative A (Canada del Cementario to head of Los Alamos Creek) has the probability of crossing more sites if it is located along the terraces above the creek. I cannot determine the exact location of the route because of the small scale of the map.

The pipeline routing should be flexible enough to allow avoiding cultural properties.

2. Alternative B results in far less impact to National Forest land (three miles as opposed to 13 miles of pipeline). This is the preferable route for preservation of sites within the Forest. However, it may result in increased impacts to archaeological sites in the Cuyama Valley. There is no reduction of impacts to archaeological sites in lower Tepusquet Canyon.

Comment noted.

3. Alternative D would cause the greatest impact to cultural resources of all the alternative routes. This route crosses National Forest lands at Laguna Ridge. Our site survey records show sites in the vicinity of Laguna Ridge.

Comment noted.

Alternative Terminal Sites

1. The Rattlesnake Canyon alternative (reference p. 297) is unacceptable from a cultural resource perspective. Communication with the CPUC consultant revealed that seven additional sites are located at the proposed site; there is not a sufficiently large area clear of cultural resources in which to locate the facility. Since the great bulk of Indian sacred activities took place at or near village sites, it is likely that this area does have spiritual significance to Chumash descendants. Also a probable shrine site has been located there.

Staff agrees that impact in the National Register District would be unavoidable, but not unacceptable, with appropriate measures. Also, the construction at Rattlesnake Canyon would be less disruptive to Chumash spiritual values.

2. I agree that the Naples (Las Varas)/Dos Pueblos sites are both less sensitive cultural resources than the Coal Oil site (reference p. 309-310). There is sufficient "clear" area for planning facility location so as to avoid cultural resources.

Comment noted.

3. The Oxnard location is the preferable location from a cultural resource viewpoint.

Comment noted.

Based solely on expected impacts to cultural resources, I agree with the preference ranking of alternative sites depicted in Table 51 (reference p. 348).

Comment noted.

Access Roads

The locations of alternative access roads to the Cojo site have not been sufficiently studied. On the basis of the meager data available to me, the alternative access roads cannot be ranked in terms of cultural resource impact. Communication with the CPUC consultants reveals that the Railroad Route would have a great impact on cultural resources. The Improved Hollister Road route is probably preferable to the Railroad Route.

Comment noted.

Summary and Conclusions

The major shortcoming of available information concerning project impact is the lack of adequate surveys of access roads and power transmission lines. On the basis of this fact and the observations made above, I offer the following recommendations.

See staff's previous response to these suggestions.

1. A plan for protection of cultural resources should be developed for the entire project. The plan should stress avoidance where possible.

2. A thorough survey of alternate access roads.

3. Adoption of alternate plans where feasible. Also where possible existing routes for access should be selected.

4. The following additions and changes in conditions be adopted:

   a. Hiring of a cultural resource manager for the duration of construction. This will facilitate planning of avoidance.

   b. Archaeological sites should be individually fenced to prevent inadvertent disturbance by vehicles and construction activities.

   c. Salvage excavation, where this is the only feasible mitigation, is recommended only for those sites which meet the eligibility standards for the National Register (36 CFR 63.3). Sites which do not meet the integrity standards of the National Register 36 CFR 800.10 (a) are still valuable as sources for potentially important scientific and cultural information. Salvage excavation of ineligible sites should be undertaken where avoidance is not feasible.

d. Consultation with Chumash descendants to 1 - determine ethnic significance of sites and 2 - identify specific areas of concern to these people. Further, this work should be conducted by an ethnographer with expertise in California Indian religion. I recommend contacting Dr. Lowell Bean, California State University, Hayward.

Stephen Horne

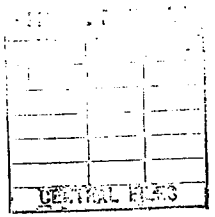
STEPHEN HORNE
Forest Archaeologist

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

2828 Chiles Road, Davis, CA 95616

June 6, 1978

Kenneth F. Plumb, Secretary
Federal Energy Regulatory Commission
Office of Pipeline and Producer Regulation
Washington, D. C. 20426



OPPR-PCCD/EEB
Western LNG Terminal Company
Pacific Gas LNG Terminal Company
Western LNG Terminal Associates
Docket No. CP75-83-2

Pacific Alaska LNG Company
Alaska California LNG Company
Pacific Alaska LNG Associates
Docket No. CP75-140

Dear Mr. Plumb:

We acknowledge receipt of the draft environmental impact statement for the Western LNG Project at Point Conception, California, that was addressed to United States Department of Agriculture in April 1978, for review and comment.

We have reviewed the above draft and have the following comments.

1. The discussion of soils and their limitations were adequately discussed; however, erosion control measures were not. Any disturbed soils, other than those used for croplands, should be seeded, fertilized, and mulched following construction activities to help insure adequate erosion control.

   See Recommendation 37 of Volume II of the DEIS.

2. The specific needs relating to rights of way through the 13 acres of vineyard and other cropland acreages should be coordinated with individual land owners to help reduce the loss of production on those lands.

   This would be taken care of in right-of-way easement agreements with individual landowners.

3. Following construction of the pipeline, periodic inspections should be made to insure that the soils have been stabilized. On areas where adequate erosion control vegetation was not established, additional efforts should be made to stabilize those sites.

   See Recommendation 38 of Volume II of the DEIS.

We find no conflict with any SCS on-going or planned programs or projects.

. F. Plumb 6/6/78
..eral Energy Regulatory Commission

We appreciate the opportunity to review and comment on this proposed project.

Sincerely,

FRANCIS C. H. LUM
State Conservationist

cc: R. M. Davis, Administrator, USDA, SCS, Washington, D. C. 20250
Director, Office of Federal Activities (Mail Code A-104),
Environmental Protection Agency, Room 537, West Tower,
401 M Street, S.W., Washington, D. C. 20460

UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Science and Technology
Washington, D.C. 20230
(202) 377-3111

June 28, 1978

Mr. Kenneth F. Plumb
Federal Energy Regulatory
Commission
Washington, D.C. 20426

Dear Mr. Plumb:

This is in reference to your draft environmental impact statement entitled "Western LNG Project, Construction and Operation of an LNG Liquefaction Terminal at Nikiski, Alaska." The enclosed comments from the National Oceanic and Atmospheric Administration and the Maritime Administration are forwarded for your consideration.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving ten (10) copies of the final statement.

Sincerely,

Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

Enclosure Memos from:

Mr. Kenneth W. Forbes Maritime Administration	Mr. Gerald V. Howard National Marine Fisheries Service
Mr. Douglas LeComte Special Projects, NOAA	Mr. Gordon Lill National Ocean Survey, NOAA

JUN 8 1978

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
300 South Ferry Street, Room 2016
Terminal Island, California 90731

Date : May 23, 1978 FSW33/RSH

To : EC, Director of Ecology and Conservation

JUN 08 1978

Thru : F5, Acting Assistant Director for Scientific and Technical Services

From : FSW, Gerald V. Howard, Regional Director, Southwest Region

Subject: Comments on Draft Environmental Impact Statement - Western LNG Project (FERC)(DEIS #7804.21)

The draft environmental impact statement for the Western LNG Project that accompanied your memorandum of April 27, 1978 has been received by the National Marine Fisheries Service for review and comment.

The statement has been reviewed and the following comments are offered for your consideration.

General Comments - Volume II

The lack of specific information concerning the seawater heat exchange system, which may have significant adverse impacts on fishery resources, makes review of the subject DEIS incomplete and of questionable value. Before the DEIS can be considered a complete document, precise details concerning the following items must be provided: the design and location of the intake and discharge structures, construction techniques to be utilized in placement of both intake and discharge structures, configuration of the cold water plume, and methods to control fouling organisms in the intake and discharge structures. Although the report recognizes these deficiencies, no indication is given as to how the current document will be corrected.

We feel that a supplement to the DEIS or an amended DEIS with the additional project information should be distributed to rectify this situation. This would allow our agency, as well as other interested agencies, an opportunity to comment on the proposed project prior to the issuance of a final environmental impact statement.

Comment reflected in Sections A and C-5b of Volume II of the FEIS. Staff disagrees that a supplemental or amended DEIS is necessary.

Ibid.

Specific Comments

Volume II

C. Environmental Impact of the Proposed Action

5. Hydrology

b) Oceanographic Impact

i. General

Page 158, paragraph 5. The discharge of heated seawater from LNG ship's condensers could adversely affect adjacent kelp (Macrocystis sp.) plants depending on the size of heated plume and duration of discharge.

Comment reflected in Section C-5b of Volume 2 of the FEIS.

6. Vegetation

b) Aquatic Vegetation

i. Marine

Page 170, paragraph 1 and 2. The loss of 26 acres of kelp through construction activities cannot be considered insignificant even though it represents a relatively small area in terms of total kelp acreage in adjacent areas. Similarly, kelp areas disturbed or destroyed during construction activities may not recover, since boat traffic and other operational activities will cause continual disturbance to this area.

Comment reflected in Section C-6 of Volume II of the FEIS.

Page 172, paragraph 2. Detailed description of the proposed outfall line, expected cold water plume, and anti-fouling methods which will be used should be included in section. Any statements regarding effects on marine plants prior to the inclusion of this information is of questionable value since it is based primarily on speculation.

Ibid.

7. Wildlife

b) Aquatic Biota

i. Marine and Estuarine Biota

Page 180, paragraph 1 and 2. A study should be conducted to determine the survival rate of fish entrained by the intake structure. Obviously, if mortality is near 100%, the use of a fish return system is not a productive mitigation measure. If this is the case perhaps more effort should be expended towards developing an intake structure which significantly lowers the entrainment of fish. This is especially important since the operation of this LNG facility may entrain significant numbers of commercially important fish.

Comment reflected in Section C-7b of Volume II of the FEIS.

Page 181, paragraph 2. Further refinement of estimated entrainment losses should be described in this section other than to state that they range from none to high.

Comment reflected in Section I of Volume II of the FEIS.

Page 184. Construction and operation of the LNG facility would eliminate an undetermined amount of hauling-out area currently used by Harbor seals.

Haul-out at the site has been suggested, but has not been confirmed.

1.2.4 Chlorination/Dechlorination

Page 185, paragraph 2. The compounds formed through the chlorination/dechlorination process should be included in this section as well as their toxicity, concentrations in discharge effluent, and water area which may be affected by them.

Comment reflected in Section C-5b of Volume II of the FEIS.

O. Measures to Enhance the Environment or to Avoid or Mitigate Adverse Environmental Effects

1. LNG Terminal

c) Dikes and Drainage

Page 229, paragraph 3. Stabilization of the site area to control erosion should be included in this section as a mitigation measure. This would ensure the protection of offshore kelp beds from excess sedimentation.

Staff recommendation No. 21, as revised, of Volume II of the DEIS addresses offshore sedimentation from site runoff.

Table 48 - Site Identification Criteria

10. Environmental Impact - Aquatic

c. Biological Impact - Aquatic

Page 273. The Point Conception coastal area currently supports extensive kelp beds which are of biological and commercial value. Additionally, this area of the California coast is unique due to the overlap between colder and warmer water fish species. Both of these attributes contribute to the overall value of the existing aquatic habitat which has a high probability of being adversely affected by the construction and operation of the LNG facility.

Comment reflected in Section C-6 of Volume II of the FEIS.

Therefore, the site selection criterion which states that "The site should not be located so that required water withdrawals or dredging activities would disrupt valuable aquatic habitats" apparently is not met. In order to clarify the process which resulted in the selection of the Point Conception alternative, the relative weight given the various site selection criteria should be included in Table 48.

Ibid.

I. Conclusions and Recommendations

Page 369. The design and development of an intake structure which would substantially reduce entrainment of aquatic organisms is an additional recommendation that should be included to mitigate adverse environmental impacts from the proposed project's operation.

Comment reflected in Section I of Volume II of the FEIS.

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
ENVIRONMENTAL DATA SERVICE
Washington, D.C. 20235

MAY 31 1978

May 26, 1978

TO: William Aron
Office of Ecology and Environmental Conservation

FROM: Douglas LeComte
Special Projects

SUBJECT: DEIS 7804.21 - Western LNG Project

General

The climatological descriptions are unusually thorough and accurate, yet there are several minor items needing clarification.

Specific (Vol II-c P)

Page 21, 3rd paragraph: The meaning of the term "non-clear days" is hazy.

Comment reflected in Section B-1 of Volume II of the FEIS.

Page 21, 4th paragraph: The Class E stability class is said to "represent surface temperature inversions with poor atmospheric diffusion." Yet, the listing on page 26 represents Class E as being "neutral." This seems to be contradictory.

Ibid.

Page 27, Table 5: The meaning of the term "Annual Extreme MPH" and how it differs from "Maximum Instantaneous Gust" is not clear.

Ibid.

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Rockville, Md. 20852

C52/JLR

MAY 25 1978

MAY 26 1978

TO: William Aron
Director
Office of Ecology and Environmental Conservation

FROM: Gordon Lill
Deputy Director
National Ocean Survey

SUBJECT: DEIS #7804.21 - Western LNG Project

The subject statements have been reviewed within the areas of NOS responsibility and expertise, and in terms of the impact of the proposed action on NOS activities and projects.

The following comment is offered for your consideration.

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The statements for the Cook Inlet and Santa Barbara Channel facilities have been reviewed in detail by NOS with respect to the physical oceanographic parameters. In preparing these documents, the authors have contacted NOS. The statements contained in the documents resulting from these contacts are accurate and do not mislead. The statement made in the first paragraph on page 70 of Volume I is still valid; the hydrodynamic model will be available this summer.

No response required.

UNITED STATES DEPARTMENT OF COMMERCE
Maritime Administration

May 26, 1978

MEMORANDUM FOR: Dr. Sidney R. Galler
Deputy Assistant Secretary for Environmental Affairs

Subject: Federal Energy Regulatory Commission Draft Environmental Impact Statement concerning the Western LNG Project (CN 7804.21)

The Maritime Administration has reviewed the subject DEIS and submits the following comments for your consideration.

1. Volume I - Construction and Operation of an LNG Liquefication Terminal at Nikiski, Alaska, CP 75-140

a. Causes of large-scale LNG release, pages 186-188

Discussion: It is stated on page 186 that: "Groundings are considered to be the most likely causes of large-scale LNG release."

Comment: The LNG tanker is constructed with a double hull which would prevent the release of LNG in lower energy casualties. If the LNG vessel is under escort and traveling at a moderate speed, it is unlikely that any high energy grounding or collision will occur. Although the potential for a high energy grounding may be greater than for a high energy collision in Cook Inlet, a collision could result in penetration of the cargo tank above the waterline, thereby releasing to the atmosphere the light and volatile LNG. A grounding penetration, however, would be below the waterline and would be less likely to cause a massive release of LNG to the atmosphere. Additional hazards from a collision include sparks from the collision itself and the potentially hazardous cargo of the other vessel.

The hazard of an above the waterline penetration is noted on page 287 as follows:

The fact remains that the data in Attachment A of Volume II of the DEIS clearly shows that groundings are the most likely causes of large-scale LNG releases. A grounding penetration below the waterline can certainly cause a massive release of LNG to the atmosphere.

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"A major accident, such as a tanker collision or ramming and subsequent release of LNG, must be recognized as possible, and the consequences of such an accident must be taken into consideration."

No response required.

b. Typical midship section of a 130,000 m^3 LNG tanker, page 213

Discussion: Figure 37 on page 213 shows a midship section of an LNG tank vessel utilizing a Conch cargo containment system.

Comment: Figure 37 should be modified to show the Gas Transport/McDonnell Douglas design instead of the Conch design.

Comment reflected in FEIS.

c. Cargo tank testing, page 216

Discussion: The description given on page 216 of the cold testing for the cargo tanks does not follow the accepted tests used for the other U.S. built LNG ships.

Comment: Rather than just test one tank with LNG, the usual method is to cool down all the tanks, take on a small amount of LNG in one tank, then pump the LNG from tank to tank to test the pumps and piping. During the gas trials, the gas burning system is also checked. Gas trials should be conducted in accordance with the Society of Naval Architects and Marine Engineers T&R Bulletin 5-2 "Gas Trials Guide for LNG Vessels." This guide provides definitive information on test procedures to prove the safe operation of all systems and their component parts involved with or pertaining to the shipboard storage and transfer of LNG.

Revised cryogenic test procedures are presented in Section D.3 of Volume I of the FEIS.

2. Volume II - Construction and Operation of an LNG Receiving Terminal at Point Conception, California, CP 75-83-2

a. Causes of large-scale LNG release, pages 220-222

Discussion: It is stated on page 220 that: "Groundings are considered to be the most likely causes of large-scale LNG release."

Comment: As discussed in paragraph 1a above, high energy collisions may be more likely to result in massive releases of LNG to the atmosphere.

Historical accident data disproves this.

GEORGE C. STEINMAN
Chief, Environmental Activities Group
Office of Shipbuilding Costs

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

ER 78/342

JUN 29 1978

Mr. Kenneth F. Plumb
Secretary
Federal Energy Regulatory Commission
Washington, D. C. 20426

Dear Mr. Plumb:

Thank you for your letter of April 21, 1978, transmitting copies of the Federal Energy Regulatory Commission's draft environmental impact statement for construction and operation of an LNG Liquefaction Terminal, Nikishi, Alaska and LNG Receiving Terminal at Point Conception, California [FERC EIS-0002]. Our comments are presented according to the format of the statement or by subject.

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General

We are pleased to note that the statement responds to the Department's concerns; the document identifies and adequately describes significant environmental elements and addresses many of the significant impacts to the environment. We are also pleased that the applicant intends to use existing roads and utility corridors to the fullest extent possible. The statement is generally adequate in its treatment of recreation. It cannot be assumed, however, that the recreation resource base will he able to absorb continued population growth as implied on page 169, Volume I. While this may be true for backcountry activities, existing developed outdoor recreation facilities already are overcrowded in many instances. Increased population on the Kenai Peninsula resulting from additional industrial development would compound many existing problems.

Because of the Kenai Peninsula's broad recreational appeal, existing pressures on local area recreational resources may be attributed not only to local users but also to users from the Anchorage area and the lower 48 states. While it is true that local developed recreational resources are heavily utilized, it is not believed that the peak workforce of about 800 workers, many of whom would be local or regional residents, would significantly add to recreational demand.

We recommend the final statement include a quantification and discussion of the existing and future ship traffic along the sea route as well as in the channel south of Nikishi, with some discussion of risks from LNG tankers.

Comment reflected in Section C.9 of Volume I of the FEIS.

We suggest the statement briefly describe the communications equipment and fail-safe monitoring techniques that will be used as specific safety measures.

Comment reflected in Section D of Volume I and II of the FEIS.

The final statement should include a brief, yet concise, discussion of the methodologies used for the field inventories. Along with this, we recommend a proper referencing of all data sources in both the text and appendix.

The field inventories conducted by the applicants and their consultants can be found in the applicants' environmental report which is available for inspection in the FERC's Office of Public Information. The staff has properly referenced all data sources used in the DEIS.

The final statement should also include a list or table of all local, State and Federal agencies from whom permits, licenses, grants and certificates must be obtained before the proposed actions can be implemented.

A list of this nature is included in Appendix C, Volume I and Appendix B, Volume II of the DEIS.

We suggest the final statement contain quantification of the extent of the commitment of natural resources that will be consumed.

Section G is a qualitative summary of the commitment of resources to the proposed project. Quantitative information on the resources listed in Section G can be found throughout the EIS. Also, see pages 223 and 224 of Volume I of the DEIS.

Fish and Wildlife Coordination Act

Under the authority of the Fish and Wildlife Coordination Act, the Fish and Wildlife Service will be reviewing all operations that require a U.S. Army Corps of Engineers permit, including dredging operations, to ensure that such dredging operations do not harm the biological populations of those areas affected by dredging. At this time, the Fish and Wildlife Service does not have any specific stipulations that should become a part of any permit issued. We do, however, strongly discourage selection of disposal sites which would be located within lakes, wetlands, river or stream channels, or marine intertidal areas.

No response required.

As new information becomes available, the Fish and Wildlife Service may require specific measures for mitigation to be met as stipulations in the permit process.

Gas Supply for the Liquefaction Terminal Project

We note the project's dependence upon projected production of natural gas from the six fields that have not been drilled. The draft statement explains that contracts for this undiscovered gas have not been negotiated and that authorization for Phase II, (a doubling of plant capacity), will be conditioned on acquiring the 40 percent of the total natural gas required from the six fields. The final statement, however, should explain how operation under Phase I will proceed if the 11 percent input from the six fields is not available. The discussion should address the contingencies surrounding this part of the supply in terms of existing or available lease rights of companies that plan to drill the areas, some reasonable schedule under which drilling is likely to occur, and some assessment on the probabilities for discovery of an adequate supply of natural gas.

A discussion on gas supply is beyond the scope of this environmental impact statement. The U.S. Department of the Interior has prepared a document entitled Lower Cook Inlet Final Environmental Impact Statement that provides an assessment of the potential oil and gas development in lower Cook Inlet.

We recommend the final statement include a discussion of off-shore oil/gas development facilities in Kenai-Cook Inlet, Santa Barbara Channel, and other potential oil/gas development areas along the proposed route.

Offshore oil and gas facilities should not affect the proposed project unless they were in the navigation lanes. No facilities for pipeline or gas processing are currently proposed at Point Conception.

Specific Comments

Volume I: Liquefaction Terminal, Nikishi, Alaska

Soils and Geology

We recommend the final statement incorporate a discussion dealing with the manner in which the proposed ground acceleration values are to be incorporated into the design process. As it reads now, not enough data are presented to assess the appropriateness of these selected values.

The adequacy of these values can be determined without knowing the manner in which the engineering design to accommodate these values would be achieved.

We recommend the utilization of the excavated topsoil for or by local interests in order to reduce the amount of spoil discharged into the marine environment. In addition, the final statement should also identify the disposal sites for the material that will be excavated during road construction. Since the document stated on page 134, that approximately 33,000 cubic yards of fill will be needed for the proposed construction dock, we recommend the fill generated from the haul road be utilized, rather than from a new source.

No topsoil remains on the plant site which has already been graded level. The applicant has repeatedly stated that they have not determined where the excess cut material would be dumped.

As stated on page 134, some 70,000 cubic yards of spoil would be generated by dredging activities off the end of the marine trestle. We recommend the final statement indicate where the spoil is to be dumped and, if such disposal is in a marine environment, the final statement should provide specific biological data for that site. We suggest that the final statement should briefly discuss results of the impact analysis on site-specific dredge and disposal operations being prepared by the U.S. Army Corps of Engineers.

The last paragraph on page 134 specified the dumping location. See also pages 147 and 148 in Volume I of the DEIS.

We also recommend the final statement include specific information relating the various local authorities that would be responsible for monitoring dredging operations.

The applicant is required to meet the stringent requirements established by EPA and the Corps of Engineers relating to the dredging operation and spoils disposal. See Appendix C of the FEIS.

Hydrology and Water Quality

The final statement should discuss any mitigation planned if the proposed aquifer tests noted in Volume I should indicate that effects on local ground water users will be more adverse than anticipated--and thus permit a net impact evaluation.

It is not anticipated that any problems would occur and consequently no planned mitigation has been offered by the applicant.

We suggest that critical areas in which construction could alter drainage patterns be identified and specific hydrological tests be conducted to aid in reducing impacts on biotic communities.

See the recommendations in Section I of Volume I of the FEIS.

On page 149, the draft statement indicates that some 14-15 million gallons of fresh water will be needed to test each tank. We recommend that the scheduling of these tests be coordinated in order to utilize the same water for each test. In addition, the disposal and the impacts to water quality from this test water should be described. The final statement should specifically describe the quality of the water to be discharged after the test, and anticipated effects on the location of its discharge.

These subjects have been adequately addressed in Sections C.5 and I of Volume I of the FEIS.

Wildlife Considerations

Low-flying surveillance aircraft could disturb nesting waterfowl, such as trumpeter swans, as well as moose and caribou. For the latter species, such stress during the winter months, when natural factors are already sources of stress, could seriously threaten the viability of local populations. We recommend the final statement identify significant habitat areas so that these areas may be avoided by low-flying aircraft.

Winter aircraft surveillance of the pipeline right-of-way would not effect caribou because they do not winter in the immediate area of the proposed pipeline. Pages 94, 96 and 98 of the DEIS identify the sensitive nesting, calving, and wintering areas.

Socioeconomic Impacts

The final statement should include a discussion of socioeconomic impacts caused by a terminal shutdown if the carriers are unable to load/discharge their cargos due to sea, weather, labor, or onshore transportation tieups.

The plant design is such that anticipated meteorological events would not seriously affect the plant operations. The socio-economic impact of an extended outage would be extremely complex. However, it may reasonably be expected that a redistribution and reallocation of gas supplies from other California regional sources could alleviate any serious problems unless the terminal shutdown were to last for a period longer than a few months.

We suggest the final statement include a discussion and quantification of existing and future electrical power requirements in the region of the terminals along with a discussion of such requirements as effects on the local power demand.

A detailed analysis of this nature would be beyond the scope of the DEIS. Existing excess generation capacity in the immediate project area was determined to be sufficient for the LNG terminal requirements.

The final statement should update the evaluation of the significance of fishing in the Cook Inlet region, including quantification of sport and commercial fishing. The statement should also note that only the lower Cook Inlet is open to sport fishing. We recommend that construction schedules should be adjusted in order to minimize the adverse effects on set-net fishermen. Compensation for all local fishermen who could be affected by construction should be completed prior to construction.

As stated on page 202 of the DEIS in Volume I, construction would be scheduled to minimize the adverse impacts on local fishing, especially during the salmon season. The applicant is negotiating compensation for local commercial fishermen who would be affected by construction activities.

Land Use

We recommend the final statement identify the specific locations of pipeline construction camps in order to predict possible environmental concerns.

The precise locations of the proposed pipeline construction work-camps will not be known until final route selections are surveyed.

The statement should also discuss the equipment needs for the construction and operation of the trestle, breakwater and small boat harbor along with the impacts from such activity.

The Nikiski facility would not have a breakwater and small boat harbor. Marine terminal construction and operational procedures are discussed in Sections A.3 and A.4 of Volume I of the FEIS.

Recreation

We recommend the final statement include a discussion of existing community recreation facilities within the section on existing community services. The section on impacts on community services should be expanded to reflect how additional population would affect community recreation facilities and services.

The general discussion of socioeconomic impact provided on page 163 of the DEIS, Volume I, is sufficient to encompass the issue of impact on community recreational facilities.

Archeological and Cultural Resources

We recommend that the cultural resource identification and evaluation process outlined in Appendix K of Volume I be stipulated in the permit authorizing construction of the proposed facilities.

The staff has recommended that the cultural resource program be attached as a condition on the FERC certificate. Field checking of any affected local sites would be conducted as part of the cultural resource program.

Source data collected from local residents should be field checked and noted in the final statement.

Volume II: LNG Receiving Terminal, Point Conception, California

In its recommendations section, the final statement should mention the need to consult with the Bureau of Land Management and the Department of Interior for "assistance in designing erosion control structures and formulating erosion control and revegetation plans," as noted on page 366, since this agency will be affected by the proposed pipeline.

Comment reflected in Sections I of Volume II of the FEIS.

The statement notes on page 200 that the lands crossed by the proposed pipeline are highly susceptible to wind erosion, especially where vegetation is sparse. Consequently, we recommend that the final statement further assess this impact, and describe mitigation measures that will be instituted to control both dust and erosion of the soil.

Page 200 makes no mention of soils being highly susceptible to wind erosion. However, Section C-4 of Volume II of the DEIS indicates that wind erosion control should not pose a significant problem.

We recommend that the tables on pages 51-54 be revised so that soil interpretations be keyed to taxonomic units and not to map units. Also in table 11, we recommend that a column headed as "texture," be completed by the addition of reference to both subsurface as well as surface soil texture. Table 11 should also include soil characteristics that apply to each component of the soil associations.

* (See staff response below.)

Endangered Species

The Western LNG Terminal Associates and the FERC should use the new list of Endangered Species Act regulations published January 4, 1974 (Federal Register, Vol. 43; pages 869-876).

The draft statement mentions endangered wildlife species potentially impacted by the project, but fails to note the mandatory consultation required with the Fish and Wildlife Service. The final statement should contain evidence of this consultation. In addition, informal consultation should also take place with the Fish and Wildlife Service, in regards to any proposed endangered plants that are found within the project area. To properly identify threatened on endangered species along the pipeline route, or in the terminal site, an adequate endangered species survey must be conducted. We believe this action may affect the San Joaquin kit fox and the blunt-nosed leopard lizard. Section 7, of the Endangered Species Act and Instruction Memorandum No. 78-162, state that until the FWS renders its biological opinion (and the FWS alone determines when the level of information is sufficient), the Bureau of Land Management or other Federal agencies will not take any action which would make an irreversible or irretrievable commitment of resources which would foreclose the consideration of modification of alternatives to the proposed action.

Consultation with the U.S. Fish and Wildlife Service has been initiated.

Minor Comments

It should be noted that at several points in the text, it is stated that the pipeline crosses Naval Petroleum Reserve Number 2; however, this land is no longer a Naval Petroleum Reserve, having reverted to BLM administration in the 1960's. We recommend the text be corrected to reflect this change in reasponsibility.

Comment reflected in FEIS.

* General soil maps from which the soil associations were taken utilize the soil series names as soil map units. Use of these units for the discussion, description, or interpretation of soils on the county level, is common. There would be no apparent benefit derived from changing to the use of taxonomic units which would likely be more confusing to the average reader. In general textural differences between surface and subsurface soils found along the proposed pipeline route are not significant enough to pose major problems. Specific areas where they are, such as the terrace soils, are discussed in Section C-4 of Volume II of the FEIS. Also, Table 11 does include the soil characteristics that apply to each component of the soil association.

On page 49, Vol. II, the statement "Aridisols . . . have no natural genetic horizons" should be changed since aridisols would not otherwise be distinguished from "entisols." Also, please note that the soil types, listed on page 50, are no longer part of the soil classification system.

Comment reflected in Section C-4 of Volume II of the FEIS.

We suggest that the final statement substantiate the statement made, on page 344 (Vol. II), that inland California prehistoric sites are smaller and easier to avoid than coastal sites. Along with this, we note that the California Public Utilities Commission estimate for archeological excavation appears to be quite high. We recommend a discussion of this point in the final text.

Reference to inland sites as being smaller has been deleted. Avoidance of inland sites should be easier in areas less developed than along the coast. With regard to cost estimates, the staff does not have the basis for the estimates to excavate the Cojo sites.

We recommend the final statement include an explanation of the term "improper water disposal," as used on page 156.

Comment reflected in Section C-5a of Volume II of the FEIS.

The final statement should discuss alternatives to the pipeline route, should the Lompoc Reservoir be built and a portion of the proposed pipeline thereby be inundated.

This would be considered if and when the reservoir is built.

The final statement should include a discussion of potential impacts, on marine biota, from the lowering of water temperatures by 12°F as a result of the "water plume" from the Point Conception facility.

Comment reflected in Section C-5b of Volume II of the FEIS.

In the section titled "LNG terminal siting criteria" (Vol. I, page 226), the following criterion is listed: The soils at the site should not be susceptible to liquefaction during seismic events and should retain their foundation stability under dynamic stress." However, in the "Geology" section of Volume I, there seems to be a statement contrary to the one above, namely: "Liquefaction could occur in the saturated bottom sediments of the inlet with resulting loss of support for the pipeline, which might then sink into the sediments." The final statement should resolve this discrepancy.

Section C.3 in Volume I of the environmental impact statement indicates that liquefaction should not be a problem at the plant site. The soils are not particularly susceptible to this phenomenon, and the ground water table is deep. The pipeline crossing of Cook Inlet is also located 6.5 miles from the plant site.

We hope these comments will be useful to you in the preparation of a final statement.

Sincerely,

Larry E. Meierotto
Deputy Assistant SECRETARY

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United States Department of the Interior

HERITAGE CONSERVATION AND RECREATION SERVICE
WASHINGTON, D.C. 20240

IN REPLY REFER TO:

H32-NR

SEP . 1978

Mr. Kenneth F. Plumb
Secretary
Federal Energy Regulatory Commission
Washington, D.C. 20426

Dear Mr. Plumb:

It has been brought to our attention that the Federal Energy Regulatory Commission may issue a license for the construction of a liquified natural gas terminal at Point Conception in Santa Barbara, California. We understand that the archeological resources located at Point Conception may make the area eligible for inclusion in the National Register of Historic Places.

In accordance with the National Historic Preservation Act of 1966, as amended, and Executive Order 11593, which are implemented by the Advisory Council on Historic Preservation procedures (36 CFR 800), Federal agencies are responsible for identifying all properties in the potential environmental impact area of a project which may be eligible for inclusion in the National Register. If any properties appear to meet National Register criteria, or if there is a question as to whether the criteria are met, a determination of the properties' eligibility for inclusion in the National Register should be requested.

Requests for determinations of eligibility, along with the necessary supporting documentation, may be submitted to this office following consultation with the appropriate State Historic Preservation Officer. In California, this is Dr. Knox Mellon, Office of Historic Preservation, California Department of Parks and Recreation, P.O. Box 2390, Sacramento, California 95811 (916-445-8006).

Enclosed for your convenience are regulations and guidelines explaining the documentation necessary for our review of such requests. We would like to bring to your attention the alternative expedited determination of eligibility process outlined in 36 CFR 63.3 which provides for rapid processing of determinations when the Federal agency and State Historic Preservation Officer agree on the eligibility of a property.

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Archaeological surveys were conducted for the proposed facilities by the applicant and the California Public Utilities Commission. As indicated in the DEIS, staff believes the sites at Canada del Cojo are probably eligible for the National Register. However, the applicant has proposed a rearrangement of the terminal facilities so as to avoid the known resources. The environmental staff agrees that a request for a determination of eligibility would be appropriate.

We recommend that you investigate the archeological potential of Point Conception in order to ascertain whether a request for a determination of its eligibility may be appropriate. Thank you for your cooperation on behalf of historic preservation.

Sincerely,

for

William J. Murtagh
Keeper of the National Register

Enclosures

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION X

1200 SIXTH AVENUE

SEATTLE, WASHINGTON 98101

REPLY TO ATTN OF: M/S 443

JUN 5 1978

Mr. Kenneth F. Plumb, Secretary
Federal Energy Regulatory Commission
U.S. Department of Energy
Washington, D.C. 20426

Dear Mr. Plumb:

EPA has completed its review of the recently revised and reissued Draft Environmental Impact Statement (DEIS) on the Western LNG Project (Docket Numbers CP75-83-2 and CP75-140). As you may remember EPA had a number of substantial concerns with regard to the original draft environmental statement issued in September 1976. A few of these concerns remain to be addressed and new concerns have developed as a result of changes in Federal and State laws regarding the project. The following comments should help you focus the relevant portions of the final environmental statement on these issues.

Alaska

Air: The air quality impacts analysis for the Nikiski site needs substantial expansion and improvement in order for it to be capable of supporting informed decision making. The analysis' weaknesses include: (a) it focused on individual sources and their separate impacts while not attempting to estimate the combined impacts of project facilities/ operations or the cumulative impacts of this development and other development in the Nikiski region; (b) due to an absence of baseline ambient air quality data, the DEIS was unable to indicate whether ambient air quality standards would be threatened by the project; (c) the analysis used air quality impact models which are inappropriate for the type of terrain around the project site at Nikiski (PTMAX is not designed for use with elevated terrain).

The final environmental statement should include the following improvements in the air quality impact analysis:

1. Baseline data showing current air quality conditions for all relevant criteria pollutants This data might be collected by the applicant and would be necessary for the applicant's application for a PSD permit from EPA in any case.

Comment reflected in Section C.12 of Volume I of the FEIS.

The effect of elevated terrain was accounted for in the PTMAX program by subtracting the receptor height from the tanker plume height. This procedure is suggested by EPA (EPA-450/4-77-001).

Estimated background pollutant concentrations have been included in Section C.12 of Volume I of the FEIS.

2. A worst case analysis of the air quality impacts (combined) of the new sources proposed by the applicant, the new electrical generation needed by the applicant, and the existing air pollution sources.

Comment reflected in Section C.12 of Volume I of the FEIS.

3. An analysis of the combined impacts of air quality of the sources identified above on ambient air quality after the application of feasible mitigation measures which could be required by any Federal or State regulatory agency.

Reduced tanker emissions have been analyzed in the revised air quality analysis.

4. Based on the above analyses, specific conclusions with regard to whether the proposed facilities will be able to comply fully with all of the applicable requirements of the Clean Air Act and an identification of any specific requirements with which compliance may be questionable.

Comment reflected in Section C.12 of Volume I of the FEIS.

The worst case analysis suggested would assume, at a minimum, Class F atmospheric stability and, perhaps, both LNG tankers in port at the same time.

As noted on page 174 of the DEIS, ambient concentrations were estimated for Classes A through F. Class E yielded the highest levels for stable conditions and only that class was presented in Table 29. The marine terminal, see Figure 3, has only one berth. At an arrival frequency of once per week, it is unlikely that both tankers would be in Cook Inlet at the same time.

Water Quality: Our principal water quality concerns continues to be the indeterminant fate of the spoil material created by the excavation of the haul road. Although the volume of the material involved has apparently been reduced from 600,000 cubic yards to 215,000 cubic yards, its destination and chemical characteristics remain unknown. There is thus no basis for determining the magnitude of the potential environmental impact or for EPA to make its statutorily required determination regarding environmental acceptability.

Comment reflected in Section C.5 of Volume I of the FEIS.

Noise: The operational noise impact analysis is much improved from that provided in the September 1976 DEIS. However, it is not complete enough, yet, to provide a clear understanding of the noise impacts for lay people who are nearby residents. We suggest that a sampling (noise level) survey be performed to collect current noise data that could be used to support the drawing of Ldn noise contours. Forecasted contours and forecasted changes in noise levels at noise sensitive receptors could then be provided and discussed. Noise level reduction measures could also be discussed in a thorough fashion.

The applicant was requested to convert the results of the ambient noise survey to L_{dn} levels. The magnetic tapes containing the original noise data no longer exists, so it was not possible to convert to the suggested format.

Comment reflected in Section C.12 of Volume I of the FEIS.

California

Air Quality: The air quality impact analyses conducted for the proposed Point Conception LNG receiving/regassifying terminal are technically more sophisticated than those performed on the Alaska LNG sending terminal. However, these analyses still need some improvement and expansion in order to provide the reader with an adequate analysis of the project's air quality impact potential.

1. The analysis and the presentation of the analytical results need to be refined and improved so that a clear statement is made

Comment reflected in Section C-11 of Volume II of the FEIS.

with regard to the project's affect on compliance with applicable air quality standards. It appears that the project will aggravate some existing standards violations and may create new standards violations.

2. For some of the pollutants associated with the LNG facility, such as oxidants, Santa Barbara County has been designated a non-attainment area under the Clean Air Act, as amended in 1977. For those pollutants, the Act's offset rules might apply to the LNG port and its ancillary facilities. The final environmental statement should discuss the applicability of this rule and the result it would have on the project's design features and air quality impacts.

3. The effectiveness and the effects of the proposed mitigation measures for reducing air quality impacts (see Volume II, Page 363) should be evaluated in the final environmental statement.

Water Quality: The DEIS was generally adequate with regard to its analysis of the potential water quality impacts of the project's California facilities. However, there are a couple of points on which additional information is necessary.

1. The statement does not indicate whether dredging will be necessary for the construction of the trestle, marine terminal, breakwater, and small boat harbor. If dredging will be required, the final environmental statement should state the estimated areas and locations to be dredged, the volume of spoils, and the spoil disposal sites under consideration. The final statement should also evaluate the impacts of the dredging and the spoil disposal on marine water quality and aquatic biota. Ocean disposal of the dredge spoil would require that the applicant obtain a disposal permit from the U.S. Army, Corps of Engineers.

2. The analysis of the water quality impacts of the wastewater discharge from the Point Conception LNG receiving station and regassification facility appears to be largely hypothetical. Although such an analytical approach is useful for designing the wastewater treatment/discharge system it is not entirely appropriate for an environmental impact statement. The final environmental statement should analyze the impacts of the actual wastewater discharge/treatment system proposed by the applicant and suggest modifications to that system which would reduce its impacts on water quality and marine biota.

3. The statement's discussion of potential mitigation measures which could be used to reduce the water quality impacts of construction merits some expansion. In particular, runoff and sediment control measures to protect the Canada del Cojo and the Cuyama River need more attention. Additionally, we suggest that the FERC consider including a license stipulation which would require the applicant to develop a mitigation plan for FERC/Natural resource agency approval after the final pipeline alignments and facility plans are determined and

Comment reflected in Section C-11 of Volume II of the FEIS.

Ibid.

Comment reflected in Section C-5b of Volume II of the FEIS.

Comment reflected in Section C-5b of Volume II of the FEIS.

Comment reflected in Section I of Volume II of the FEIS.

approved. The FERC should also consider including a stipulation which requires the applicant to monitor the effects of its project on the aquifer and its water quality. If there is a significant water quality impairment then the applicant's pumping rate should be reduced appropriately. The final statement should discuss in detail the impacts of proposed dredge and fill operations on the marine environment. This discussion should include but not be limited to: effects of sedimentation, turbidity, oxygen depletion, loss of benthic habitat and changes in water circulation patterns. This discussion should also include those mitigation measures proposed to offset any unavoidable adverse impacts.

4. The final should address the means to be employed in the small boat harbor to provide pump-out facilities for vessels using the harbor. Additionally, all other methods used to provide control over vessel waste discharges within the harbor should be identified.

The small boat harbor is no longer proposed.

Other Considerations:

1. Part II - 247 "The LNG facility would introduce major industrial development into an agricultural area. The pressure for further industrial development along the south coast region would increase with the potential for major environmental impact being incurred if additional industrialization efforts were successful."

The implication of this statement is unclear. EPA would like the following series of questions answered in the final statement.

(1) What effect would this project have on prime agricultural land?

(2) Where will the "pressure for further industrial development" come from?

(3) Has the possibility of an industrial complex forming at Point Conception been publicly discussed?

(4) If indeed pressure for continued development is generated by this project, what mitigation measures can be instituted to address this concern?

Comment reflected in Section C-9 of Volume II of the FEIS. The site is not classified as a prime agricultural area.

2. Part II - 247 "The presence of the breakwater would alter offshore topography and circulation patterns. These alternations will probably change sediment desposition patterns which could lead to erosion of beaches east of the proposed site."

The final statement should discuss in detail the potential for accelerated beach erosion as a result of changes in the circulation patterns resulting from breakwater construction.

The breakwater is not proposed. Any reference to one has been deleted.

Based upon the Western LNG project's potentially significant impacts upon water quality and air quality we have rated this draft environmental statement ER-2 (ER-environmental reservations, 2-inadequate information). The date of our comments and this rating will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions, pursuant to Section 309 of the Clean Air Act, as amended.

We appreciate the opportunities we have had to review the environmental statements on the Western LNG Project and would be glad to answer any questions which you may have about our concerns. Mr. Daniel Steinborn, of my staff, and Mr. Robert Klinkner, of the Region IX staff, are both available for this purpose. Mr. Steinborn can be reached at (FTS) 399-1285 and Mr. Klinkner can be reached at (FTS) 556-6695.

Sincerely,

Alexandra B. Smith

Alexandra B. Smith, Chief
Environmental Evaluation Branch

No response required.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

RECEIVED BY
MAY 15 1978
L. W. M.

MAY 5 1978

Mr. Barry Hasse, Director
Office of Pipeline and Producer Regulation
Federal Energy Regulatory Commission
825 North Capitol Street, N. E.,
Washington, D. C. 20426

Dear Sir:

We recently received a request from Mr. Pat Weinstein of the California Coastal Commission to comment upon the possible selection by them of Rattlesnake Canyon as a site for the Western LNG Project terminal. I am enclosing, for your information, a copy of our response to Mr. Weinstein.

In the near future, we will be discussing with the Coast Guard possible measures to assure safe operation of nuclear power plants which are located adjacent to water ways serving liquified fuel gas traffic. We would welcome your views concerning similar measures that might be within the jurisdiction of the FERC.

Sincerely,

Harold R. Denton

Harold R. Denton, Director
Division of Site Safety and
Environmental Analysis
Office of Nuclear Reactor Regulation

Enclosure:
As stated

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CHIEF

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NATURAL GAS
OFFICE OF THE CHIEF

No response required.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

APR 1 2 1978

Mr. Pat Weinstein
Onshore LNG Project Manager
California Coastal Commission
631 Howard Street, 4th Floor
San Francisco, California 94105

Dear Mr. Weinstein:

Thank you for the information concerning your investigations of coastal sites. We appreciate your request for NRC comment before any final decision is made on the preferred site for the proposed western LNG terminal.

As you noted in your letter of March 13, there are two nuclear power reactor sites where potential accidents involving LNG traffic has been reviewed (Calvert Cliffs and Hope Creek/Salem). Our general criteria are that nuclear power reactors should not be located near hazardous industrial developments unless one of two circumstances are satisfied: (1) that the risks of an accident at a nearby hazardous industrial facility affecting the safety of the nuclear reactor be acceptably low or (2) that the design of the nuclear reactors be such that they can safely withstand an accident from other nearby facilities.

Part 100 of Title 10 of the Code of Federal Regulations permits two or more nuclear power reactors to be in close proximity if, and only if, they are so designed that an accident at one does not endanger the safety of any of the others. Our design requirements against other industrial and transportation facilities nearby are consistent with this requirement, namely that the safety of the nuclear power plant must not be dependent upon events at those other facilities. Certain hazards, however, are considered sufficiently unlikely at many sites that it is unnecessary to design against them specifically. At present, for example, it is physically possible that one of the LNG tankers now sailing the Pacific Ocean could be wrecked upon the California coast. The probability that this might actually occur near San Onofre or Diablo Canyon is, however, extremely remote, and this hazard has not been considered in the design of those plants.

The nearby presence of an LNG terminal, even if that terminal were so designed and situated that it did not place a direct hazard to a nuclear power plant, could bring with it the increased possibility of the close approach by LNG tankers or flammable gases released from these tankers. Such a possibility would have to be considered in deciding whether or not the nuclear power plant could be operated safely without undue risk to the public.

Although no LNG facilities are likely to be built on the Delaware River, other hazardous ship cargos do appear in traffic on that river, and an Atomic Safety and Licensing Board is presently deliberating upon the Hope Creek license application on those grounds. Also, LNG tankers are expected to approach to within about 6km of the Calvert Cliffs site. This situation is currently under review by the NRC.

In the material you provided, it was noted that the adequacy of a four mile "buffer zone" between Rattlesnake Canyon and the Diablo Canyon sites "to ensure containment of an emergency at one plant without involving the other requires further study". We would agree with that conclusion. The hazards of LNG tanker spills have been estimated by some authorities to persist to distances of up to 20 km under particularly adverse conditions. For lesser distances, it would be necessary to restrict the LNG traffic during those periods when such adverse conditions prevail. Where adverse winds are common and the separation distance is much smaller than 20 kms, such restriction may prove a significant burden to the LNG traffic.

Our safety requirements for nuclear power plants are intended to protect the public from radiation injury, and not to protect an applicant's investments. If LNG and nuclear facilities are sited in close proximity, similar populations are at risk from accidents at either, and measures that go to prevention of the initiating LNG accident would be more desirable than measures to mitigate the effects of such accidents in power reactor facilities. Careful study is required to assure that specific proposed measures to protect one element of society does not, in effect, increase the risk to others.

At this time we are not prepared to offer specific suggestions for provisions in the construction and operation of an LNG terminal at Rattlesnake Canyon or Horno Canyon necessary to clearly demonstrate the compatibility of such a facility with the existing nearby nuclear power reactors. While a variety of measures might be taken to isolate the possible interaction between the two types of activities, the need for and value of any specific measure would require further study. We recommend, since this option still exists, that the problem be avoided, by selection of a site for an LNG terminal that is more removed from the existing nuclear power reactors.

Finally, we do not believe that a seawater exchange system between a nuclear power plant and an LNG terminal would be economically feasible, nor of significant net environmental benefit, because of the length of the pipelines.

For your information, we are enclosing the results of staff work on LNG hazards from other licensing actions (Hope Creek, Salem, Calvert Cliffs). In addition, we are including a report, IITRI J6405, which indicates that certain staff assumptions may be nonconservative. We have not yet completed a technical review of this work.

It may be helpful to discuss this matter further, and particularly to clarify the substance of the results of our prior reviews (as noted, this material is attached). If you desire a meeting please do not hesitate to call me (301) 492-7207.

Sincerely,

Original Signed by
H. R. Denton

Harold R. Denton, Director
Division of Site Safety and
Environmental Analysis
Office of Nuclear Reactor Regulation

Enclosure:
AS stated

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAY 24 1978

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FEDERAL POWER
COMMISSION

Mr. Kenneth F. Plumb, Secretary
Federal Energy Regulatory Commission
Washington, D. C. 20426

Dear Mr. Plumb:

This is in response to your letter of April 21, 1978 inviting our comments on the draft environmental impact statement concerning the Western LNG Project (Docket No. CP75-83-2). As you know, the draft statement is on the proposed construction and operation of facilities to collect and liquefy natural gas, the transportation of liquefied natural gas (LNG) in interstate commerce, and the sale of natural gas to Southern California Gas Company and to Pacific Gas and Electric Company. Our comments are as follows:

1) Some of the considered alternate sites are within several kilometers of nuclear power generating facilities (viz., Diablo Canyon and San Onofre); and a recommended alternate site, Rattlesnake Canyon, is one of these. Even should the storage tanks and terminal facilities of the project be positioned and designed to avoid bearing risk on the nuclear facilities, LNG tanker traffic to the nearby sites would still bear risk on them.

   It is our practice (see April 12, 1978 letter from H. R. Denton to P. Weinstein) that risk should be assessed for LNG tanker traffic that is expected to pass within 20 km of any nuclear power facilities. Since the hazards of LNG accidents are at present uncertain, any LNG risk assessment must also be uncertain. It is prudent, therefore, where viable alternate sites are available, to avoid this risk altogether. Consequently, we request that the FERC reassess the available alternate sites to identify the best alternate site at which tanker traffic would not be expected to enter within 20 km of a nuclear power facility.

2) The largest-consequence LNG accident postulated to occur near a nuclear power facility is qualitatively different from the same accident postulated to occur elsewhere. The public safety and environmental consequences of such an accident could be the sum of those of the LNG accident

No response required.

There is absolutely no justification for a 20-km figure constituting a site elimination criteria.

itself, and of the radiological consequences resulting from any damage caused at the nuclear power facility. The final statement should include this consideration of the summed risks. In addition, while the draft statement has assessed and accepted the LNG risk at Rattlesnake Canyon, we do not accept the summed risk, since this risk is unnecessary in that there are a number of viable alternate sites (see comment 1, above).

Such an analysis is well beyond the scope of the FEIS and is unwarranted.

3) Attachment A to Volume II of the draft statement assumes moderately stable atmospheric conditions in predicting the largest downwind hazard distance. It should be noted that stability increases with an increasing positive vertical temperature gradient. Since an LNG spill of 30,000 m^3 would remove 6 x 10^{12} joules of heat from the surroundings (due to its heat of vaporization), the vertical temperature gradient above such a spill would exceed any considered by the model selected in the attachment, and an extremely high stability should thus be assumed and included in a reanalysis.

Attachment A to Volume II of the DEIS calculated risks based on vapor travel distances of up to 26.6 km and as such include extremely high stability conditions.

4) The discussion in Attachment A of tanker accidents does not consider equipment failure internal to the ship as a spill-causing mechanism; that is, it is assumed that spills can occur only by collisions, groundings, or ramings. Cargo spillage can also occur, however, by either passive or active failures of the ship's tanks or cargo containment systems, and such accidents are not uncommon even in crude oil tankers (see Devanney and Stewart, "Bayesian Analysis of Oil Spill Statistics", Marine Technology, pp. 365, October 1974). This spill mechanism should also be assessed in considering public risk, and the reassessment included in the final statement.

Previously discussed on pages 386-387 of Volume II of the DEIS.

Thank you for providing us with the opportunity to review and comment on this draft environmental impact statement.

Sincerely,

Voss A. Moore

Voss A. Moore, Assistant Director
for Environmental Projects
Division of Site Safety and
Environmental Analysis

cc: EPA (5)

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUL 14 1978

Federal Energy Regulatory Commission
ATTN: Mr. Barry Haase, Director
Pipe Line and Producer
Regulation
825 North Capital Street
Washington, D. C. 20426

Gentlemen:

Enclosed you will find a letter of inquiry to the Nuclear Regulatory Commission from Mr. Robert Batinovich, President, California Public Utilities Commission, asking for a determination as to the acceptability of locating an LNG facility within four-five miles of an existing nuclear generating station. Our response to that inquiry is also included. I am providing this correspondence for your information so that you will have direct knowledge of the NRC's concerns in this matter.

Sincerely,

Harold R. Denton

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Enclosures:
As stated

Letters noted.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

CHAIRMAN

July 7, 1978

Mr. Robert Batinovich, President
Public Utilities Commission
State of California
California State Building
San Francisco, California 94102

Dear Mr. Batinovich:

Thank you for your telephone call and letter of June 6, 1978 advising me of the status of your review of the Western LNG Terminal Associates application. Your letter noted that the CPUC must decide on the siting question by July 31, 1978.

The NRC staff has been aware of, and has commented on this application for a number of years. They have repeatedly advanced the position that, as a matter of preference, LNG terminals and LNG shipping routes should be located some distance away from nuclear power reactor sites.

As you pointed out, the California Coastal Commission has ranked two other sites, relatively close to nuclear reactors, as preferable to Point Conception. Since they are well aware of our concerns, their ranking implies a view on their part that the Horno Canyon and Rattlesnake Canyon sites are, or can be made acceptable - notwithstanding the presence of nearby nuclear facilities.

Your letter of June 6 stated:

> "The CPUC requests an NRC determination as to the acceptability of locating an LNG facility within 4-5 miles of an existing nuclear generating station. In the alternative, a clear set of specific NRC guidelines for the location of potentially hazardous facilities in proximity to nuclear reactors is sought."

We have, in considering this request, reviewed Mr. Denton's responses to the California Coastal Commission staff, which were partially quoted in your letter, and find that we are in general agreement with those responses. We believe that the NRC input you request must focus upon the issue raised in Mr. Denton's letter of April 12, 1978:

> "The nearby presence of an LNG terminal, even if that terminal were so designed and situated that it did not place a direct hazard to a nuclear plant, could bring with it the increased possibility of the

close approach by LNG tankers or flammable gases released from these tankers. Such a possibility would have to be considered in deciding whether or not the nuclear power plant could be operated safely without undue risk to the public."

Our staff believes that it is feasible to design an LNG storage and gasification facility such that a severe accident at that facility is very unlikely and even should an accident occur, it would not jeopardize the continued safety of a nuclear generating station four or five miles away. As discussed below, our principal concern is with LNG tanker traffic to and from the facility. In our view, potential accidents involving major LNG shipments constitute a significant risk to nearby nuclear generating stations. That such risks can be made acceptably low will be difficult to demonstrate to the satisfaction of all parties in the licensing process and may impose difficult implementation burdens.

We understand that the State of California has contracted for studies to identify measures to reduce risks of LNG tanker accidents during transit or docking. We would expect that these studies would also identify measures that could, if implemented, result in reduced risks to a nuclear power plant in the general vicinity of LNG ship traffic. Based on our experience licensing nuclear plants in the vicinity of LNG traffic, the adequacy of any such provisions will be difficult to demonstrate.

Our reviews of LNG traffic along the Delaware River, past the Hope Creek/Salem Generating Stations have been very lengthy, and their outcome is not yet decided. Our reviews of the LNG traffic associated with the Cove Point terminal and its potential impact on the Calvert Cliffs Nuclear Power Plant have shown that measures to limit the risk from LNG traffic, while feasible, are difficult to establish and constitute burdens to the Coast Guard, our licensees and the operators of the LNG traffic. We would anticipate difficulties in establishing satisfactory safety measures to reduce the risks of accidents in the open coastal waters of California, due to the larger volume of traffic and more hazardous maritime conditions, than in Chesapeake Bay. Judging from our experience in the Hope Creek reviews, there will be no ready consensus on the acceptability of such measures or on the level of risks posed by the LNG traffic.

In the event either of the two highest ranked sites is selected by your Commission, it would be necessary to conduct an evaluation, whose outcome is unclear, of the acceptability of continued operation of the nuclear facility in question. The burden on demonstrating adequate safety of the nuclear generating station would lie with the NRC licensee, while the Coast Guard and the owners and operators of the LNG tankers could bear much of the burden of implementing the appropriate safety measures.

In summary, we believe that where a major coastal LNG facility is to be located within four to five miles of a nuclear generating station, design, operational and procedural features beyond those normally required would be necessary. We believe that such siting should be avoided if there are other sites which are also acceptable from an overall environmental, economic and safety standpoint.

At this time there is insufficient information available for the Commission to make a determination as to the acceptability of locating an LNG facility within four-five miles of San Onofre or Diablo Canyon Nuclear Generating Stations. Should you decide to propose either Horno Canyon or Rattlesnake Canyon sites, we would urge that the permit include a condition that the permittee develop measures with appropriate Federal and State agencies and the licensee of the existing nuclear station to assure that the risk of an LNG accident will not jeopardize the continued safe operation of the nuclear station.

Sincerely,

Joseph M. Hendrie

[illegible] Commissioner
STATE OF CALIFORNIA

[illegible]

ne 6, 1978

norable Joseph M. Hendrie
17 H Street, N.W.
.S. Nuclear Regulatory Commission
shington, DC 20555

ar Chairman Hendrie:

n September 16, 1977, California's Governor Brown signed Senate
ill 1081, the Liquefied Natural Gas Terminal Act of 1977. (LNG
erminal Act) This act grants the California Public Utilities
ommission (CPUC) exclusive power to issue a permit for the con-
truction and operation of a liquefied natural gas (LNG) terminal
n California. On October 14, 1977, Western LNG Terminal Associates
iled an application with the CPUC for a permit to construct and
perate an LNG terminal at Point Conception, California. The
NG Terminal Act requires the CPUC to issue a decision on the
pplication no later than July 31, 1978.

urther, the act provides that not later than May 31, 1978, the
alifornia Coastal Commission must submit to the CPUC the Coastal
ommission's final report evaluating and ranking the sites which
ualify for an LNG terminal. The Coastal Commission's report is
eemed a recommendation to the CPUC, and the CPUC is required to
ssue a permit for construction and operation at the site designated
s the highest-ranked site by the Coastal Commission. However,
he CPUC may select a lower-ranked site if it determines with
espect to each higher-ranked site that location of an LNG terminal
t such site is not consistent with interests of public health,
afety and welfare, or if it determines that it is not feasible
o complete construction and commence operation of the terminal
t such higher-ranked site in sufficient time to prevent significant
urtailment of high-priority requirements for natural gas and also
finds that approval of the lower-ranked site will significantly
educe such curtailment.

On May 31, 1978, the Coastal Commission issued its final report
evaluating and ranking suitable sites for an LNG terminal as follows:

88

The extremely poor reproduction of this page and the next two pages is beyond the control of the FERC staff. The originals sent in to the FERC are of extremely poor quality.

(1) Camp Pendleton-Horno Canyon (San Diego County)
(2) Rattlesnake Canyon (San Luis Obispo County)
(3) Point Conception (Santa Barbara County)
(4) Bear Canyon (Ventura County)

amp Pendleton, the highest-ranked site, is located five miles south f Southern California Edison's San Onofre Nuclear Generating Station hile the second recommendation, Rattlesnake Canyon, is situated .6 miles south of the Pacific Gas and Electric Diablo Canyon Nuclear enerating Station.

n evaluating the pending application to construct and operate n LNG terminal at Point Conception, the CPUC must determine, on or efore July 31, 1979, whether the highest-ranked sites, Camp Pendleton nd Rattlesnake Canyon, are acceptable in terms of both public safety nd timely delivery of gas supplies. To facilitate the resolution of this difficult question, the CPUC seeks guidance from the NRC with espect to its policy for locating nuclear generating facilities in the area of a potentially hazardous LNG facility or vice versa.

y letter dated April 12, 1978, Harold Denton, Director of the ivision of Site Safety and Environmental Analysis at the NRC, nformed Pat Weinstein of the Coastal Commission staff that:

> "Part 100 of Title 10 of the Code of Federal Regulations permits two or more nuclear power reactors to be in close proximity if, and only if, they are so designed that an accident at one does not endanger the safety of any of the others. Our design requirements against other industrial and transportation facilities nearby are consistent with this requirement, namely that the safety of the nuclear power plant must not be dependent upon events at those facilities."

Mr. Denton further stated that:

> "[A]t this time we are not prepared to offer specific suggestions for provisions in the construction and operation of an LNG terminal at Rattlesnake Canyon or Horno Canyon necessary to clearly demonstrate the compatibility of such a facility with the existing nearby nuclear power reactors. While a variety of measures might be taken to isolate the possible interaction between the two types of activities, the need for and value of any specific measure would require further study."

In light of the Coastal Commission's recommendations of May 22, 1978 and in view of the statutorily-mandated decision date of July 31, 1978 precluding further study, the CPUC requests an early determination as to the acceptability of locating an LNG facility within 4-5 miles of an existing nuclear generating station. In the alternative, a clear set of specific NRC guidelines for the location of potentially hazardous facilities in proximity to nuclear reactors is sought.

In view of obvious constraints imposed by the July 31 decision date, a timely response is requested. Your consideration and cooperation in this matter of great importance is much appreciated.

Sincerely yours,

Robert Batinovich

ROBERT BATINOVICH, President

STATE OF ALASKA

JAY S. HAMMOND
GOVERNOR

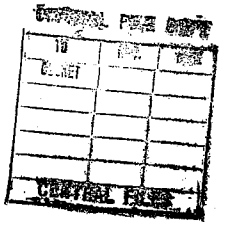
OFFICE OF THE GOVERNOR

STATE POLICY DEVELOPMENT AND PLANNING

POUCH AD — JUNEAU 99811
PHONE 465-3512

June 12, 1978

Mr. Kenneth F. Plumb
Secretary, Federal Energy Regulatory
Commission
825 North Capitol St., N.E.
Washington, D. C. 20420



Re: OPPR-PCCD/EEB
Western LNG Terminal Company
Pacific Gas LNG Terminal Company
Western LNG Terminal Associates
Docket No. CP75-83-2

Pacific Alaska LNG Company
Alaska California LNG Company
Pacific Alaska LNG Associates
Docket No. CP75-140

Subject: Close-out of Alaska State Clearinghouse Review on the Draft Environmental Impact Statement on Western LNG Project (FERC/EIS --0002)

Dear Mr. Plumb:

The Alaska State Clearinghouse has conducted review on the subject EIS. The following comments were coordinated with the departments of Law, and Natural Resources and constitute a composite state response. While the cut-off date for receipt of comment was June 5, 1978, I contacted the FERC and spoke with Dr. Hienaman. He indicated that three other reviewers, including the State of California, have sought a three-week extension of that date and it had been granted. While I am aware this does not constitute a blanket extension, it is our hope that the State of Alaska Official response will be accepted and duly noted. The following state agencies commented:

The Department of Fish and Game said:

"The Department has reviewed the second draft Environmental Impact Statement for the Western LNG Project. In general, the EIS is well written and provides a fairly accurate assessment of the probable environmental impacts of the project. The only serious shortcomings identified during our review of the document were (1) The failure to discuss in detail the section of the gathering system extending south to Anchor Point and north to the Susitna Basin, (2) the failure to discuss the problems of crossing Cook Inlet, (3) the recommendations to conduct winter stream crossings, and (4) the failure to identify under ice leaks of natural gas as a potential problem. Our specific comments on the EIS follow:

Discussion of the subjects addressed in this paragraph have been appropriately added, expanded or revised in Volume I of the FEIS.

"Page 7
The proposed 2,200 ft. dock must provide for free movement of water, fishes and marine mammals. There should be no discharge of potentially contaminated ballast water, i.e., ballast water containing fish disease pathogens, exotic contaminants (heavy metals, etc.), or exotic species.

Figure 8 in Volume I shows that the trestle and dock would allow free movement. A discussion on ballast water has been included in Section C.7 of Volume I of the FEIS.

"Page 13
Is the 620,000 bbl containment dike sufficient to hold 550,000 bbls of expanding LNG in the event of a ruptured tank?

Yes.

"Page 19
LNG vessels will compound the existing vessel traffic problem in Kachemak Bay and increase the need for a vessel traffic control system.

The additional traffic generated by the LNG project, about one ship per week in Phase II, would not significantly increase the traffic problems in Kachemak Bay.

"Page 21
The construction dock probably will impact existing set net sites in the vicinity of the proposed facility.

Section D.1 of Volume I of the FEIS addresses this subject.

"Page 23
Insufficient information is available on the area seaward of the proposed site to assess the effects of dredging on marine fish and game resources. The applicant should conduct a biological survey before construction to determine if the area is important marine habitat. Blasting in Alaskan waters is strictly regulated and only would be permitted during the period of lowest fish use.

Due to the extreme tidal regimes in this area of Cook Inlet, local marine life is minimal and would not be significantly affected by local dredging. If the permitting agency for dredging feels that information on the area is insufficient to allow dredging to proceed then such a stipulation can be placed on that permit. A recommendation has been placed in Section I of Volume I of the FEIS indicating that the applicant should consult with ADFG for construction times least disruptive to local and migrating aquatic populations.

"Page 25
Winter crossings of rivers supporting fish populations would not be permitted. An EPA study conducted in conjunction with the winter TAPS crossing of Chatinik a River documented heavy fish and invertebrate kills. Spring or early summer crossings would be strongly encouraged. The applicant should be aware that under AS 16.05.870, the Department must be notified of all anadromous stream crossings and must approve such crossings in advance. Paragraph 3. Large quantities of fresh water should not be withdrawn from small streams, particularly during the low flow period. This will require a DNR permit. No water containing any contaminents may be returned to streams or rivers.

Recommendations in Section I of Volume I of the FEIS reflect these concerns.

"Page 26
Paragraph 3. Contrary to the EIS, there is currently a vessel traffic problem in Kachemak Bay where all of the tankers pick up pilots. This is compounded by the intensive small boat traffic (50-120 ft. class) in Lower Cook Inlet which increases the chance for a collision and spill. Conflicts between vessels and fishing gear are also common within Kachemak Bay and Lower Cook Inlet. To mitigate these problems, voluntary traffic lanes have been established within Kachemak Bay by the Coast Guard. Interference with or destruction of fishing gear is a misdemeanor under Alaska law.

See response to comment on page 19. A collision with a small boat is unlikely to result in a LNG spill.

"Page 75
The information on currents and sedimentation contained in the EIS is extremely cursory. Much better information exists. Our department would be happy to provide you with references.

The information contained in Section B.5 of Volume I provides the public with a general description. It does not include all of the information that was reviewed by the staff in the formulation of its impact discussion and conclusions.

"Page 94(a)
Terrestrial Birds - peregrine falcons are permanent residents of the Western Inlet and knowledgeable ornithologists feel that they nest there. This should be considered when working around potential nesting sites in bluff areas.

A formal consultation on this matter was carried out with the Fish and Wildlife Service of the Department of the Interior. It was their official biological opinion that the two subspecies of endangered peregrine falcons are only migrants through the area. The subspecies Peales peregrine falcon does nest in the area but is neither threatened nor endangered.

"Page 133
Topography - all stream crossings will have to meet ADF&G standards which may be more stringent than the criteria listed.

No response required.

"Page 135
Paragraph 4. The statement that Pacific Alaska will obtain its fill material from the nearest (unspecified) site is disturbing. The location of material sites is extremely important and all locations will have to be identified before use. Excavation of borrow material

No response required.

can destroy fish spawning grounds, important terrestrial habitat, and important intertidal or marine resources. Permits will have to be obtained from ADNR before removing gravel from any State lands, and from ADF&G before removing gravel from any refuges or anadromous fish streams.

"Page 148
Paragraph 2. The Department of Fish and Game supports and encourages the requirement for a site specific survey of the area proposed for dredging before a Corps permit is issued. This survey should include (1) abundance and distribution (temporal and seasonal) of fish, marine birds, marine mammals, benthic organisms, and planktonic larvae, and (2) oceanographic and sedimentary processes at the site.

Comment accepted.

"Page 151
Paragraph 3. The effects of the discharge of 5,000 gal of 100 ppt salinity water per day, although probably not a serious problem, should be investigated further before a DEC permit is issued. Salinity at the proposed plant site is in the range of 27-28 ppt and the discharge of highly saline water could cause avoidance of a localized area by marine life. This could be important if it causes salmon to avoid local set net fishermen's net sites in the plant area.

The staff does not believe that this discharge would impact an area large enough to interfere with waters available to local fisherman.

"Page 155
Paragraph 3. Areas used by nesting Trumpeter swans and other sensitive species should be identified and avoided by surveillance aircraft during the sensitive periods.

See recommendation in Section I of Volume I of the FEIS.

Paragraph 4. Apparently there is evidence to indicate that, unless the soil is actually disturbed in clearing operations, the area grows back to grasses rather than willows or alders. Grasses are not an important food item for either moose or caribou and, wherever possible, steps should be taken to insure the regrowth of willows, small birch, or alders.

It is a normal pipeline practice to allow a right-of-way to revegetate only with grasses or other low level growth. No trees are allowed to grow over or adjacent to a pipeline. Perhaps negotiations between ADFG and the applicant could result in allowing tree growth over a wider section of the right-of-way than normally allowed but trees would not be allowed to grow directly over the buried pipeline.

"Page 156
The construction of the gathering lines on the west side of the Inlet could have an effect on as yet unidentified peregrine falcon habitat. Because the peregrine falcon is an endangered species it is suggested that a study be undertaken to identify their habitat.

See recommendation in Section I of Volume I of the FEIS.

"Page 157
The discharge of ballast water could be damaging if it contained disease pathogens which could utilize marine organisms found in Cook Inlet as hosts. Examples are Sacramento River Salmon disease, IPN, whirling disease, and VHS which are all known ot be present in California

Such a problem has been identified in Section C.7 in Volume I of the FEIS and a recommendation to study this is contained in Section I.

and which could infect Alaskan salmon stocks. If possible, ballast waters should be discharged in the Gulf of Alaska, treated before discharge, or utilized elsewhere in the LNG facility.

"Page 159
Paragraph 3. Harbor seals and several species of whales are found within the project area and could also be affected by construction activities.

The marine species present in Cook Inlet were identified in Section B.7 of Volume I of the DEIS.

"Page 170
The Recreational and Aesthetics Impacts section fails to recognize the fact that the increased employment and secondary employment associated with plant construction and operation will attract additional people to the area. This population increase will place additional pressure on recreational resources. This increased pressure will be reflected in crowded campgrounds, reduced bag limits, and shorter fishing and hunting seasons.

The projected impact on local recreation and aesthetics would not be significant as stated on page 169 of the DEIS.

"Page 198
The fire control plan for the plant should include precautions to guarantee that a fire or explosion would not spread and cause a devastating forest fire. Fire control systems should not be dependent upon the plant's electrical power system which could be easily destroyed by a fire or explosion. A contingency plan should be developed utilizing other fire control organizations' equipment and personnel.

The plant would have an emergency electric generator for use in the event of an electric power failure. Local fire departments in Kenai and North Kenai would be available for support.

"Page 205
Paragraph 1. This statement is inaccurate. The pipeline south of the facility would also pass very close to the town of Kenai and the small communities of Clam Gulch, Ninilchik, and Anchor Point.

Comment reflected in Section D.C of Volume I of the FEIS.

"Page 206 & 207
Winter is probably the worst time to construct pipelines across streams supporting fish. Winter construction should be discouraged. EPA studies conducted in conjunction with construction of the TAPS pipeline indicated that late spring or early summer crossings were best. Winter crossings resulted in large fish kills and loss of invertebrate stream life. Department of Fish and Game review and approval of all crossings of anadromous streams and all streams located in State refuges will be required before construction can proceed.

Note appropriate changes and additions to Sections B, D, and I of Volume I of the FEIS.

"Page 246
The Department of Fish and Game agrees that the Nikiski site is the most desirable for construction of the LNG facility. This decision is supported in the Department's 1976 analysis of the Starichkof and the Nikiski sites.

No response required.

"Page 249
Based on the information presented in the EIS, it appears that the alternative Ivan route proposed by the environmental staff of the Federal Energy Regulation Commission (FERC) offers some advantages over the applicant's proposed route. The Department of Fish and Game supports the Ivan River alternative.

The applicant has agreed to use the Ivan River alternative and now considers it as their primary route.

"Page 250
The Department supports the FERC staff recommendation for an alternate main pipeline route between the Lewis River Field Tie-in and the Beluga River Field Tie-in.

Comment noted.

"Page 251
Because the applicant's proposed pipeline lateral follows existing right-of-ways and does not create new access, it is favored by the Department over the staff proposal.

Note revision of the staff's preference concerning this alternative in Section H of Volume I of the FEIS.

"Page 252
The Department supports the staff alternative of a slightly longer pipeline which would follow the existing Kenai pipeline right-of-way but avoid bisecting the Kenai caribou calving area.

Comment noted.

"Page 256
The Department would support the use of the existing Swanson River gas pipeline except for the fact that it requires five additional stream crossings over the applicant's original proposal.

The staff still favors the use of the existing Swanson River gas pipeline.

"Page 261
The Department prefers the applicant's original proposal over the staff's alternate.

Note revision of the staff's preference concerning this alternative is Section H of Volume I of the FEIS.

"Page 287-292
Conclusions and Recommendations. The Department of Fish and Game supports the use of the Nikiski site over the Starichkof site. Because the Tok and Fairbanks alternative pipelines would have greater environmental impacts within Alska, the Department supports the proposed LNG plant proposal over either of the alternative pipelines.

Comment noted.

"Under recommendations 1 on page 288, the Department supports all of the alternative pipeline routes, except for (c) and (d). The Department believes the proposed Birch Hill alternative is of dubious value and opposes the North Fork Sput alternative because it may be more damaging to the environment than the applicant's original proposal.

See changes in Section I of Volume I of the FEIS.

"Under Recommendation 3, the applicant should develop a fire control contingency plan which would guarantee that an LNG fire at the plant would not spread to nearby forests and result in a major forest fire. The applicant should not receive a permit to operate the plant until he has demonstrated his ability to control the maximum project fire.

The plant's fire protection and extinguishing capabilities are discussed in Section D of Volume I of the FEIS.

"Under Recommendation 16, the applicant should consult with the Department of Fish and Game, Habitat Protection Section, before planning any construction activities or stream crossings in State refuges, critical habitat areas or anadromous fish streams. The Department reviews all projects in these areas and their approval must be obtained before any construction can proceed. For example it is doubtful that winter crossing of anadromous streams would be permitted. Early consultation with the Department may eliminate lengthy delays later.

Comment reflected in Section I of Volume I of the FEIS.

"The following recommendations should be added:

22. The applicant should be prepared to conduct studies to assess the potential effects on local marine life of dredging and blasting for the loading terminal.

Comment reflected in Section I of Volume I of the FEIS.

23. Canadian studies have indicated that under-ice bacterial degradation of methane (CH_4) in lakes and streams can result in oxygen depletion and the death of fishes. The applicant should be prepared to detect and rapidly find pipeline crossing gas leaks in lakes and streams and if necessary provide for artificial aeration to prevent the loss of commercial or recreational fisheries resources.

Gas pipelines are regularly inspected for leaks and repaired accordingly.

The Alaska Power Authority stated:

"The Alaska Power Authority's comments on the Draft E.I.S. concerning the Western LNG Project are based on the assumption that legislation passed at the national level will restrict the future use of natural gas for electrical generation. Assuming that the future conversion of natural gas to electricity will be held

to levels approximate to today's, utilities are expected to turn to other power sources, particularly hydroelectric and coal, to meet long-term needs in South-central Alaska. Thus, the depletion of Cook Inlet gas reserves to supply energy for southern California is not expected to create conflicts with the long-term supply of power to Alaskans.

"The Homer Electric Association (HEA) distributes power to the Kenai Peninsula. HEA purchases electricity from the Chugach Electric Association (CEA), which operates two generating plants on the Kenai. HEA will supply power for the operation of the PLANG facility, and has estimated that the Project will require 17.4 mw of capacity and 132 million kwh of annual energy. This demand level represents almost 74 percent of the total 1976 energy requirements in the HEA service area. However, no mention is made of the ability of existing and planned electric generation and transmission systems to accommodate power requirements for the plant and the temporary and permanent work force associated with the Project. HEA has proposed construction of the Bradley Lake Hydroelectric Project to expand power generation capacity on the Kenai Peninsula. If the Bradley Lake project is found to be economically feasible, construction could begin in 1979 and the project could be operational by 1984. Due to anticipated load growth in the HEA service area, it is belived that out put of the Bradley Lake system could be fully utilized at the time the system becomes operational. According to the PALNG Draft EIS, however, the LNG facility may be completed by January, 1983. Thus, the 4-year construction activities and the initial year of the PALNG Project operation may strain the HEA and CEA generation and transmission systems before the Bradley Lake Project can come on-line.

"The effect of the PALNG development on long-term electric utility planning should be addressed. In additon to the plant's direct energy requirements, the HEA and CEA systems will be expected to supply power for a peak construction workforce of 800 and the long-term population increment associated with 50 to 60 Project operation employees. This demand may represent a strain on generating capacity available prior to the completion of Bradley Lake. Plans for supplementing existing Kenai Peninsula generation with standby units or power obtained from other parts of the interconnected Anchorage systems should be specified. What are the alternative plans for power supply in the event Bradley Lake is significantly delayed or not developed?"

As stated on page 112 of the DEIS, some upgrading of HEA's power transmission network would be necessary between the Bernice Lake generating plant and the applicant's proposed terminal facility. Our information indicates that no additional generation capacity would be required on the HEA system since the excess capacity at Bernice Lake would be sufficient to meet the proposed LNG terminal's electric power requirements.

The Department of Community and Regional Affairs said:

"Pacific Alaska LNG Company proposes to construct a 400 mmcfd LNG liquefaction plant and loading terminal adjacent to the Collier Carbon and Chemical Company at the Nikiski industrial complex on Cook Inlet. The applicant has amended proposed plans for the California receiving facilities, thus necessitating this review. This project was originally reviewed by Clearinghouse in November 1976, (State I.D. No. 76091501) and the Alaskan portion of the project is virtually unchanged.

"Several issues surfacing in the original DEIS have not been clarified. The USCG now concurs in the selection of the Nikiski site over the alternative of Cape Starichkof and the Nikiski Marine Terminal Safety Committee is now in operation. This Department still agrees that the Nikiski location offers less disruptive socio-economic consequences than would development of an isolated section of coastline like Cape Starichkof.

No response required.

"We also concur with the FERC Staff recommendation (page 261) that existing pipeline networks be utilized for this project, (e.g., the Swanson River pipeline under Cook Inlet) instead of constructing generally parallel rights-of-way as suggested by the applicant.

The Swanson River pipeline runs east-west on the Kenai Peninsula and does not cross the inlet.

"We take issue with the statement on page 112 that . . . "Pacific Alaska has agreed to give priority to the satisfaction of local gas demand before and during exploration of LNG to out-of-state markets." Once contractual agreements are confirmed with Southern California consumers, it will be illegal for Pacific Alaska to divert gas supplies for in-state use.

The statement reflects Pacific Alaska's policy position in sworn testimony at the Federal Energy Regulatory Commission. Whether or not this policy could result in any breach of contractual agreements would depend on the individual contract terms. However, the magnitude of gas discoveries in the general Cook Inlet region and the prospects for future additions to known gas reserves strongly suggests that the satisfaction of local demand will not become a problem.

"Roughly one-third of the 59 acre site is leased by the State of Alaska to Pacific-Alaska LNG (ADL No. 61493: January 4, 1974). The lease document affords a strong opporutnity for the state to enforce a variety of reasonable environmental stipulations or operating conditions. The agreement however, is strictly boiler-plate and tenders the 20 acres for the small annual sum of $8,000. For a facility costing over $600 million, this agreement appears very generous. The State should consider the merits of renegotiating the lease.

We suspect that the low land-lease rates are intended to encourage planned industrial development at Nikiski rather than uncontrolled growth on private lands scattered throughout the Kenai Peninsula region. Taxes paid to state and local government will offset the apparently low land costs of the site itself.

"The applicant stresses that much of the plant construction will be modular and will be transported to the site via an excavated haul road cut into the inlet bluffs approximately one mile south of the plant site. The DEIS states that . . . due to the large volume of materials removed 'the haul road should be considered permanent' (p. 166) and . . . The construction dock is temporary, however and ' . . .would be removed and the shoreline would be restored to natural conditions.' (p. 28).

"If properly planned, this corridor could provide needed public access to Cook Inlet once construction is complete. The temporary construction dock could also serve recreational or commercial pursuits. LNG should work together to achieve a mutually-satisfactory, multi-purpose design and proper disposal or conversion orocedures for both the haul road and dock. Provision for revegetating the wide road swath should also be considered. If public lands are involved, careful lease stipulations would accomplish this.

The applicant has indicated that the construction dock and haul road could be utilized for recreational or commercial pursuits if desired by the local community or public agencies.

"Problems of traffic congestion at the Nikiski complex seem to be solvable, according to procedures outlined by the USCG and the Nikiski Marine Terminal Safety Committee. One intriguing risk not mentioned so far concerns the combination of strong ebb tides and the relative differences terminals protrude about 1,200 feet from shore and are about 2,500 feet apart. The proposed terminal would maintain this separation but would jut out some 2,200 feet from shore. What danger exists that an emergency breakaway from the Collier facility during ebb tide would terminate in a vellel-terminal collision at the proposed LNG loading dock?

Collisions at docks are inherently part of the historical accident rate for Cook Inlet which was used in staff's risk analysis.

"Appendix I is a copy of the Nikiski Marine Terminal Committee's "Operations Guide." The telephone number given for a 24 hour port advisory is apparently dated as it reaches a private party. The correct number is 7768877."

Comment reflected in Appendix I of Volume I of the FEIS.

Thank you for the opportunity to comment.

Sincerely,

Bill Ross for Jerry Madden

Jerry L. Madden
State-Federal Coordinator

cc: Fred Boness, Deputy Commissioner, DNR
Commissioner Ronald Skoog, ADF&G
Commissioner Lee McAnerney, DCRA
Eric P. Yould, Executive Director
Alaska Power Authority

State of California, Edmund G. Brown Jr., Governor

California Coastal Commission
631 Howard Street, 4th floor
San Francisco, California 94105
(415) 543-8555

June 1, 1978

Kenneth Plumb
Secretary
Federal Energy Regulatory Commission
825 North Capitol Street
Washington, D.C. 20426

Dear Mr. Plumb:

This letter serves as the California Coastal Commission's comments on the Draft Environmental Impact Statement (DEIS) on the Western LNG project (CP 75-140 and CP 75-83-2). A copy of this letter with the accompanying supporting documents is being sent directly to Robert Arvedlund of your staff.

As the DEIS notes, the California Coastal Commission has the responsibility under state law (SB 1081) to evaluate and rank remote onshore LNG sites according to the land use and environmental policies of the California Coastal Act of 1976. On May 24th the Coastal Commission adopted the following site ranking (the first ranked site having the least adverse effect on coastal resources, the last ranked site the greatest adverse effect):

(1) HORNO CANYON on Camp Pendleton

(2) RATTLESNAKE CANYON

(3) LITTLE COJO near Point Conception

(4) DEER CANYON

We have enclosed a copy of the final Commission report which details the rationale for such a ranking. We request that this final report be included as that of the California Coastal Commission's comments to the DEIR. In addition, we would like to call your attention to the following specific comments we have relative to the Horno Canyon site.

Finding 11 of the Coastal Commission report states, on page 36, that "considerably more adverse impacts will occur at Rattlesnake Canyon (the second ranked site) than at first ranked Horno Canyon." In contrast, the DEIS prepared by the FERC states on page 284 with regard to the Horno Canyon site:

"The staff, however, feels that there would probably be significant institutional problems in obtaining the site, since it is controlled by the Federal Government. Its availability for a terminal is

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No response required.

extremely uncertain. The Navy, owners of the land, expressed an extremely negative viewpoint of an LNG facility in this area. For these and the previously stated reasons (slightly longer shipping distances and a 9000 foot trestle), the staff has rejected these (two Pendleton sites) as serious alternatives."

The Coastal Commission was aware of the possible institutional difficulties involved in securing the Horno Canyon site. However, it did not believe this factor should eliminate the site from consideration and stated in Finding 7 on page 17:

"7. Horno Canyon on Camp Pendleton is Ranked First. The Commission ranks the Horno Canyon site on Camp Pendleton (Figures 6 and 7) first among the four sites because construction and operation of an LNG terminal there would have the least adverse effects on the objectives of Chapter 3 of the California Coastal Act of 1976. The basis for this ranking is that a Horno Canyon LNG terminal would have low adverse impacts on public access, recreation, and natural resources and would not be inconsistent with most of the development policies of the Act. It is ranked first despite statements from the Navy and Marine Corps that the site would not be available for an LNG terminal, because the military does not necessarily exercise final control over the use of federal property. Federal property is not subject to state authorized eminent domain proceedings. Consideration of national energy priorities and a federal LNG terminal siting policy to locate such terminals where they will be least damaging to the environment, however, could cause other officials in the executive branch, including the President, to make the land available. The Commission recognizes that under both the federal Coastal Zone Management Act and the California Coastal Act the Commission does not regulate lands on the coast in federal ownership. However, the LNG Terminal Act of 1977 expressly states that the Commission shall study, evaluate and rank 'potential onshore sites for an LNG terminal' (Section 5611) and that 'onshore' is defined as 'any location on the mainland of California landward of the mean high tide line' (Section 5565). Thus the Act requires an evaluation of all potential sites regardless of site ownership, even though use of federal lands for a terminal would have to be a federal decision. Given the small number of feasible sites remaining after an evaluation of 82 sites, this has turned out to be a prudent legislative directive."

In view of the California Coastal Commission's findings and the provisions of the National Environmental Policy Act (NEPA), we strongly urge that the final EIS seriously evaluate the Horno Canyon site. We believe that NEPA requires the lead agency for an EIS to consider all logical alternatives, even those which are not within its jurisdiction (see Natural Resource Defense Council vs. Morton 458F 835 (1971)). To assist you in a more complete analysis of the Horno Canyon site in the final Environmental Impact Statement, we have enclosed with this letter the final reports of the Coastal Commission's consultants on maritime and geotechnical conditions and on fish and wildlife resources.

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No response required.

Staff reiterates that the Horno Canyon Site should not be considered as a serious alternative. To make this site available, an extremely lengthy process of congressional review and legislative action would be required. In addition, the site has other disadvantages as outlined in the FEIS, and since other alternatives are available there seems little justification to pursue Horno Canyon.

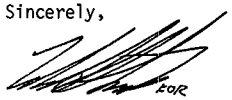
Finally, as noted in the DEIS, the California Coastal Commission is evaluating offshore sites and designs for an LNG terminal. This study will be completed by September 16, 1978. Preliminary indications are that offshore siting may be a worthwhile alternative, and, therefore, we are encouraged by the following statement of the DEIS on page 267:

> ". . .it should be emphasized that the California Coastal Commission is actively studying the feasibility of offshore siting. Should this effort be fruitful on a site-specific basis prior to a Federal and/or state decision on an onshore site, any offshore site recommended by the feasibility study should be considered prior to a final site selection for the Western facilities."

We have enclosed the February 1, 1978 Interim Report of the staff on the California Offshore LNG Terminal Study, and request that this be made part of our comments on the DEIS.

We thank you for the opportunity to comment on the DEIS and look forward to continued cooperation in this important energy facility siting effort.

Sincerely,



MICHAEL L. FISCHER
Executive Director

Enclosures:
1) Final Report Evaluating and Ranking LNG Terminal Sites, California Coastal Commission staff
2) California Offshore LNG Terminal Study: Interim Report, California Coastal Commission staff
3) Geotechnical Evaluation of Five Potential Mainland California LNG Import Terminal Sites, Woodward-Clyde Consultants
4) Fish and Wildlife Resources of Five Proposed Onshore Liquefied Natural Gas Terminal Sites, California Department of Fish and Game
5) Maritime Factors Analysis: Onshore LNG Facility, John J. McMullen Associates, Inc.

cc: Robert Arvedlund, Federal Energy Regulatory Commission
Allen Lind, Office of Planning and Research

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Comment reflected in Section H-2a of Volume II of the FEIS.

September 21, 1978

Nanette Lemmehel
LNG Task Force
Public Utilities Commission
California State Building
San Francisco, CA 94102

Review of Proposal to Fulfill Condition 12. Proposed LNG Facility Point Conception, Santa Barbara County

I appreciate the opportunity to comment on the Western LNG partial proposal to fulfill Condition 12. In accordance with your request of September 6, 1978 to Mr. Bill Seidel, my Office's review is attached. This review should not be construed as my sanctioning "Condition 12" as providing for adequate mitigation nor as my sanctioning the processing of the Final Environmental Impact Report as being in compliance with the California Environmental Quality Act. "Condition 12" does not afford either a framework for adequate mitigation of the cultural resources nor does it offer the applicant sufficient guidance for the development of an expeditious and sufficient mitigation program.

Comments noted.

However, attached is this Office's review of the proposed mitigation program (Attachment 1) and a recommended process, guidelines and standards to accomplish reasonable compliance for the archeological recovery or preservation within the site area (Attachment 2).

I trust that these will be of benefit to you. If my staff or I can be of further assistance, please do not hesitate to contact Mr. William Seidel at (916) 445-8006.

Original Signed by
William E. Padgett

Dr. Knox Mellon
State Historic Preservation Officer
Office of Historic Preservation

BS:pkp

ATTACHMENT #1

Review of WLNG Proposal for the Protection of Archeological Values at the Proposed Point Conception Plant Site in Partial Fulfillment of CPUC's Condition 12.

This review was made in accordance with standards used by the Office for over three years, with standards circulated by the President's Advisory Council on Historic Preservation on August 20, 1976 and with standards circulated by the Department of the Interior on October 4, 1976.

We were rather diappointed in the lack of critical elements within the plan. It is apparent that whoever developed this plan was: 1) unfamiliar with current archeological standards; 2) demonstrated no knowledge of the resource he would be dealing with; 3) demonstrated a lack of knowledge of the heritage value of archeological sites to the local Native Americans, and; 4) developed a plan which may well be in conflict with current ethical standards within the profession.

Specifically, we find the following deficiencies with this plan:

1. Figure 2 is essentially unreadable.
2. There is no definition of the project area in relation to identified archeological sites.
3. There is no effort to clarify the rather confused archeological situation displayed in Figure 2.
4. There is no statement of "an independent survey of archeological resources at the site".
5. There is no statement of the qualifications of the "principal archeologist" or field personnel.
6. There is no mention of coordination with people of expertise in the area.
7. Native American Heritage values for the archeological sites and information are inadequately addressed.
8. There is no statement of purpose, research orientation or objectives.
9. The statement on curation demonstrates a lack of knowledge of CPUC's capabilities in this area and is obviously inadequate.
10. The section on Native American access is not adequate either in terms of the archeologist's responsibility to the Native American values, accruing to the archeological sites or in terms of the sacred and spiritual values accruing to Point Conception.

In summation, the proposed plan appears to have no objective other than allowing the undertaking to proceed. It appears to have no substance, being exclusively methodological in nature. It appears to be methodologically unsound. It appears to have a very low cost-benefit ratio. It does not conform to any accepted standards in use by this State or the Federal Government. It does not fulfill the desires of the Santa Barbara County Board of Supervisors. It does not fulfill the statements made in PUC's Environmental Impact Report. It does not fulfill "Condition 12". Finally, it does not provide for meaningful mitigation of the archeological resources.

ATTACHMENT #2

Proposal for the Development of a Meaningful Mitigation Program for the Archeological Values at the Proposed Point Conception LNG Facility.

This Office suggests the following steps be undertaken prior to the development of specific measures designed to avoid and mitigate the archeological values at Point Conception.

1. Conduct or have conducted a meaningful, professionally adequate ethnographic study to define the historic significance and use of the Point Conception area to the Native Americans. This study should be as site specific as possible. It should tie this area to the greater culture history of Southern California as appropriate and should cover all areas of potential environmental impact. It should be conducted by an impartial, professionally qualified ethnographer who is familiar with the resources of this area and is agreeable to this Office. This study should include a thorough archival and literature search and interviews with individuals to ascertain pre-1970 use of and feelings for this area. It should be noted that interviews could extend well beyond the Chumash culture area as Point Conception is noted as being important to at least the Luisenos. (N.B. the existing ethnographic study by Chester King and Steve Craig is not considered by this Office to be an adequate ethnographic statement though it certainly documents current Native American values at the site quite thoroughly.)

2. The archeological values at the plant site and other areas of impact should be re-identified through on-ground survey by an impartial, professionally qualified archeologist familiar with the area and agreeable to this Office. This study should be sufficient to define the area extent and characteristics of archeological values including isolated artifacts, inter- and intra-site differences, and statements of possible, probable and certain significance (data potential and Native American heritage value). The data potential of these sites should be assessed in terms of specific research questions currently being addressed in the general area of Point Conception and should follow from a regional research design concept. A program should be developed for sub-surface testing for those sites which may not be avoidable. This program should be designed to define the subsurface nature of the site as well as define and redefine the research potential of the sites and allow for cost estimates to be made for an appropriate mitigation plan which should be resubmitted to Public Utilities Commission.

Given the nature of the Native Americans' concerns in this area, we suggest that subsurface investigation not proceed until either final licensing is approved by both the CPUC and the Federal Energy Regulatory Commission, and the local Native Americans give their consent. In neither case should sub-surface investigation proceed a review and concurrence of the CPUC and this Office.

If you or the applicant have any questions concerning this proposal, I or my staff would be most happy to meet with you.

ADDRESS ALL COMMUNICATIONS
TO THE COMMISSION
CALIFORNIA STATE BUILDING
SAN FRANCISCO, CALIFORNIA 94102
TELEPHONE: (415) 557- 1824

Public Utilities Commission

STATE OF CALIFORNIA

FILE NO.

June 21, 1978

Mr. Kenneth F. Plumb
Secretary
Federal Energy Regulatory Commission
Room 9310
825 North Capitol Street, N.E.
Washington, D.C. 20426

Dear Mr. Plumb:

Re: Pacific Alaska LNG Company, et al., Docket Nos. CP75-140, et al. and Pacific Indonesia LNG Company, et al. Docket Nos. CP74-160 et al., Comments on the Draft Environmental Impact Statement.

The Federal Energy Regulatory Commission (Commission) Staff's Draft Environmental Impact Statement (DEIS) in the above-entitled applications was published on April 21, 1978 in compliance with the National Environmental Policy Act of 1969. Section 2.82(c) of the Commission's Rules of Practice and Procedure states that, "All intervenors taking a position on environmental matters shall file timely comments, in accordance with paragraph (b) of this section on the draft statement...". Section 2.82(c) also states that, "Nothing herein shall preclude an intervenor from filing a detailed environmental impact statement".

As the parties to the above-entitled proceedings are aware, the California Public Utilities Commission (CPUC), pursuant to the "California Liquefied Natural Gas Act of 1977", is the California agency charged with the responsibility of issuing a decision on the permit application for a liquefied natural gas receiving terminal in California, for the state. As part of that decision making process, the CPUC is the project lead agency under the California Environmental Quality Act and must prepare a Final Environmental Impact Report. The CPUC has prepared numerous detailed studies on the various issues of siting an LNG facility in California. The Commission staff has been kept informed of these studies and has in fact acknowledged the CPUC environmental work in its DEIS. In its Final Environmental Impact Report the CPUC must consider many of the same comments that the Commission staff must consider.

California is concerned with presenting the Commission with the most complete environmental information possible in the most useful and logical manner. We believe that the best method of accomplishing this is to send the Commission the CPUC Final Environmental Impact Report and appended studies when it is completed as allowed for by Section 2.82(c) of the Commission's Rules of Practice and Procedure. Any attempt to present our studies and findings in a piecemeal fashion consisting of "specific comments" to the DEIS would be highly unsatisfactory. Furthermore, such an effort would be premature. As stated above, the CPUC must consider many of the same comments submitted to the Commission staff on the DEIS before it can issue its Final Environmental Impact Report. Additionally, as all parties are aware, the CPUC will not make an official decision until July 31, 1978 on LNG terminal siting in California. Any party to the Pacific Alaska LNG Company or Pacific Indonesia LNG Company applications may obtain a copy of the CPUC Draft Environmental Report by contacting the undersigned.

No response required.

The CPUC will, in fact, take an "environmental position" in the subject proceedings. If it appears necessary to aid in developing a complete environmental record, the CPUC will seek to present evidence on environmental matters in these joint proceedings as contemplated in Section 2.82 of the Commission's Rules of Practice and Procedure.

No response required.

Very truly yours,

Randolph W Deutsch

Randolph W. Deutsch
Principal Counsel

RWD:acb

cc: All Parties on limited service list

ADDRESS ALL COMMUNICATIONS
TO THE COMMISSION
CALIFORNIA STATE BUILDING
SAN FRANCISCO, CALIFORNIA 94102
TELEPHONE: (415) 557-1824

Public Utilities Commission

STATE OF CALIFORNIA

June 21, 1978

OFFICIAL FILE COPY

TO	INIT.	DATE
DOCKET		
CENTRAL FILES		

Mr. Kenneth F. Plumb
Secretary
Federal Energy Regulatory Commission
Room 9310
825 North Capitol Street, N.E.
Washington, D.C. 20426

Dear Mr. Plumb:

Re: Comments to Draft Environmental Impact Statement, Pacific Alaska LNG Company, et al. Docket Nos. CP75-140, et al., and Pacific Indonesia LNG Company, et al., Docket Nos. CP74-160, et al.

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The California Public Utilities Commission (CPUC) is submitting this letter in response to the comments on the Draft Environmental Impact Statement filed by the Hollister Ranch Owners' Association and Santa Barbara Citizens for Environmental Defense (Hollister Ranch). This unusual step is made necessary by comments submitted by Hollister Ranch which may reflect a serious misconception of the liquefied natural gas (LNG) proceedings in California, which proceedings are being held before the CPUC.

No response required.

At page 15 of their comments, Hollister Ranch states that the "California State Energy Commission has concluded that LNG is not needed in the time frame proposed by the Applicants, and, indeed, should not even be considered for another five years". This statement may be misleading to those who are not familiar with the various CPUC hearings being conducted pursuant to the "California Liquefied Natural Gas Terminal Act of 1977". Pursuant to this state legislation the CPUC has been holding hearings on gas supply and demand in California. The California Energy Commission was a participant in the CPUC proceeding along with numerous other parties. Pursuant to the California Act, the California Energy Commission Staff prepared and submitted to

No response required.

the CPUC a supply and demand forecast. That forecast, which was one of several filed in the proceeding, included various supply and demand scenerios. This forecast differed significantly from others developed for the CPUC record including the forecast of the CPUC Staff which concluded that the Pacific Alaska and Pacific Indonesia projects are necessary for California. An analysis of all of the supply and demand evidence must be made by the CPUC acting as a Commission.

The CPUC is also concerned with the accuracy of the statements made by Hollister Ranch. To this date the California Energy Commission has not made a recommendation on the Pacific Indonesia or Pacific Alaska projects or the need for LNG in California. The California Energy Commission Staff brief in the above-referenced CPUC proceeding states on page 2, "The Energy Commission is not making a recommendation to the CPUC that it should grant or deny a permit for the proposed terminal".

No response required.

We appreciate the opportunity to clarify what we believe may be a serious misconception on the part of Hollister Ranch.

Very truly yours,

Randolph W. Deutsch

Randolph W. Deutsch
Principal Counsel

RWD:acb

cc: All Parties to the limited service list

STATE OF CALIFORNIA—THE RESOURCES AGENCY EDMUND G. BROWN JR., Governo

DEPARTMENT OF PARKS AND RECREATION

P.O. BOX 2390
SACRAMENTO 95811
(916) 445-8006

April 5, 1978

FILED
OFFICE OF THE SECRETARY
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FEDERAL ENERGY
REGULATORY COMMISSION

Mr. Kenneth Plumb, Secretary
Federal Energy Regulatory Commission
825 North Capitol Street
Washington, D. C. 20426

Dear Mr. Plumb:

Currently the California Coastal Commission is engaged in the ranking of potential LNG Terminal Sites within the California Coastal Zone. We wish to take this opportunity to remind the Federal Energy Regulatory Commission of its responsibilities with regard to the protection of historic and cultural properties as per 36 CFR 800.

The California Coastal Commission has retained five potential LNG Terminal Sites for evaluation and ranking. These sites are located at Rattlesnake Canyon, San Luis Obispo County; Point Conception, Santa Barbara County; Deer Canyon, Ventura County; Camp Pendleton, San Diego County; and Las Varas, Santa Barbara County.

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Information compiled by staff of this office indicates that three of the possible LNG Terminal Sites have archeological sites within their project boundaries. One of these potential LNG Terminal Sites is located within the National Register of Historic Places District "Rancho Canada de Los Osos y Pecho y Islay." Although a search of our records showed no cultural resources within the remaining two possible LNG site project boundaries, the files of the Regional Officer of the California Archeological Site Survey are more current. The potential for cultural resources to be situated within these terminal sites is considered great.

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OFFICE OF GAS

Equally important, consideration should be given Native American values. It has been reported the Native American religious ceremonies continue at Point Conception, the Chumash entrance to the afterworld.

In light of the preceding, we urge the Federal Energy Regulatory Commission to meet its legal responsibilities through compliance with 36 CFR 800. It is our position that compliance would facilitate the project, thus saving time and money as well as identifying and protecting properties of possible National Register of Historic Places quality.

Please find enclosed a copy of the cultural resources report for the Point Conception LNG Project. We suggest that your staff review this report. We

A Golden Anniversary for the Golden State's Park System

Although this is not a comment to the DEIS (note date of letter), staff shall treat it as a letter of comment.

No response required.

No response required.

See Section B.10 of this FEIS.

This is a legal determination which is beyond the scope of this EIS.

A. D. Little's Technical Report #8 was used in preparing the EIS.

also feel that the Advisory Council should be consulted regarding the possible eligibility of the resources described within for listing on the National Register of Historic Places. As is readily apparent, this report does not provide documentation concerning all five potential LNG Terminal Sites.

We thank you for your attention to this matter. If my staff or I can be of assistance, please do not hesitate to contact Mr. William Seidel at (916) 445-8006.

Sincerely yours,

Knox Mellon

Dr. Knox Mellon
State Historic Preservation Officer
Office of Historic Preservation

C-6104A

Enclosure

cc: Mr. Roger Wise
Federal Energy Regulatory Commission
825 North Capitol Stret
Washington, D. C. 20426

OFFICE OF THE SECRETARY
RESOURCES BUILDING
1416 NINTH STREET
95814
(916) 445-5656

Department of Conservation
Department of Fish and Game
Department of Forestry
Department of Navigation and Ocean Development
Department of Parks and Recreation
Department of Water Resources

EDMUND G. BROWN JR.
GOVERNOR OF
CALIFORNIA

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

THE RESOURCES AGENCY OF CALIFORNIA
SACRAMENTO, CALIFORNIA

JUN 2 1978

Mr. Kenneth Plumb
Federal Energy Regulatory Commission
Washington, D.C. 20426

Dear Mr. Plumb:

The State of California has reviewed the Draft Environmental Impact Statement for the Western LNG Project (SCH No. 78051644), submitted to the Office of Planning and Research in the Governor's Office.

As you may be aware, in 1977 the California Legislature passed legislation setting up a special siting process for LNG facilities on the California coast. Pursuant to that legislation, over the past several months the California Coastal Commission and the California Public Utilities Commission have been engaged in intensive studies of various siting alternatives for onshore and offshore sites.

On May 25, 1978, the Coastal Commission forwarded to the CPUC its recommended ranking for onshore LNG sites based on an evaluation of effects on coastal resources, seismic features, and tanker safety considerations. The Coastal Commission ranked the sites as follows, (in declining order) Camp Pendleton, Rattlesnake Canyon, Pt. Conception, Deer Canyon. The CPUC now has until July 31, 1978, to make the final decision as to whether a permit for any LNG site will be granted.

The most significant apparent omission from the subject Draft EIS is the failure to consider the Camp Pendleton site among the project alternatives. The Coastal Commission is transmitting to you its materials on the Camp Pendleton alternatives, which should allow rapid inclusion of that site in your final document. We will consider any final EIS on the Pt. Conception project that omits consideration of Camp Pendleton as an alternative to be materially deficient under the National Environmental Policy Act.

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Staff has considered the Camp Pendleton site as a project alternative. The only disagreement is that staff has rejected the site as a viable alternative.

JUN 2 1978

Attached are copies of comments received from the State agencies listed below. The Coastal Commission, the CPUC, and the Governor's Office of Planning and Research are transmitting their comments to you directly, under separate cover.

We appreciate the opportunity to review and comment on this project.

Sincerely,

Richard E. Hammond
Deputy Secretary for Resources

Attachments

cc: Department of Fish and Game
Department of Navigation and Ocean Development
Department of Parks and Recreation
Energy Resources Conservation and Development Commission
Air Resources Board
State Water Resources Control Board

State of California — The Resources Agency

Memorandum

To : Huey D. Johnson
Secretary for Resources
1416 Ninth Street
Sacramento, CA 95814

Attn: L. Frank Goodson

Date: May 30, 1978

From : Department of Fish and Game

Subject: SCH 78051644 - Draft Environmental Impact Statement - Western LNG Project
Federal Energy Regulatory Commission (FERC)

We have reviewed the subject document and offer the following comments regarding the proposed Point Conception site and alternate sites for an LNG receiving terminal. We have commented on previous proposals by Western LNG for receiving terminals at Los Angeles Harbor and Oxnard and were in basic agreement with project location at either of these sites and, in fact, at that time we pointed out our preference for either of these sites or the use of an overland pipeline as being preferable to the use of Point Conception as an LNG receiving terminal (page 1 of Attachment #1).

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We, therefore, agree with the conclusions and recommendations (page 359, Volume II) presented by the FERC. The FERC states "... there is an alternative site on the west coast significantly superior to the prime proposed Point Conception site. This significantly superior site is located at Oxnard, California."

With regard to the subject document we have the following specific comments. Our comments pertain to Volume II, Construction and Operation of an LNG Receiving Terminal at Point Conception, California. We will frequently reference comments we have submitted to the California Public Utilities Commission regarding their DEIR for the Proposed Point Conception LNG Project. Specifically, we will refer to our comments on Technical Report 5A, which is extensively cited in both the DEIS and PUC's DEIR (Attachment #2).

1. Page 91. C) Ecologically Sensitive Areas. This section should be expanded to include a quantification of the number of distributional limits that occur at Point Conception. We previously reviewed the DEIR for this project prepared by the California Public Utilities Commission and reference our comments on Technical Report 5A of said DEIR. (See page 3 of Attachment #2).

Comment reflected in Section B-6 of Volume II of the FEIS.

2. Page 105. Rare and Endangered Marine Species. The discussion of the importance of Point Conception with regards to marine mammals and migratory birds should be expanded. For a more detailed comment see page 4 of Attachment #2.

Based on the analysis oonducted for the CPUC FEIS, the proposed terminal should not have a significant adverse effect on migratory bird or marine mammal populations.

3. Page 158. Oceanographic Impact. The impact of a discharge of 60,000 gallons per minute of seawater at 20°F above ambient from LNG tankers while berthed should be further quantified with regards to its effects on marine resources.

Comment reflected in Section C-5b of Volume II of the FEIS.

4. Page 179. Marine and Estuarine Biota. The discussion of impacts resulting from project operations should be expanded. Our comments on Technical Report 5A, as they relate to impacts of the seawater system, cold water discharge, antifouling of vaporizers, operation of auxiliary craft and LNG ships, and spills of toxic materials and/or LNG should be considered in this section (see page 3, 4, 5, 6 and 7, Attachment #2).

Comment reflected in Section C-7b of Volume II of the FEIS.

5. Page 181. Recent data collected by Department personnel (Table 1, Attachment #2) refutes the statement that sportfishing is not particularly important at Point Conception. An expanded discussion of sportfishing activities at Point Conception should be included in this section.

Comment reflected in Section C-7b of Volume II of the FEIS.

6. Page 293. The extension of existing environmental monitoring programs and biological surveys as a positive aspect to favor Rattlesnake Canyon as a preferred alternative is, in our opinion, not germain. However, we do believe environmental monitoring programs and surveys should be included as one of the conditions of approval for the selected LNG site, wherever that might be.

Since monitoring is likely to be instituted whichever site is selected, existing program can provide reduced cost and an expanded data base which are desirable.

We disagree with the statement at the bottom of this page that a seawater exchange system with Diablo Canyon Power Plant may not be biologically beneficial. That statement apparently considers only the effects of cold water discharge while ignoring the impacts resulting from impingement and entrainment. Those impacts, in our opinion, can be of much greater consequence than the effects of discharge.

Comment reflected in Section H-2d of Volume II of the FEIS.

7. Page 359. Conclusions and Recommendations. We concur with the recommendations to mitigate environmental impacts, however, we believe the consideration of gas fired vaporizers in place of a seawater vaporization system for the purpose of mitigating and/or reducing entrainment impacts should be considered.

Comment reflected in Section C-5b of Volume II of the FEIS.

This concludes our analyses. If there are any questions regarding our comments, please contact us.

E C Fullerton

Director

State of California ATTACHMENT #1 The Resources Agency

Memorandum

To : Honorable [illegible] Bedrick
Secretary for Resources
1416 Ninth Street - Room 1311
Sacramento, California 95814

Attention: L. Frank Goodson
Projects Coordinator

Date

From : Department of Fish and Game

Subject: Project and Final EIS on SCH 76011263 Review - Alaska Natural Gas Transportation Systems - Federal Power Commission (FPC)

The following comments comprise the Department's assessment of the effects on California's fish and wildlife resources of the alternate proposals for transporting Alaskan natural gas from the North Slope to California, and summarize our position on the adequacy of the FPC's Final Environmental Impact Statement (FEIS) for the project.

As indicated in our previous comments on the Draft Environmental Impact Statement (DEIS) for this project, and in our comments on the Bureau of Land Management's (BLM) DEIS and FEIS for the overland pipeline alternative for this project (SCH 75080531); we strongly believe that the overland pipeline proposal for transporting natural gas to California markets will result in fewer deleterious impacts on California's fish and wildlife resources than the competing liquified natural gas (LNG) tanker proposal. It is therefore our position that the overland pipeline proposal should be adopted as the preferred method of transporting Alaskan gas. Our support of this alternative is conditional on adoption of the pipeline corridor adjacent and parallel to Pacific Gas and Electric Company's existing pipeline from the Oregon border to Antioch, and, if the pipeline proposal terminating in Cajon is reactivated, on adoption of Alternative 1 as originally proposed by the U.S. Forest Service for the Cajon pipeline segment.

Should the LNG tanker proposal be selected for transporting natural gas despite the greater damage which would result to fish and wildlife resources, the Department strongly favors construction of the receiving LNG terminal at the Oxnard or Los Angeles Harbor alternative site. We oppose construction of the LNG facilities at Point Conception because of the far greater deleterious impacts on fish and wildlife resources, which can largely be avoided by siting the LNG facilities at a location already committed to industrial development such as Oxnard or Los Angeles Harbor. The deleterious impacts associated with construction of the facilities at an area now largely unaffected by development or waste discharge, such as at the Point Conception site, should be avoided. In addition, should the LNG tanker proposal be selected, we favor the consolidation of the proposed Western LNG facilities (SCH 75080531) and other future LNG projects with the Alaskan gas project so that only one facility need be constructed for the importation of LNG. This would prevent the addition of

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These are comments on original FPC Alaska EIS and are not comments to the FERC DEIS issued in April 1978.

deleterious effects which could result to fish and wildlife resources should duplicate LNG facilities be built unnecessarily.

The environmental staff of the FPC has rated the desirability of the alternative proposals for importing Alaskan natural gas in their FEIS. We strongly support the environmental conclusions (Vol. I, p. I-A9 through I-A13) and recommendations (Vol. III, p. III-376 through III-382) of the FPC environmental staff, as most of our comments and concerns on the DEIS are adequately addressed on these pages.

However, the problem still remains as to whether or not approval of the project will be based on incorporation of all the FPC staff recommendations in addition to mitigation measures proposed by the applicants. The following items have yet to be adequately addressed in either the Draft or Final EIS:

A. More specific information regarding pipeline routings associated with each alternate LNG terminal site is still needed. Three of our original comments (Vol. IV, Part I: p. 149, #2A, 1st para.; p. 150, #2B, 3rd para.; p. 150, #2B, 6th para.) were related to this problem.

   We still contend that in order to make a reasoned decision regarding where to build this project, the decision makers must have as much information regarding the environmental aspects of all alternatives as they have for the preferred alternative. Information still required would include more exact routings, occurrence of rare or endangered plants and animals and acreage totals of habitat types that would be disturbed during construction.

B. In order to adequately mitigate for the loss of wildlife habitat located within the proposed LNG terminal facility at Point Conception, we recommended (Vol. IV, Part I: p. 151, #2B, 2nd para.) that lands adjacent to but outside of the project boundaries be acquired and improved to increase their wildlife carrying capacity. Such action could provide suitable habitat for many wildlife species displaced from the project site. The FPC did not consider this recommendation stating that since the adjacent areas are privately owned, the project sponsor would be denied access to them for enhancement purposes.

   This statement fails to consider our primary proposal which was to first acquire some specified amount of adjacent land, thereby eliminating any legal access problems.

   We strongly believe this mitigation concept should be addressed in the FEIS.

C. We recommended (Vol. IV, Part I: p. 151, 5th para.) consideration of a specific mitigation concept involving immediate revegetation of the pipeline corridor after specific sections of pipe are placed rather than completion of the entire pipeline followed by revegetation at a later date. The FPC response was that they couldn't speak for the project sponsors in terms of mitigation measures proposed.

We believe the FPC should include such a mitigation concept in their recommendation section of the FEIS.

This concludes the Department's comments. Please contact us should further information be desired.

Director

FTP/GBS/lr

bcc: Dir
DD
CO
ESB
MRR-Long Beach
Region 1-Redding
Region 5-Long Beach
rf

ATTACHMENT #2

State of California — The Resources Agency

Memorandum

To: Honorable Huey D. Johnson
Secretary for Resources
1416 Ninth Street, Room 1311
Sacramento, CA 95814

Date: April 5, 1978

These are comments on CPUC's EIS, not the FERC DEIS.

From : Department of Fish and Game

Subject: ES - SCH 78030684 - P.U.C. Draft EIR for Proposed Point Conception Liquified Natural Gas Project

The following statements comprise our comments on the above captioned draft EIR dated February 28, 1978, and on the associated Technical Reports which form an important part of the draft document.

The comments consist of a critique of the draft EIR, as well as our assessment of the project based on information available to date.

Assessment of Project. Since liquified natural gas (LNG) projects were first officially proposed in California, the Department has consistantly maintained that construction and operation of LNG facilities at Point Conception would substantially harm the fish and wildlife resources of the area. These resources are of major scientific and economic importance to California. The scientific importance of the area stems from the unique oceanographic characteristics of the Point Conception region, where a sharp transition occurs between the flora and fauna of cold, northerly waters and warmer southerly waters. The economic importance of the area stems from the valuable fisheries for kelp and other marine resources found in the site vicinity.

We believe construction and operation of LNG facilities at Point Conception would substantially diminish both the scientific and fishery resources of the area. From a fish and wildlife standpoint, therefore, it is our position that Point Conception is a poor choice for the location of LNG facilities.

Comments on the Draft EIR. The draft EIR, in our opinion, inadequately portrays the adverse impacts to fish and wildlife resources and their habitats which would result from the location of LNG facilities at Point Conception. The EIR, therefore, understates the extent of these adverse impacts and the need for mitigation measures to offset the impacts. While we recognize that the California Coastal Commission will be recommending mitigation measures for impacts of the LNG facilities; it is still necessary for the project EIR to accurately identify impacts and the need and nature of possible mitigation measures. We, therefore, recommend that the document be revised to more accurately portray the impacts on fish and wildlife resources and the need for mitigation measures for the following features of the LNG project:

1. Impacts on kelp beds and kelp fisheries.

2. Economic value of commercial kelp fisheries and other commercial fisheries.

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3. Impacts on marine birds and mammals.

4. Additional impacts on fish populations due to entrainment and impingement losses should the fish return system not live up to expectations.

5. Impacts on the value of the terminal site as a location for scientific study.

Our detailed comments and specific recommendations regarding the draft EIR follow.

Page 1-7. The document states that several acres of kelp will be destroyed during construction but that regrowth will occur within three months. No mitigation for the damage is offered. Kelp canopy is regenerated within about three months after harvesting the top four feet and not the whole plant. We believe the kelp destroyed during construction may be permanently lost. The economic impact of this loss should be recalculated and the loss due to construction should be mitigated by successful replanting or by other means.

Page 1-11. It is not clear that the project sponsors (Western LNG Associates) are commited to mitigation for fish losses, but are "considering" a fish return system or intake screen. Because the sea water system will have a major impact upon fisheries resources, we believe the sponsors should be commited to fully mitigate fish losses by employing available "state of the art" screening devices, such as Passavant screens.

Page 3-28. We believe the discussion of the fisheries resource is condensed to the point of having little value. Because fish losses due to the operation of the sea water system are identified elsewhere in the document as a major impact, we believe the discussion on page 3-28 should be rewritten to better reflect information in Technical Report 5a. At the very least, readers should be directed to the Technical Report as amended.

With regard to marine mammals and birds neither the draft document nor Technical Report 5a adequately portray populations or potential impacts. (Please see our comments regarding Technical Report 5a for further details).

Page 3-30. We believe the economic values for fish and kelp are grossly underestimated because, a) the values may be taken from figures several years old that do not reflect inflation and increased value of fisheries resources; and b) the valuations do not accurately reflect kelp losses. We believe valuations for kelp should be increased several fold and that the loss of tonnage over 26 acres should be projected for more than three months if the entire stand is removed in the area.

Page 8-7 to 8-20. The draft EIR summarizes the various alternate sites described in detail in Technical Report 23-Alternative Site Analysis. These sites, which are identified as Guaddalupe Dunes, Point Conception, Tajiguas, Oxnard, Camp Pendleton and three offcoast sites (Beechers Bay, off Pitas Point, and off east Santa Cruz Island) are summarized with respect to environmental impacts. The environmental impact rankings are

identical to those contained in Technical Report 23 which portrays Oxnard and Camp Pendleton as environmentally acceptable alternatives while the remaining sites, including Pt. Conception, are classified as only marginal. It is, of course, premature to finalize the alternative site analysis since the California Coastal Commission has made a preliminary recommendation (Appendix E) on proposed LNG terminal sites pursuant to the LNG Terminal Act of 1977 (SB 1081) and has retained five sites for further study and ranking. These sites are Rattlesnake Canyon, Point Conception, Las Varas, Deer Canyon and Camp Pendleton. The final ranking of those sites will not be submitted to the Public Utilities Commission until May 31, 1978.

Comments on Technical Report 5a. Generally this technical report is well written. However, it contains several deficiencies as noted below:

rage 9. The statement that "catastrophic" oil spills (i.e., those causing irreparable ruin) are unlikely at Point Conception is debatable, and we remain concerned about damage that might accompany spilled oil. The document states that bunkering facilities will be constructed to enable LNG tankers to refuel while docked at the terminal. Our past experience indicates that bunkering operations can result in spills that are often of substantial volume. Experience also indicates that oil spills along an open coast are more widespread and more difficult to contain and abate than would be the case if it had occurred within a harbor enclosed by a breakwater. We regard Point Conception as a practically unspoiled area supporting a unique assemblage of marine organisms of unmatched scientific value. Therefore, we believe that any oil spill at that location, even if not "catastrophic", could nevertheless be regarded as disastrous (causing great damage or destruction).

Page 12. We believe the discussion of transition zones would benefit if it included a quantification of the number of distributional limits that occur at Point Conception and contrasted this number with numbers of zoogeographic limits elsewhere along the coast. The scientific value of this phenomenon should also be discussed. Based upon our analysis of the Dames and Moore data cited in the document, we found fourteen fish species and twenty invertebrate species have northern or southern limits of distribution at Point Conception. To our knowledge, at no other site along the entire Pacific U.S. coast, indeed in few other locations worldwide, does such an abrupt faunal break occur. This, coupled with the fact that the area is relatively unspoiled by industrial development and that a well equipped university laboratory is located nearby (at UC Santa Barbara), make Point Conception an area of outstanding scientific value.

Pages 23 & 24. The discussion of commercial fishing should mention the distances that fishermen must travel to fish at Point Conception and compare them with other distances traveled to fish for the same species found at Point Conception. Point Conception also has several fisheries that are as yet much underexploited. This unusual potential should also be discussed.

Pages 25 & 26. We disagree that a small boat launched at Gaviota would take three hours to reach Point Conception; our estimate is that it would take about 1½ hours. Also, our information indicates that a major portion of boats launched at Gaviota go to Point Conception. Attached Table 1 summarizes data collected by Department personnel which has recently been or will soon be distributed in administrative reports. In addition to the data presented in the table, we believe pertinent data should be extrapolated from these administrative reports and presented in the final EIR.

Page 31. The document cites the Dames and Moore study as observing two grey whales offshore at Point Conception. The discussion of marine mammals strongly implies that few occur near Point Conception. By contrast, Rice and Wolman (1971)[3] determined that 95% of grey whales migrating between Yankee Point, near Monterey, and Point Loma, near San Diego, stayed within a few kilometers of the coast. From other data presented by Rice and Wolman, it may be extrapolated that virtually all of the world's California grey whale population passes within a few kilometers of Point Conception. Also, on January 1, 1975, up to fifty grey whales were sighted at Point Conception (Robert Guess, UC Santa Cruz, personal communication). Furthermore, our recent understanding from the UC Santa Cruz group studying the mammal and bird populations of the southern California bight for the Bureau of Land Management is that they consider Point Conception an area of "extreme impact potential" and identified the area as a staging point for grey whales (K. T. Briggs, UC Santa Cruz, personal communication). In light of this information, the effects of the LNG project upon grey whales should be discussed.

Page 35. In addition to the information taken from the UC Santa Cruz study of marine birds near Point Conception, it should be noted that the researchers consider this area to be a "funnel" for migratory birds and have calculated that at certain times of the year some species (e.g., black brant or pink-footed shearwater) could occur in numbers representing a major percentage of the world's population (K. T. Briggs, UC Santa Cruz, personal communication). Project impacts on such species could be important, and should be discussed in the document.

Page 39 - Figure 10-5a. This figure would benefit if it included the lease boundaries for the commercial kelp bed and the boundaries of kelp found in the comprehensive federal surveys conducted in the early 1900's.

Page 41. We believe that the statement that sport fishing is not important is refuted by the addenda offered for pages 25-27 and by the data we have offered above in Table 1. The document should be revised accordingly.

3 Rice, D. W. and A. A. Wolman. 1971. The Life History and Ecoloy of the Grey Whales (Eschrichtius robustus). The American Society of Mammalogists. Special Publication No. 3.

Page 42, Pages 146-149. We believe the discussion of kelp values in general should include the products derived from kelp and their uses. More specifically, we think the value of bed 32 should be stressed. Significant kelp resources occur at Point Conception. We believe that the operation of LNG tankers, tugboats and pilot boats will continuously damage the kelp as they move through the kelp bed resulting in significant economic losses. These losses, coupled with the fact that kelp generally fosters a diverse assemblage of fishes, makes loss of the kelp bed an important issue.

The kelp bed at the site is the fifth largest in the state. It is significant to add that this bed is as large or larger than it was when the Federal Government made its survey of commercial kelp resources in 1912. This is in striking contrast to other kelp beds that were mapped along the southern California coast in 1912 which have since severely dwindled or disappeared.

Kelp harvest is a multimillion dollar business in Califonria. The kelp bed at the proposed site has yielded almost 10% of the state's total wet tonnage and has represented 25% of the leaseholder's annual production in some years. In fact, the industry considers this bed to be the most productive in California.

Most growth occurs at the floating tips of the plants and only the top four feet of kelp canopy are harvested, which enables plants to regenerate. However, propellers on LNG ships and tugs will probably be substantially lower in the water and severe damage will probably result as they pass through the bed. The biological and economic significance of this aspect of terminal operations relative to the kelp bed should be more adequately addressed.

Pages 55, 60, 148-149. We believe the commercial values for kelp are underestimated. The dollar value attributed to Department personnel on page 60 ($25.00 per wet ton) is a value that was determined in 1971. Since that time, inflation and demand for kelp have increased the value of kelp several fold (to $100.00 per wet ton or more, landed value). The values for kelp should be recalculated and presented in the final draft. For example, the losses due to small craft operations would jump from $312,500 to approximately $1,250,000 annually. We believe the loss will be permanent and should be mitigated.

Regeneration of kelp is projected to be totally achieved by natural means three months after construction closes. This projection is valid only if the top four feet of kelp are removed as in harvesting. If whole plants are removed, the kelp could be permanently lost; even if it does return naturally, regrowth will be longer than three months. Any vessel drawing more than four feet will destroy harvestable kelp. These losses should be recalculated and mitigated.

Furthermore, the weight and dollar value attributed to construction are identified as a one-time loss. This assumption would be true if no impediments remained after construction to the continued harvest of kelp and commercial fish species, however, the placement of a marine trestle

will preclude the utilization of these resources for the life of the project. Therefore, these values should be recalculated to show the poundage and value of these resources over the life of the project.

Pages 64-68. The volume of seawater needed to warm LNG should also be given in millions of gallons per day.

Page 131. We question the statement that turbidity from the waste plume will not cause significant biological impacts. Kelp growth could be significantly and adversely affected by turbidity, and this question should be addressed in the report.

Page 131-140. This section deals with the cold water (12°F below ambient) discharge from the LNG plant and its impacts on marine organisms. While the time exposure within the plume may be short, the exposure to a temperature reduction of up to 12°F will be rapid and the resultant shock, especially to nonswimming organisms, could cause significant losses. The effects and magnitude of these losses should be determined and included as part of the losses attributed to the seawater system.

Page 136. Discharge should also be quantified as gallons per minute and cubic feet per second.

Pages 140-141. Volumes of discharge other than seawater and thermal exchange should be quantified. Also, we suggest total residual chlorine as a parameter to be monitored.

Pages 143-144. The amount of oil contamination from natural seeps should be quantified and then contrasted to the amount projected from accidental spills. In our view, three oil spills per year resulting from offloading Bunker C fuel and resulting in the deposition of "tarry blobs" on the beach could represent a large scale increase in oil contamination and adversely affect marine life. This discussion does not include fueling of LNG tankers (183-190 calls per year). If the rate of spillage for fueling tankers is similar to that for offloading supply ships bringing Bunker C to the terminal (20 calls per year) the rate and amount of spillage could be several times those portrayed. This question should also be addressed in the document.

Pages 146-147. We believe that significant damage to kelp will occur not only from propeller damage as ships pass through the bed but also as a result of turbidity caused by propeller wash. The value of kelp should be indicated because the kelp affected by ships may be totally destroyed. But even if all the kelp is not destroyed, it will probably be lost to commercial harvesters because the damage will occur below the four foot cutting depth (LNG ships will draw about 50 feet of water).

Page 148 - Table 19. The calculations of commercial species lost annually to activities of small craft and fuel tankers apparently do not consider the potential for future expansion of fisheries in the area if not prevented by LNG operations. This question should be analyzed in the document.

Pages 150-151. We believe the losses of kelp will not be localized effects; rather the effects of kelp bed destruction will have statewide, if not national, implications because the bed is now so productive (as noted above) and because products derived from kelp are used in foods, paints, and many other products. The document should be revised accordingly.

Page 154. Contrary to implications on this page, we again disagree that oil spill contamination is a minor impact.

Page 166. We disagree that intake location is unimportant in regard to impacts to fish. Kelp beds and their associated rocky reefs tend to attract fish. We believe that location of intakes on sandy bottoms away from reef areas could substantially reduce the numbers of fish entrained in the intake structure.

Comments on Technical Report 23 - Alternative Site Analysis. This report presents a two-phase site evaluation of various proposed alternative LNG sites. Both onshore and offshore sites were evaluated. Phase I analysis consisted of twenty-six onshore sites and twenty-four offshore sites. These sites were initially screened with respect to site requirements and environmental impacts. Five onshore sites and three offshore sites were retained and examined in greater detail.

With respect to environmental impacts of the proposed project, the Oxnard and Camp Pendleton sites were ranked as acceptable sites while the Tajiguas, Point Conception and Guadalupe Dunes sites were considered marginal. We agree with this evaluation.

This concludes our comments. If there are any questions regarding our comments, please contact Mr. John Day at 445-1383.

COPY ORIGINAL SIGNED BY
CURTIS C. FULLERTON

Director

cc: P.U.C.

LRE/RN/PK/DD:ptp

bcc: ESB
RF
MRR-LB

TABLE 1.

GAVIOTA - Independent Sport Fishing Data - July 1, 1975 - June 30, 1976 1/

	No. of parties	No. of anglers/divers	No. of hours	No. of days sampled	No. of fish/invertebrates taken
Weekday fishermen	40	102	548.2	15	
Weekday divers	9	28	146.5		2,969
Weekend fishermen	123	342	2,157.2	19	
Weekend divers	52	164	999.8		

Projected Annual Total

No. of parties	No. of anglers/divers	No. of hours	No. of days sampled	No. of fish/invertebrates taken
696	1,775	9,539	261	
157	487	2,549		31,873
673	1,872	11,508	104	
285	898	5, 473		

COLETA - Independent Sport Fishing Data - July 1, 1975 - June 30, 1976 1/

	No. of parties	No. of anglers/divers	No. of hours	No. of days sampled	No. of fish/invertebrates taken
Weekday fishermen	55	109	819.5	15	
Weekday divers	2	3	11.		2,385
Weekend fishermen	173	446	2,303	21	
Weekend divers	21	50	253.9		

Projected Annual Total

No. of parties	No. of anglers/divers	No. of hours	No. of days sampled	No. of fish/invertebrates taken
957	1,897	14,259	261	
35	52	191		24,181
857	2,209	11,405	104	
104	248	1,257		

	No. of parties	No. of anglers/divers	No. of hours	No. of days sampled	No. of fish/invertebrates taken
Weekday fishermen	16	38	232	5	2,110
Weekday divers	3	11	76		
Weekend fishermen	124	381	2,284.8	21	3,870
Weekend divers	90	267	1,676		1,760

Projected Annual Total

No. of parties	No. of anglers/divers	No. of hours	No. of days sampled	No. of fish/invertebrates taken
835	1,984	12,110	261	29,621
157	574	3,967		
614	1,887	11,315	104	54,329
446	1,322	8,300		24,708

GOLETA - Independent Sport Fishing Data - July 1, 1976 - June 30, 1977 2/

	No. of parties	No. of anglers/divers	No. of hours	No. of days sampled	No. of fish/invertebrates taken
Weekday fishermen	33	66	416.8	12	2,872
Weekday divers	3	6	29		
Weekend fishermen	459	1,126	7,252.7	34	3,176
Weekend divers	42	103	533.9		304

Projected Annual Total

No. of parties	No. of anglers/divers	No. of hours	No. of days sampled	No. of fish/invertebrates taken
718	1,436	9,065	261	22,789
65	130	631		
1,404	3,444	22,195	104	25,201
128	315	1,633		2,412

1/ Wine, Vickie & Therese Hoban. 1976. Southern California Independent Sportfishing Survey Annual Report, July 1, 1975 - June 30, 1976. State of Calif., Resources Agency, Dept. of Fish and Game, Mar. Res. Adm. Rept. No. 76-14.

2/ Wine, Vickie. 1978. Southern California Independent Sportfishing Survey Annual Report, July 1, 1976 - June 30, 1977. State of Calif., Resources Agency, Dept. of Fish and Game, Mar. Res. Adm. Rept. No. 78-2.

State of California THE RESOURCES AGENCY

Memorandum

To : Mr. L. Frank Goodson
Projects Coordinator
Resources Agency, 13th Floor
Resources Building

RECEIVED
JUN 5 9 54 AM '78
FEDERAL POWER COMMISSION

Date: JUN 2 1978

In Reply Refer To: 420:JH

From: STATE WATER RESOURCES CONTROL BOARD
Division of Planning and Research
P. O. Box 100, Sacramento, California 95801

Subject: COMMENTS ON DRAFT EIS VOLUME II--WESTERN LNG PROJECT, POINT CONCEPTION TERMINAL, SANTA BARBARA COUNTY

We have coordinated review of the subject document with the California Regional Water Quality Control Board, Central Coast Region. The Regional Board is preparing a National Pollution Discharge Elimination System permit for the Point Conception LNG project, and has been in close contact with Western LNG Associates. Thus, the comments below reflect up-to-date information, which may not have been available to the authors of the EIS.

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Recommendation:

The following comments should be considered in preparing the final EIS.

Specific Comments:

1. Page 2, first paragraph - The project proposed in the draft EIS is for 900 million cfd of Indonesian gas and 400 million cfd of Alaskan gas, for a total of 1.3 billion cfd, proposed to be delivered at Point Conception, rather than the 1.0 billion cfd described in the draft EIS.

   Only an average of 900 million cfd is proposed, as stated on page 2 of Volume II of the DEIS.

2. Page 5, paragraph 4 - We were told by WLNG that the small boat harbor was not needed and would not be built.

   Comment reflected in Section A of Volume II of the FEIS.

3. Page 9, last paragraph - Dimensions have been changed from those listed in the DEIS according to the latest proposals by WLNG.

   Ibid.

4. Page 10, paragraph 2 - Sanitary wastes are expected to be 7,200 gpd, rather than the 2,000 to 2,500 gpd listed in the DEIS.

   Ibid.

5. Page 13, paragraph 2 - Discharge of hydrostatic test water may require Water Quality Certification or Waste Discharge Requirements

   Ibid.

by the Regional Board; more stringent protective measures than those described in the DEIS may be required.	No response required.
6. Page 76, last paragraph - Last sentence under "Salinity" should be revised to fit the environmental conditions.	Correction made.
7. Page 157, paragraph 4 - Hydrostatic testing of the tanks will be conducted using seawater; therefore, the discharge of that water will have little impact in the ocean.	Comment reflected in Section C-5b of Volume II of the FEIS.
8. Page 158, paragraph 1 - The aerial extent of the plume will be much smaller than 5 acres, according to modeling conducted by Brooks, List, and Koh of Cal Tech. The discharge angle has been changed to 20°. After the plume touches the seafloor at midpoint, it would be touching the bottom thereafter.	Comment reflected in Section C-5b of Volume II of the FEIS.
9. Page 158, paragraph 2 - The chlorine level of 0.002 mg/l is the water quality objective to be met after minimum initial dilution. If Western LNG has a minimum initial dilution of 10:1, they would be allowed to have 0.02 mg/l at their discharge point. Also, the proposed chlorination will be continuous rather than intermittent.	Comment reflected in Section C-5b of Volume II of the FEIS.
10. Page 158, last paragraph - This paragraph should describe whether the tankers will discharge 60,000 gpm of cooling water continuously during the complete unloading procedure.	Comment reflected in Section C-5b of Volume II of the FEIS.
11. Page 172, third paragraph - WLNG proposes settling ponds for drainage runoff.	Comment reflected in Section C-6 of Volume II of the FEIS.
12. Page 172, fourth paragraph - Hydrostatic test water will be seawater and will be discharged through the seawater outfall.	Ibid.
13. Page 233, Q - Oily water will be treated by an oily water separater and coalescer before being discharged through the seawater system. A limit on grease and oil of 25 mg/l for a 30-day average and 75 mg/l at any one time will be placed on WLNG by the California Regional Water Quality Control Board, Central Coast Region in their NPDES permit. Grease and oil will be monitored before discharge to the seawater system. Sanitary wastes will undergo biological secondary treatment before being discharged through the seawater system. Limits will be set in the NPDES permit on flow, B.O.D., settleable solids, suspended solids, and coliform bacteria. Those parameters will be monitored before discharge to the seawater system.	No response required. The California Regional Water Quality Control Board was previously identified in Appendix B of Volume II of the DEIS.
14. Page 247, middle paragraph, last sentence - Need references on this.	See references listed in bibliography under (1) Bullock, T. H., (2) Dehnel, P. A., (3) Fox, H. M., (4) Mac Laren, I. A., (5) Passano, L. M., and (6) Patel, B. and D. J. Crisp.

State of California

The Resources Agency of California

Memorandum

To : Frank Goodson
Project Coordinator
Resources Agency

Kenneth Plumb
Federal Energy Regulatory Commission
Washington, D.C. 20426

Date : May 31, 1978

From : Energy Resources Conservation and Development Commission
1111 Howe Avenue
Sacramento, 95825
– James A. Walker

Subject: WESTERN LNG PROJECT, DRAFT EIS – SCH NO. 78051644

Introduction

Pacific Alaska LNG Company, Alaska California LNG Company, and Pacific Alaska LNG Associates have applied for two certificates of public convenience and necessity, pursuant to Section 7(c) of the Natural Gas Act.

The first certificate authorizes the construction and operation of facilities to collect and liquefy natural gas; the transportation of liquefied natural gas (LNG) in interstate commerce; and the sale of natural gas to Southern California Gas Company (SoCal) purchased from gas fields in the Cook Inlet region of Alaska and transported through a proposed 291.6 mile pipeline network to a proposed LNG plant in the Nikiski industrial complex, 9 miles north of Kenai, Alaska. Two 130,000 cubic meter LNG vessels would be constructed to carry LNG by sea from Nikiski to the Western LNG Terminal Company, Pacific Gas LNG Terminal Company, and Western LNG Terminal Associates' proposed receiving terminal at Point Conception, California.

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No response required.

The second certificate authorizes the construction and operation of an LNG terminal facility, which would unload, store, revaporize, and send out LNG delivered by oceangoing tankers to Point Conception from Pacific Alaska LNG Company's proposed liquefaction and storage facility near Kenai, Alaska, as well as tankers from the Republic of Indonesia for Pacific Indonesia LNG Company. Western Terminal proposes to construct and operate two 550,000-barrel LNG storage tanks, nine seawater vaporizers, three gas-fired peaking vaporizers, a marine terminal capable of berthing and unloading LNG tankers with a capacity up to 130,000 cubic meters, and other appurtenant facilities. The proposed Point Conception facility would revaporize LNG at an average plant output rate of 900 million cfd with additional peaking capacity of 300 million cfd. Revaporized gas would be transported through a proposed 112.4 mile long, 34-inch diameter pipeline to Gosford, near Bakersfield, where the pipeline would join with existing gas transmission facilities owned and operated by Pacific Gas and Electric Company.

No response required.

Recommendations

The Draft EIS fails to adequately consider alternatives to the proposed project. The Federal Energy Regulatory Commission should reevaluate the need for the

project including a more detailed discussion of the no-project alternatives. The EIS should respond to the following specific comments:

1. The no-project alternative should be considered far more seriously. The draft EIS dismisses the no-project alternative with the sentence, "Inasmuch as there is a need for natural gas, this alternative would appear to be inacceptable." (Vol. 2, p. 358; Vol 2, p. 285). Rather than simply assuming that a need for the project exists, the Final EIS should realistically evaluate the no-project option as a viable alternative. Listed are several alternatives to the Western LNG Project with potential amounts of gas supplied which should be considered:

   a. Alaskan North Slope, Western leg and Alberta gas = 840 (mmcfd) by 1985 (see California Energy Commission's Natural Gas Supply and Demand for California 1978-1995, Summary, March 15, 1978).

   b. Texas intrastate gas available on interstate market due to regulatory changes and coal conversion in Texas: CEC estimates up to 835 mmcfd for California by 1985.

   c. California's share of El Paso Natural Gas Transmission Company's prospective imports from Algeria (Algeria II LNG) and Mexico: 850 mmcfd by 1985.

   d. Numerous "small" elements of incremental gas supply such as:

      (1) Solar (displaced 57 mmcfd in 1985, more later)

      (2) Pac Interstate: 25 mmcfd in 1985

      (3) Rocky Mountains: 100-150 mmcfd in 1985

      (4) Elk Hills: 100 mmcfd in 1985 Total: 500 mmcfd

      (5) California OCS: 50 mmcfd in 1985

      (6) SNG from petroleum: 154 mmcfd in 1985

      (7) Biomass: 11 mmcfd in 1985

   e. Conservation = 1075 mmcfd by 1990 (see comment 2 below).

   On a more detailed level, an analysis of California's year-by-year gas demand shows that it is possible to construct many supply scenarios which are feasible, meet all gas demand except that for electricity generation, which do not rely on the proposed Western LNG project. (See Natural Gas

The need for the gas is beyond the scope of the FEIS. See expanded Section H-5 of Volume II of the FEIS.

Supply and Demand for California 1978-1995, Summary and Appendices A-G.) The Concurrent Brief of the CEC in California Public Utilities Commission Case No. 10342, which concludes that, with or without the Western LNG project, there is no serious risk of gas curtailments to high priority customers (defined to include all customers except electric utilities) in California until at least 1986.

The EIS should address these alternative supply scenarios, and describe their environmental impacts to a level comparable with that used for the LNG alternative.

2. It is stated in the Draft that conservation considered could cost-effectively replace 28-43% of the project (Vol. 2, p. 477). The EIS should also consider the following additional conservation measures:

   a. Any industrial conservation (CEC estimates 346 mmcfd)

   b. Solar water heating (CEC estimates 151 mmcfd in 1990 if current tax credit is extended)

   c. Swimming Pool Retrofits (CEC estimates 14 mmcfd)

   d. Water heater retrofits (CEC estimates 3 mmcfd)

   e. Furnace modification (CEC estimates 6 mmcfd)

   f. Night thermostat setback (CEC estimates 39 mmcfd)

   (Note: A 406 mmcfd savings results from already existing regulations. The 151 mmcfd from solar is in addition to the 1075 mmcfd from conservation.)

   Because the draft omits these conservation methods it shows a 400 mmcfd potential saving at $5.16/MCF. CEC, in an exhaustive analysis carefully done to prevent any doublecounting (i.e., saving the same mcf twice) finds 1075 mmcfd achievable, allowing for less than 100% market penetration, at about $4.75/$10^6$ Btu. (See Natural Gas Supply and Demand for California 1978-1995, Summary pp. 59-60, and also Appendices A, B, C).

   Thus conservation alone could replace gas volumes greater than those proposed to come from LNG, at a lower cost.

3. The DEIS gives only cursory attention to overland pipeline routes to either Fairbanks or Tok. The DEIS concludes that the Tok Alternative is preferable to the Pacific Alaska LNG proposal unless it is assumed that an existing LNG facility is available in California. Both the Tok and Fairbanks alternatives should be discussed in-depth in the EIS.

Comment reflected in revised appendix to the FEIS.

The staff believes that the level of detail presented is adequate.

4. The footnote on page 475, Vol. 2, has an error in estimated 1990 savings by a factor of about 1,000.

Comment reflected in revised appendix to the FEIS.

JAMES A. WALKER
Executive Director
(322-4774)

SNM/JAW:nwb

State of California

Memorandum

Date : May 30, 1978

To : Mr. L. Frank Goodson
Project Coordinator
Resources Agency

The Resources Agency of California

From : Department of Parks and Recreation

Subject: Point Conception L.N.G.
Environmental Impact Statement
SCH 78051644

The attached comments were prepared by this Department for the Public Utility Commission Draft Environmental Impact Report.

These are not comments on staff's DEIS.

James P. Tryner, Chief
Resource Preservation and
Interpretation Division

Attachment

APR 6 1978

Mr. L. Frank Goodson
Project Coordinator
Resources Agency

Public Utilities Commission
350 McAllister Street
San Francisco, CA 94102

Liquified Natural Gas Terminal - Point Conception
SCH 7803068

The Department of Parks and Recreation has reviewed the Point Conception LNG Draft Environmental Impact Report, and has concerns related to Gaviota State Park.

The project as proposed would require an access road. This access road may require upgrading of the County-State owned road through Gaviota State Park upcoast to Point Conception. The Department requests the alternative of providing road access from the north be thoroughly explored.

In the event that the road through Gaviota State Park becomes necessary, the Department requests the following mitigative measures: 1) Complete design control by the Department of Parks and Recreation. In this manner damages, hopefully, can be kept to a minimum within the park. 2) The maintenance and construction by other agencies of the actual road. 3) Reimbursement to the Department for additional operational cost to maintain the park in light of the heavy traffic during the construction phases. 4) Location of the road to avoid cultural sites within the park.

Our further concern is for the construction of a power line to the Point Conception site. The proposed project envisions a power line traversing Gaviota State Park. All of the routes proposed by the applicant through the park would severely affect the visual resources of the unit. The alternatives to this have not been adequately addressed in the Environmental Impact Report.

We suggest that the alternative of providing power from the north over the proposed gas line right-of-way be thoroughly explored. The Draft EIR indicates the only reason for requiring a power line from the Point Conception site to Goleta is the fact that the LNG site is within the Southern California Edison Company territory. We suggest that the Public Utilities Commission could reallocate this portion of the territory to the Pacific Gas and Electric Company, which would provide for a shorter transmission line and considerably less damage to Gaviota State Park and the coastline of Santa Barbara County.

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The alternative of undergrounding any portion of the project was not addressed in the EIR, and we request that an analysis be developed of the feasibility of undergrounding the power line within Gaviota State Park.

The existing power line is alleged to be of too small a capacity to provide adequate service to the LNG site or we would suggest the alternative of using the existing pole lines. Perhaps these lines could be upgraded for the capacity required.

The protection of Gaviota State Park is an important mission of this Department. If further assistance is needed, please contact James M. Doyle, Supervisor, Environmental Review Section, (916) 322-2481 for referral.

The comments of the State Historic Preservation Officer are attached.

Original Signed By
Russell W. Cahill

Russell W. Cahill
Director

Attachment

cc: Mr. Jack Harrison, Chief, Development Division
Mr. Lon Spharler, Chief, Planning Division
Mr. Les McCargo, Acting Chief, Acquisition Division
Mr. Richard Felty, Assistant Deputy Director
District 6
District 5

RWC:JMDoyle:svb

State of California — The Resources Agency of California

Memorandum

Date : April 4, 1978

To : Mr. Frank Goodson
Project Coordinator
Resources Agency

From : Department of Parks and Recreation

Subject: SCH# 78030684 - Point Conception LNG Project, Santa Barbara County

My staff and I have reviewed the Draft Environmental Impact Report for the Point Conception LNG Project and have the following comments.

*

The description of expected impacts to cultural resources within the Point Conception LNG Terminal site is unclear. Wording in the DEIR suggests the possibility of impacts to five archeological sites; however, only four sites were identified. The expected impacts should be specified on an archeological site by site basis.

This comment refers to the CPUC DEIS.

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We concur with the statement that the California Public Utilities Commission will retain the services of a qualified cultural resources manager. The duties of such an individual should include management aimed at resource protection and preservation through consultation with the Native American Heritage Commission, a local Native American Advisory Committee, and the State Historic Preservation Office. Retention of a cultural resources manager and implementation of a management program should lessen the possibility of project encumbrances.

This suggestion is compatible with staff Recommendation 42 in Volume II of the DEIS.

With respect to the formation of a Native American Advisory Committee, it must be considered that within the Point Conception LNG Terminal Project limits there exists two major indian groups - the Chumash and the Yokuts. The values of these groups may differ and even conflict. We suggest that contact be made with all interested Native American groups and individuals, and that these groups be allowed to formulate their own responses to their areas of concern.

See staff Recommendation 42 in Volume II of the DEIS.

We stress that consultation with Native Americans in determining proper mitigation procedures is imperative. We do not, however find it desirable that development of mitigation procedures and disposition of Native American artifacts should rest entirely with a Native American Advisory Committee. Furthermore, should surprise discoveries be made, we recommend that mitigation procedures should result from consultation of the cultural resources manager, the Advisory Committee, and this Office.

No response required.

* Although these comments deal with the CPUC DEIS, the California SHPO has specifically requested that these comment be considered as comments to the FERC DEIS. Staff will adhere to this request.

An issue not fully dealt with concerns Native American values with regards to alteration of the visual and aesthetic environment. It was acknowledged in the DEIR that such impacts could be expected and that the "appearance, sanctity, and significance of such (sacred) locations" would be adversely effected. Determination of Native American religious values and the impact of the proposed project on these values should be an integral element in the consideration of approval of a LNG Terminal a Point Conception. Any measures which would mitigate impacts (if they can be mitigated) to Native American sacred sites should be formulated in consultation with the pertinent local Native Americans. To facilitate a determination of Native American sacred values, we suggest that, prior to the Final Environmental Impact Report, a serious ethnographic study be conducted. The study should include a determination of the values at Point Conception for the Native American population and the effect that this project will have on the culture of these people.

Comment reflected in Sections B-10 and C-10 of Volume II of the FEIS.

It was noted that a thorough cultural resources inventory was lacking along the routes of the proposed access road. However, it was expected that damage to cultural resources would be severe. The DEIR indicates that a "thorough survey would probably identify further resources that may be impacted." We suggest that if this is the case than perhaps the severity of adverse impact would far outweight the benefit of construction and use of any particular route. Because of the acknowledged sensitivity of the Point Conception LNG Terminal Project Area, we suggest that, prior to the FEIR, a thorough survey of the proposed access road and all alternate reoutes be accomplished and incorporated into this document.

Available information on the access roads is presented in Sections B-10 and C-10 of Volume II of the FEIS.

Though critical information is lacking in this document, it is our understanding that the impacts of this undertaking on Native American cultural values could far outweight the benefits of an LNG Terminal in this location, consequently, we urge consideration of siting an LNG Terminal at another less sensitive location.

If my staff or I can be of assistance in this matter, please do not hesitate to contact Mr. William Seidel at (916) 445-8006.

Sincerely yours,

Dr. Knox Mellon
State Historic Preservation Officer
Office of Historic Preservation

WS:pbp

cc: Mr. Steven W. Miller
California Public Utilities Commission
350 Mc Allister Street, Room 5151
San Francisco, CA 94102

State of California — The Resources Agency of California

Memorandum

To : (1) L. Frank Goodson, Projects Coordinator
The Resources Agency

(2) Federal Energy Regulatory Commission
Office of Pipeline and Producer Regulation
Washington, D. C. 20426

Date : May 30, 1978

Subject: SCH 78051644: Western LNG Project - Point Conception

From : Department of Navigation and Ocean Development

The Department of Navigation and Ocean Development has completed its review of the Draft Environmental Impact Statement and would like to offer the following comments:

(1) On page 241 of Volume II-CP 75-83-2, the last paragraph states that the United States Coast Guard has not outlined procedures or regulations for LNG tankers docking at Point Conception, but would do so if the project is approved. The proposed procedures and regulations should be prepared and used as part of the review process before it is determined if a facility will be constructed at Point Conception.

The Coast Guard maintains the stated DEIS position.

(2) The first paragraph of page 242, Volume II, states that the first time a tanker docked at the terminal, it would dock only during daylight hours. Is it possible for all docking to be scheduled for daylight hours?

This would be governed by Coast Guard procedures, if adopted by the Coast Guard.

(3) Some consideration should be given to providing boaters with information regarding the LNG tankers' time, speed, and course within three miles of the terminal. This could reduce the number of other vessels in the area when the tanker is underway.

Communication systems identified on page 241 of the DEIS could probably be monitored by boaters and/or be governed by Coast Guard procedures.

(4) It is recommended the ship safety mitigating measures listed on pages 6-11 and 6-12 of the DEIR (SCH 78030684) for proposed Point Conception LNG project compiled by Arthur D. Little, Inc. for the Public Utilities Commission should be made mandatory. (See attached)

Comment reflection in Section I of Volume II of the FEIS.

Thank you for the opportunity to review your document.

Marty Mercado

MARTY MERCADO
Director

Attachment

cc: Larry Thomas, Operations Division

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The first of the above measures would be effective in increasing the maintainability of the terminal at any baseload capacity. The second and third measures might be considered if demand for terminal output increases to the point where it operates frequently at its maximum design capacity.

6.2.2 LNG Ship Safety

The mitigating measures identified to reduce the risk (and therefore the potential impact) associated with LNG ship traffic to Point Conception fall into two general categories: equipment and procedures. These measures are summarized below and are supplementary to the Marine Operations Plan included with Western LNG's application to the CPUC.

Ship instrumentation mitigating measures are as follows:

- *Anemometer:* The ship should be equipped with an anemometer to provide wind speed and direction information to the bridge. This information will be necessary for docking and to ensure that docking is not attempted under conditions outside the specified operational envelope.
- *Rate of Turn Indicator:* The ship should be equipped with a rate of turn indicator to read out at the steering stand for use by the helmsman and at a second appropriate place on the bridge for use by the Master/Pilot. This indicator will assist in maneuvering and docking the LNG ship.
- *Docking Velocimeter:* If it is not provided on the pier, the ship should be equipped with a direct reading bridge instrument that displays the velocity of the bow and stern (separately) toward the pier. This will assist in preventing too high a lateral velocity of the ship into the pier.

Navigational aid mitigating measures are as follows:

- *Range Markers:* The terminal should be equipped with a set of range markers defining the initial approach path to the pier. One marker at the end of the trestle and a second on the mainland, properly aligned, are recommended.
- *Buoys:* A buoy should mark the location of the reported rock (hazard to navigation) at longitude 119° 20.5' latitude 34° 24.4'. This reported rock is at a depth of 4 fathoms and must be avoided by LNG ships. At least two buoys should mark the southern- and western-most extremes of the field of submerged well-heads in the vicinity of the offshore oil platform (HERMAN). These well-heads are at a depth of 6½ fathoms and should be avoided by LNG ships. No other buoys marking the approach to the dock are recommended since they could become a hazard rather than an provide assistance.
- *Lighting of the Pier:* The entire trestle and pier head should have shielded lights not directly visible from seaward. These lights should be in operation at night and under all conditions of reduced visibility. Except for actual search purposes, spotlights or floodlights pointing seaward should be avoided. An occulting, distinctive-colored light on top of the control tower is recommended to serve as a navigation aid for ships not yet in the docking approach.

Site instrumentation mitigating measures are as follows:

- *Weather Instrumentation:* The control tower on the pier should be provided with an anemometer for direct onsite reading of wind speed and direction to assist in determining if the wind conditions at the pier are inside or outside the specified operational envelope.
- *Visibility Measurement:* The control tower should be provided with equipment and a procedure for determining if the visibility conditions at the pier are inside or outside the specified operational envelope. Marking a series of distances along the trestle to be visible from the control tower would be adequate.
- *Swell/Wave Measurement:* The pier should be equipped so that wave and swell height, direction, and period can be measured to determine if the ocean water conditions are inside or outside the specified operational envelope. This may be accomplished by observing the wave and swell action against a marked piling.
- *Radar:* The control tower should be equipped with a surface search radar with a 15- to 20-mile range. This radar should be operated when an LNG ship is in transit as soon as it is within range.

Procedure mitigating measures involve the approach route, communications, and the docking operational envelope.

For the Alaskan LNG ships, it is recommended that when the arriving ship reaches a latitude of about 34° 40', it uses an approach route to the vicinity of the pier that follows a rhumb line to a point 2 to 4 miles south of Point Conception. For Alaskan traffic, this route can reduce exposure to potential casualty by as much as 60 percent by decreasing the number of meeting situations with northbound vessels and eliminating crossing of the vessel traffic lanes. For Indonesian LNG ships, it is recommended that the ships enter the southbound vessel traffic lane, then turn to cross the northbound lane, and proceed to the vicinity of the trestle.

During its approach to the vicinity of the trestle, the LNG ship should attempt to communicate with all other vessels within (or potentially within) its path and inform them of its intentions. It is recommended that the control tower on the pier attempt to communicate with vessels with which the LNG ship may interact and inform them of the ship's intentions.

The LNG ship and the site should mutually confirm, by use of their radars and communications, all vessel traffic with which the LNG ship may interact. This procedure, particularly under conditions of limited visibility, will, in effect, be a vessel traffic service for all LNG ships during their approach and departure.

Approach and docking should initially be carried out within the envelope of wind speed and direction conditions given in Technical Report 9. These conditions ensure control of the LNG ship during docking, and as experience develops, this envelope may be subject to modification

6.2.3 Safety

Well-designed safety systems are essential in a facility of this type. Since many of the fire control and protection systems as well as the emergency shutdown control systems are not yet

State of California

Memorandum

To Frank Goodson
Project Coordinator
Resources Agency

Date : June 2, 1978

Subject: Draft EIS Western LNG Project, SCH #78051644

From : **Air Resources Board**
Harmon Wong-Woo, Chief
Stationary Source Control Division

INTRODUCTION

Western LNG Terminal Associates proposes to construct a liquified natural gas (LNG) facility near Point Conception. Oceangoing tankers from Pacific Alaska LNG Company's proposed liquefaction and storage facility near Kenai, Alaska and from Pacific Indonesian LNG Company's facilities in the Republic of Indonesia would deliver the LNG to the Point Conception facility, where it will be stored and revaporized.

Western LNG proposes to construct and operate two 550,000 barrel LNG storage tanks, nine seawater vaporizers, three gas-fired peaking vaporizers, a marine terminal capable of berthing and unloading LNG tankers with a capacity up to 130,000 cubic meters, and other minor, related equipment. The proposed Point Conception facility would revaporize LNG at an average plant output rate of 300 million cfd. The revaporized gas would be transported through a proposed 112.4-mile long, 34-inch diameter pipeline to Gosford, near Bakersfield, where the pipeline would connect with existing Pacific Gas and Electric Company gas transmission facilities.

GENERAL COMMENTS

The draft EIS is deficient in a number of important areas. The draft does not describe how the project will comply with all district, state, and Federal air quality rules and regulations. Specifically, the draft indicates that the project as proposed will not meet all the requirements of the Santa Barbara County new source review (NSR) rule adopted January 26, 1978, yet no mitigation measures are recommended which would allow the project to comply with this rule.

Comment reflected in Section C-11 of Volume II of the FEIS.

In addition, the air quality section of the draft does not include the latest available information on the proposed project and its impact on the ambient air quality. This information was included in Western LNG Terminal Associates application to EPA for NSR approval, dated March 17, 1978. These changes include the use of 0.5% sulfur fuel oil and LNG boiloff as fuel for the tanker boilers rather than 2% sulfur fuel oil as indicated in the draft. These mitigation measures should be incorporated into the final EIS. The draft also includes statements concerning air quality that may be questioned by some experts.

Ibid.

SPECIFIC COMMENTS

Following are our specific comments on the draft EIS:

1. On page 134, the statement is made that "oxidant levels throughout the Santa Barbara County have experienced a definite decline in recent years..." As can be seen from Table 1, there has been no definite county-wide decline. For Santa Barbara-State St., although the highest 1-hour average appears to have declined somewhat, the number of hours over the standard does not show a definitive trend. At the Santa Barbara-Satellite (Cathedral Oaks) station, a trend toward fewer hours over the standard is evident, but no trend in the highest 1-hour average is apparent. No definite trends are evident for stations in the Goleta, Santa Ynez, and Santa Maria areas.

Comment reflected in Section B-11 of Volume II of the FEIS.

2. On page 134, the projected number of days in excess of the oxidant standard for 1977, 12 days as mentioned in the draft, applies only to the Santa Barbara-State St. station. More complete data now available indicate the oxidant standard was exceeded on 16 days in 1977 at the State St station, and 21 days at the Goleta station.

Ibid.

3. In Table 31 on page 135 and in several other locations in the draft, the California 24-hour sulfur dioxide standard should be 131 ug/m^3, not 130 ug/m^3.

Ibid.

4. The fuel consumption figures used for the emissions estimates in Table 40 on page 201 are significantly different between information supplied for the draft by the applicant and estimates by independent consultants. Differences can be noted for fuel consumed in hoteling and offloading for 120,000 to 125,000 m^3 LNG tankers. The fuel consumption is almost twice as great as for the 130,000 m^3 tankers in these operational modes, yet fuel consumption for the 130,000 m^3 tankers in the approach/docking mode is more than twice as great as the fuel consumption for this mode by the 120,000 to 125,000 m^3 tankers. In addition, almost identical fuel usage while underway is indicated in Table 40 for the two classes of LNG tankers, yet the power ratings of the two are substantially different. The 120,000-125,000 m^3 tankers are typically 30,000 to 34,000 horsepower, while the 130,000 m^3 tankers will have engines rated by various sources at anywhere from 48,000 to 80,000 horsepower. These apparent discrepancies should be investigated and resolved in the final EIS, since the tankers are one of the largest sources of emissions for the project.

A wide range of tanker fuel consumption and emission data has been submitted to this agency. The FEIS has been revised to reflect the most recent submitted data.

5. Although on page 208 it is stated that the air quality model predicts violations of the state 1-hour NO_2 ambient air quality standard due to fired vaporizer emissions, no mitigation measures are recommended. The NSR rule for Santa Barbara County requires the denial of an authority to construct for any project that would cause a violation of any national primary or state ambient air quality standard. These points should be discussed in the final EIS.

The revised air quality analysis shows no violations of ambient air quality standards.

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6. On page 210, it is stated that the non-methane hydrocarbon (NMHC) to oxides of nitrogen (NO_x) ratio in southern Santa Barbara County is about 1:1, thus an increase in NO_x will not have an impact on regional oxidant levels. This statement may not be true. Prevailing winds at the site generally are from the ocean, where NO_x and NMHC concentrations are probably low. As the air passes over the rural areas, the concentration of hydrocarbons may increase from natural source emissions. Thus, the existing NMHC/NO_x ratio could be relatively high downwind of the site, and NO_x emissions at the site could result in elevated downwind oxidant concentrations.

Comment reflected in Section C-11 of Volume II of the FEIS.

7. On page 210, it is stated that under the Santa Barbara County NSR rule, a source may be approved if the source will not (1) prevent the attainment or maintenance of any Federal primary ambient air quality standard or (2) prevent reasonable progress toward the achievement of any Federal secondary or state air quality standard. This is incorrect. The rule states that approval shall be denied unless emissions from a project will not: (1) cause a violation of, or interfere with the attainment or maintenance of, any National primary or state ambient air quality standard; or (2) prevent reasonable progress toward the achievement of any National secondary ambient air quality standard.

Ibid.

8. No air pollution mitigation measures for project operations are proposed in Section D, Measures to Enhance the Environment or to Avoid or Mitigate Adverse Environmental Effects on pages 225-244, and no comments on air pollution effects for project operations are included in the following Section E, Unavoidable Adverse Environmental Impact. These omissions are not consistent with the significant adverse impact on air quality described in earlier sections of this draft, in which violations of air quality standards are predicted.

Comment reflected in Section D of Volume II of the FEIS.

9. On pages 299 and 300, it is stated that total suspended particulate (TSP) and oxidant levels at the Rattlesnake Canyon site should be within standards. From past monitoring experience in California, however, although the annual geometric mean standards for TSP are rarely if ever exceeded in remote areas, the 24-hour standards are occasionally exceeded in such areas. The one-hour Federal oxidant standard is violated throughout most of California, and almost all stations, even those in remote areas, record several violations of this standard annually.

Comment reflected in Section H-2d of Volume II of the FEIS.

10. The table displaying ambient air quality data for San Luis Obispo on page 299 contains data for only one site for part of the year. Since the San Luis Obispo station changed locations during 1976, it would be more representative to combine data for both sites. This change is incorporated in Table 2.

Ibid.

11. On page 300, in describing the air quality impact of the LNG terminal for the Rattlesnake Canyon site, the NO_2 standard violations predicted by the model should have been mentioned. In addition, the statement in the draft

The impact on ambient air quality was not modeled for the Rattlesnake Canyon alternative. Impacts are discussed qualitatively

that emissions at the Rattlesnake Canyon site will have an insignificant impact on regional air quality is not necessarily true. Emissions of NO_x can affect oxidant concentrations as discussed in 6 above, and can also contribute to TSP concentrations if NO_x is converted to nitrate particulate.

12. The ambient air quality table for Port Hueneme and Camarillo on page 322 should be changed in several areas. The table should note that the TSP and oxidant data for these two sites, and the NO_2 data for Port Hueneme are for a partial year, and that a full year of data could show a more severe pollution problem. In addition, TSP data for 1976, rather than 1975, should be presented in this table. The 1976 TSP data for these two sites are summarized in Table 3.

Comment reflected in Section H-2d of Volume II of the FEIS.

13. On page 345, the draft indicates that the local impact at Oxnard should be within standards. This appears to be incorrect, as the modeling for Point Conception discussed earlier in the draft indicated local violations of the California 1-hour NO_2 standard for the fired vaporizers.

The high NO2 levels predicted in the DEIS for Point Conception resulted from the complex terrain which is not present at Oxnard.

14. Again on page 345, the statement is made that emissions at the Point Conception and Rattlesnake Canyon sites would have an insignificant impact on regional air quality. As indicated by the draft, however, the LNG terminal has sufficient emissions to be categorized as a major source requiring new source review. Although emissions from a terminal located at Point Conception or Rattlesnake Canyon would not severely impact heavily populated areas, the impact on the area surrounding either of these two sites could be significant.

Revised emission data shows much lowered emissions than presented in the DEIS. Ambient standards would not be exceeded at Point Conception.

15. Table 51 on page 348 appears to rank alternative sites for air quality based on the effect of emissions in the immediate area, and ranks all sites as having very little environmental impact. More weight should have been given to total emissions for each site, and the effect of these emissions on downwind air quality. In addition, since modeling indicates localized NO_2 violations, it appears inconsistent to rank all sites as having little environmental impact on air quality.

See above.

TABLE 1

Summary of Oxidant Air Quality Data for

Santa Barbara County Stations

Site	Number of Hours in Excess of Federal Standard					Highest Annual 1-Hour Average				
	1973	1974	1975	1976	1977*	1973	1974	1975	1976	1977
Santa Barbara-State St.	87	53	82	58	55	19	17	11	15	14
Santa Barbara-Satellite	170	136	19	95	37	20	15	14	24	14
Goleta	-	-	54	97	75	-	-	23	23	17
Santa Maria-ARB	8	5**	-	-	-	11	12**	-	-	-
Santa Maria-E. Main	-	-	-	37	14	-	-	-	12	12
Santa Ynez	-	85**	-	-	-	-	13**	-	-	
Santa Ynez Airport	-	-	-	-	34	-	-	-	-	15

* Preliminary data, subject to change

** Partial year of data

Source: California Air Quality Data, Air Resources Board

TABLE 2

Summary of 1976 Ambient Air Quality for San Luis Obispo*

		Value
TSP	Annual Geo. Mean (ug/m^3)	52.1
	24-hour Max. (ug/m^3)	122
	Samples in excess of Primary Std.	0
	Samples in excess of Secondary Std.	0
	Samples in excess of California Std.	3
Oxidant	1-hour Max. (ppm)	.11
	Hrs. over Primary Std.	9
NO_2	Annual Ave. (ppm)	**
	1-hour Max. (ppm)	.15
CO	1-hour Max. (ppm)	16
	8-hour Max. (ppm)	7.5
	Hours in excess of 8-hour Std.	0

* Station moved during year, data combined from both stations for table.

** Insufficient data for a statistically valid annual average, but data indicate the actual average should be well within the Primary Standard

Source: California Air Quality Data, Summary of 1976 Air Quality Data, Air Resources Board

TABLE 3

Summary of 1976 TSP Ambient Air Quality Data for Port Hueneme and Camarillo

	Port Hueneme*	Camarillo
Annual Geo. Mean (ug/m^3)	83.9	74.1
24-hour Max. (ug/m^3)	153	131
Samples in excess of Primary Std.	0	0
Samples in excess of Secondary Std.	1	0
Samples in excess of California Std.	9	15

* Data may not be representative; only 33 of 61 possible samples taken.

Source: California Air Quality Data, Summary of 1976 Air Quality Data, Air Resources Board

OFFICE OF THE SECRETARY
RESOURCES BUILDING
1416 NINTH STREET
95814

(916) 445-5656

Department of Conservation
Department of Fish and Game
Department of Forestry
Department of Navigation and Ocean Development
Department of Parks and Recreation
Department of Water Resources

EDMUND G. BROWN JR.
GOVERNOR OF
CALIFORNIA

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

THE RESOURCES AGENCY OF CALIFORNIA
SACRAMENTO, CALIFORNIA

JUN 9 1978

Mr. Kenneth Plumb
Federal Energy Regulatory Commission
Washington, D. C. 20426

Dear Mr. Plumb:

The State of California forwarded to you on June 2, 1978, comments on the Draft Environmental Impact Statement for Volume II of the Western LNG Project (SCH No. 78051644). In that letter the State advised that additional comments would be forthcoming.

Attached are belated comments from the Division of Mines and Geology of the Department of Conservation. We would appreciate your giving full consideration to these comments.

Sincerely,

L. FRANK GOODSON
Assistant Secretary for Resources

Attachment

cc: Department of Conservation

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State of California The Resources Agency

Memorandum

To : Department of Conservation
Land Resources Protection Unit
Attn: D.L. Jackson

Date: May 31, 1978

From : **Department of Conservation**
Division of Mines and Geology
1416 - 9th Street, Sacramento 95814

Subject: Review of: Draft Environmental Impact Statement, Western LNG Project
Prepared by the Federal Energy Regulatory Commission
SCH 78051644 Santa Barbara County

Volume II of the subject document, "Construction and Operation of an LNG Receiving Terminal at Point Conception, California" has been reviewed in regard to recognition of actual and potential geologic and seismic hazards.

The document provides a rather comprehensive narrative description of the proposed project; in the opinion of the Division, however, the document is incomplete and inadequate in assessment of actual and potential geologic and seismic hazards for the following reason:

1. Site specific hazard evaluations and planned mitigating measures are not provided for the offshore receiving trestle and facilities, the LNG terminal and facilities, and the gas transmission pipeline.
2. Geologic and seismic hazards investigations, including determination of the potential for surface rupture at the LNG terminal site are still in progress.
3. The selection of design for some components and the validity and adequate conservatism of seismic design criteria for components to mitigate geologic-seismic hazards have not yet been determined.

Edward C. Sprotte
Edward C. Sprotte
Geologist
RG 1287

ECS:wa

APPROVED:

J. E. Gay Jr.
for James F. Davis
State Geologist

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It is not the purpose of an EIS to provide site specific studies for any of the facilities mentioned. Studies which have been made were reviewed during the EIS process. As mentioned in points 2 and 3, some studies were not complete at the time the DEIS was prepared. Such studies have now been reviewed and their essence incorporated into this FEIS.

No response required.

City of Los Angeles

CITY HALL
LOS ANGELES, CALIFORNIA 90012
(213) 485-3311

OFFICE OF THE MAYOR

TOM BRADLEY
MAYOR

June 2, 1978

Mr. Charles B. Curtis, Chairman
Federal Energy Regulatory Commission
825 North Capital Street, N.E.
Washington, D.C.

Dear Mr. Curtis:

RE: PACIFIC ALASKA LNG ASSOCIATES, ET AL
Docket Nos. CP 75-140, et al

I believe the decision on the Pacific Alaska LNG Associates LNG facility at Cook Inlet, Alaska, is crucial to expedite the delivery of natural gas to Southern California soon enough to avoid serious shortages and economic dislocation in this region. The Cook Inlet project, as proposed by the applicant, offers the best hope for timely augmentation of Southern California's vital gas supplies.

The critical need for the natural gas supplies represented by the PacAlaska project is established beyond dispute. Curtailment based on end use and allocation of gas supplies must be considered short-term solutions. Projects such as that proposed by PacAlaska are in fact indispensable elements in the solution to Southern California's need for clean energy sources.

It is my understanding that a pipeline lateral from Cook Inlet to the proposed Alaska Highway Gas Pipeline is being considered as an alternative to the Cook Inlet LNG Project. It seems certain that such a lateral could not transport the Cook Inlet gas to Southern California in the same time frame as the LNG Project.

Thank you for your consideration in this most crucial matter.

Sincerely,

Tom Bradley

TOM BRADLEY
Mayor

TB:gbw

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No response required.

COOK INLET AIR RESOURCES MANAGEMENT DISTRICT
825 L STREET ANCHORAGE ALASKA 99501 TELEPHONE (907) 264-4713

June 16, 1978

Federal Energy Regulatory Commission
Office of Pipeline and Producer Regulation
Washington D.C. 20426

Re: OPPR-PCCD/EEB
Pacific Alaska LNG Company
Pacific Alaska LNG Associates
Docket No. CP75-140

Gentlemen:

The District has reviewed the Draft Environmental Impact Statement on the above subject and finds the following:

1) Initial analyses indicates little adverse air pollution impact will result on ambient concentrations in the local area. PSD evaluation will need to be accomplished to verify this fact.

Response reflected in Section C.12 of Volume I of the FEIS.

2) Construction of the LNG plant is set for the 1980 time frame. This places construction under PSD review for carbon monoxide, oxides of nitrogen, hydrocarbons and oxidants as well as sulfur oxides and particulates.

See above.

3) The major concern of the staff is a routing of the pipeline used for gas collection.

No response required.

4) While the F.E.C. staff would like to see a gas line from Kenai tie into the Prudhoe Bay gas line, that course of action would require much construction and pass through the most populated area of Alaska, the Anchorage urban area.

No response required.

In the opinion of the District, the most feasible and least adverse impact to the environment is the construction of the liquification plant in the Kenai area and the shipment of the liquified gas to California for regassification.

If there are any questions concerning our review, please contact the District at 264-4713.

Sincerely,
Robert A. Hall
Robert A. (Bert) Hall
Director

COUNTY OF SANTA BARBARA

CALIFORNIA

DEPARTMENT OF PLANNING

ENGINEERING BUILDING
105 E. Anapamu St.
SANTA BARBARA
CALIFORNIA 93101
(805) 966-1611

BRITT A. JOHNSON
Planning Director

PAUL W. WACK
Assistant Planning Director

May 31, 1978

In Reply to:
OPPR-PCCD/EEB
Western LNG Terminal Company
Pacific Gas LNG Terminal Company
Western LNG Terminal Associates
Docket No. CP75-83-2

Mr. Kenneth F. Plumb
Secretary
Federal Energy Regulatory Commission
Washington, D.C. 20426

Subject: DEIS for LNG Receiving Terminal at Point Conception, California

Dear Mr. Plumb:

This letter and the accompanying materials represent the County of Santa Barbara's response to the subject Draft Environmental Impact Statement (DEIS).

In response to our critical staff shortage, we are presenting materials previously submitted to the California Public Utilities Commission (CPUC), since the subject material is coterminous with your interests. However, we are submitting a short document on power generation for your consideration which was not part of the materials presented to the CPUC.

To avoid your need to meander through the entire CPUC packet, two documents should be of interest to you: the Santa Barbara County Board of Supervisors Recommended Terms and Conditions (April 10, 1978, 29 pages, and Addendum of May 8, 1978, one page), and the County's letter of April 11, 1978, to Assemblyman Gary Hart. I have placed paper clips as markers for your reference.

The County's Terms and Conditions for the proposed Point Conception LNG facility reflect our comprehensive evaluation of the site, including what we consider to be proposed mitigation measures to deal with the significant impacts that this facility would generate. However, please understand that these conditions represent our best effort given the inadequate information base and legislated time frame that is grossly inappropriate in relation to the magnitude of the project under consideration.

Related to this concern, is the County's letter to Assemblyman Hart, which outlines the various issues we feel make the LNG siting evaluation process of the LNG Terminal Act of 1977 highly suspect in meeting its mandate within any reasonable realm of governmental decision making credibility. Also included in the packet, immediately following the Hart letter, is the County's Resolution

ADMINISTRATION	COMPREHENSIVE PLANNING Planning, Research, Graphics	LAND DIVISIONS	PLANNING COMMISSION	ZONING INFORMATION AND ENFORCEMENT
Ext. 230, 232	Ext. 237 360 361	Ext. 250	Ext. 238	Ext. 238, 239

(No. 78-163) supporting our position that no LNG be selected this year by the State of California.

Finally, the last attachment on the formulation of a Geotechnical Review Committee for Point Conception would be applicable to your efforts, since we continue to believe that local representation is critical to the interests of Santa Barbara County.

I hope this letter and the accompanying attachments are adequate for your needs. Please do not hesitate to contact either myself (805) 966-1611, Ext. 230 or 232, or Albert McCurdy, Vice Chairman, at (805) 966-1611, Ext. 377, 378, 379, if you have any questions or comments.

Sincerely,

Paul W. Wack, Chairman
County of Santa Barbara LNG Task Force

PWW:dc

POWER GENERATION AT POINT CONCEPTION LNG FACILITY (Per Docket No. CP75-83-2)

The proposed Point Conception LNG receiving terminal will require considerable amounts of energy for the purpose of revaporizing the liquified natural gas. Two forms of energy are required to achieve regasification: thermal energy (to raise the temperature of the LNG) and electrical energy (to raise the pressure, via pumps, of the LNG).

The applicant proposes to utilize a seawater exchange system to provide most of the thermal energy and either gas turbines or an electric transmission line to provide the electrical energy.

Each element of the proposed LNG terminal energy supply system has serious impacts. The electrical transmission line would have a visual, scenic, and land use impact along or near 35 miles of coastal zone. The gas turbines would produce NO_x emissions. The seawater exchange system would seriously impact the marine resources of the area.

On April 10, 1978, the County Board of Supervisors adopted a condition which addresses the issues raised by the proposed means of supplying energy for the Point Conception facility. This condition reads as follows:

78. All electric power utilized by the facility shall be produced onsite provided that offsite electrical power may be permitted when the facility reaches an operative capacity of 0.9 BCD/D if applicant conclusively demonstrates at that time or no sooner than two years prior to that time both of the following: A) Expansion of the gas turbine generating capacity is impractical or will unavoidably result in unacceptable levels of air pollution under then-current best available control technology and standards, and B) No other method of onsite power generation (including without limitation cold power systems and solar and wind power generation) is feasible at the time such capacity is reached.

    Transmission of offsite power to the site, if permitted under the above, shall be by means of underground lines at all places visible from within the coastal zone as defined in Section 30103 of the California Public Resources Code.

If approved by the CPUC, this condition would probably entail the use of gas turbines as the primary source of electrical power generation until the late 1980's. This is consistent with the applicant's stated preference as late as March of this year. Left as such, the remaining impacts would entail the damage to marine life from the seawater exchange system and NO_x emissions from the gas turbines.

On May 22, the California Coastal Commission recommended the prohibition of the use of the seawater exchange system:

    Condition 22: A seawater exchange system for vaporizing LNG shall not be installed or used at Little Cojo and all electricity used at the site shall be generated onsite. If, for any reason, the onsite generation of electricity is not permitted, all transmission lines to the site in the coastal zone shall either be placed underground, or shall use existing wooden transmission poles.

Comment reflected in Section C-5b of Volume II of the FEIS.

Ibid.

If accepted by the CPUC, this condition would substantially reduce the impac- on marine resources in the Point Conception area.

Taken together, the proposed conditions of the County of Santa Barbara and the California Coastal Commission would have the effect of adopting the design utilized at the Cove Point, Maryland, LNG facility. That facility obtains its thermal energy requirements from gas-fired vaporizers and its electrical energy requirements from onsite gas turbines.

If adopted at Point Conception, remaining impact is the NO_x emissions of the gas turbines and the gas-fired vaporizers. If control technology is applied to the gas vaporizers and/or the gas turbines, the level of emissions would be reduced. The "Water Injection System" and the "Catalytic Reduction System" have been suggested as control technology for NO_x emissions from the vaporizers and the turbines.

Alternatively, NO_x emissions could be reduced or eliminated by providing the necessary energy requirements from onsite solar or fuel cell technology. The solar option for the Point Conception facility is currently being explored by the Jet Propulsion Laboratories. The feasibility of fuel cells will be determined by the results of the 4.8 MW fuel cell being installed next year in Consolidated Edison's electrical transmission system by United Technology Corporation. Southern California Edison, the utility company which would normally provide electricity for the Point Conception facility, is heavily involved in fuel cell development and applications. Pending favorable results from the Consolidated Edison fuel cell demonstration program, SCE is committed to the purchase of 12 fuel cell units (at 45 MW each) from UTC. One of these units would provide sufficient power for the LNG facility, eliminating the need for a transmission line and substantially reducing NO_x emissions compared to onsite gas turbines.

The Draft Environmental Impact Statement of the FERC does not address the issues raised by the choice of power generation for the Point Conception facility nor the alternatives available to mitigate or eliminate the expected impacts. Since these alternatives would eliminate or reduce the impacts associated with the applicant's proposal, there is sufficient justification to require the applicant to redesign the facility to incorporate these alternatives.

Paul W. Wack

Paul W. Wack, Chairman
County of Santa Barbara LNG Task Force

Don Schultz

Don Schultz, Energy Planner

Solar and fuel cell technologies, while promising for future applications, are not sufficiently developed for the reliability required of this project.

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

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DEPARTMENT OF ANTHROPOLOGY SANTA BARBARA, CALIFORNIA 93106

January 9, 1978

Mr. Roger Wise
Room 6112-E
Federal Energy Regulatory Commission
Washington, D.C. 20426

Dear Mr. Wise:

In reply to Mr. Plumb's letter of December 28th regarding the impact of construction of the Point Conception LNG terminal and associated pipelines on archaeological resources, I have the following suggestions:

First, you should not proceed with your planning, insofar as it involves archaeological resources, until you have had a chance to review the report prepared by Chester King for Arthur D. Little, Inc. You will find that a number of other archaeological sites will possible be affected by the construction than are indicated in your letter.

Study has been reviewed.

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Second, all possible effort should be made to position the planned facilities in such a way that archaeological resources will not be affected. This is the optimum mitigative measure.

Staff agrees.

Third, unavoidable impact would require archaeological excavations to salvage the valuable data that the sites contain. I suspect that even if the impact is minimal, the cost of salvage may run several hundred thousand dollars. (The cost of salvage at sites such as these normally runs between $800 and $1000 per cubic meter.) Given the high cost of archaeological salvage, planners should be encouraged to avoid affecting archaeological resources as much as possible.

Staff agrees.

Fourth, if the Federal government is to direct mitigative efforts, the services of the Interagency Archaeological Services in the National Park Service should be obtained. The local office is headed by Mr. Garland Gordon, NPS-IAS, 450 Golden Gate Avenue, Box 36063, San Francisco, CA 94102.

No response required.

You will find many of the answers to your questions expressed in Mr. Plumb's letter in Mr. King's report. If, after reading his report, you still have questions, I would be happy to try to answer them. I will be out of the country for the next five months but will be back briefly during the last week of February and the first week of March should you wish to contact me.

Sincerely,

Michael A. Glassow

Michael A. Glassow
Associate Professor

MG:ms

16682 Bolero Lane
Huntington Beach
California 92649
July 31, 1978

Addressed to:
California Coastal Commission
Federal Energy Regulatory Commission
Public Utilities Commission

Dear Sirs:

As a 15 year old citizen, surfer and one who is concerned about the California coast that may be endangered for me and my future children and grandchildren, I wish to protest the plans for the Liquified Natural Gas facility at Point Conception.

I wish to direct your attention to the following organizations who are opposed to the LNG facility proposed for Point Conception: The Sierra Club, Friends of the Earth, Goo-Get Oil Out, Pt. Conception Preservation Committee, Hollister Ranch Owners Association, Cal-Cag-California Consumer Action Groups, Cure-Californians United for Responsible Energy, CAUSE, CED, Ventura Concerned Citizens Committee, Pt. Fermin Home Owners Association, Long Beach.

Comments noted.

I wish to join the above organizations in expressing my opposition to the LNG facility for the following reasons: The destruction of the surfing break and surrounding areas; the inherent dangers of LNG; the unsuitability of the Point Conception area for navigation; the lack of necessity for the plant due to the supplies of gas available from the Alcan pipeline and recently secured natural gas deposits in Mexico, Louisiana, Wyoming, Texas and Oklahoma; the possibility of an earthquake due to a fault located directly under the planned location; the availability of other energy sources such as solar energy, wind energy, solid wastes, methanol, geothermal energy and nuclear fission; legal objections that Western LNG's attempts to secure the site haven't been carried out properly and LNG's economic drawbacks in general.

The Pt. Conception LNG conflict obviously has far reaching effects, but I feel the most important is the reprehensible act of destroying miles of natural, unspoiled coastline and the best surfing spot in California, which I hope to enjoy someday.

Sincerely,

Lou Abel

Lou Abel

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06/07/78

Dear Sirs:

I do strongly oppose a LNG terminal at Point Conception, California. I beg of you to put an end to this proposed catastrophiy.

Thank you.
Yours Truly
Barry C. Friedman

Comment noted.

JUL 10 11 04 AM '78
FEDERAL POWER COMMISSION

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FRIENDS OF THE EARTH
CALIFORNIA LEGISLATIVE OFFICE
717 K STREET, #208, SACRAMENTO, CALIFORNIA 95814
(916) 446-3109

Kenneth F. Plumb, Secretary
Federal Energy Regulatory Commission
825 North Capitol Street, N.W.
Washington, D.C. 20426

June 23, 1978

OFFICIAL FILE COPY

TO	INIT.	DATE
DOCKET		
CENTRAL FILES		

RE: OPPR-PCCD/EEB
Western LNG Terminal Company
Pacific Gas LNG Terminal Company
Western LNG Terminal Associates
Docket No. CP75-83-2

Pacific Alaska LNG Company
Alaska California LNG Company
Pacific Alaska LNG Associates
Docket NO. 75-140

Draft Environmental Statement

Dear Mr. Plumb:

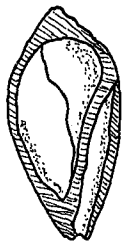
161 Friends of the Earth Sacramento wishes to register the most angry of complaints regarding the above. We received a copy of the DEIS in question June 21, 1978. We read with great interest that all comments on the DEIS were due June 5, 1978. We ask, "Why wasn't the DEIS sent to our office earlier enough so that we could be a part of the public participation process?"Friends of the Earth has been following with great interest the whole issue of LNG Terminal siting in California and across the nation for some time. The action taken by your department can only be construed as a deliberate attempt to deny Friends of the Earth from participating inthe decision-making process. As a result, we are writing to you to ask for an extension of the review period at least equal to that allow by the DEIS so that we can review and make comments on the DEIS.

Sincerely,

Michael Keesee

Michael Keesee
Enviornmental Impact Report/Statement Coordinator.

A DEIS was mailed to Friends of the Earth on April 5, 1978. The DEIS was returned to FERC with a postal notification of address change on or about May 18, 1978. A second DEIS was remailed the following week to the Friends of the Earth address as shown on their letter of comment. This staff cannot explain why the second DEIS took 4 weeks to arrive in Sacramento.



ROBERT O. GIBSON, ARCHAEOLOGIST

P.O. Box 102 Paso Robles, Calif. 93446 Phone (805) 238-5411

August 31, 1978

Mr. Roger B. Wise
Federal Energy Regulatory Comm.
Archaeologist
825 North Capital Street
Washington D.C. 20426

RE: Point Concepcion Archaeology , Santa Barbara Co.

Dear Mr. Wise:

Mr. Larry Spanne and I are the two archaeologists who worked on the trenching phase of the WLNG project at Point Concepcion. I am currently completing an article describing the archaeology of the Point Concepcion site.

The stone artifacts recovered at a depth of 5.3 meters appear to date circa 21,000 B.P. As such they represent one of the most significant archaeological sites in California and the Americas.

I have information regarding the nature of the site, its management and preservation that I believe would be helpful in your review of the WLNG project at Point Concepcion. However, I do not have the funds to attend the public meetings presently scheduled in Washington D.C. this month.

I would like to request that the meetings of the F.E.R.C. be held in California, possibly in Santa Barbara County, in order that myself and other interested parties may attend.

I hope to complete the article by the end of September and will forward you a copy at that time. Also I am enclosing a preliminary report by Clay Singer, UCLA, on the original scraper that was found.

Thank you for your consideration of this matter.

Sincerely

Robert O. Gibson

cc. K. Plumb, F.E.R.C.
T. King, I.A.S, N.P.S

No response required.

PRELIMINARY ANALYSIS OF A STONE TOOL FROM A PROBABLE EARLY MAN SITE NEAR POINT CONCEPTION, SANTA BARBARA COUNTY, CALIFORNIA.

Submitted to:

Mr. Larry Spanne
Archaeologist
250 San Pasqual Road
Lompoc, California
93436
(805) 735-2040

Submitted by:

Clay A. Singer
Archaeologist
Archaeological Resource
Management Corp.
830 1/2 Bay Street
Santa Monica, California
(213) 392-4723

14 June 1978

Commissioner Brown

Much of Southern California Coastline is now buried under civil engineering wonders and municipal perks as well as untold scores of manmade wonders. As a person who has experienced the pristine beauty of Pt. Conception I am opposed to the use of this land as a site for an LNG facility. If we are to continue as a species on this planet we have to learn to live in harmony with it as opposed to manipulating it. I would like my children and their children to be able to experience this land that has been relatively undisturbed by man.

Yours Truly,
Bill Howden

Comments noted.

Indian Legal Service - Spiritual Counselors Inc.

Governor Jerry Brown
c/o Alice Lytle
Secretary Deputy Legal Affairs.
Governor's Office
Sacramento, Calif. 95814

American Bear Nation
United American Indian Refugees
United Coosawattee Cherokee Tribe
of California and Nevada

Dear Honorable Governor Brown:

This matter I come you with, is a moral issue and a public safety issue knowing that you have the executive powers of seeing that the civil and criminal la s of the state of our great state of California are enforced and w e American Indians regard you as the guardian of the people's liberty in California. As all people in California are of the same thought.

Therefore knowing this about you Sir. I know you will take time to read on, or have your secretary Deputy Of Legal Affairs brief you in on this issue.

Before I go on, I want to state, I see that you or your office handed over to the state police the suggestion that I sent you, of useing the bull horn on police cars for the safety of our state police and their lives. Good.

Now recalling this, I am sure you will realize I do have the public's interest at heart. When I tell you that if the Calif. state public utility's commission builds the liguid gas plant, dab smack upon the earth qwake fault on point conception here in Santa Barbara county. I feel it is my personal duty as a Spiritual Counselor and the duty of our American Indian Religious organization to inform you , your twentyth century technology is yet far to primitive to detect the great unknown danger.

I will give you an example, you are on a camping trip, and have dug a hole in the earth, and have built y ourselves a good camp fire. but; along comes a guy who just sets a can of liquid gas upon your camp fire, its a closed can but; what do you think happened?, well this thing will happen at point conception, only in so large a measure, I cannot put it into words during an earthquake.

Chief Greywolf: Director P.O. Box 2369. Santa Barbara. Ca 93102 (805) 966-1125

Comments considered in preparation of FEIS.

Indian Legal Service - Spiritual Counselors Inc.

American Bear Nation
United American Indian Refugees
United Coosawattee Cherokee Tribe
of California and Nevada

Now before you say, what does an Indian know about twentyth century technology?. Remember we Indians always knew the world was round Why? from our Indian Spiritual teachings

But the white man had to build primitive technology, before he could understand this, and then he didn't believe untill he tested it. Is this going to be what happens at point conception? The Calif. state public utility commissioners will not believe without testing. I write this with a heart that has no malice against white people, I am a spiritual man and I work for the Great Spirit. I am in this world physically, but; mentally I am not part of materialism. I am a true Indian Spiritualist, as our old ones.I know this world is Spiritual, and I know this world is under Spiritual law. This is who I am and this is where I am comming from. I serve the Great Spirit. I am not funded to serve, I am not even paid to serve, as I am living under spiritual law, and it is my duty to write to you about this matter.

I am also an American citizen and a registered voter, and I must pay taxes as every one else. And its also my duty as an American citezen to bring this matter to your attention.

As the federal power commission does not construct these liquid gas plants, they only regulate them after they are built there. The state public utility commission are the ones who I am reporting to you. I feel they are overlooking the safety and welfare of the General public. Please don't let our organization write a letter sometime later on, and remind you or your office, that we told you our Spiritual Indian teachings tell us.

Chief Greywolf: Director P.O. Box 2369. Santa Barbara. Ca 93102 (805) 966-1125

American Bear Nation
United American Indian Refugees
United Coosawattee Cherokee Tribe
of California and Nevada

not to allow this plant upon Point Conception, because it will indanger the welfare and the safety of the GENERAL PUBLIC.

And most Important to the Indians on this planet, our religious liberty is being denied, this point conception land has been on Indian Religious church site from time unremembered. It does not only belong to the Chumash of this area, It belongs to all American Indians across America. It also is known to Indians in Canada, Mexico, and South America. Therefore the United States Constitution is being broken. This religious freedom in our country's law of the land, which is the Constitution of the United States, nor the States may take away our religious liberty, so why is the state's public utility commission and the Natural Liquid Gas Corporation have more power then the United States and the State of Calif.? I can not beleive this !.

Therefore I am requesting that you as the Governor of Calif. put an emmediate stop to this DENIAL of our most precious right, our freedom of RELIGION and save our sacred Indian religious church site at Point conception for all Indians in America and all Indians.

It is prohibited under the law of this State and tbe law of this coutry to destroy our church, as point conception is our church, For all Indians and not just for the local Santa Barbara Chumash Indians.

My Granfather told me of point conception, when I was yet a little boy He told me its the most sacred place to all Indian Spiritualist, that if I was to ever go there, I would first have to fast, and then I must always remove my shoes before walking upon that sacred ground.

Chief Greywolf: Director P.O. Box 2369. Santa Barbara. Ca 93102 (805) 966-1125

American Bear Nation
United American Indian Refugees
United Coosawattee Cherokee Tribe
of California and Nevada

I go there all the time in my Spirit body of light, during my Spiritual meditations, and I have alredy covered those wounds, and I am praying for their healing, as untill they are healed the Spirit door remains closed. Now what needs to be done is have Indians from all over go over there and cover up the wounds that were inflicted upon our mother's body. For my grandfather has told me, it was at this point that the mother earth opened up herself and received the gift of life from father sun. This is where all Indians were concieved, and all persons . But; because you do not know, or do not remember does not make it untrue. Would you leave the door closed against your own soul or the souls of those you love?. I think not you are a good honest man.

I was shown by Spirit that I had to move to Santa Barbara over five years ago. I was told that only here near Point Conception can the prayer for mother earth be made.for her needed healing and only here could we pray for the uplifting of the Spiritual awareness of all MEN AND WOMENKIND. Here at Point Conception must these healing prayers be made, and these rites be held.

So; I ask you to please save this sacred religious land for Indians religious freedom, and for the healing of our mother, and the uplifting of the human race.

I am also a counselor of the Bill Of Rights of the United States Constiution as we need not be attorney's at law to stand up for the Bill Of Rights, as we understand civil rights was defined by the Supreme court as this, an individual has the right to do anything which is not prohibited by the law of the land.

Chief Greywolf: Director P.O. Box 2369. Santa Barbara. Ca 93102 (805) 966-1125

Indian Legal Service - Spiritual Counselors Inc.

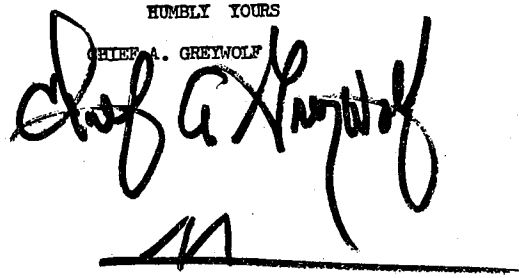
American Bear Nation
United American Indian Refugees
United Coosawattee Cherokee Tribe
of California and Nevada

Most respectfully do I point this out, so; Therefore as a legal Spiritual counselor of the Great Spirit and also a legal Spiritual Counselor of the Bill Of Rights in the United States Constitution, I req uest an answer to this letter, Most respectfully, but most legal also.

I REMAIN THE SERVANT OF THE GREAT SPIRIT
AND A SPIRITUAL COUNSELOR OF THE BILL OF RIGHTS
IN MY COUNTRY'S CONSTITUTION.

HUMBLY YOURS

CHIEF A. GREYWOLF



Chief Greywolf: Director P.O. Box 2369. Santa Barbara. Ca 93102 (805) 966-1125

Dear FERC:

A cry to leave

Pt. Conception, California

as it is now. In four years, will they blow mother natures million year masterpiece, the Ranch, with LNG?

NO! Do not let this happen!

(surfer) Burt Johnson

Comment noted.

rainbow resin press
karl kempton
441 north 6th street
grover city ca 93433

July 22, 1978

TO: Regional Coastal Commission

RE: Rattlesnake Canyon as an LNG Terminal

GENERAL--
I am awakening to the ideal that I must walk my path, my life line, upon Mother Earth step by step as prayer because the elements of her body have created and maintain my physical being. The vegetable beings, the winged beings, the four-legged beings, the fish beings and the microscopic beings have no vote in the American Material structure of government, a government which is a dictatorship of homo sapiens over Mother Earth and her other children. The creed of the American Material Religion is maximize profit and its pride is equated to the size of the Gross National Product to which all that can be gotten away with is sacrificed: the rape of the land; the poisoning of the air; the poisoning of streams, rivers, lakes and oceans; the slaughter of vegetable and non-human beings as well as the sacrifice to profit of human life in such forms as 50,000 traffic deaths a year, unsafe working conditions leading to industrial accidents causing death and disabilities and high cancer rates, high infant mortality rates and lower life expectancy compared to other money worshipping regions on Mother Earth, etc. The quest for a material life is out of balance with the quality of life requirements.
LNGs are not needed if the creed of the Material Religion regarding energy use and industrial production was altered to follow the laws of thermodynamics which then would lead to efficient energy use and products which are not planned to fall apart or planned for short use but rather to remain intact as long as possible and in use as long as possible. The only reason such an energy source as LNG is utilized and being expanded these days is because of the industrial-governmental power structure which remains uncreative and conservative while serving only the stock holders and vested interests. The rights of all the people are ignored and the rights of the nonhuman beings are ignored.
Remember, when White culture spread over the world its religious leaders were horrorified at human sacrifice practiced by other peoples. The heart ripping Aztecs, who to insure benefits of and from the sun killed countless thousands of people, come immediately to mind. But I point to you the fact that our Material Religion is sacrificing the lives of more countless thousands in order to maintain the metaphysics of the Gross National Product.
SPECIFIC--
Point Concepcion: Anybody who has read Chumash literature knows about the sacredness of the area around and on Point Concepcion. I refer you, for example, to DECEMBER'S CHILD BY Blackburn, U of C Press, pp98-100, which any archaeologist studying the Chumash worthy of that title should have read. The religious points have been covered by others and more than adequately stressed by the Chumash people themselves which would lead any reasonable individual to conclude on those grounds alone the LNG must not be built on that location.
The beauty and uniqueness of this area should remain intact for future generations to enjoy rather than leave it an industrial junkyard for such a short and planned obsolescent project.
The weather and water conditions are obviously so adverse with high winds, dense

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Comments noted.

fog and high waves, that this site should never have stayed in someone's so-called creative mind more than half a minute let alone to have permitted events to reach the current stage.

Rattlesnake: Within the Indian Way of Life this area is held to be a religious, a sacred area--village, burial and ceremonial sites of their ancestors abound along the bench between Avila Beach and Morro Bay. With confidence I believe I can state that the confrontation at Point Concepcion with the Indians would be repeated at Rattlesnake. The fact that this region has already been desecrated by an industrial road and a nuclear power plant is no justification to continue desecration. In fact the removal of 66 bodies and their burial possessions sponsored by P G & E at Diablo Canyon still has to be resolved and more such disregard for the Indian religion will not be tolerated.

Rattlesnake Canyon is also part of an archaeological district and has been on the National Register of Historic Places for several years. This of course means that numerous restrictions exist on this site under federal law according to the National Historic Preservation Act of 1966 and Executive Order 11593. Several years of mitigation at extremely high costs would be required even if the Indians permitted which stressed above is highly unlikely.

This area is in a near pristine state in quanity and quality of nonhuman beings and scenic beauty inspite of the access road and nuclear power plant which, by the way, can not be seen from Rattlesnake Canyon. The nuclear plant now retards development and inhibits public access. The state Park Service is extending its territory to the boundries of the P G & E nuclear plant. Nearby at Point Buchon is a cormorant breeding area for one of the largest colonies in central and southern California. Sea lions are thought by the park service to breed at the nearby Lion Rock and the close at hand Pecho Rock is a rockery for at leat 500 Sea Lions. Along this coast is the migration path of the gray whales. The endangered sea otter has one tenth of its population in the area. The endangered brown pelican is a winter migrant to this area. And the proposed water exchange system with the nuclear plant would further destroy the marine environment in the area by having at one site hot water flowing into the ocean and at another site cold water flowing into the ocean; the consequences of which are not known except that it is certain microscopic life, fish and mammals would be killed, maimed and forced to relocate.

Moreover, there is the existence of the Hosgri earthquake fault which is now known to connect above San Francisco to the San Andreas fault. This fault zone has not been thoroughly studied and this fault with its potential thrust has repeatedly delayed the licensing of the nuclear plant and may in the end halt its licensing.

Further, it has been mentioned that one of the reasons Rattlesnake has been selected as a potential site is that it is located in a low population area so that in case of a disaster the human toll would be tolerable. I suggest that this thinking be re-examined for two reasons--that even low numbers of people should not be placed on the potential sacrifice blocks of economic expediency and that the recreation population of not only Avila be considered but that over 3 million vehicles per year drive along Pismo Beach, that over 100,000 people camp along that stretch on 3 day week ends and this area is within the 16 mile radius of extreme damage from a huge blast.

Finally, I suggest that the local fishermen be consulted in regards to the foul weather conditions along the coastline--frequent high winds, dense fog and high swells will be their experienced answer.

In spirit,

Karl Kempton

Karl Kempton

TO: Regional Coastal Commission
RE: Rattlesnake Canyon as an LNG Terminal
FROM: Central Coast Indian Council
728 13th
Paso Robles Ca 93446

Central Coast Indian Council wonders if the Regional Coastal Commission, the Public Utility Commission, the Federal Energy Regulatory Commission and all parties concerned are aware of the fact that Rattlesnake Canyon is a part of the Rancho Canada de Osos y Pecho y Islay Archaeological District and has been on the National Register of Historic Places for several years. Thus, there are several restraints placed on this site by Federal laws according to the National Historic Preservation Act and Executive Order 11593. Several years of mitigation at the expense of tens of millions of dollars would be required (see Dr. Dills' attachted letter).

The existence of the National Register District was noted in the DEIS.

More importantly, in our Way of Life this area is considered a religious place: the village sites, burial sites and ceremonial sites of our ancestors are not to be further disturbed. The matter of the unearthing--desecration--of 66 bodies and sacred burial possessions at Diablo Canyon sponsored by P G & E still has to be resolved; we can not, will not, permit anything like this to reoccur.

Comments noted.

By the actions the Indians are taking in preserving religious sites, burial sites, village sites, etc., following generations of all people will benefit by not having to look at ugly, dangerous and desecrating structures.

In spirit,

Joseph Buddy Gaittan

Joseph Buddy Gaittan,
Director

5/5/78

TO: The Coastal Commission

RE: Rattlesnake Canyon as an LNG Terminal from an Archaeological View

FROM: Charles E. Dills
Site Recorder, San Luis Obispo County Archaeological Society
and Regional Officer, Cultural Resources Section of the
Office of Historic Prservation, State Department of
Parks and Recreation (volunteer jobs)

I would like to make a few last points to help you in your decision. Private developers are required to avoid or mitigate adverse effects of development on archaeological resources. Government must not be so hypocritical as not to demand the same behavior of itself. The terminal must not be built anywhere if mitigation of impact cannot be accomplished.

Archaeological investigation of the proposed area at Rattlesnake Canyon by Pilling 30 years ago, by Riddell and by Greenwood about ten years ago, and by King during the last year have revealed a rich and extensive archaeological deposit throughout most of the area that would be required. The depth and ultimate importance are not known, and indeed cannot be known until excavation takes place. The major focus of most archaeology today is toward the preservation of these materials until the latest possible time. Even then the site should be only sampled and the remainder saved for the future. At this future time there will be a greater body of knowledge for background and interpretation and a magnificent array of techniques and instrumentaion not yet dreamed of. Material must still exist or we will have simply destroyed these cultures. This must not happen.

If what I have just said is true, no adequate mitigation of these sites is possible now. The best mitigation that could be accomplished at this time would be terribly expensive, both in money and time. I would guess (and it is a guess at this time) that it would take up to several years and would cost at least five and probably 50 million dollars to accomplish.

It must be emphasized that these are non-renewable deposits. When they are gone, the record of that culture is gone. If you were to find an unpublished and unknown play of Shakespeare, and if it was in such a condition that it would be destroyed in the act of reading it, you would have to feel a terrible responsibility. An archaeological site is a book that can be read only once and is destroyed by the act of reading.

One last point, it is virtually certain that there are burials in these sites and probably an organized burial ground. Encountering such a feature could stop the project temporarily and possibly permanently. Existing law would make it difficult to proceed and the local Native Americans would be very watchful. The area is on the National Historic Register.

While I am a member of the San Luis Obispo County Archaeological Society and a member of the Executive Board, this statement is my own. There was not time to put it to the membership.

Charles E. Dills

Dr. Charles E. Dills
1371 Avalon Street
San Luis Obispo, CA 93401

Comments noted.

7/13/78

TO: Regional Coastal Commission

RE: Rattlesnake Canyon as an LNG Terminal, an addendum

FROM: Charles E. Dills
(see attached sheet)

I cannot afford on my own to attend meetings on this issue at distant places in California. I cannot afford the time either, particularly on short notice. My testimony is on record from a meeting in San Luis Obispo and I attach a previous letter to the Coastal Commission. I would appreciate it if you would xerox my comments and include them with all future meetings on this subject. The nature of the testimony is not likely to change.

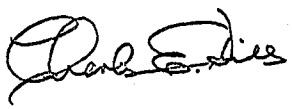
Comment noted.

I would like to make a point I have not made before. Are you giving any consideration to the possibility that none of the sites are useable? The sooner some offshore or island site is discussed, the sooner you are likely to reach a feasible solution. But discussion of the present four possibilities seems to me to be futile. Or are you trying blatantly to tire out the opposition?

Perhaps an analogy would be appropriate. I need a photographic darkroom. I'm trying to decide where to put it. I have four sites that I'm considering, 1) your living room, 2)your neighbor's master bathroom, 3) the lobby of the Highway department on Higuera St, SLO and 4) the main men's room of the Madonna Inn. Which do you think I should consider? It won't take me very long to admit that none of them are suitable. How long will it take the Coastal Commission to realize that none of the four sites being considered are feasible?

Please strongly and genuinely consider the possibility that *none of the four sites can become realities.*

Sincerely,



Dr. Charles E. Dills
1371 Avalon Street
San Luis Obispo, CA
93401

1144 Buchon Street
San Luis Obispo, CA 93401
January 28, 1978

Bill Johnson
California Coastal Commission
631 Howard Street
San Francisco, California 94105

Dear Mr. Johnson:

I understand that Rattlesnake Canyon in San Luis Obispo County is now being considered for the site of the proposed LNG facility. I am directing your attention to the fact that the area in question forms part of the Rancho Canada de Los Osos y Pecho y Islay Archaeological District, listed on the National Register of Historic Places for several years. I am enclosing copies of an archaeological survey of the coastal zone by Roberta S. Greenwood and the nomination form submitted for the National Register application. As a National Register district, there are certain restraints on development by public or publically regulated agencies, such as utility companies according to the National Historic Preservation Act of 1966 and Executive Order 11593. Details of these regulations can be obtained from Mr. William Seidel, Office of Historic Preservation, P. O. Box 2390, Sacramento, California 95811 (ATSS 8-485-5006).

Please note the presence of several large archaeological sites at the mouth of Rattlesnake Canyon for which preservation or mitigation would be required and the upper portion of the canyon, which has never been surveyed for archaeological sites. I hope that you find this letter useful.

Sincerely,

Robert L. Hoover

Robert L. Hoover

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The existence of the National Register District was noted in the DEIS.

2207 Carroll Street
Apartment 3
Oakland, CA 94606
415+451-3714
1 May 1978

Federal Energy Regulatory Commission
Department of Energy
Washington, D.C. 20426

ref: OPPR-PCCP/EEB
Western LNG Terminal Company
Western LNG Terminal Associates
Docket No. CP75-83-2

Draft EIS for the Western LNG Project (VOL II)

Thank you for sending a copy of the Draft EIS for review and comment.

Additional archaeological investigations and evaluations of the contemporary heritage significance are needed for certain specific areas named in the Draft EIS. These include the area potentially impacted by the erection of the terminal powerline, the area potentially impacted by the railroad route, the area to be specifically impacted by the pipeline right-of-way, and the 200 acres needed for pipe storage, equipment storage, work areas and metering facilities.

Comment reflected in Section I of Volume II of the FEIS.

The irreversible and irretrievable impact of the project upon contemporary Native-American heritage values should be acknowledged.

Comment reflected in Section B-10 of Volume II of the FEIS.

The potential site specific impacts of all of the alternative pipeline routes, west coast LNG sites and access routes upon the cultural environment, archaeology and related remains and scientific features must be considered.

This level of detail for every alternative site would be impractical and unwarranted. If an alternative site became the proposed site, this level of detail would be done.

Will the project impact paleontological deposits or non-cultural remains and features of importance to understanding past human activity?

Staff is unaware of potential impact to unique paleontological resources.

Full compliance with the National Historic Preservation Act of 1966 and Executive Order 11593 in the manner stipulated in 36 CFR Part 800 must be demonstrated in the Final EIS.

This is a legal determination which is beyond the scope of the FEIS.

I appreciate the opportunity you have given me to comment on this undertaking.

Sincerely,
Clyde E. Kuhn

LEAGUE OF WOMEN VOTERS

OF SAN LUIS OBISPO, CALIFORNIA

June 2, 1978

Kenneth Plumb, Secretary
Federal Energy Regulatory Commission
Washington, D.C. 20426

Re: OPPR-PCCD/EEB
Western LNG Terminal Co.
Pacific Gas LNG Terminal Co.
Western LNG Terminal Assoc.
Docket No. CP75-83-2

Dear Mr. Plumb:

The League of Women Voters of San Luis Obispo has the following comments on the Western LNG Project Draft Environmental Impact Statement, Volume 11-CP 75-83-2.

Our comments will be confined to the discussion and analysis of the Rattlesnake Canyon Alternate site and to those relevant parts of the DEIS evaluation of the Point Conception site.

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GENERAL COMMENTS

We found that many of the comments in the DEIS were too brief to adequately describe the site and its suitability as an LNG terminal site. More details are needed.

In some cases, we suspect that preliminary reports, particularly those generated by the California Coastal Commission were used, which since the release of the DEIS have been revised. We still find fault with these reports but find the revisions better than the preliminary reports. However, it is the obligation of the DEIS to provide an independent assessment of other agencies' reports. We find no such independent evaluation in the DEIS.

In some cases, we feel that local governmental agencies should have been consulted rather than relying on less immediate agencies

No response required.

particularly with respect to land use and planning.

SPECIFIC COMMENTS

Geology

DEIS p. 289: "This site is more level than Point Conception and would require less site preparation."

Western LNG's estimate that Rattlesnake Canyon will require the removal of 2.2 million cubic yards of excess offsite cut and fill disposal (55,000 truck trips), while at Point Conception no offsite disposal will be required, should be investigated.[1]

The statement is still true. The relationship about truck trips is irrelevant. In fact, if the applicant agrees to the CPUC recommendations, offsize disposal will also be required.

DEIS p. 289: "The Hosgri Fault, an active fault capable of a magnitude 7.5 earthquake, passes about 3.5 miles offshore."

The nature of this fault is under dispute: "A comparison of the critical points concerning the Hosgri fault shows that there is a disagreement on the following points:

- presence or absence of large scale horizontal right lateral displacement
- extention of the fault north of Point San Martin or south of Point Sal
- recency of movement.

Additionally, it should be noted, that the data base...is not presently complete enough to resolve the major question."[2]

There is also incomplete data and disagreement about the significance of portions of the Santa Ynez fault system. The point is that, for purposes of comparison, the Rattlesnake Canyon and Point Conception sites are quite similar with respect to proximity of major faults.

There is some discussion that the MCE may be greater than 7.5.[3] Evidence on both sides of the question will be heard at the Diablo Canyon Nuclear Power Plant Licensing Hearings in Fall, 1978 (Docket 50-275 and Docket 50-323).

The Final EIS should contain a more complete analysis of the Hosgri fault, noting the incomplete data and the disagreement over the nature of this fault system.

We also note the different ground acceleration levels from Woodward-Clyde (.5g) and Slosson and Associates (.62g);[4] this conflict needs to be resolved in the Final EIS.

DEIS p. 289: "A substantial breakwater would be required because of oceanographic conditions which are more severe than at Point Conception."

In addition to the breakwater, extensive blasting of underwater pinnacles will be necessary to create a channel clear of obstructions for ships. The extent of blasting will depend on the final breakwater design selected. If the Western LNG breakwater design is selected, 1.6 million cubic yards will need to be blasted;[5] less blasting is estimated for the latest J.J. McMullen breakwater design.[6] The Final EIS should take into account the costs and environmental impacts of the underwater blasting that will be necessary depending on breakwater design.

Estimates of the environmental and economic cost of breakwater installation and channel clearing were included in staff's DEIS.

DEIS p. 290. The DEIS does not mention landslides, expansive soils and ground water seepage. Slosson and Associates notes that "non-seismic geologic hazards that can be anticipated within the site (Rattlesnake Canyon) include gully or barranca erosion, slope failure, expansive soils and terrace materials."[7] Woodward-Clyde discuss active landslides at the seaward margin of the coastal terrace in the southern portion of the site.[8] The Final EIS should discuss these geologic hazards fully.

Comment reflected in Section H-2d of Volume II of the FEIS.

Oceanography

DEIS p. 290. The DEIS evaluation is based upon the California Coastal Commission's (CCC) preliminary studies for its onshore LNG terminal site selection study. The final CCC maritime conditions studies are now available and we assume the final EIS will use this

The FEIS has been updated to reflect the final CCC studies.

material and, therefore, our comments will be based on the updated maritime conditions studies.

a. Berth Availability - The CCC study's final J.J. McMullen and Associates (JJMA) report concludes that "maritime operating conditions at the Rattlesnake Canyon site are very unfavorable to LNG carrier operations due to the general wave and wind environment and to the presence of natural hazards to navigation; - A major breakwater would be required .... and removal or adequate working of hazards to navigation".[9]

There is a 70% probability of one 3-day tanker delay for 4 months a year and a 50% probability for 8 months a year even with a breakwater, based on average wind, waves, and visibility data.(page 3-62, Figure 3.2.2-4). Based on three storage tanks, one 3-day delay is enough to interrupt California gas supply. These probabilities from the final report are much more optimistic than those in the draft report, distributed one month earlier, but the difference is not explained.

The JJMA report recommends an extensive breakwater at an approximate cost of $ 173 million.[10](page 3-92) But this figure does not include the costs for the 4,800 foot trestle running from the berth to shore.

To enhance site feasibility the CCC report postulated a 50% increase in storage tank capacity to provide for 4½ day site endurance. However, the impacts of this increase in capacity are not explored. Additional ship trips may be needed annually to keep the tanks filled or the total number of trips may remain the same, but be made within a shorter time frame. Since plans now call for a ship every other day, more frequent arrivals may necessitate an added berth which would require extending the breakwater and the trestle. McMullen indicates that even with a breakwater, there is

a 50% probability of a 4½ day delay from May to August.[11] The DEIS must include the trestle costs, expanded storage costs and additional costs that may be generated by expanded storage capacity.

Finally all downtime figures are averages, and as such may hide significant impacts such as the distribution of projected downtime within the month or the length of significant downtime periods.

Further, the CCC's document, "Impact of Delay", indicates that berth availability at Rattlesnake Canyon may be limited to daylight hours. Also in a letter to the CCC, April 12, 1978, the Nuclear Regulatory Commission (NRC) stated "The hazards of LNG tanker spills have been estimated by some authorities to persist to distances of up to 20 km under particularly adverse conditions. For lesser distances, it would be necessary to restrict the LNG traffic during those periods when such adverse conditions prevail." Further clarification of "adverse conditions" should be sought from the NRC. However, the DEIS must consider these operational restrictions on the Rattlesnake Canyon site when evaluating its potential for LNG operations.

There is a final question concerning berth availability that is underscored by this information, that has not been dealt with by the DEIS. That is - At what point does the persistence of probable downtime become sufficient to eliminate a proposed site from consideration as an LNG terminal ?

b. Data Sources - The CCC's basic information used to analyze maritime conditions and to project berth availability is not site specific and is subject to great question both in terms of its relevancy to the site and to the methods of analysis.

There are three major sources of wave data for Rattlesnake Canyon and two sources strongly qualify their conclusions. One source, "Preliminary Evaluation of Wind and Wave Effects at Potential LNG Terminal Sites, State of California",[12] is based on wave data

from the DNOD wave station at Lion Rock, over 4 miles from Rattlesnake Canyon and is extrapolated to the Rattlesnake Canyon site. However the report states, "The computations which have been performed are site specific; i.e., they have been determined by utilizing the situations unique to that one particular location, and the results should not be extrapolated far beyond the respective site, if at all."[13]

The second report is Miscellaneous Paper H-78-2, Appendix A, to the above report.[14] Appendix A raises doubts about the DNOD singular wave model statistics. Page 48 states, "In recent weeks serious questions have arisen concerning the absolute magnitudes of the wave heights displayed in the DNOD singular wave model statistics. As a means of verifying the FNWC singular wave data as presented by DNOD, Strange compared one month of DNOD data to the FNWC spectral hindcast for that same month and also compared a number of severe storm events to the DNOD hindcast for that particular period."

"22. The two different approaches resulted in an enormous gap in predicted wave heights with the spectral heights being, on the average, 182 percent greater than the heights computed using the singular wave method. The conclusion by Strange was that the DNOD predicted wave heights are far too low, since known events failed to show up at all in the DNOD statistics and the wave heights appeared consistently and dramatically lower than the spectral height."

"23. Most knowledgeable researchers agree that the spectral approach is significantly better than the singular approach. In fact, the Waterways Experiment Station is presently engaged in a 5 year wave hindcasting program....the data results for the coast of California will not be available until the latter part of 1979; hence it is not possible to delay the selection of the LNG tanker terminal site until these comprehensive data become available. Thus the only

alternative is to proceed with a relative analysis based upon the best information presently in existence, and to realize and acknowledge that the absolute results may differ from the relative values so obtained."

A third wave source for Rattlesnake Canyon is the U.S. Navy Fleet Weather Facility Climatological Study for the Southern California Operating Area. The study contains observations for ½ degree quadrangles along the California Coast but Rattlesnake Canyon was not within one of the quadrangles and an extrapolation was made.[15]

The DEIS must deal with the question of the sufficiency of this information for planning LNG carrier operations, especially for a site like Rattlesnake Canyon which is characterized by a rocky coast, high winds and waves and poor visibility. The DEIS must provide an independent evaluation of the appropriateness of all sources of maritime data and the reliability of all extrapolations. The conditions evaluated must include winds and visibility as well as wave data and must take into account the microclimatic conditons of the Central California coast where such conditions can change rapidly within short distances and may vary seasonally.

The staff believes that the CCC data and other data used by staff are representative of the Rattlesnake Canyon area and can be used for alternative site analysis. Site specific data would be extremely helpful but this level of detail for a site not formally proposed for construction is not necessary.

Vegetation

DEIS p. 293 "The possibility of a seawater exchange system with the nuclear power plant has been considered by staff, but extensive pipeline construction would be required, and the project may not prove to be biologically beneficial."

The California Coastal Commission has included a seawater exchange system as a mitigation measure for adverse effects of the cold water plume on marine resources at Rattlesnake Canyon. They propose a pipeline along the coastal terrace to the nuclear plant 4 miles away. Since this is a condition placed on Rattlesnake Canyon by the California Coastal Commission, the impacts on the coastal terrace should be discussed in the final EIS.

Comment reflected in Section H-2d of Volume II of the FEIS.

DEIS p. 293 "Approperly designed cold water outfall from the LNG terminal would probably have little adverse effect on marine

plants, particularly since many species present here are adapted to colder northern waters."

The essential question is not whether they are adapted to colder northern waters but whether they are adapted to changes in temperature. California Public Utilities Commission consultant A.D. Little contends that the diurnal temperature range "is a better indicator of the environmental impact of the cold water plume", and suggests that organisms will encounter water temperatures outside their normal daily range 39% of the time.[16] The Final EIS should discuss the effects of the cold water plume in light of the normal daily range of the site.

Comment reflected in Section H-2d of Volume II of the FEIS.

Wildlife

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DEIS p. 294. "The coastal strand and bluffs are extensively utilized by many species of birdlife."

Further consideration needs to be given to the species which breed in the area and their vulnerability to disturbance during nesting. The California Department of Fish and Game report that pelagric cormorants nest at Point Buchon; this colony is one of the largest colonies in the central and southern California area. There is also a colony of Brandts cormorants which is the most southerly mainland breeding population for this bird.[17] Both species use the waters of the site for feeding. Also the endangered California brown pelican is a winter migrant in this part of the coast. The Final EIS should give a more detailed description of the kinds of birds present, their utilization of the site and surrounding area and their vulnerability to disturbance.

Comment reflected in Section H-2d of Volume II of the FEIS. The staff believes that a LNG terminal could be constructed without significantly impacting the nesting colonies.

DEIS p. 294. "Seals and sea lions also occur offshore in the vicinity of this alternative site. Although the site is outside the principal range of the sea otter, the animal does occur offshore."

Comment reflected in Section H-2d of the FEIS.

The Final EIS should reflect actual population numbers. The California Department of Fish and Game reports a population of from 50 to 60 harbor seals in the vicinity with important haul out sites all along that coast.[18] The mean number of sea otter ranges from 26 to 126 depending on the survey.[19] Sea lions are thought to breed at Lion Rock and as many as 500 sea lions have been seen on Pecho Rock near the site. With the experience gained at Diablo nuclear plant, it is anticipated that the seals will not return to the area once construction takes place. The Final EIS should reflect these impacts.

Comment reflected in Section H-2d of FEIS.

A.D. Little, consultant for the California Public Utilities Commission ranks the alternate sites with respect to Terrestrial Biology. Sites are ranked from low impact to high impact: Oxnard, Camp Pendleton, Point Conception, Las Varas, Rattlesnake Canyon, etc., assuming the Gosford pipeline route from Rattlesnake Canyon is the most feasible.[20]

Staff ranked the alternative sites in Table 51 of the DEIS.

They also rank the sites with respect to water quality and marine biology from low impact to high: Oxnard, Camp Pendleton, Las Varas, Tajiguas, Point Conception, Guadalupe Dunes, Rattlesnake Canyon.[21] They base this ranking on the fact that "there are more sensitive animals to be impacted, and all of the potential impacts are more likely."[22] Not only will there be interference with reproduction, cold water plume impacts, and disturbances associated with other sites but unfavorable sea and navigation hazards increase the risk of toxic spills.

Staff ranked the alternative sites in Table 51 of the DEIS.

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Land Use

DEIS p. 295. "There is very little development seaward of a line from Morro Bay through San Luis Obispo to Avila Beach."

This statement fails to take into account small land holdings

and apple farms in See Canyon, new development along the access road from Highway 101 to Avila Beach and other development in the immediate area of Avila Beach. In addition, depending on where such a line is drawn, portions of San Luis Obispo, Baywood Park and Los Osos may be included.

Comment reflected in Section H-2d of the FEIS.

DEIS p. 295. "The site would be served by a private access road previously constructed by PG&E."

There is an implication here that the single access road provides complete security. However, there are four access easements on the road. If the easements are exercised extensively in the future, the PG&E Diablo security gate may have to be moved.

The private access road merely limits the amount of potential traffic in the vicinity of the site. It is not proposed as a direct security measure.

DEIS p. 295. "The 1975 California Coastal Plan makes no recommendations for this stretch of coastline."

This statement is based upon a 1975 State document. A new document, The Local Coastal Program is in the process of being approved by the California Coastal Commission and in fact, both the Regional Coastal Commission and the local government have approved this document. The San Luis Obispo County local Coastal Program (Feb. 1978) states that the "unique and scenic character of the study area has been noted in the Open Space Plan, with a need indicated for policies to protect scenic quality south of Diablo Canyon;"[23] and that in the County Recreation Element this area is suitable for "general scenic viewing, fishing, riding and hiking, science and education."[24] The 1,600 acre parcel between Diablo Canyon and Point San Luis is designated by the Open Space Plan as "Scenic Restrictive". Thus the industrial activities of an LNG terminal conflict with County planned land uses. In fact, LNG activities may conflict with those at Diablo Canyon, 4 miles away, since ship movements, support vessel traffic, supply deliveries ,

The local coastal program quoted is the San Luis Obispo County Work Program which is designed to identify every coastal issue which may arise. Other sections of the document acknowledge this area's designation as a possible LNG terminal as well as noting that PG & E may acquire the Marre Ranch, which would "increase the potential for industrial and energy development . . . ." The local coastal program, when approved, will provide valuable land use information; however, this is not expected for several years.

etc., are of a different nature than a nuclear power plant.

It must be remembered that the area surrounding Rattlesnake Canyon is a wild, unspoiled, scenic coastal terrace from which Diablo nuclear plant is not visible.

Recreation

DEIS p. 296. "A 12-mile stretch of coastline bordering Diablo Canyon (including the site area) is virtually devoid of recreation facilities."

The Fields Ranch between Point Buchon and Diablo nuclear plant (see map) is being considered by the California State Parks and Recreation Department for acquisition for preservation and recreation.

Comment noted.

DEIS p. 296. "The entire shoreline in the Avila Beach area is a popular summer recreation area."

Due to the sheltered nature of this beach, Avila Beach provides year-round recreation used by an estimated 1 million people/year. It is the only sheltered beach on this section of the coast, providing low cost recreation to county residents and tourists alike. In addition the area supports a small boat harbor and is used for both recreational boating and fishing. Estimated seasonal daily recreational population ranges from 7,300 in the summer to 2,050 in the winter. In the immediate area is San Luis Bay Club with golf course, hotel, swimming pool and tennis courts, used by additional people. At Mallagh Landing south of Avila Beach there is another small beach which is used as a secluded bathing area by the public. The statement in the DEIS does not adequately reflect the importance of this recreational area or the fact that its use is not confined to summer but is year round.

Comment reflected in Section H-2d of the FEIS.

FIELDS RANCH
P.G.&E. DIABLO
POWER PLANT
MARRÉ RANCH
LNG TERMINAL
POTENTIAL SITE
PT. BUCHON
STUDY AREA
BOUNDRIES
N
SAN
LUIS

Access from Highway 101

The DEIS fails to note that there is only one road into the Avila-Port San Luis area and thus this road is the only entry to Diablo Canyon and the Rattlesnake Canyon site. This is a two lane road constrained by cliffs and San Luis Creek, and between Avila Beach and Port San Luis the road is constrained by cliffs and the beach. According to the Local Coastal Program "high recreational use at peak hours may limit the capacity of the road to serve additional development."[25]

On weekends the Port San Luis parking lot is often filled beyond capacity. The shoulders of the access road are used for parking and road capacity is diminished.

The dilemma caused by the large recreation population and the limited access road is: How to provide for the evacuation of the population in a half hour given an LNG accident at Rattlesnake Canyon and a vapor cloud traveling 5 miles an hour. Widening Avila Road would require extensive cutting and damage to creek and beach. Increased capacity for evacuation would serve to attract more daytime population to this already popular shoreline. The only solution would be an aggressive program of restriction of the recreational use of Avila Beach and harbor facilities. The Final EIS should investigate this dilemma and explore mitigation measures.

There are several possibilities for alternative routes into the plant site which would avoid Avila Beach. This would eliminate the problem of construction traffic on the road, which is the main disadvantage of the two lane road which staff explored. Vapor cloud and risk analysis are addressed in other sections of the FEIS.

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Aesthetics

DEIS p. 296. "The site would only be visible to private citizens from a few limited locations."

The current J.J. McMullen breakwater design makes berth and trestle visible south of Point San Luis and Pismo Beach.[26] If additional berths are required and a longer breakwater further out in the ocean needed, this facility could become more visible. Although

Comment reflected in Section H-2d of the FEIS.

visibility from Montana De Oro State Park is compromised by Diablo Nuclear Plant this is not a legitimate argument for including another facility with greater visual impact within the viewing area. With the acquisition of the Fields Ranch more opportunity for public viewing will be available. The Final EIS should note these visual impacts.

Socioeconomic Considerations

DEIS p. 297. "The combined effect of the nuclear power plant and the proposed LNG terminal might produce significant expansion of existing local towns, in turn necessitating the expansion of existing social services."

There needs to also be a discussion of the impacts such growth will have on the loss of prime agriculture land and the change in character of these small communities, not only along the coast but further inland (like Arroyo Grande). Currently San Luis Obispo County's growth rate is 3.8% as compared with 1.8% for the state as a whole, with most of the growth occurring in the unincorporated areas (6.8%), Arroyo Grande (5.7%), and Grover City (4.5%).[27] Added pressure from construction and operation at Rattlesnake Canyon will impact these areas further. These impacts should be discussed in the Final EIS.

The level of detail suggested by this comment is beyond the scope of the present EIS. Because this is an assessment of an alternative site, a lower level of detail is used in the analysis. If Rattlesnake Canyon were considered at a later date as a proposed site a more detailed estimate of the socioeconomic impacts and mitigating measures would be required.

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Archaeological

DEIS p. 297. "The scientific significance of the cultural sites at Rattlesnake Canyon cannot be known until they have been tested, but it is unlikely that they would be more significant than those at the applicant's proposed sites because of the historical records, the known intensity of interaction along the Channel Coast and the spiritual importance of the Point Conception areas."

Comment noted.

It is because of the minimal "historical records" and the lack of "known intensity of interaction" that the sites like those at Rattlesnake Canyon are particularly valuable for preservation for future excavation as new techniques are developed. Much more information on Native American culture is available for the Santa Barbara area. Of equal importance are the transition zones (such as San Luis Obispo County) between such cultures.

Comment noted.

In addition, comparison of sites should not be made on total numbers of sites, but on a comparison of the number, extent and site type which will be destroyed if construction takes place; the amount of room available for alternate location of facilities and cost of excavation.

Site comparisons were based on known data, which staff agrees are not well developed in the Rattlesnake Canyon area.

Disruption to sites along the coastal terrace, if a water exchange system between LNG and Diablo is used, should be discussed and considered in the Final EIS.

Staff does not consider a seawater exchange with nuclear facility as a serious possibility.

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Air Quality

DEIS p. 297. "This part of the county is designated a "non-attainment area" for POx".

Comment reflected in Section H-2d of Volume II of the FEIS..

The entire county has been designated nonattainment for oxidants.

DEIS p. 297. "The nearest air monitoring station is located in San Luis Obispo, about 12 miles northeast of this site."

The nearest and most appropriate air monitoring station is located in Arroyo Grande, southeast of the site. However, not all pollutants are monitored in Arroyo Grande and baseline data is spotty.

Ibid.

DEIS p. 300. "The impact of an LNG facility at this site on regional air quality would be insignificant."

The report fails to discuss cumulative effects of this project on air quality. The DEIS only addressed the impacts of the project itself and does not take into account those generated in conjunction

This level of detail would be accomplished at such time that the alternative site became a proposed site.

with previous projects, other concurrent projects, or probable future projects.

The Final EIS should also take into account the growth inducing aspects of the project which will also impact air quality.

Indirect impacts on air quality are discussed in Section C-11a of Volume II of the FEIS.

Noise

DEIS p. 300. "In the absence of any nearby residence or noise sensitive areas, the plant would have a negligible impact on noise quality."

The DEIS fails to take into account the noise generated by underwater blasting. (For the Western LNG breakwater it is estimated 1.6 million cu. yards for a minimum 50' water depth -- chart from WLNG. There are no estimates available for the blasting required if the J.J. McMullen breakwater design is used.) Nor does the DEIS take into account the noise impacts on Avila Beach and other popular recreational areas.

Noise from underwater blasting would have only a temporary impact on noise quality. Avila Beach, located over 3 miles from the alternative site, would be negligibly impacted by operational noise.

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Comparison of Impact

DEIS p. 337. The League of Women Voters feels that the more detailed analysis outlined in our previous comments on Rattlesnake Canyon will change this comparison.

No response required.

Attachment A. ANALYSIS OF THE RISK TO THE PUBLIC. (DEIS p.381)

We are especially concerned with safety because the tankers to be used will be significantly larger than those in current use (50,000-75,000m^3 vs. 125,000m^3) and the amount of LNG transported to the proposed facility will be much greater than at other facilities. There are 25 small tanker trips annually at Everett, Mass., while 166 to 186 large tanker trips annually are proposed for

the California terminal. According to Transportation of Liquified Natural Gas, Office of Technology Assessment, 85% of all maritime accidents occur because of human error and LNG crew education and training are significantly lacking.

No response required.

We are concerned about the assumptions and omissions in the technical reports with respect to spills and risk assessment. Detonation in unconfined spaces is not considered, and explosions in confined areas are omitted. Risk assessment doesnot take into account small failures, yet "major safety related incidents have been traced back to seemingly insignificant failures of sub-components in complex systems" according to California Energy Trends and Choices, Vol. 4, Fossil Fuel Supply Issues, State Energy Commission.

Detonation in unconfined spaces is not a realistic assumption. Explosions in confined areas would be limited to the plant terminal.

This report also refutes many of the assumptions used in LNG Risk Assessment (pages 108 to 143) and Dr. V. Fairley; Associate Professor of Statistics at Harvard, says, "A risk that can be expressed as a small number is not ipso facto an acceptable risk" (same report, page 122). We are concerned about reliance on such disputable risk/spill data because detonation and/or a major vapor cloud spill/fire could produce major devestation.

No response required.

DEIS page 386 - Annual Probability of an LNG Tanker Accident.

The DEIS uses U.S. Coast Guard Information to assess tanker casuality, however, Human Error in Merchant Marine Safety, the National Research Council, 1976, concluded that U.S. Coast Guard data is inadequate for such analysis.

Staff seriously doubts that U.S. Coast Guard accident data is inadequate for risk analysis. The fact that other sources of data exist results in better analysis, i.e., more data generally results in more accuracy. It should be noted,however,that staff uses both USCG and worldwide data in the risk assessment.

The LNG Tanker and Cargo - Considerations of Casualty Circumstances and Ship Salvage, Alex Rynecki, suggests that Lloyd's Register of Shipping is perhaps a better source. The Rynecki

analysis is based on Lloyd's Register "Serious Casualties to Tankers and OBO's of 50,000 Tons Deadweight and Over 1967-1976 Inclusive", and states "that incidents involving large ships have occurred at the rate of over one per month for the last eleven years. 27 have resulted in total losses and fully 10% of the casualties were sustained by ships while moored". Further, 44% of the ships involved in incidents were less than 10 years old. Many of the ships were "beset by a series of incidents in sequence which caused the ultimate loss, such as fire-explosion-foundering....".[28]

DEIS page 386 "this study...is based on a one-tank spill". The Atomic Safety and Licensing Appeals Board Decision, 6NRC 229 (1977) stated that in "the event of a collision which results in a single tank LNG spill and fire ... the likelihood and consequences of the subsequent involvement of the entire LNG cargo should be considered".

The Final EIS should consider involvement of the entire cargo.

Previously discussed on pages 402-410 of Volume II of the DEIS.

DEIS page 412 - Risk to the General Public.

This section of the DEIS fails to account for unique Rattlesnake Canyon conditions.

The Avila Beach area and the Point San Luis area, within 4 miles of Rattlesnake Canyon, have small residential populations, but have large daytime recreational populations that vary seasonally. These daytime populations must be taken into account. Based on San Luis Obispo County figures there were an estimated 996,400 people at Avila in 1977. The 1977 peak figure at Avila was 12,000 people; at Port San Luis, 8,000 people. The DEIS bases its result on a small residential population that would have time to enter shelters or to

The risk estimates in Attachment A are based on receptors located nearest to the tanker route and therefore exposed to the greatest risk. All population within the path of a flammable vapor cloud are assumed to be fatalities--no credit is offered for evacuation of shelters.

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escape from ignited structures without harm. It also assumes 80% of the population will be indoors. It is unlikely that a large beach population could find shelter at Avila Beach or Port San Luis. It also seems unlikely that they could escape from structures without harm, not only from fire but from possible mob reactions. Evacuation of the area within the necessary time may be unlikely because of the limited capacity of the two lane access road.

The 80 percent indoor factor only applies to exposure from an LNG pool fire which does not affect the population on land at this site. Avila Beach and Port San Luis are located greater distances from the tanker route and therefore would experience loss risk.

The United States Office of Technology Assessment estimates that an LNG vapor cloud can drift from 1 to 50 miles; the NRC recognizes 12 miles as reasonable.[29] The shape of the cloud will be influenced by land forms and the distance it travels will depend on local conditions of weather and geography. Portions of the cities of Pismo Beach, Arroyo Grande and San Luis Obispo, as well as several unincorporated communities and numerous pockets of unincorporated development lie within 12 miles of the site, An estimated 50,000 people reside within 10 miles of the Rattlesnake Canyon site, and there are an estimated 340,000 to 874,000 people monthly at the several state parks within 10 miles of the site according to the San Luis Obispo County Planning Department.

Risk estimates in Attachment A represent the highest risk areas.

The Final EIS evaluation of an LNG site must include consideration and protection of the entire population within a potential danger area of the site.

Staff agrees.

Also the DEIS does not take into account possible damage to the Union Oil storage facility, including the several tanks, nor to the power net at the Diablo Canyon nuclear facility once it is operating. Damage to these facilities might drastically increase personnel and property damage.

Staff's analysis conservatively assumes that 100 percent of the population located in the path of a vapor cloud would be fatalities. The population located near an oil storage facility and in the path of a vapor cloud would be counted as fatalities, regardless of the mechanism.

Nor is mention made of the safety problems connected with the

close proximity of Rattlesnake Canyon to Diablo Canyon nuclear plant 4 miles away. The Nuclear Regulatory Commission has questioned the adequacy of this four mile buffer. Although at first glance it might be thought that the Irish Hills provide a natural safety barrier, they in fact also serve to restrict dispersal of vapor cloud and, depending on the wind direction, help to funnel the cloud toward the recreational area of Avila Beach or Pismo to the southeast; or funnel the cloud along the shore line to the northwest and the nuclear plant.

Operational safety requirements to insure compatibility with the Diablo Canyon nuclear plant would be investigated in detail at the time the alternate site becomes a proposed site.

The NRC has also noted in a letter to the California Coastal Commission, April 12, 1978 (exhibit 00843) that "even if that terminal were so designed and situated that it did not place a direct hazard to a nuclear power plant, (it) could bring with it the increased possibility of the close approach by LNG tankers or flammable gases released from these tankers." They suggest that there may be a need to restrict tanker traffic during periods of adverse wind conditions. They suggest that the problem be avoided by selecting an LNG site further away from existing reactors.

Comment noted.

Also, the DEIS does not consider detonation or explosion, although there is a dispute among experts over the possibility of an explosion in unconfined areas. Monte Canfield, Jr., GAO, in testimony before the House Subcommittee on Energy and Power Committee on Interstate and Foreign Commerce indicated that more work is needed on the topic of under what conditions LNG clouds can detonate. We understand that new research (Document reference DOE-EV-002 NTIS) states that a methane air detonation

Attempts to initiate explosion or detonation of an unconfined vapor cloud have been unsuccessful.

was produced in a condition representing a partially confined cloud.

The DEIS risk study examines risks at one point in time. However, we suggest that a more realistic appraisal of the project would result from a cumulative risk assessment study covering the life of the project.

We trust the above comments will be addressed in the Final EIS.

Sincerely yours,

Lauretta Rice

Lauretta Rice, President
San Luis Obispo League of Women Voters

Janet S. Kourakis

Janet S. Kourakis, LNG Consultant
San Luis Obispo League of Women Voters
1577 Tanglewood Drive
San Luis Obispo, California 93401
805 544-6219

The individual risk estimates apply to the life of the project.

FOOTNOTES

1. Western LNG Associates, "Impact of Delay", submitted to the California Coastal Commission for their Onshore LNG Terminal Project, 1978, see chart,"Differing Environmental Factors"

2. Slosson and Associates, Environmental Geology and Seismic Analysis, Alternative Sites, Vol 1-B, Prepared for the California Public Utilities Commission, Page RC-38, March 31, 1978

3. Slosson and Associates, Environmental Geology and Seismic Analysis Alternate Sites, Vol. 1-B, Addendum to Appendix A, Prepared for the California Public Utilities Commission, Page3, March 31, 1978

4. California Public Utilities Commission, LNG Task Force, "Alternate Siting Report", 1978 ,

5. Western LNG Associates, Op. cit., see chart, "Differing Envir. Factors"

6. California Public Utilities Commission, LNG Task Force, Op. cit.

7. Slosson and Associates, as cited in Footnote 2, Page RC 31

8. Woodward - Clyde, Geotechnical Evaluation of Five Potential Mainland California LNG Import Terminal Sites, prepared for the California Coastal Commission, San Francisco, California, April 28, 1978, Page I-2

9. John J. McMullen Associates, Inc., Maritime Factors Analysis, Onshore LNG Facility, prepared for California Coastal Commission, San Francisco, California, Page 1-2

10. Ibid, page 3-92

11. Ibid, Figure 3.2.2-4

12. Hales, Lyndell Z., Preliminary Evaluation of Wind and Wave Effects At Potential LNG Terminal Sites, State of California, prepared for California Coastal Commission, San Francisco, Calif., January, 1978, Page 165

13. Ibid, Page 165

14. Hydraulics Laboratory U.S. Army Engineer Waterways Experiment Station, Miscellaneous Paper H-78-2, Preliminary Evaluation of Wind and Wave Effects At Potential LNG Terminal Sites, State of California, Appendix a An Evaluation of the Relative Wave Climate At Five Onshore LNG Sites Considering Island Influences and Topographic Effects, Prepared for the California Coastal Commission, San Francisco, April, 1978, Page A8.

15. John J. McMullen, Op cit. Page F-4

FOOTNOTES continued

16. Arthur D. Little, Inc., Alternative Site Analysis Las Varas/ Rattlesnake Canyons Sites Supplement, Technical Report Number 23 In support of the Point Conception LNG Facility DEIR, report to The Public Utilities Commission State of California, April, 1978, Page 41

17. Ibid, Page 33

18. Ibid, Page 32

19. Ibid, Page 33

20 Ibid, Page 169

21. Ibid, Page 166

22. Ibid, Page 166

23. San Luis Obispo County Planning Department,"Local Coastal Program," San Luis Obispo County, February, 1978, Page 45

24. Ibid, Page 21

25. Ibid, Page 48

26. California Public Utilities Commission, LNG Task Force, Op. cit., Page 11-62

27. Telegram-Tribune, San Luis Obispo County, May 21, 1978

28. Alex Rynecki and Robert P. Umbdenstock, The LNG Tanker & Cargo -- Considerations of Casualty Circumstances and Ship Salvage, 3030 Bridgeway, Sausalito, California, undated

29. Congress of the United States, Office of Technology Assessment, Transportation of Liquefied Natural Gas, Library of Congress Catalog Card No. 77-600048, September, 1977 Chapter II, Page 66 for discussion of vapor cloud drift. Also see U.S.A. Nuclear Regulatory Commission Atomic Safety and Licensing Appeal Board, 6NRC 229 (1977), Page 242

To whom it may concern,
I think the proposed site (Cojo Point on Point Conception) for the Liquified Natural Gas terminal facility is very wrong!

This land of the Bixby and Hollister area is the last of its kind in the Southern to Central Calif. Coastal Region. To put an L.N.G. facility here would eventully destroy this sacred place.

Recently researching this project, I have found that there are more dangerous Con's than energy helping Pro's, by finding an article based on the impact to human!! animal and the environmental life of the proposed site. Plus the fact that the proposed site is right over a earthquake fault line, maybe mother nature is trying to tell you something?
So I ask you Please!!! redirect

Comments noted.

your attentions to save this indan-
-gered speicies and try to preserve
it.

Thank you for listening.

Thomas Liom

6/13/78

(1)

RECEIVED
JUN 15 11 21 AM '78
FEDERAL POWER COMMISSION

Dear Sirs,

Please help us here in California. We are trying to preserve Point Conception in its near perfect natural state while Western L.N.G. terminal Associates are trying to destroy it with an facility at that location.

The need for L.N.G. should first be resloved and then an alternate solution for a facility.

I feel we have had very little to say about where, when, why and how to find the best answers to the questions of where

203

Comments noted.

to put the L.N.G. terminal

Please help us find the right answer. I feel were getting a fast deal pulled over our eyes.

Thank You
John Wm. Lodin
5618 Fostoria St.
Bell Gardens Ca.
90201

7-8-78

TO: FEDERAL REGULATORY COMMISSION
WASHINGTON D.C.

DEAR SIRS,

I, AM WRITING AS A CONCERNED INDIVIDUAL REQUARDING THE PLACEMENT OF A LIQUID NATURAL GAS TERMINAL AT PT. CONCEPTION CALIFORNIA.

CONCERNED NOT FROM A BUSINESSMANS VIEW OR A SURFERS OR POLITITIAN OR CONSERVATIONIST BUT AS A HUMAN BEING INTERESTED IN OUR EARTH AS A LIVABLE PLANET FOR US AND OUR CHILDREN.

THROUGH THE YEARS SOCIETY HAS RESORTED TO EXTREMES IN SECURING ENERGY FOR THE FUTURE. ITS ABOUT TIME BUSINESSMEN AND POLITITIANS WAKE UP TO THE FACT THAT WE'RE HEADING IN THE WRUNG DIRECTION. GOING AFTER A MARKETABLE ENERGY PRODUCT BY REAPING THE ~~LAND~~ EARTH OF ITS RESOURCES WITH NO OR SUPERFICIAL CONCERN FOR THE LONG TERM EFFECTS THE EARTH OR ITS INHABITANTS MAY ENCOUNTER.

FROM THE BOTTOM OF MY HEART I ASK YOU AND PRAY THAT YOU WILL RECONSIDER YOUR SITE FOR LIQUID NATURAL GAS FOR THE FOLLOWING REASIONS.

Comments noted.

1. GOVERNMENT SEIZING PRIVATE LAND FOR PRIVATE INDUSTRY - UNCONSTITUTIONAL
2. THE PUBLIC NOT BEING GIVEN A VOTE ON LIQUIFIED NATURAL GAS TERMINAL ACT OF 1977.
3. INTRODUCING A PRODUCT THAT HAS NUMEROUS UNTESTED HAZARDS AND REPERCUSSIONS
4. NOT ENOUGH CONSIDERATION GIVEN TO OTHER SITES.

5. ENVIRONMENTAL HAZARDS AFFECTING ANIMAL AND PLANT LIFE - I.E. RECYCLED WATER DESTROYING BASIC FOOD CHAINS OR ACCIDENTAL OIL DISCHARGES FROM SUPERTANKERS

6. POSSIBLE EARTHQUAKE AFFECTING STORAGE TANKS RESULTING IN A MASSIVE EXPLOSION.

7. UNSUITABLE WEATHER CONDITIONS - I.E. WIND, VISIBILITY, WAVES, BASED ON PACIFIC WEATHER ANALYSIS INDICATES A YEARLY DOWNTIME FOR TANKERS OF 29.2%.

THE RANCH - PT CONCEPTION - COJO IS UNDOUBTABLY ONE OF THE MOST BEAUTIFUL PLACES ON EARTH.

PLEASE DON'T DESTROY IT

SINCERELY

John L. Malloy

C/O YALLINGUP P.O.
W.A.
AUST.

McHENRY & STAFFIER
ATTORNEYS AT LAW
SUITE 606
1140 CONNECTICUT AVENUE, N. W.
WASHINGTON, D. C. 20036

GEORGE W. McHENRY, JR.
JOHN R. STAFFIER

(202) 467-5880

June 8, 1978

Mr. Kenneth F. Plumb
Secretary
Federal Energy Regulatory Commission
Room 9310
825 North Capitol Street, N.E.
Washington, D.C. 20426

RE: Pacific Alaska LNG Company, et al., Docket Nos. CP75-140, et al. and Pacific Indonesia LNG Company, et al., Docket Nos. CP74-160, et al.

Dear Mr. Plumb:

Enclosed herewith for filing are an original and fourteen copies of the Comments of the Hollister Ranch Owners' Association and the Santa Barbara Citizens for Environmental Defense on the Draft Environmental Impact Statement issued by the Commission's Staff in the above-referenced proceeding.

Although it is my understanding that service of these Comments upon the parties is not required, I have, as a matter of courtesy, served copies upon the active parties, i.e., the Applicants, Pacific Gas and Electric Company, San Diego Gas and Electric Company, Chevron USA, the Commission Staff, the Bixby Ranch Company, the Sierra Club, the State of Alaska, Pertamina, and the People of the State of California and the Public Utilities Commission of the State of California.

Very truly yours,

John R. Staffier

Counsel for:
HOLLISTER RANCH OWNERS' ASSOCIATION
and SANTA BARBARA CITIZENS FOR
ENVIRONMENTAL DEFENSE

JRS:jcr

Enclosures

COMMENTS OF THE
HOLLISTER RANCH OWNERS' ASSOCIATION
AND THE
SANTA BARBARA CITIZENS FOR ENVIRONMENTAL DEFENSE
ON THE STAFF'S DRAFT ENVIRONMENTAL IMPACT STATEMENT,
PACIFIC ALASKA LNG COMPANY, ET AL.,
DOCKET NOS. CP75-140, ET AL.

Vol. II, Section A--Description of the Proposed Action, pp. 1-18.

p. 5, Figure 2:

As the Staff is aware, this figure no longer accurately depicts either the plant boundaries or the layout of the various facilities, since the Applicants have proposed moving the site approximately 1500 feet to the east and rearranging the layout of the facilities, in an attempt to avoid construction on major archaeological sites.

Comment reflected in Section A of Volume II of the FEIS.

p. 6:

Although a small boat harbor was deemed necessary for the protection of tug and line handling boats by the sponsors of the El Paso Alaska LNG project and was, therefore, proposed as part of the Point Conception terminal plan in that case, the Applicants in this proceeding do not propose to construct such a harbor.

Ibid.

p. 17:

Although the Applicants have not filed any applications on the Federal level proposing to expand their facilities beyond the 900 Mmcf/d capacity reflected in their present filings, they have made their intention to expand crystal clear. Indeed, they have formally sought State authorization for facilities with a capacity of 1.3 Bcf/d. In these circumstances, we believe that the Staff must assess in this proceeding the impact which will result from the construction and operation of the additional facilities necessary to expand the capacity of the LNG terminal from 900 Mmcf/d to 1.3 Bcf/d, despite the fact that these additional facilities are not now the subject of a FERC application. Consideration of the additional 400 Mmcf/d is of crucial significance in analyzing the feasibility of marine operations at Point Conception, given the severity of weather conditions there.

Previously considered throughout DEIS and page 17 of Volume II of the DEIS.

Vol. II, Section B--Description of the Existing Environment, pp. 19-140.

Subsection 1--Climate, pp. 19-27.

p. 19:

The Point Conception site is not subject to a land breeze/sea breeze regime. This is shown in the wind roses reproduced in Figure 7 on page 25, which demonstrate the predominance of offshore winds from the northwest quadrant. The wind regime at Point Conception is subject to gradient flow, rather than temperature induced diurnal reversal such as that found at the Santa Barbara airport.

Numerous references indicate that Point Conception, like a large portion of the southern California coast is subject to diurnal wind reversal (e.g., A. D. Little, Dames and Moore, California Office of Planning and Research). However, since the mass of air affected is relatively shallow (p. 19), it does not greatly affect the prevailing northwest winds.

pp. 19-20:

The wind data from Point Arguello, reproduced in Table 1 on page 20 is not representative of wind conditions at the terminal site. The Point Arguello data in that table was obviously collected at the Point Arguello Lighthouse which is located on the headland of the Point itself. Because of the high cliff on which the Lighthouse sits, the wind field at the specific location where the instrumentation is located is subject to "vertical eddying" which, of course, distorts all wind measurements. In additon, because the Lighthouse is located on the headland of the Point, its exposure is windward of the prevailing northwest wind flow. The Point Conception terminal site, in contrast, is leeward of the prevailing flow.

In addition to the Lighthouse, wind data has also been collected at the Point Arguello Life Boat Station. The Life Boat Station is located on the leeward side of the Point so that its exposure to the prevailing flow is similar to that at the terminal site. Accordingly, the Life Boat Station data is much more representative of wind conditions at the site than is the data collected at the Lighthouse. Attached hereto as Appendix A is a summary of approximately 9 years of measured data collected at the Point Arguello Life Boat Station, which was prepared by the U.S. Air Weather Service. It shoud be substituted for the Lighthouse data reproduced in Table 1. In addition, we would reference the Staff's attention to the following two technical papers which discuss in great detail, the air flow patterns at Point Arguello which result in stronger winds on the leeward side of the Point than on the windward side:

> Smith, T. B. et al., "Micrometerological Investigation of Naval Missile Facility Point Arguello, California, Vol. 1 - Analysis, Final Report to Headquarters Pacific Missile Range Point Mugu, California, Contract N 123-(61756) 32885A (PMR), July 31, 1976. Cermak, J. E. et al., "Limitation of Wind Fields Over Point Arguello, California By Wind-Tunnel Flow Over a Topographic Model", prepared under U.S. Navy Contract N 123-(61756) 34361 A (PMR), U.S. Navy Purchasing Office, Los Angeles, California, November 1966 (AD 643689).

Similar air flow patterns prevail at Point Conception.

See revised Section B-1 of Volume II of the FEIS for a discussion of the selection of Point Arguello wind data. Staff attempted to evaluate regional air flow patterns, rather than site specific micro-climates.

p. 21:

The "data" collected for the Applicants by Oceanographic Services, Inc., and presented in Table 2 on page 22, was not collected from "ship weather observations". It was hindcast from weather maps. The accuracy of OSI's hindcasts and the representativeness of the years they selected for study have already been seriously undermined on cross-examination of the sponsoring witness, and further evidence bearing on its usefulness will soon be filed. In additon, the hindcast data consists of six hour averages, and is thus not comparable to the measured data shown in Tables 1 and 3. "Averaging" is a statistical technique which distorts frequency of occurrence data downward. In any event, in terms of marine operations, six hour averages, such as those presented by OSI, are virtually meaningless, since winds obviously do not have to average a threshold velocity for six hours in order to impact upon operations. On the contrary, persistence of the threshold wind speed (i.e., approximately 25 knots per hour) for between 10 and 15 minutes, will interrupt LNG transfer.

The references to Table 2 have been corrected in the text. The usefulness of hindcasting is not being deleted in the EIS. The data was presented strictly for comparison to the measured data.

p. 21:

The measured wind data collected at the site for Southern California Edison Co., which is referenced on p. 21 and set forth in Table 3 and Figure 7, on pages 23 and 25, respectively, has not been properly or usefully presented. First, Table 3 does not present the data in a manner which is useful for evaluating the suitability of the site for LNG tanker operations. The critical wind speeds for tanker operations are in the range of 20-25 knots. Table 3, however, does not break the data down above the speed of 10.4 knots. Second, Table 3 does not reveal whether the frequency percentages reflect measurements at the thirty-foot level or the 150-foot level. These basic deficiencies must be corrected in utilizing the SCE data in the FEIS.

Comment reflected in revised Table 3 of Volume II of the FEIS.

In addition, in interpreting the SCE data, the Staff must recognize the following: (1) In terms of tanker operations, the crucial location is the vicinity of the end of the trestle, almost one mile or more offshore, at heights up to approximately 100 feet (i.e., the "sail" area of the tankers); (2) because of "friction" effects, wind speeds measured onshore will be lower than those offshore at the same time; and (3) again, due to "friction" effects, wind speeds increase from the land or water surface, upward. These factors, taken together, suggest that the SCE data which was taken onshore at heights of 30 feet and 150 feet, must be adjusted in order to reflect wind conditions at the end of the trestle in the relevant height range from the surface up to approximately 100 feet. Our weather expert, Mr. R. Rea Strange, III, was supplied by the Applicants with a copy of the raw SCE measured wind data. When adjusted for the above-referenced phenomena, that data shows that wind speeds at the berth in the relevant height range exceeded 25 knots for approximately 12.5% of the reported measurements. Since the measuring instruments failed to operate for significant periods during the measurement year, and since instrument downtime generally occurs as a result of severe winds, it can reasonably be assumed that winds at the berth actually exceeded 25 knots for a significantly higher percentage of the time.

A discussion of Mr. Strange's data is presented in Section B-1 of Volume II of the FEIS.

p. 26:

The statement that severe weather conditions are infrequent in southern California is directly contradicted by the fact that "gale force winds with gusts of up to 90 miles per hour" have admittedly occurred at least twice in the past year.

As noted in the revised Section B-1 of Volume II of the FEIS, December 1977 was an extremely stormy weather period. Dames and Moore report only gale-force winds (up to 40 knots) but do not specify duration. Neither of these cases are evidence of persistent severe weather.

p. 27:

The Extreme Wind Data presented in Table 5 is not accurate with respect to the end of the trestle, approximately one mile offshore. The Applicants themselves have acknowledged that extreme winds in this offshore area will exceed the values shown in the tables by 20-30 mph (see, Pacific Alaska, et al., Tr. Vol. 35 at 4163).

The text and footnote indicate that the data has not been adjusted for local conditions; however, the maximum recorded wind speeds given in the text indicate that the table accurately reflects the range of extreme winds.

Subsection 3--Geology, pp. 33-47.

This subsection, which was necessarily based upon the information available to the Staff prior to the issuance of the DEIS on April 21, 1978, will obviously have to be completely re-written for the FEIS, given the major new geologic information about the site which has recently come to light. This being so, we offer only the following general comments:

(1) The criteria used by Dames and Moore to define potentially significant faults is unsound. They considered a fault to be significant only if they discovered affirmative evidence of movement within the Holocene period (approximately 11,000 years) or evidence of historic seismicity. The "historic" seismicity" standard is meaningless in assessing the probability of the occurrence of a seismic event on any fault in the southern California area. As the Staff stated in the DEIS issued on the Applicants' Los Angeles Harbor terminal proposal (Pacific Alaska LNG Company, et al., DEIS, issued September 1976, Vol. II at II-70):

> "... with few exceptions, 'it appears that every event since 1912 greater than magnitude 6 in southern California occurred on a fault without known prior historic activity' [footnote omitted]."

In addition, arbitrary designation of the Holocene period as the critical time frame in evaluating the significance of faults for a facility such as this is absurd. Given the high costs and potential hazards associated with all LNG terminals, the same seismic criteria should be applied to this facility as are applied by the Nuclear Regulatory Commission to nuclear facilities (see, discussion below). As the Staff is aware, those standards recognize the importance of movements in periods much beyond the Holocene.

Finally, the notion that a fault should be dismissed as insignificant simply because Dames and Moore failed to find affirmative evidence of movement is shocking.

Comment reflected in Section B-3 of Volume II of the FEIS.

Recent discoveries have shown that their cursory "study" failed to report the presence of at least two capable faults which can be seen without excavation, directly under the terminal site. This glaring omission speaks for itself. Aside from the obvious inadequacy of Dames and Moore's search, it is clear that, for a facility such as this, a fault should not be deemed insignificant simply because an investigator, however thorough and competent, has failed to find affirmative evidence of movement in the relevant time frame. On the contrary, a fault should be considered active and capable unless there is affirmative evidence of non-movement during the relevant periods. As indicated below, this is the approach taken by NRC in evaluating the sufficiency of sites proposed for nuclear facilities.

(2) We urge that in evaluating the suitability of the Point Conception location as an LNG terminal site, the Staff apply the same seismic criteria developed by the NRC for the siting of nuclear generating plants. 1/ Those criteria, in effect, preclude siting within five miles of a "capable fault", and define "capable fault", as: (a) a fault not affirmately proven not to have moved within the past 35,000 years; or (b) a fault which, irrespective of what has happened within the past 35,000 years, is not proven not to have moved more than once within the past 500,000 years. The logical and irrefutable justification for these strict standards is that, because so little is known about ground accelerations within 5 miles of a seismic event, there is no reliable way to design sensitive and hazardous facilities that close to a capable fault. One cannot, in other words, design for that which he does not understand.

(3) A great deal of additional evidence on seismic conditions will soon be filed by the Applicants and other parties. It is clear even now, however, that at least two and possibly more, faults exist directly on the site, which were not reported in the Dames and Moore study, and which qualify as "capable" under the NRC's standards. We submit, therefore, that on these grounds alone, Point Conception is unacceptable as a terminal site, irrespective of the claims which we expect the Applicants to make as to their ability to create special designs to accommodate these faults.

(4) We agree with the Staff's conclusion that the South Branch of the Santa Ynez Fault must be considered

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1/ As the Staff is certainly aware, the Office of Pipeline Safety has recently proposed new safety regulations which are intended to impose upon LNG facilities, the same seismic standards which apply to nuclear plants.

potentially active and capable of a magnitude 7.5 earthquake (Table 8, p. 43, p. 47). Since, as the Staff states, that fault apparently passes within 3 miles of the site offshore (pp. 44-45), we believe that, applying the NRC's seismic standards, the South Branch, in and of itself, disqualifies Point Conception as a terminal site.

Subsection 5, Water Resources, Part b)ii Waves, pp. 67-72.

LNG tanker operations are concededly quite sensitive to sea conditions. It follows, therefore, that an adequate evaluation of any proposed terminal site must include a thorough investigation of prevailing wave conditions. The superficial analysis of "waves" at Point Conception which is presented in this subsection is clearly not sufficient, and we do not believe that the Staff views it as being so, given that no effort has been made even to summarize, much less evaluate, the evidence on this subject which has already been submitted in this case by the parties. In any event, a great deal of important additional information on waves will soon be filed, including the results of the onsite measurement program conducted for the Applicants (see discussion, infra). We are certain that the Staff realizes that a thorough evaluation of waves must be prepared for the FEIS following the presentation and cross-examination of all relevant evidence. At this time, therefore, our only specific comment on this subsection is that the Severe Storm Wave Data presented in Table 16, p. 69, reflects conditions east of Gaviota, which is quite distant from the proposed terminal site. The OSI severe storm study from which Table 16 is derived, also includes similar data for Point Conception, which is obviously much closer to the site. The Point Concepiton data should be substituted in the FEIS for that shown in Table 16.

Staff has made a thorough evaluation of all wave data filed and has presented a summary of these data in Section C-5b of Volume II of the FEIS.

Subsection 10, Archaeological and Historical Resources, pp. 124-133.

This subsection presents an adequate summary of the archaeological and historical resources at the Point Conception terminal site. Nevertheless, although the religious and spiritual importance of this location to the Chumash Indians is referenced (p. 126), we believe that the significance of these values has been understated. The depth of the Chumash's feelings about the Point Conception area was graphically demonstrated when the Applicants attempted to cut trenches on the site to investigate a recently discovered geologic fault. As summarized in the attached article from the May 18, 1978 edition of the Santa Barbara News and Review (Appendix B), the Chumash occupied the site and refused to permit trenching until adequate safeguards had been established. Even then, trenching was permitted by the Chumash only because "the seismic information the trenches reveal may bring an end to plans to place an LNG port near the point". As stated in the article:

Comment reflected in Sections B-10 and C-10 of Volume II of the FEIS.

"At a recent PUC hearing, Archie Fire Lame Deer said, 'We consider this area the most sacred of any area in the state of California,' and though he did not want another violent Wounded Knee-type takeover, he continued, 'if that's what it takes, and if that is what

> is to happen, then with our brothers from the Sioux nation, we'll come to help our brothers of the keepers of the Western Gate'."

We believe that the spiritual importance of Point Conception to the Chumash should be reviewed in much greater detail in the FEIS and that this factor alone requires the elimination of Point Conception from further consideration as an LNG terminal site.

Vol. II, Section C--Environmental Impact of the Proposed Action, pp. 141-224.

Subsection 1--Climate, p. 141.

This section implies that the only wind condition which will interfere with marine operations at the LNG terminal will be "hurricane-force winds" and that interruptions due to this factor will be "relatively infrequent". Even the Applicants, however, agree that winds of considerably less than hurricane force will prevent berthing and interrupt unloading. The Applicants admit that 25 knot winds will prevent berthing and, although they have not yet stated a position as to the weather related criteria which should govern the cessation of unloading operations, we believe that the same 25 knot wind speed should apply. As shown in prior sections of these comments, and in our filed evidence, available data indicates that winds at the berth exceed 25 knots more than 12.5% of the time, so it is apparent that adverse wind conditions will frequently interfere with marine operations at the Point Conception site.

Comment noted. Revisions to Section C-1 of Volume II as the FEIS indicate that 25 knot winds will be the limiting conditions for berthing or remaining at the berth. The applicability of Mr. Strange's downtime estimates has been discussed elsewhere in the FEIS.

Subsection 2 and 3--Topography and Geology, pp. 141-147.

p. 143:

As the Staff has correctly recognized, the geology of the Point Conception area "has more potential for serious impact upon the proposed facilities than vice versa". Since the issuance of the DEIS, at least two capable faults and possibly more, have been discovered directly beneath the proposed terminal site. We believe that simple prudence, as well as the Staff's long-standing criteria for LNG terminal site evaluation, dictates that Point Conception be eliminated from further consideration as a site because of the presence of these faults. In any event, as we are sure the Staff appreciates, this new discovery requires that the brief review of geologic impact in this subsection of the DEIS be completely re-evaluated in the FEIS. The re-evaluation should properly await the presentation and cross-examination of the Applicants' new seismic reports and of any answering testimony submitted by other parties. In this regard, we urge that the Staff formally request that the United States Geologic Survey (U.S.G.S.) investigate and report upon geologic conditions at Point Conception. U.S.G.S. obviously possesses the greatest concentration of geologic expertise of any agency in the Federal government, and, given the overriding importance of the seismic issues in this proceeding, this resource cannot properly be ignored. The resolution of this contested matter should not be permitted to depend solely upon the reports submitted by interested adversary parties when a disinterested independent agency such as U.S.G.S. is available, especially given the obvious disparity between the vast resources possessed by the Applicants, and the limited resources available to those who oppose them.

No response required.

Aside from the new seismic discoveries, we believe that the South Branch of the Santa Ynez Fault, which passes within 3 miles of the site offshore and is capable of a 7.5 magnitude event, should, in and of itself, disqualify Point Conception from further consideration as a terminal site.

Staff does not agree. The fact that the site is on active faults disqualifies it.

Subsection 5--Hydrology, Part b)i General Oceanographic Impact.

pp. 157-158:

The Applicants have announced that they will soon be submitting a new "seawater exchange system analysis" (see, Pacific Alaska, et al., Tr. Vol. 48 at 5781). Clearly, preparation of the Staff's evaluation of the seawater exchange issue for the FEIS must await the presentation and cross-examination of that material and any answering evidence.

Comment noted.

Part b)ii Waves, pp. 160-165.

As stated previously in these comments, we believe that a thorough assessment of wave conditions at the site, and of their impact upon terminal operations must necessarily be included in the FEIS. Much evidence on this subject has been filed since the preparation of the DEIS and additional material will be forthcoming soon. Our only general comment on this subsection, therefore, is that it is clearly insufficient in its present form. We have the following specific comments:

pp. 160-161:

The Staff's apparent interpretation of the Delft report as a berth availability study is in error. The Applicants' witness Van Orshot, who sponsored this report, specifically testified that the study was aimed at determining optimum berth orientation, not berth availability (see, Pacific Alaska, et al., Tr. Vol. 39 at 4703-04, 4708-09). The figures on berth availability contained therein, while appearing to be precise, are nothing more than generalized assumptions (Ibid.) In any event, the Delft report was based solely upon the weather data presented in the OSI hindcast, the accuracy of which has already been undermined. Further information, including the results of the Applicants' onsite measurement program, demonstrates that weather conditions at the site are much more severe than shown in the OSI study.

Comment reflected in Section C-5b of Volume II of the FEIS.

p. 165:

Table 37:

(1) The Table suggests that the Staff, without presenting any justification, has accepted 6 feet as the critical wave height for LNG marine operations. This issue is in dispute in this case, and, in any event, 4 feet was adopted as the critical height in the El Paso Alaska proceeding. A thorough review of this matter, based on all available information, must be included in the FEIS.

Since the El Paso Alaska proceeding, staff witness John Figel has presented evidence utilizing a 6-foot wave criteria and no longer utilizes a 4-foot criteria.

(2) Berth downtime based upon the results of the hindcast prepared by Mr. Strange, is incorrectly characterized in the Table as being the "high estimate". In fact, the frequencies shown in Mr. Strange's report for the occurrence of 6 foot waves and/or 25 knot winds at the site

Comment reflected in Section C-5b of Volume II of the FEIS.

are, if anything, low. In this regard, the Staff should be aware that the onsite measurement program now being conducted for the Applicants shows that, during the months December 1977 through April 1978 the significant wave height at the site was six feet or greater on 24.6 percent of the measurements. This includes 32 percent in January and 47 percent in February. It is important to note that there was very little data recovery during the extremely rough ocean conditions in January. Waves in excess of four feet were, of course, even more frequent.

Subsection 10--Archaeological and Historical Resources, pp. 197-198.

p. 197:

As indicated previously in these comments, we believe that the Staff has understated the spiritual and religious significance of the Point Conception area to the Chumash Indians and has underestimated the adverse impact that construction and operation of an LNG terminal at the proposed site would have upon these important values. This matter must be studied further by the Staff prior to the issuance of the FEIS. We believe that further study will show that the Point Conception area is of inestimable value to the religious beliefs of the Chumash and that the Chumash believe that construction of an LNG facility at Point Conception would completely destroy these values. In our view, this factor alone warrants elimination of Point Conception as a potential site, especially given the availability of preferable alternatives.

Comment reflected in Sections B-10 and C-10 of Volume II of the FEIS.

Vol. II, Section D--Measures to Enhance the Environment or to Avoid Adverse Environmental Impacts, pp. 225-244.

Before embarking upon a discussion of mitigative measures, we want to make clear our belief that, no matter what steps are taken, Point Conception will remain a totally unacceptable location for an LNG terminal. Marine operations there are not feasible at an open sea berth, in our judgment, because of adverse weather conditions. In addition, the recent seismic discoveries at the site disqualify Point Conception from further consideration based upon the Staff's own seismic criteria. Further, the construction and operation of a terminal at Point Conception would result in unavoidable adverse environmental impacts so severe and irreparable that they could never, in our view, be adequately mitigated. These facts, coupled with the availability of several preferable alternative locations, have convinced us that Point Conception cannot lawfully be approved by this Commission as a terminal site under the standards of either the Natural Gas Act or the National Environmental Policy Act of 1969. The mitigative measures discussed below would lessen the adverse impact of a Point Conception terminal, but there are, we feel, no such measures which can reduce impacts to an acceptable level. In this context, we offer the following suggestions, each of which is consistent with the recommendations of both the County of Santa Barbara and the California Coastal Commission.

No response required.

(1) The undergrounding of storage tanks should be required. Undergrounding will enhance the safety of the facility by reducing the risks associated with tank rupture and reducing the exposure of the tanks to hazards such as airplanes, meteorites, saboteurs, etc., which might cause rupture. In addition, of course, undergrounding will reduce the severe adverse aesthetic impact of the terminal facility.

The staff's analysis of these issues is presented in the Mitigating Measures section of this EIS and in the Recommendation section; however, the staff does agree with unqualified support of underground storage tanks.

(2) Onsite generation of all electrical power needed by the facility should be required. If electric power is obtained offsite, as proposed by the Applicants, the construction of a lengthy and unsightly high voltage transmission line will obviously be necessary. No matter where this line is located, its construction, like that of any facility, will adversely impact upon vegetation, wildlife, topography, etc. Once completed, the line will have a substantial adverse aesthetic impact on the 30-mile coastal terrace from Goleta to Point Conception. In addition, supplying the large power needs of the terminal will tax the capacity of existing offsite generating facilities. Onsite power generation, which has already been required for other LNG facilities, including the terminal at Cove Point, Maryland, will reduce these impacts and should, therefore, be required at Point Conception.

The staff does not support onsite power generation as noted in Section 3 - Air Quality Impact. Powerline rights-of-way are discussed in Sections 3 and 8 and in the recommendations.

(3) The Applicants' plans for gaining access to the site during construction and operation should be significantly modified. Each of the vehicular access routes which has been reviewed would result in major adverse impacts. Accordingly, maximum use of barges and of the Lompoc Valley spur of the Southern Pacific railroad should be required. If necessary a new temporary track could be installed alongside the existing railroad track and within the existing right-of-way. We believe that proper utilization of barges and of railroad facilities could eliminate the need for an access road during construction and that transportation of construction equipment, materials, and personnel by barge/railroad would

The staff does not agree. Section H of the EIS presents a discussion of access road alternatives to the site. This comment is reflected in that discussion.

be less costly than vehicular transport. Elimination of a construction access road would clearly reduce the adverse environmental impact of the project. In addition, utilization of the Lompoc railroad spur as the major access route for construction personnel would focus the burden of providing housing for construction workers on Lompoc and the North Santa Barbara County area, where the housing situation is far less acute than in the South County. The feasibility of barge/railroad access should be reviewed in detail in the FEIS.

If vehicular access is deemed necessary during construction or for plant operation following the completion of construction, a private road should be built leading northward from the site and connecting with Highway 1 at its nearest point, following generally the pipeline route proposed by the Applicants. 2/ Precise alignment should be designed so as to avoid cultural sites and to minimize earth moving and degradation of significant vegetation and wildlife habitats. A northerly route is preferable to the southerly approach from Gaviota through the Hollister Ranch, which the Applicants support, because:

(a) It better diffuses the impact of traffic and housing within the County, focusing these impacts at a more median point in the County, and, in particular, diminishing the housing impact on the already overcrowded Santa Barbara-Goleta urban areas;

(b) It avoids the impact of heavy construction traffic through Gaviota State Beach Park;

(c) It avoids disruption and damage to existing residential and agricultural developments;

(d) Reconstruction of the existing Hollister Ranch road would entail extensive cuts and fills, realignment and grade reduction along a ten-mile stretch of narrow coastal terrace, resulting in greater visual degradation, increased land use impacts and greater safety problems;

(e) The northerly route offers sufficient flexibility in alignment to permit bypassing of archaeological sites and other cultural resources, thereby eliminating the severe impact to archaeological sites associated with any route through the Hollister Ranch; and

(f) The northerly route eliminates use of the dangerous Gaviota turn-off on U.S. Highway 101 which involves an on-grade crossing of southbound lanes by all northbound traffic. Instead, the intersection of Highway 1 and U.S. Highway 101, where a full diamond interchange exists, would be used. This will result in a major reduction of traffic hazards.

2/ As indicated, infra, we believe that the pipeline route proposed by the Applicants is the best available alternative, at least for the segment between the site and Highway 1. With the proper pipeline route we endorse the Staff's position calling for a common corridor approach for road access and pipeline.

Vol. II, Section E--Unavoidable Adverse Environmental Impact, pp. 245-250.

This section appears to identify most of the unavoidable impacts associated with the Point Conception proposal, although, in our view, the severity of the impacts is generally understated. This is particularly true with respect to the effect the proposed terminal will have upon the spiritual and religious values of the Chumash Indians. As indicated previously, Point Conception is considered by the Chumash to be the most sacred area in California and they believe that construction of an LNG terminal there would totally destroy the area's spiritual and religious value.

Comment reflected in Section E of Volume II of the FEIS.

Vol. II, Section H--Alternatives to the Proposed Action, pp. 255-358.

Subsection 1--Alternative Pipeline Routes

Part a) Alternative A, pp. 256-260:

We do not believe that the modification to the first eleven miles of the Applicants' proposed route, set forth in this subpart, is feasible. The terrain it would cross is simply too rough for pipelining. 3/ Accordingly, both the costs and the impact of pipeline construction along this modified route would be increased dramatically and unnecessarily. We wholeheartedly agree, however, with the Staff's notion that the proposed electrical transmission line--if such is necessary 4/--and the pipeline should follow the same right-of-way. In addition, we believe that the access road, if required, should be located within this same corridor (see discussion, infra). The solution, however, is not to relocate the pipeline and the access road so as to follow the existing power line easement. Rather, the power line and the access road, if needed, should be relocated to follow the Applicants' proposed pipeline corridor.

Comment reflected in Section H-1 of Volume II of the FEIS.

Subsection 2, Alternative West Coast LNG Sites, pp. 264-349.

As a general matter, we believe that the Staff has done a fine job in evaluating alternative onshore LNG sites. We certainly agree that the record shows Oxnard to be vastly superior to Point Conception as a site, and Rattlesnake Canyon to be preferable to Point Conception. Although we are in general agreement with most of the Staff's conclusions, we, nevertheless, believe that the Staff's alternate site analysis has some important deficiencies:

No response required.

(1) In discussing the feasibility of offshore siting as an alternative to the Point Conception propoasl, the Staff has taken the position that the facility "must be capable of being operational within the same general time frame proposed" for Point Conception by the Applicants. The Staff then rejects the offshore alternative primarily because an offshore facility, in the Staff's judgment, cannot meet this requirement (pp. 265-267). We have several problems with this approach.

First, the only valid basis for the imposition of a timing requirement in a proceeding such as this would be a finding that available supplies of natural gas, compared with anticipated demands, are such that the prompt attachment of this additional supply is essential. The Staff, however, has not discussed the supply/demand situation at all, and appears simply to have accepted on faith the Applicants' claims that

Comment reflected in Sections H-2a and H-5 of Volume II of the FEIS.

3/ This route is probably feasible as a power line right-of-way because the relatively small number of towers could be spaced so as to avoid the rough terrain and sensitive areas. This would not, of course, be possible in pipeline construction.

4/ As indicated, supra, we believe that onsite power generation should be required so that the need for a transmission line would be eliminated.

LNG is needed in California by early 1982. This is a crucial and, in our view, fatal, deficiency in the Staff's assessment of alternatives to the Applicants' proposal. As the Staff is aware, the California State Energy Commission, after intense study, has concluded that LNG is not needed in the time frame proposed by the Applicants, and, indeed, should not even be considered for another five years. This additional time would, of course, be more than sufficient to permit the approval and construction of an acceptable offshore facility. We submit, therefore, that it is essential that the Staff thoroughly review California's supply/demand picture in the FEIS, based on all available evidence, including the extensive material developed in California's proceedings on the Point Conception proposal. Such a review will, in our judgment, establish that there is plenty of time to develop an acceptable offshore facility.

Aside from the Staff's tacit and unjustified acceptance of the timing requirements imposed by the Applicants, the Staff seems to have assumed, again without justification, that the proposed Point Conception facility can, in fact, go into operation on schedule, in early 1982. That is totally unrealistic. Even if the Applicants could construct the facility within the scheduled construction period--something which we seriously doubt--they will obviously be unable to meet the scheduled start-up date. That date assumes that all governmental approvals will be obtained by July 1978. Given the present status of this proceeding, that assumption is a simple impossibility. On the present schedule, it is unlikely that this Commission will issue a final decison in this case until late spring 1979. If Point Conception is approved, the decision will obviously be appealed, a process which can reasonably be expected to last at least one year. Since financing will be unavailable until all governmental approvals are final and unappealable, it follows that the project will not get underway until the summer of 1980, at the earliest, two years after the date assumed by the Applicants. Allowing at least six months to arrange financing, start-up of Phase I could not occur until early 1985, even if everything else goes smoothly.

We believe that an appropriately sited offshore facility would generate little, if any, opposition, and that the approval process, therefore, could avoid the substantial delays inherent in a bitterly contested adversary hearing and appellate review. When all of these factors are taken into account, we believe that an offshore terminal could be ready in the same general time frame as an onshore facility. Since actual construction of an offshore facility will take less time then that of an onshore terminal, the offshore facility might actually be completed before a comparable terminal onshore!

(2) In its analysis of alternate onshore sites, the Staff has summarily rejected Camp Pendleton, because of institutional problems involved in obtaining the land from its present owner, the U.S. Navy (see, p. 284). We believe that this is an inadequate reason for eliminating Camp Pendleton. As the Staff is aware, Camp Pendleton was recently selected by the California Coastal Commission as the best available "remote" site for this LNG terminal. We recognize that the Navy has not, thus far, argeed to give up the necessary land. It is clear, however, that it is within the power of higher authorities within the Executive Branch, or of Congress, to override the Navy's objections and require that the land be provided, if they determine that such would be in the public interest. This basic policy question should properly be decided by balancing the Navy's needs against the public benefits which would be derived from devoting this

See staff's response to the CCC's comments on this matter.

property to an LNG facility. It is essential, therefore, that the ultimate decision-makers have before them, a thorough and objective analysis of the merits of Camp Pendleton as a terminal site, irrespective of the Navy's present position. Such an analysis must, we submit, be included in the FEIS. By summarily rejecting Camp Pendleton, for a reason not related to its suitability as a terminal site, the Staff has (1) in effect, exercised a power it does not have--i.e., the authority to determine that the Navy's alleged needs outweigh the public benefits of using this land for a terminal; and (2) precluded those who do possess the authority to make this decision--i.e., Congress and the Executive Branch--from acting rationally by failing to provide them with the detailed analysis essential to a balancing of relative needs.

(3) The Staff has rejected Naples/Dos Pueblos as an alternative site for this terminal primarily because of unfavorable seismic conditions (pp. 301, 347). We agree with this conclusion. We must emphasize, however, that, given the recent discovery of at least two previously unreported capable faults directly beneath the Point Concepiton site, it is readily apparent that seismic conditions at Point Conception are substantially more unfavorable than those at Naples/Dos Pueblos. We believe that the proper conclusion to be drawn from these facts is that Point Conception, like Naples/Dos Pueblos, should be eliminated from further consideration as a site and should be found in the FEIS to be an unacceptable location for this facility. If, however, the Staff, despite the recent seismic revelations, reaffirms in the FEIS its finding that Point Conception is an acceptable site, it necessarily follows that Naples/Dos Pueblos, Los Angeles Harbor, and all of the other locations which have heretofore been rejected by the Staff on seismic grounds, must be revived as possibilities and thoroughly re-evaluated on the basis of all other pertinent criteria. Any other result would be unlawful. We cannot emphasize too strongly, however, our view that the Staff should adhere to its traditionally strict and prudent seismic criteria, and should therefore, reject Point Conception as an alternative, together with all of the other locations previously found to be seismically unsuitable.

Comment reflected in Section H-2d and I of Volume II of the FEIS.

Subsection 3--Alternative Access Roads

As indicated in our comments on the Mitigative Measures section of the DEIS, we believe that proper utilization of barge and railroad transport may eliminate the need for a construction access road. This possibility must, we submit, be analyzed in detail in the FEIS.

Comment reflected in Section H-2 of Volume II of the EIS.

If an access road is deemed necessary, we wholeheartedly endorse the Staff view that a multiple use right-of-way corridor should be studied in depth. Common sense strongly suggests that one corridor, accommodating both the pipeline, the access road, and the electric transmission line, if needed, 5/ would have far less adverse impact than three separate corridors, as proposed by the Applicants. As referenced above, we believe that the multiple use corridor should follow generally the Applicants' proposed pipeline route. In our view, the terrain along that route is much more suitable for pipeline and road construction than any other alternative.

Ibid.

5/ We should note that we believe that onsite power generation should be required, so as to eliminate the need to construct a high-voltage electric transmission line to the site.

Subsection 4--No Action or Postpone Action

In view of the recent transfer to this agency of the Pacific Indonesia Point Conception application amendment, and its subsequent consolidation with its Pacific Alaska counterpart, the integral interdependence of these two LNG projects is now a legal, as well as a factual, reality. Accordingly, it is essential that the Staff consider in the FEIS all reasonable alternatives to the combined projects. We believe that one such alternative exists which has not yet been directly or formally evaluated by the Staff, i.e., the construction of a pipeline lateral from Cook Inlet in Alaska to the recently approved Alcan pipeline system to carry both the volumes presently dedicated to the Pacific Alaska project (400 Mmcf/d) and the volumes presently being exported to Japan from Nikiski (150 Mmcf/d). 6/ Such a lateral would permit the delivery of 550 Mmcf/d of additional natural gas to California by early 1984, without the need to construct an LNG terminal on the West Coast. A review of all available projections of gas supply and requirements in California, shows that those volumes would be more than sufficient to ensure the satisfaction of all high priority needs. It follows, therefore, that construction of such a lateral would obviate the perceived need to import LNG from Indonesia or, at the very least, postpone the need for such imports until an acceptable offshore terminal facility can be approved and built. The viability of this alternative must, we submit, be addressed in the FEIS.

Although the Staff has not yet considered the specific alternative proposed above, a detailed review of the feasibility of a Cook Inlet pipeline lateral for the transport of the Pacific Alaska volumes is included in Vol. I of the DEIS at pages 264-284. The Staff's conclusions can be summarized as follows: The construction of such a lateral is feasible and, if it would eliminate the present need for an LNG terminal on the West Coast, the pipeline alternative would be "significantly superior" to the proposed LNG system in terms of its environmental impact. Further, the Staff emphasized that the several studies completed to date show the economics of the lateral to be comparable to those of the LNG project. It seems clear that the expansion necessary to accommodate the volumes presently being exported to Japan would not increase the environmental impact of the line. Further, those volumes should, if anything, improve the economics of the pipeline by reducing unit costs. In additon to the work already done, therefore, the major issue which must be addressed in the FEIS in order to evaluate our proposed alternative is the question of whether the additional 550 Mmcf/d which our proposal offers, will be sufficient to satisfy California's needs. As referenced above, we believe that the available studies establish beyond any doubt that those additional volumes will be adequate, until at least 1990.

6/ The present Nikiski export license expires in early 1984. Given this country's present energy circumstances, it appears that extension of that license will not be permissable under the standards of Section 3 of the Natural Gas Act, so the Nikiski export gas will be available for delivery to the lower 48 states.

On December 30, 1977, the Department of Energy approved the applications, as amended, of Pacific Indonesia LNG Company and Western LNG Terminal Associates to import LNG from Indonesia over a 20-year period and to deliver this gas at Oxnard, California. This proposal would deliver 500 million cfd of Indonesian gas. Phillips-Marathon LNG Company is currently exporting about 150 million cfd to Japan. An exchange of Alaskan gas for Indonesian gas would result in a 350 million cfd shortfall. Therefore, such an alternative is unacceptable because the 500 million cfd import has been found to be in the public interest.

The issue of gas supply and demand is beyond the scope of this environmental impact statement.

Phillips Marathon LNG Company's contract with the Tokyo Electric Power Company, Inc. and the Tokyo Gas Company Limited contains an option for a 5-year renewal which might delay the availability of this gas until 1989. When Phillips-Marathon LNG Company's authorization to export LNG expires, about 150 million cfd of gas would be available for use in Alaska and/or the lower 48 states. There is no guarantee that California would successfully compete for this gas.

Vol. II, Section I--Conclusions and Recommendations

(1) We fully agree with the Staff that Oxnard is by far the best West Coast location for an LNG facility. As the Staff points out, Oxnard's superiority has been conclusively demonstrated so often in so many decisions that further discussion is not required.

No response required.

(2) In addition, we agree that Rattlesnake Canyon is preferable to Point Conception as a terminal site. We object, however, to the Staff's suggestion that the costly breakwater required at Rattlesnake Canyon is a relative disadvantage for that site vis-a-vis Point Conception. When all of the weather evidence is in, it will be clear that a similar, and perhaps more extensive, breakwater would be required to make marine operations feasible at Point Conception.

Comment noted.

(3) We object to the Staff's conclusion that Point Conception is not an environmentally unacceptable site. The addition of the required breakwater would cause severe irreparable and totally unacceptable impacts to the sensitive and unique marine environment at Point Conception. These additional impacts, coupled with those already identified by the Staff, are, in our judgment, sufficient to disqualify Point Conception as a site on traditional environmental grounds.

Comment noted.

Beyond these traditional impacts, we believe that the site must be absolutely disqualified from further consideration because of unfavorable seismic conditions. The Staff has already identified the South Branch of the Santa Ynez fault as active and capable, and has correctly found that it passes within three miles of the site offshore. Under the strict and prudent seismic criteria applied by the Nuclear Regulatory Commission to nuclear plants, which we, like the Office of Pipeline Safety, believe should apply as well to LNG facilities, the South Branch of the Santa Ynez, in and of itself, precludes siting at Point Conception. As the NRC has consistently found, not enough is known about ground motions within five miles of a seismic event to permit the safe and reliable design of costly, sensitive and hazardous facilities. In any event, the recent discovery of at least two, previously unreported, capable faults directly beneath the site, mandates that Point Conception be immediately and finally rejected as a potential location for an LNG terminal. It would be the height of hypocrisy if Oxnard, a site already conclusively shown to be both safe and reliable, were ultimately rejected by this Commission in deference to some unspecified and totally undocumented threat to the public, congered up by California politicians, and Point Conception, a site which is seismically unsuited for a facility such as this based on prudent and well established seismic criteria, was found to be acceptable.

Comment reflected in Section H-2d and I of Volume II of the FEIS.

For all of the reasons set forth above, we submit that the Staff must specifically find in the FEIS that Point Conception is an unacceptable site for this LNG facility. If it does not so find, the Staff must, we submit, reconsider Naples/Dos Pueblos, Los Angeles Harbor, and all of the other sites which have been summarily rejected heretofore on seismic grounds, and must thoroughly evaluate each such location on the basis of all pertinent criteria.

Ibid.

(4) As referenced above, we believe that the Staff must in the FEIS thoroughly evaluate the merits of Camp Pendleton as a terminal site, despite the Navy's present reluctance to provide the necessary land. Such an analysis will, in our view, show Camp Pendleton to be the best "remote" terminal site in California. A thorough review of the suitability of this location is required so as to permit higher authorities within the Executive Branch and in the Congress, to reach a rational decison as to whether the Navy's present objections to the use of Camp Pendleton as a terminal site should be overridden.

Staff disagrees.

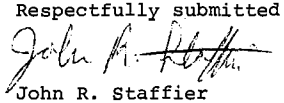
(5) Staff Recommendation (1) (p. 361) is not consistent with the findings in prior sections of the DEIS. Table 8 on page 43 of Vol. II lists both the North and South Branches of the Santa Ynez Fault as "Active or Potentially Active Faults". Each is correctly found to pass within 3 miles of the site; the Maximum Credible Earthquake for each is listed as magnitude 7.5, with an average peak acceleration at the site of .67g. On page 143 of Vol. II, it is stated that "The average maximum bedrock acceleration at the site would be approximately 0.7g for the maximum credible event at either of the two closest portions of the Santa Ynez Fault." It follows that the facilities should be designed to within a maximum peak acceleration of at least 0.7g, not 0.6g as required by Recommendation (1). As we have emphasized previously, however, we do not believe that there is any way that these facilities can be designed to account adequately for seismic conditions at the site. The simple fact is that not enough is known about earthquakes and their effects to permit the siting of sensitive and hazardous facilities such as these within five miles of a capable fault, much less directly above two capable faults and within three miles of two others.

Comment reflected in Sections H-2d and I of Volume II of the FEIS.

(6) The studies referenced in Recommendations (45) and (46) (p. 369) should be expanded to include consideration of the feasibility of establishing a multiple use corridor generally following the Applicants' proposed pipeline route.

The information derived from such studies can be used to achieve the purpose of this comment.

Respectfully submitted,



John R. Staffier

Counsel for:

HOLLISTER RANCH OWNERS' ASSOCIATION
and SANTA BARBARA CITIZENS FOR
ENVIRONMENTAL DEFENSE

ETAC, USAF 72392 PT ARGUELLO LIFE BOAT STA CALIF

DATA PROCESSING DIVISION 34 33 N 120 36 W 64 FT ANNUAL

JAN 49-FEB 58

DIRECTION	WIND SPEED GROUPS IN KNOTS 01-06	07-16	17-27	28-40	GTR 40	TOTAL %	TOTAL OBS	MEAN WIND SPEED/KTS
N	2.6	5.0	4.0	1.4	.0	12.9	3446	14.9
NNE	.7	.7	.3	.1	.0	1.7	454	10.5
NE	1.2	1.0	.4	.1	.0	2.7	709	9.5
ENE	.4	.2	.0			.6	150	6.4
E	3.2	1.4	.3	.1		5.0	1332	6.6
ESE	.7	.8	.3	.1	.0	1.8	493	11.1
SE	1.1	1.0	.5	.1	.0	2.7	732	10.9
SSE	.6	.6	.2	.0	.0	1.4	362	9.5
S	.7	.5	.1	.0		1.3	343	6.8
SSW	.2	.2	.0		.0	.4	111	7.5
SW	.6	.3	.1	.0	.0	1.0	268	8.6
WSW	.3	.1	.0	.0		.5	136	6.4
W	2.3	3.0	1.3	.2		6.8	1803	10.6
WNW	1.0	3.0	2.4	.6	.0	7.0	1874	15.4
NW	3.7	10.6	7.0	2.0	.3	23.5	6266	15.0
NNW	2.2	8.8	9.4	3.1	.1	23.6	6288	17.5
VARIABLE								
CALM						6.9	1850	
TOTALS	21.3	37.0	28.3	7.8	.5	100.0	26617	13.0

MAXIMUM WIND NW 56 KTS

ETAC, USAF 72392 PT ARGUELLO LIFE BOAT STA CALIF

DATA PROCESSING DIVISION 34 33 N 120 36 W 64 FT WINTER

JAN 49-FEB 58

DIRECTION	WIND SPEED GROUPS IN KNOTS 01-06	07-16	17-27	28-40	GTR 40	TOTAL %	TOTAL OBS	MEAN WIND SPEED/KTS
N	4.1	8.0	4.4	.5	.0	17.0	1159	12.1
NNE	1.2	1.3	.6	.1	.0	3.2	222	10.9
NE	1.7	1.9	.9	.2	.0	4.8	326	11.0
ENE	.6	.2	.1			.8	57	6.3
E	3.8	2.3	.9	.2		7.2	489	8.3
ESE	.9	1.3	.9	.2	.1	3.4	234	13.6
SE	1.5	1.6	1.0	.3	.0	4.4	301	12.7
SSE	.8	.9	.5	.2		2.3	154	11.8
S	.8	.6	.3	.0		1.7	117	9.0
SSW	.3	.3	.1		.0	.7	46	9.6
SW	.6	.7	.3	.1	.0	1.7	119	11.4
WSW	.3	.1	.0	.0		.5	34	7.5
W	1.8	2.3	1.2	.1		5.4	369	10.7
WNW	.7	1.4	.4	.1		2.6	178	10.4
NW	3.9	9.0	4.7	.9	.2	18.7	1278	13.2
NNW	2.7	7.4	6.3	.6	.0	17.1	1171	14.5
VARIABLE								
CALM						8.5	579	
TOTALS	25.7	39.3	22.5	3.6	.4	100.0	6833	11.1

MAXIMUM WIND NW 56 KTS

ETAC, USAF 72392 PT ARGUELLO LIFE BOAT STA CALIF

DATA PROCESSING DIVISION 34 33 N 120 36 W 64 FT AUTUMN

JAN 49-FEB 58

DIRECTION	WIND SPEED GROUPS IN KNOTS 01-06	07-16	17-27	28-40	GTR 40	TOTAL %	TOTAL OBS	MEAN WIND SPEED/KTS
N	2.4	4.2	4.2	1.3	.0	12.2	797	15.4
NNE	.8	.6	.3	.1		1.8	116	9.5
NE	1.4	.7	.4	.1		2.6	168	8.4
ENE	.6	.2	.1			.9	58	5.6
E	4.5	1.9	.3	.1		6.8	445	6.0
ESE	.8	.5	.2	.0		1.5	95	8.1
SE	1.0	.8	.3	.0	.1	2.1	139	10.0
SSE	.5	.3	.0	.0		.9	58	6.5
S	.8	.3	.0			1.1	75	5.4
SSW	.2	.2				.4	24	5.8
SW	.4	.3	.1	.0		.8	50	7.6
WSW	.5	.1	.0			.6	40	5.9
W	3.6	4.1	1.4	.4		9.5	622	10.0
WNW	1.3	2.6	2.6	.8	.0	7.3	479	15.9
NW	3.1	8.8	4.8	1.0	.1	17.9	1172	13.7
NNW	2.6	9.8	9.7	3.2	.1	25.4	1663	17.0
VARIABLE								
CALM						8.3	544	
TOTALS	24.5	35.6	24.3	7.0	.3	100.0	6545	12.1

MAXIMUM WIND SE 52 KTS

AIR WEATHER SERVICE — PERCENTAGE FREQUENCY OF SURFACE WINDS — N SUMMARY 44

ETAC, USAF — 72392 PT ARGUELLO LIFE BOAT STA CALIF

DATA PROCESSING DIVISION — 34 33 N 120 36 W 64 FT — SPRING

JAN 49-FEB 58

DIRECTION	WIND SPEED GROUPS IN KNOTS 01-06	07-16	17-27	28-40	GTR 40	TOTAL %	TOTAL OBS	MEAN WIND SPEED/KTS
N	2.1	4.5	4.4	1.3		12.3	814	15.3
NNE	.5	.5	.2	.1		1.2	78	11.5
NE	1.0	.7	.2	.0		2.0	134	8.2
ENE	.2	.2	.0			.4	28	7.7
E	2.1	.8	.1	.1		3.1	205	6.
ESE	.6	1.0	.3	.0		1.9	126	10.0
SE	1.2	1.4	.7	.1	.0	3.3	219	10.8
SSE	.7	.9	.2	.0	.0	1.8	122	9.0
S	.8	.5	.0			1.3	89	6.1
SSW	.3	.2	.0			.5	31	6.6
SW	.7	.2	.0	.1		1.0	65	6.5
WSW	.4	.2	.0			.7	45	6.2
W	1.6	2.1	1.2	.0		4.8	320	10.7
WNW	.9	3.3	2.4	.6		7.2	474	15.4
NW	4.2	13.2	12.1	2.6	.0	32.0	2121	15.6
NNW	1.5	7.6	9.3	2.2	.0	20.7	1373	17.5
VARIABLE								
CALM						5.7	376	
TOTALS	18.9	37.1	31.2	7.1	.1	100.0	6620	13.6

MAXIMUM HRLY SE 40 KTS

ETAC, USAF 72392 PT ARGUELLO LIFE BOAT STA CALIF

DATA PROCESSING DIVISION 34 33 N 120 36 W 64 FT SUMMER

JAN 49-FEB 58

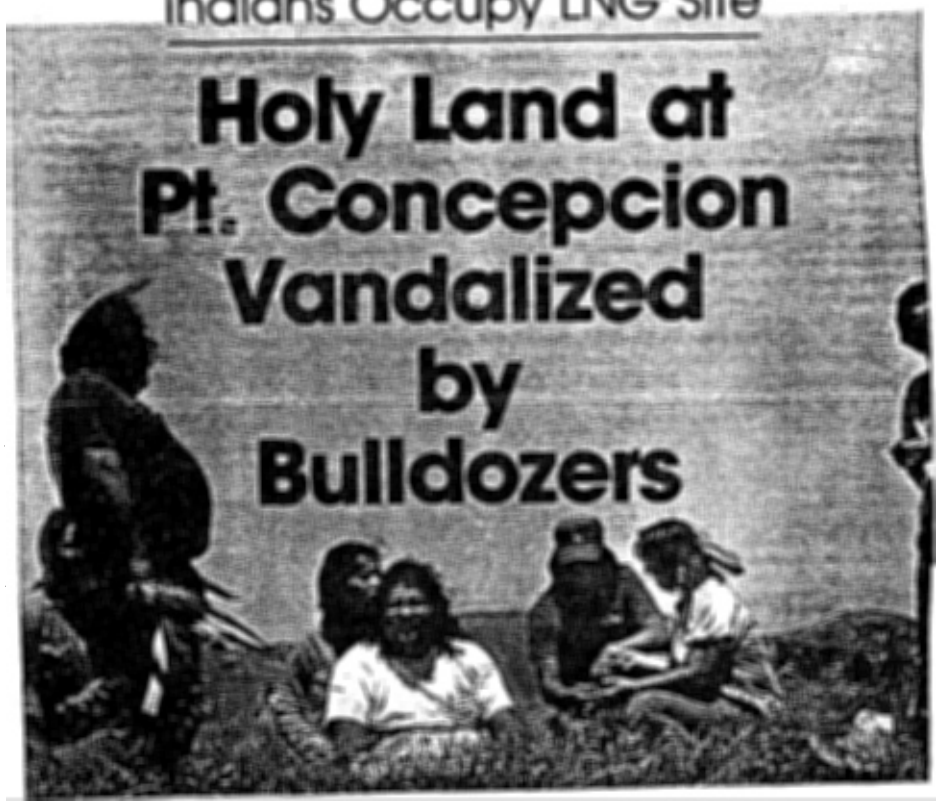
DIRECTION	WIND SPEED GROUPS IN KNOTS 01-06	07-16	17-27	28-40	GTR 40	TOTAL %	TOTAL OBS	MEAN WIND SPEED/KTS
N	1.6	3.1	3.1	2.4	.1	10.2	676	18.4
NNE	.2	.2	.1			.6	38	9.8
NE	.7	.4	.1			1.2	81	7.8
ENE	.0	.1				.1	7	7.9
E	2.3	.6	.0			2.9	193	4.3
ESE	.3	.3				.6	38	6.2
SE	.8	.3	.0			1.1	73	5.4
SSE	.3	.2				.4	28	5.2
S	.6	.4				.9	62	5.5
SSW	.1	.0	.0			.2	10	5.3
SW	.4	.1				.5	34	4.4
WSW	.2	.1				.3	17	5.4
W	2.2	3.5	1.5	.2		7.4	492	11.2
WNW	1.1	4.8	4.2	1.1		11.2	743	16.2
NW	3.7	11.4	6.3	3.4	.8	25.6	1695	16.5
NNW	1.8	10.6	12.3	6.5	.2	31.4	2081	19.5
VARIABLE								
CALM						5.3	351	
TOTALS	16.2	36.0	27.7	13.6	1.1	100.0	6619	15.4

MAXIMUM WIND NW 52 KTS

APPENDIX B

Indians Occupy LNG Site

Holy Land at Pt. Concepcion Vandalized by Bulldozers



By Herb Fox

THEY LEARNED ABOUT IT from a newspaper article Wednesday night, and that in itself was bad. The three bulldozers were so large that they had to be transported to the site by barge because the roads leading to Point Concepcion could not support that kind of weight. And they were standing there, ready to begin digging trenches on the proposed LNG site, seeking an earthquake fault on sacred Indian land.

For to many Native Americans, Point Concepcion is the Western Gate through which souls pass on their way to the afterlife. The land was home to the Chumash Indians for 7,000 years before the Spanish arrived—and more. The land is their church, their Wailing Wall or St. Peter's Basilica—their Holy of Holies.

News & Review Thursday, May 18 1978 7

That the bureaucrats and technocrats have been thinking of building a massive LNG port on the site—an archeological goldmine—is bad. That they saw fit to tear up the land-church in search of seismic clues was worse because of its immediacy. But that they totally neglected to consult with, or even inform, the local Chumash Indians—the Keepers of the Gate—of their ditch-digging plans was unacceptable.

So the 25 Indians—young and old, male and female, including one Sioux medicine man and "Uncle" Thurmond McCormack, a second chief of the Lasuene Tribe from the Rincon Reservation near San Diego—converged at the Indian Center in downtown Santa Barbara and began their five-car caravan to see for themselves what was being done to the land.

Driving through the exclusive Hollister Ranch and then Southern California Edison's properties toward Point Concepcion, north of Gaviota Beach, it was difficult to believe a potentially deadly liquified natural gas (LNG) port—and may nuclear power plant—may someday threaten this expansive, unblemished land.

Between the cattle and horses freely roaming the mustard hills on the right and the surf pounding the chalk-white cliffs on the left, it was almost easy for the caravan to drive past the proposed LNG site. But there, off toward the ocean on a wide, flat plain, they could make out the familiar yellow shapes of the bulldozers and a few small figures milling around.

The trench-digging operation, it was soon learned by the group of Indians, was being carried out by Dames and Moore, a Los Angeles geology consulting firm with a local office, which was hired by Western LNG Associates to flush out information on the newly discovered earthquake fault lying directly under the proposed LNG site.

Matt Warner of the geology firm was on hand to guide the Indians around the site. Here was the gorge in which the field workers were looking for signs of a fault; over there, about 1,500 feet, was the gorge in which the fault was discovered only a few weeks ago.

And here, another 500 or so feet to the east, was the first bite of the bulldozers—a newly dug trench, 30 feet long, ten feet wide, and eight feet deep.

(It was later learned that at least one more trench would have to be dug and that the two may grow in size up to 35 feet deep and 200 feet long.)

This first trench was located only 30 feet from the archeological edge of an ancient Chumash village.

Archie Fire Lame Deer, a Sioux medicine man working with the Indian Center, tried to explain to Warner the significance of this land to local Indians. "This is our church," he said. "This is where we worship."

"I can appreciate all that, Warner explained, "but I'm just the field manager..."

Within minutes, however, the "higher-ups" appeared, out of the sky. In a helicopter came Dames and Moore geologist Art Darrow and UCLA archeologist William Clewlow, who surveyed the land for Western LNG.

The Indians sat in a semi-circle and confronted the two. Why are you digging trenches on archeologically—and spiritually—valuable land?

"I'm just a geologist," Darrow said. "I know nothing about the site; Clewlow, though, knows all about it. He approved the site for trenching."

Clewlow squirmed a little as the group faced him with their questions. "You know more than I do that this entire area is a spiritual and religious source..." he began, and finished by saying, "I'm just the archeologist. I'm not an advocate one way or the other."

Darrow took over the grassy floor again, explaining how his firm came to start digging trenches without applying for county permits or consulting local Indian groups. After the fault was discovered last month, the Public Utilities Commission (PUC) requested that Western LNG Associates provide a full report on the fault by June 2. Dames and Moore were given a letter of authorization to investigate the fault, and considered the usually necessary permits waived because the PUC ordered the work.

Bob Whitney of the Indian Center handed out a copy of the state's Native American Heritage Act, which protects designated sacred sites from "severe and irreparable damage." Whitney asked Darrow if his firm consulted the PUC's environmental impact report on Point Concepcion before digging. Darrow said no.

"We hate to pick up a newspaper," Lame Deer said to Darrow, "and find out my grandmother is being dug up. Why didn't you contact the Indian Center before starting this project?"

"That was an error," the geologist conceded. "We should have contacted you. You're right."

Then are you prepared to stop digging trenches on the land? Darrow was asked. Again, he said no.

"Those tractors aren't going to move anywhere," one of the Indians shouted. Another joined in: "We're prepared to stay here. We don't leave until those tractors do."

Everyone shook their heads yes, and the occupation of Point Concepcion began.

"We hate to pick up a newspaper," Lame Deer said, "and find out my grandmother is being dug up...."

Time on Our Side

BY FRIDAY MORNING, with attorney

(continued on next page)

Indians

(continued from previous page)

Marc McGinnes and the Environmental Defense Center (EDC) staff already negotiating with Western LNG on behalf of the occupiers, the issues which led to a settlement four days later began to crystallize.

In reappraising the situation at the occupation site, the consensus of the Indians was that they were not opposed to the trench-digging per se, for the seismic information the trenches reveal may bring an end to plans to place the LNG port near the point.

What they were disturbed about was the manner in which the trenching operation began, with no apparent concern by the PUC, Western LNG or Dames and Moore for the spiritual or archeological value of the site. According to members of the Indians' negotiating team, the companies and agency ignored existing state and federal laws protecting historical, archeological, religious and burial sites by not doing a comprehensive study of the land before digging it up.

At a meeting with LNG officials—which included Keith McKinney, Western LNG's president who helicoptered to the occupation site to "listen to what the people have to say"—John Flynn of the Indian Center explained, "We don't feel any less sad when a site like this is ripped-off than our ancestors felt when their land was ripped off. The only difference is this time the law is on our side."

Also on the Indians' side was time; for each day the occupiers held up the trench work was one day closer to Western LNG's June 2 deadline to file a seismic report with the PUC. One of the first things McKinney told the Indians when he spoke to them at the site was that "we do need to go forward as rapidly as possible."

So it's almost not surprising that the agreement worked out over the weekend was a total victory for the occupiers. Indian representatives—consisting of McGinnes, EDC staff and Indian Center members—received everything they wanted from Western LNG at this time and more.

The agreement, which was reached late Monday with the help of a federal mediator, calls for an archeological surface survey of the area being trenched to be done by mutually agreed upon experts. In case a significant archeological find is made, the trenching operation will be held up until a more detailed study of the site is done. Also, a group of no more than six Indian observers will be allowed on the site to monitor the survey and any ditch-digging that goes on.

Perhaps the most significant aspect of the agreement had little to do with the issues of archeological value and the consultation of local Indians; instead, it struck at the heart of the Indians' right to worship as they please. Once the Indians realized that Western LNG, for time and publicity purposes, was in a bargaining mood, they threw in one demand for good measure. They won the right of unrestricted access to the land for religious purposes now and if Western LNG gains title to the site. (The area

now belongs to Southern California Edison but will pass onto Western LNG if the LNG port is approved for Pt. Concepcion.)

This is the first time Native Americans have been granted the right to worship on sacred land which is private property.

Up Against a Timetable

THE LNG TIME FACTOR not only helped the Indians win a decisive settlement against Western LNG, but it seemed to dictate almost all the moves of the characters in the LNG drama.

The Coastal Commission must make its final recommendations on the LNG site by May 31; Western LNG must submit its seismic study to the PUC by June 2; and the PUC, according to state law, must make its final site decision by July 31. That leaves Western LNG only ten weeks to convince the PUC that Pt. Concepcion is not only their favored pet, but the *only* acceptable site for the terminal.

Ten weeks translates into a crisis timetable for bureaucratic mechanisms and most everyone involved thought that proper environmental review and the rights of local Indians would be the easiest "obstacles" to avoid.

When Art Darrow, the Dames and Moore geologist, was first asked why local Indians were not consulted before the ditch-digging began, he could only apologetically agree that "they should have been," and offered that even Clewlow, the Western LNG archeologist, advised Dames and Moore to do so as early as Tuesday.

Why didn't the geology firm contact an Indian group then? A Dames and Moore consultant who wishes to remain unidentified said that the firm asked Clewlow to make contact with an Indian group for them, but that Western LNG vice-president Maury Fuller caught wind of the matter and warned Clewlow not to notify any Indians since that "was not his responsibility."

The source added that Clewlow took this as an implied threat to his position as consultant to Western LNG and he took the warning to heart. Clewlow would not comment on the report, but at least one other source close to the situation confirmed the details, claiming to have first-hand knowledge of the threat to Clewlow.

Meanwhile, the PUC—which gave Western LNG only 29 days in which to make the seismic study—thought that the Indians were contacted by the firm. The PUC's LNG Project Co-ordinator, Fred John, said he believed the company was going to contact "both private and governmental authorities" before commencing with the earth removal, and that this would include Indian groups. He admitted his office was "at fault" in making a wrong assumption.

Spokespeople for Western LNG, when asked why Indians were not consulted, responded with "I can't tell why not" or "I don't know why." When asked if Clewlow was told not to contact any Indians, Al Pizano of the Southern California Gas Company, which owns Western LNG, said it was "impossible to believe."

The same kind of run-around explanations were offered by all parties when they were asked why a county grading permit was not applied for before a road was graded on the site to make way for the bulldozers.

Dames and Moore officials first said their firm was exempt because they were working on a project for the PUC; the next day they said the county's Public Works Department had visited the site and told them they did not need a permit. That same day, Friday, Western LNG said they were considering applying for a permit, but it was "unclear" whether it was needed. Meanwhile, the PUC claims to have thought that a permit was applied for all along.

In any event, Western LNG applied for a

county grading permit Monday morning—almost five days after work at the site had begun.

Cutting Corners

WHERE CORNERS were cut the most seems to be in the environmental/archeological arena—where it is apparent that state and federal site preservation laws were violated and that the PUC's own archeological report for the area was ignored. (See sidebar.) The Cultural Artifacts (archeological) section of the PUC's environmental impact report on the proposed LNG port found the Pt. Concepcion area to contain at least five ancient Chumash villages covering a 7,000 year history.

Since the report was based on a mere surface survey of the site, it recommended that "adequate subsurface archeological tests" be made in "sensitive areas" before any earth is removed, and that "concerned Native Americans" be consulted about a program to protect these archeological resources.

A source with a working knowledge of the report said that, since Chumash burial sites are known to exist in the area but have not yet been found, the bulldozers "could have been digging up anything."

Steve Rios of the state's Native American Heritage Commission said that he believes Western LNG violated California Environmental Quaility Act sections which stipulate that a study be made before any archeologically rich areas are dug up. He also said that certain Penal Code and Health and Safety Codes may have been violated, specifically in reference to burial laws.

At press-time, a team of archeologists was preparing to venture out to Pt. Concepcion to begin the survey that many believe should have been done last week.

The real battle for Pt. Concepcion, however, is still being waged at commission hearings and in the media as the days tick off toward the July 31 deadline for the PUC's LNG site decision.

When one considers how seriously the Indians took a ditch-digging project on the site, it doesn't take much imagination to realize how they will react to a monster LNG port being built at Pt. Concepcion.

At a recent PUC hearing, Archie Fire Lame Deer said, "We consider this area the most sacred of any area in the state of California," and though he did not want another violent Wounded Knee-type takeover, he continued, "if that's what it takes, and if that is what is to happen, then with our brothers from the Sioux nation, we'll come to help our brothers of the keepers of the Western Gate.,

June 16, 1978

Federal Energy Regulatory Commission
825 N. Capitol
Washington, D.C.. 20426

JUN 22 8 45 AM '78

Dear Sir:

The purpose of this letter is to voice my opinion on the proposed siting of an LNG facility at Pt. Concepcion. To build such a facility in what is possibly the last remaining undeveloped stretch of Southern California's coastline would be disastrous from many standpoints, a few of which are listed below.

1. Safety of Facility and Tankers - Taking into consideration the fact that an earthquake fault runs through the site area, I should think that alone would be sufficient cause to chose an alternate site. The Pt. Concepcion area is known as the Cape Horn of the Pacific, complete with adverse winds, currents, fogs and occasionally large swells. These factors I have first hand knowledge of, having frequented the area in my 16' boat. A few miles up the coast is Pt. Arguello, site of the U.S. Navy's largest peacetime disaster.

2. Potential Harm to Environment - Though the major reason I boat into Pt. Concepcion is for surfing, I also very much enjoy fishing Cojo Reef and other "fishing holes" in the area. This stretch of coastline is one of the few remaining areas in Southern California to provide consistently good fishing in unpolluted waters. Adverse effects of potential oil spillage from LNG support and service vehicles, in addition to cooled-discharges from an LNG plant could destroy the marine life in the area. Access roads built to service the site, the resulting increase in traffic, and construction of a pipeline through the area would also affect the wildlife on land. (Deer, bobcats, heron, coyotes, etc.)

3. Destruction of Surfing Breaks - The proposed LNG facility could radically alter or destroy the adjacent surfing breaks. The surf at Cojo Point would be completely wiped out. Any large breakwater built at the site would affect the down shore flow of sand, thus altering nearby breaks at Hollister Ranch. At these very breaks I've had some of the most memorable experiences of my thirteen and a half years of surfing. The Pt. Concepcion area has undoubtedly the best surf in Southern California, offering waves high in quality, power, and consistency.

There are so many reasons for preserving this beautiful stretch of coastline. I hope you are aware of all the consequences that would result from building an LNG facility at Pt. Concepcion and take them into serious consideration. Those of us who really love the shorline environment have lost many beautiful areas to various land developments and other forms of "progress". Help us to preserve the last of these areas in Southern California. Let the LNG plant be built in some place that's already been ruined by civilization, not at Pt. Concepcion.

Sincerely,

David G. Moeller

David G. Moeller
14971 Hope St.
Westminster, CA. 92683

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These issues are all covered in the DEIS and reiterated in the FEIS.

Julie E. Neal
814 Westwood Ln.
Aptos, Calif, 95003
August 16, 1978

Federal Energy Regulatory Commission
825 N. Capitol
Washington, DC 20426

Dear Sirs:

I am writing concerning the proposed LNG project at Coho Point. I want to voice my opinion against this proposal. My reasons are varied. I am concerned with the economic approach to Natural Gas, and why some regulations are not placed on this limited resource. I am also concerned about the damage that would result from any accident or attack on even one of the storage tanks.

The earthquake danger also seems eminent in any location along the California coastline. This has been demonstrated by the earthquake on August 13, 1978, which registered 5.1. What is the reasoning in creating an energy source and storehouse that could annihilate the men it was built to serve?

The rance has some of the most beautiful land and wildlife along the California coast. Thechange in water temperature will cause damage to the fish, and bird life and the vegetation.

It has also been noted by certain weather recordings that the wnds there can become very high at certain times of the year. These high winds can cause dangerous unloading conditions and combined with the similar recordings of high swells, could make unloading extremely dangerous.

I am a native Californian and registered voter. I am greatly concerned for my future and the future of others. I say stop this Coho Point Project and the use of Nuclear Energy!

PLEASE!

Julie E Neal

Comments noted.

19 William Street,
FAWKNER, VIC. 3060
AUSTRALIA

14th August, 1978

The President of the United States of America,
Mr Jimmy Carter,
The White House,
Pennsylvania Avenue,
WASHINGTON, D.C. 20 500, U.S.A.

Re: Proposed site of the Western Terminal Associates
LNG terminal at Point Conception/Cojo Bay, California, USA

Dear Mr President,

My name is Mark Sakautzky, I am of West German nationality and for three years I have been living in Melbourne, (Victoria/Australia). I am 24 years of age and started surfing 8 months ago.

I'm a pretty bad surfer, but I love it. It taught me to appreciate and accept nature - not to destroy my environment, but to live with it.

I have never been in California or the United States, nor have I ever surfed 'the Ranch' (Point Conception, Cojo Point). I know about Point Conception through the now monthly magazine SURFER and its extensive coverage in words and pictures about Cojo Bay and surrounding areas.

I ask you, I beg you, Mr President, to stop the proposed plans to industrialize Point Conception by putting up a huge LNG terminal which would destroy the surf, the beach and the land. The area was described as one of the last paradises, or to quote SURFER magazine: "Everybody knew that it didn't exist. It was just too much of a paradise."

Please, Mr President, try to get hold of photos and articles describing the unspoiled beauty of the area. Try to get some comments from people who live there and have surfed there. Or, even better, have a look at Point Conception yourself.

I probably haven't even got the right to write this letter asking, and begging, over 10,000 miles away from the U.S.A., not a U.S. citizen, but a West German, living in Australia.

Although I know about Point Conception only through magazines, it would make me very, very sad to see that beautiful place destroyed by an LNG terminal. And I'm sure I speak for a lot of other Australian surfers, too.

Please, Mr President, help Point Conception to retain its beauty and surf. You greeted the contestants and guests of the first All-American National Surfing Championships with these words:

> "Anyone who has seen an accomplished surfer swoop down the face of a big wave, can appreciate the popularity of this sport. Its striking visual appeal is heightened only by the athlete's precarious flirtation with the awesome power of the sea." (SURF, Spring 78, p.p.38)

...2/..

Comments noted.

I appeal to you, Mr President, to support the efforts of many American surfers to keep Point Conception alive and you will have the chance to see "an accomplished surfer swoop down the face of a big wave ...", and with luck, that will probably be at Cojo Point.

On the other hand, if Western Terminal Associates is given the go ahead to build an LNG terminal at Point Conception, you will have to hurry to see that surfer: there isn't much to see once the tankers are docking.

Mr President, thank you very much for reading this letter.

With hope for an unspoiled Point Conception, I remain,

Yours faithfully,

MARK SAKAUTZKY

This is an open letter, and carbon copies have been sent to the following:

Surfer Magazine, California, U.S.A.
Surf Magazine, Florida, U.S.A.
Surfing World Magazine, Sydney, N.S.W. Australia
Los Angeles Times, California, U.S.A.
Washington Post, Washington, D.C. U.S.A.

LNG California Coastal Commission, California, U.S.A.
Federal Energy Regulatory Commission, Washington, D.C. U.S.A.

Santa Barbara Indian Center
1614 State St.
Santa Barbara, Cal. 93101
(805) 963-5433

October 3, 1978

Mr Kenneth Plumb
Federal Energy Regulatory Commission
825 N. Capitol, Room 9310
Washington, D.C. 20003

We have reviewed the draft Environmental Impact Statement for the Federal Energy Regulatory Commission and we have found it inadquate in these areas.

1. There is virtually no mention of the impact of this project on the American Indians spiritual and religious issues.

2. The D.E.I.S. does not correctly assess the physical impact of the project on the Point Conception Site.

3. There is no Ethno-historic component to the D.E.I.S. which results in an inadequate assesment of the impacts to the American Indians concerns.

4. The D.E.I.S. as layed out does not consider any of the above problems, and does not adequately address proper mitigation procedures.

The C.P.U.C. made an attemt to address the American Indians concerns with a working Ethno-historic paper. This document was insufficient because of a lack of time and effort that the C.P.U.C. was willing to give. As a result the C.P.U.C. is still unable to adequately address the Spiritual and Religious concerns of the American Indians. This situation leaves them open to legal action from the American Indian People.

After our initial contact with you in Washington, we met with Roger Wise of your office. We explained to him that the Federal Energy Regulatory Commission effort should include an Ethno-historic component to correctly identify impacts to the American Indians. We also pointed out to Mr. Wise, that the Federal Energy Regulatory Commission effort should be better organized and planned than the C.P.U.C. attemt. Mr. Wise apparently does not understand his function in the total assesment of the impact of this project. Mr. Wise is an archaeologist, and is qualified to address only archaeological concerns. Mr. Wise's efforts to conduct an Ethno-historic study by telephone will not result in a complete picture of the problem. His inquiries into California can be better directed into a plan of involvement from your agency.

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Discussion of this topic has been expanded in the FEIS.

The applicant has proposed a rearrangement of the proposed terminal to avoid archaeological sites.

Discussion of this topic has been expanded in the FEIS.

See revised Recommendation No. 42 of Volume II of the DEIS.

No response required.

Ibid.

The Federal Energy Regulatory Commission should conduct hearings in California, and we expect a ruling on our position to intervene on that issue. The Indian Center of Santa Barbara would be willing to conduct an Ethnohistoric survey for your agency. We discussed this matter with you in Washington and we will follow up with a written program of involvement for you to consider.

In Spirit,

Lee Dixon

Lee Dixon
Director

LD/cb

c.c. Marc McGinnes
1005 Santa Barbara St.
Santa Barbara, CA 93101

Native American Heritage Commission
Steve Rios
1400 Tenth St.
Sacramento, CA 95814

Roger Wise
Federal Energy Regulatory Commission
825 N. Capitol
Washington, D.C. 20003

No response required - pending receipt of the written program.

LAW OFFICES
RONALD J. WILSON
810 18TH STREET, N.W.
WASHINGTON, D.C. 20006
TELEPHONE (202) 628-3160

June 5, 1978

Mr. Kenneth F. Plumb
Secretary
Federal Energy Regulatory Commission
Room 9310
825 N. Capitol St., N.E.
Washington, D.C. 20426

Re: Pacific Alaska LNG Co., et al.
FERC Docket Nos. CP75-140, et al.

Dear Mr. Plumb:

Please accept for filing an original and four copies of the Sierra Club's comments on Staff's Draft Environmental Impact Statement for the Western LNG Project.

Very truly yours,

Lee L. Bishop
Attorney for Sierra Club

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

In the Matter of	)	
	)	
Pacific Alaska LNG Co., et al.	)	Docket Nos. CP75-140, et al.
	)	
Pacific Indonesia LNG Co., et al.	)	Docket Nos. CP74-160, et al.

COMMENTS BY SIERRA CLUB ON THE STAFF DRAFT ENVIRONMENTAL IMPACT STATEMENT ON THE WESTERN LNG PROJECT

Lee L. Bishop
Ronald J. Wilson
810 18th Street, N.W.
Room #802
Washington, D.C. 20006

Attorneys for Sierra Club

June 5, 1978

COMMENTS BY SIERRA CLUB ON STAFF DRAFT ENVIRONMENTAL IMPACT STATEMENT ON THE WESTERN LNG PROJECT

The Point Conception area has been the subject of repeated studies over several years for its suitability as a LNG terminal. Not suprisingly, this draft EIS agrees with the others that Point Conception is not the preferred site for a LNG terminal. The Sierra Club strongly agrees with this conclusion. The Club offers the following comments to assist the Commission Staff in supplementing this DEIS with new information, and to draw the Staff's attention to certain areas that are not adequately discussed.

1. Need

At the outset, the FEIS should fully address the issue of need from an independent perspective. For example, the Staff must consider a brief filed May 30, 1978, by the California Energy Conservation and Development Commission with the California Public Utilities Commission (CPUC). In that brief, it is urged that LNG is not needed as part of the California fuel mix until the late 1980's and perhaps 1990. The implications of this finding affect many aspects of the DEIS. For example, if it is not necessary to construct a LNG terminal by 1982, the Commission can and should decide that the public interest requires that no terminal be built at this time. California's (and the nation's) natural gas needs may then be satisfied by the full development of the Alcan project, the development of other fuel sources, or the construction of an off-shore terminal at some later date. There are simply too many variables which are not realized to risk the danger inherent in a project of this type.

Comment reflected in Section H-5 of Volume II of the FEIS.

2. The Alaska Lateral Pipeline Option

Volume I of the DEIS discusses the merits of a lateral pipeline, to connect the Cook Inlet gas fields to the Alcan project (thus eliminating the need for liquifaction facilities in Alaska and regasification facilities in California). This comparison should be expanded to include the proposal advanced by counsel for Hollister Ranch in his letter to Commission Staff Counsel on March 6, 1978. That proposal, the subject of an informal conference on March 30, 1978, envisioned sale of Indonesian gas to Japan and the inclusion of all Alaskan gas in the Alcan project, and suggested that it made little sense for the United States to liquify and import foreign gas from Indonesia while the U.S. was simultaneously liquifying and exporting natural gas to Japan. While the companies involved were less than

On December 30, 1977, the Department of Energy approved the applications, as amended, of Pacific Indonesia LNG Company and Western LNG Terminal Associates to import LNG from Indonesia over a 20-year period and to deliver this gas at Oxnard, California. This proposal would deliver 500 million cfd of Indonesian gas. Phillips-Marathon LNG Company is currently exporting about 150 million cfd to Japan. An exchange of Alaskan gas for Indonesian gas would result in a 350 million cfd shortfall. Therefore, such an alternative is unacceptable because the 500 million cfd import has been found to be in the public interest.

enthusiastic about this plan, the Staff should remember that their responsibility is to the public convenience and necessity, and that duplicative LNG facilities may not be either necessary or convenient. This option deserves full, in depth analysis, particularly in light of the fact that it may not be necessary to import LNG until the late 1980's or early 1990's (see paragraph 1, supra).

3. Incongruities with California EIR

In several instances the DEIS is inconsistent with base data offered by the Applicants in the parallel California proceeding. These differences should be reconciled.

a) Page 2 of the DEIS states that the facility will receive "initially" 130 to 700 MMCFD from Indonesia "and/or" Alaska (Phase One), and that the DEIS will assume that the full capacity baseload of the plant is 1.0 billion cfd (conclusion of Phase II). The construction timetable (Figure 5) indicates that the facility will "start-up" Phase One by January 1982, and Phase Two by January, 1983. The California DEIR states on page 1-3, "...Western LNG would...have the necessary portions of the terminal ready to receive LNG quantities up to 500 MMCFD from Indonesia by April 1, 1982. ...(U)p to an additional 400 MMCFD from Alaska...is expected on April 1, 1983."

Figure 5 of the DEIS indicates Phase I is operational in April 1982 and Phase II in April 1983. There is no inconsistency.

Since, according to the Applicant, the supply of gas is critical to make up supposed shortfalls in the winter 1982-3, the differences in initial throughput quantities should be reconciled. Exactly how much LNG is the Applicant proposing to provide for gasification and use in the California natural gas market? The significance of the disparities relative to need is that if LNG is not needed in California until after 1985, then further consideration of alternative sites (including offshore) seems warranted and plausible, without significant adverse economic consequences for California or the nation.

The need of the LNG is beyond the scope of the EIS.

b) Similarly, page 3 of the DEIS states that "Western Terminal proposes to construct and operate two 550,000 barrel LNG storage tanks... ." Again, the description of the project before FERC differs in an important detail from the project pending before California agencies. The DEIR states that "Two tanks will be required initailly, and a third tank will be required for the full 1.3 BCFD send-out." (Page 2-8). However, in its review, the California Coastal Commission noted that "if an approved terminal reaches the maximum gas delivery rate authorized under the LNG Terminal Act, 1.3 billion cubic feet per day, additions may be needed to the terminal to increase the reliability of LNG tanker berthing and unloading..." (Staff Recommendation on Ranking of LNG Terminal Sites, May 5, 1978 at 16). The FEIS should address the possibility of full send-out of 1.3 BCFD and its implications on facility expansion and increased impact on the environment.

Previously discussed on page 17 of Volume II of the DEIS.

c) On page 3, the DEIS states: "The marine terminal would occupy...subtidal land extending approximately 4,600 feet offshore to a depth of 60 feet mean lower low water (MLLW)."

There seems to be considerable confusion in the environmental reviews as to exactly what the water depth at the berth really is. The California DEIR in one place offers the same depth (60 feet MLLW) as the DEIS (DEIR page 3-26), but in another (DEIR, page 2-8) states that the depth is 50 feet MLLW. Technical Report 5A to the California PUC (page 2, Figure 1, "Site Bathymetry") indicates that the berth is located just seaward of the 50 foot isobath. The "Draft Vessel Traffic Analysis" prepared by consultant J. J. McMullen for the PUC relied on a 54 foot water depth at the berth (pages 5-13 and 5-10). And Western LNG's California application to the CPUC (Tab "A", page A-1) notes "a 50-foot mean lower low water (MLLW) water depth. ..."

The significance of this uncertainty lies in the fact that LNG tankers have a draft of 36-38 feet, depending upon which shipyard builds the 125,000 dwt to 130,000 dwt ships. The Applicant has stated (Application to CPUC, Tab B, page B-8) that tidal variations are from plus 8 feet (extreme high water) to minus 2.5 feet (extreme low water). Assuming the water depth to be 50 feet at MLLW, should the tanker for any reason depart from the horizontal plane (sudden gusts, currents, heel, etc.), it would come near the bottom. Page 164 of the DEIS, in the discussion of mooring force limits, cites a 12 foot downward motion of the ship's keel as one limit. If the tanker has a 38 foot draft and the keel moves down 12 feet, the ship bottoms out.

More important, perhaps, is the fact that Technical Report 5A, Figure 1, indicates the 40 foot isobath to be approximately 1/16th mile from the western end of the berth. Given that LNG tankers are about 1/5th mile in length, we wonder how this shallow area could be avoided over hundreds of tanker trips during all kinds of conditions? Would the area have to be dredged to maintain adequate water depths for the ships? What would the impacts be on water quality and down-current productivity? If dredging is not to be performed, are the three committed tugs (and their lines) sufficiently powerful to prevent the tankers from being forced into shallower waters by adverse weather or malfunction and potentially grounding or ramming the trestle/pipeline?

In response to inquires made of the applicant, the depth of water at the proposed berth varies from 52 to 56 feet below MLLW. No dredging is required to maintain an adequate water depth. Four tugs are proposed to be provided and it is expected that these tugs would have sufficient capability to handle the LNG ships both under normal and extreme climatic conditions.

d) DEIS Page 9, "The vaporization plant would require an average of 108,000 gallons per minute of seawater..."

The California DEIR states (Page 2-10) that 110,000 gpm would be required for vaporization of 900 MMCFD and 160,000 for 1.3 BCFD. Over extended periods of time, the additional cooled discharge could have a significatn effect on biota near the diffuser.

Comment reflected in Section C-7b of the FEIS.

e) DEIS Page 10, "The terminal's daily electrical power requirements would be 35,000 kilowatts (KW) peak and 25,000 average..."

The California DEIR states (page 2-13) that "When operating at the design capacity of 1.3 BCFD, the terminal requires, on the average, 39.6 MW of electrical power for its operation. ..." The difference, computed over a year, is significant in terms of its effects on Southern California air quality.

The 35 MW peak figure is for a 1.2 Bcfd peak day. On a 1.6 Bcfd peak day (1.3 average) the terminal requires 46 MW of electrical power. Also see Section C-11 of Volume II of the FEIS.

f) DEIS Page 116, "The developments around Government Point include oil storage tanks..."

This statement is misleading. As the California DEIR correctly points out, there is not a tank farm as might be inferred from the DEIS, but rather "a railroad line and a 55,000 barrel, white-painted oil tank. ..." (at 3-59).

Comment reflected in Section B-9 of the FEIS.

4. Geologic Fault at Point Conception

The DEIS does not reference the recent discovery of an active fault at the plant site. (DEIS at 33, 143). In considering the effect of this discovery on the acceptability of Point Conception as a LNG terminal site, the FERC Staff should note that the staff of the California Coastal Commission (CCC) deleted the Las Varas site after a small thrust fault was discovered there. (The staff report was subsequently adopted by the full Commission on May 24, 1978). The CCC staff further stated that: "Applying the same reasoning and caution which caused the Comcission to remove Las Varas would also mean eliminating the Little Cojo site from further evaluation. However, the Liquefied Natural Gas Terminal Act of 1977 precludes that action. Since it is the applied-fore (sic) site, it must be ranked by the Coastal Commission. If it were not for the requirements of the legislation, that specific site would not longer be considered." Staff Recommendation on Ranking of LNG Terminal Sites, California Coastal Commission (May 5, 1978) at 16.

In light of FERC's policy of eliminating sites with active faults (Heisler letter to Island, May 8, 1978), Point Conception should be eliminated as a potential site.

Comment reflected in Section B-3 of Volume II of the FEIS.

5. Wind and Wave

The information in the DEIS on climate and the effect on wave heights is dangerously imprecise. Data derived from National Ocean Survey wave measurement stations over twenty-five miles from the proposed site (DEIS at 65-6) is not representative of Point Conception or Cojo Bay. In addition, the methodological naivete with which some wind data is accepted as "representative of the region" while other data is rejected because of incompatible format (DEIS, at 21) is completely unacceptable. As Rea Strange's testimony has shown (filed April 3, 1978), it is extremely important that precise wind and wave estimates be calculated for Cojo Bay, due to its severe and peculiar weather patterns. The

The DEIS states that Mr. Strange's data was not presented because of its imcompatible format. As stated on page 21 of Volume II of the DEIS, his data was reviewed along with others and that the STAR program for Point Arguello was used for the reasons stated. Also, see Sections B-5b and C-5b of the FEIS.

Staff should review and evaluate Mr. Strange's site-specific data and the experience of similar vessels in severe weather conditions at the Cove Point, Maryland LNG Terminal before any conclusions can be reached on the suitability of Cojo Bay.

6. Offshore Sites

The DEIS dismisses the alternative of offshore sites in general after a discussion covering four pages (DEIS, at 264-67). This is completely unacceptable. Offshore siting should be fully and adequately considered as an alternative to the proposed action, as required by the National Environmental Policy Act, 42 U.S.C. Section 4332 (2)(C)(iii).

The DEIS concludes that all offshore sites are not worthy of serious consideration because of three factors:

1) Need for further research and development;

2) Inability of existing technology to construct facilities of a sufficient size within the time-frame required (i.e., by 1983);

3) Need for further legislative or regulatory action for sites not on natural or manmade islands. (DEIS, at 265-7).

All of these conclusions are directly challenged by the interim report, "California Offshore LNG Terminal Study," released on February 1, 1978, by the California Coastal Commission. That report concluded that "It is clearly feasible to construct a liquified natural gas (LNG) terminal offshore of the California mainland." (Id, at ii). Regarding the "state of the art" for offshore sites, the report states:

> "The planning and construction of large offshore facilities has accelerated during the last decade. Thousands of offshore oil platforms and tens of offshore oil storage and tanker terminals have been placed off California, in the Gulf of Mexico, in the North Sea, the Persian Gulf and the Mediterranean Sea. Exxon in building an offshore oil storage and tanker terminal 3 1/2 miles from shore in the Santa Barbara Channel. (California sought to find satisfactory ways of having this terminal built onshore). ARCO operates a floating barge type liquid petroleum gas terminal in the Ardjuna Field off Indonesia, and an offshore LNG receiving terminal on the man-made Canvey Island in the English Channel has been operating for about 14 years. Belgium is planning a hybrid LNG receiving terminal at Zeebrugge, with floating storage and the process plant on an artificial island, while PetroCanada is considering an offshore LNG export terminal near the Arctic Circle. A major conclusion, derived from examining these projects, from interviewing 12 designer-builder groups, and from discussion with experts, is that

Additional information regarding offshore siting has been added to Section H-2a of Volume II of the FEIS.

> the major development work on systems needed for offshore LNG terminals, the LNG loading arms, the moorings, tanks, pile supports, barges, swivel joints and docking systems, has already been done. What is required is design work, arranging the systems and designing the structures for specific sites." (Emphasis added, Id. at 3).

It should be noted that the study assumed that an offshore terminal

> "should be able to perform at the same level as the terminal currently proposed by Western LNG Terminal Associates for a site near Point Conception. This means an ability to continuously deliver about 1.3 billion cubic feet (bcf) a day of gas to the distribution system, with an LNG tanker arriving about once every two days... . The basic siting requirements for a terminal would change little if the assumed size were halved or doubled." (Id at 3).

While the report recognized several problems with offshore sites, the staff concluded that six offshore siting zones might be suitable: "offshore of Camp Pendleton in San Diego County, the Eastern Channel Shelf in the Santa Barbara Channel, Bechers Bay at Santa Rosa Island, and three zones at Santa Cruz Island." (Id. at iii).

The report states that while construction of an offshore site could be completed within four years, regulatory delays could require an additional two to four years of lead time. (Id. at iii). Although this puts off the operation of an offshore site until the mid 1980's, the recently released brief on California's need for LNG indicates that a terminal need not be in operation until the late 1980's or early 1990's. (Supra, paragraph 1). This should permit State and Federal authorities sufficient time to consider fully the offshore alternative. The Staff's Final EIS should fully evaluate the contents and conclusions of this CCC interim report and all future reports on this subject issued by the CCC prior to the publishing of the FEIS.*

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*/ On May 30, 1978, the CCC issued a "Progress Report on the Offshore LNG Terminal Study - February 1 - May 22." That report confirmed the conclusions stated in the Feb.1 interim report, and disucssed the progress toward completing the final report.

7. Small Craft Breakwater

The DEIS (at 141-142) mentions a small craft breakwater as part of the facility. If such a breakwater is needed, then the DEIS should discuss the reasons why it is needed. If the breakwater is to shelter the craft when they are not in use, is the reader to assume that they will not be used to assist in tanker docking during weather conditions exceeding a threshold level? What is that threshold? Why isn't a breakwater needed to shelter them when they are assisting the tanker? At the Indonesian liquifaction facility, a breakwater is being constructed for protection of the tankers during loading and docking. How do sea conditions differ in California so that a breakwater for tankers is not needed? Why is the breakwater deleted from the California DEIR but retained by FERC? What sedimentation impacts on operations and nearby kelp beds will occur from a small craft or tanker breakwater? Where will the stone and rock for such a breakwater be optained? Will dredging be required to keep the berth and approach lanes from shoaling, either because of the breakwater or the trestle?

Comment reflected in Sections A and E of Volume II of the FEIS.

8. Fresh Water Wells

On page 155, the DEIS states that "The use of onsite wells to provide freshwater requirements to the plant could result in groundwater impact."

In the application to the California PUC, Western LNG (Application, Tab B, page B-5) indicates the need for an unspecified number of freshwater wells to provide water for fire protection, plant water, and potable water. No specific quantities are indicated, although at least one 5,000 gallon tank, one 5,000 barrel tank, and one 20,000 gallon storage tank will be built at the site. The location of wells (on- or off-site) is not indicated. It should be noted that Santa Barbara County has imposed a number of water-connection bans within its jurisdiction and that the California Coastal Commission has denied numerous water-well applications for non-agricultural or coastally-dependent recreational uses pursuant to the 1976 Coastal Act. The Hollister Ranch itself has experienced water shortages and has consequently built several agricultural dams to impound coastal streams. The adequacy of coastal freshwater aquifers in coastal Santa Barbara County to supply existing uses is in doubt. The EIS should therefore address the availability of alternative freshwater sources and provide for an aquifer study to dteremine a safe yield without degradation of water quality through saltwater intrusion, and potential adverse effects on the riparian habitat.

Comment reflected in Sections C-5 and Section I of Volume II of the FEIS.

9. Safety

There are several safety-related issues which are not adequately addressed in the DEIS.

a) The discussion of safety issues at 218, et seq., omits consideration of the cryogenic pipeline and trestle linking the

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berthing area to the storage tanks. In that the trestle and pipeline present a large obstacle which could be hit by other vessels, it is striking that no detailed design for the trestle has been done. For example, the DEIS states on page 6 that the deck height of the trestle would be 40 feet above mean sea level. Have any studies been done which consider the adequacy of this elevation in the event of storm wave superelevation? Are there underwater faults along the trestle route? Have contingency plans been developed to prevent a disabled or over-powered tanker from colliding with the trestle during storm conditions? Will the pipeline be provided with a trestle spill containment mechanism? What would the effect be of a sizeable LNG spill on the trestle itself?

Since the trestle and transfer line are approximately 5.5 miles north of the nearest edge of the Santa Barbara Channel, it is highly unlikely that any large vessels would ram the trestle. Any small vessels which would be in the vicinity of the trestle would be able to easily maneuver around it. Storm wave "superelevation" high enough to submerge the trestle is highly unlikely. (See Section B5b) It is impractical to design the trestle much higher since the unloading arm height must be compatible with the unloading connections on the LNG tanker. In the event of severe storm conditions, unloading operations would cease and the LNG tanker would move away from the dock and anchor at a safe distance from the trestle. There are underwater faults under the trestle route.

b) During the public hearings before the Coastal Commission in Santa Barbara on April 11, 1978, witnesses reported the presence of two underwater obstructions near the proposed tanker berth: (1) capped and abandoned oil well heads approximately one mile to the east of the berth, and (2) an underwater, 40-foot diameter pinnacle rising to 4-fathoms below the surface several miles offshore the berth locations and most recently identified on 1962 coastal charts. Since both of these are at the edge of the tanker approach routes to the berth, how will these be avoided, marked or removed? What impacts will removal of the latter have on biota that have colonized them?

No spill containment would be provided for the over-water portions of the trestle, other than at the unloading dock. An LNG spill is not expected to cause any severe damage to the trestle.

The existence of a pinnacle is still under research. Item 1 was previously discussed on page 241 of Volume II of the FEIS.

c) Will the Coast Guard require a "moving safety zone" around an LNG tanker, as they require at the Everett, Mass. Distrigas terminal? How will this zone affect commercial, private, and military traffic (water and air craft)?

The Coast Guard would prepare contingency and safety plans if the project is approved.

d) On page 229, the DEIS states that "Containment for the LNG transfer line at the railroad crossing...is planned...."

The Southern Pacific Railroad track is used by two passenger trains and an undetermined number of freight trains per day. To assure the safety of the LNG facility, what protection against a train derailment at the LNG terminal site will be provided? Are any hazardous cargoes carried in the freight trains that could ignite during a derailment? What limitations, if any, apply to train movements now (speed, weight, etc.)? Will train schedules be altered to allow for LNG throughput?

The LNG transfer line is proposed to be built under the tracks, away from train mishaps.

e) DEIS Page 231, Operation and Maintenance. Since the facility is proposed to be built in phases, with some units already in operation while others are still being built, what construction precautions will be taken to minimize adverse effects on the existing facility from such activities as welding?

This would be the subject matter of further environmental review if and when these facilities are proposed.

10. Spills

The section of the DEIS dealing with spills (at 187-8) is deficient in several respects. Chemical spill retention basins should be included within the grading plan. An oil spill contin-

gency plan must be prepared pursuant to the Clean Water Act of 1977, 33 U.S.C. 1251 et seq., and it should address the maximum credible spill, not merely an "average" spill. If, as the DEIS notes, it "may be difficult to implement [such a plan] in the harsh wind and wave conditions of Point Conception" (DEIS at 188), perhaps tankers should not be refueled at the proposed site. At the very least, refueling should be limited to those times when an acceptable plan can be implemented.

Comment reflected in Section C-7b of the FEIS.

Given that Staff recognizes the controversy among the scientific community over the effect of a large LNG spill (DEIS at 220-3), the project should be delayed until more reliable and generally acceptable data is prepared. This option is particularly reasonable in light of the gas supply studies referenced in paragraph 1, supra, which indicate that LNG importation may not be necessary in California until 1990.

Staff's risk analysis adequately addresses the effects of a large LNG spill.

11. Marine Impacts

While it is true that kelp growth normally recovers quite rapidly (DEIS at 170), that normal growth rate may be slowed significantly due to decrease in sunlight (because of the trestle), continuous vessel movements in close proximity to the bottom (see paragraph 3, supra), and possible spills of Bunker C oil.

The proposed seawater exchange system poses several problems. (DEIS 157 et seq., 232). The Staff Recommendation on Ranking of LNG Terminal Sites, prepared for the California Coastal Commission on May 5, 1978, included the following special condition:

> "A seawater exchange system for vaporizing LNG shall not be installed or used at Little Cojo and all electricity used at the site shall be generated on site....The seawater exchange system proposed by the applicant to regasify LNG would have a serious impact on marine resources, including fish, fish eggs, and invertebrate larvae, through impingement, entrainment, and damage from anti-fouling chemicals. The construction of the conduits would also temporarily damage marine resources. Elimination of the seawater exchange system would eliminate these adverse impacts on the marine resources of the Little Cojo area. The Cove Point, Maryland, LNG terminal uses gas fired vaporizers instead of a seawater system. Electricity would be needed at a Little Cojo site as it would at any terminal site to run pumps and other equipment. Elimination of the seawater exchange system would eliminate a major power use at the terminal. If the electricity were brought to the terminal by transmission lines, the lines would traverse about 40 miles over the coastal area between Little Cojo and Goleta, adversely affecting views and wildlife habitat. On site electricity generation seems feasible and would eliminate these adverse impacts of the

Comment reflected in Section C-5b of the FEIS.

transmission lines. Indications are that the Cove Point, Maryland LNG terminal uses about two percent of the LNG throughput there to generate electricity and regasify the LNG. (Emphasis added, at 51,2).

The Sierra Club concurs with this recommendation.

12. Sport Fishing

The DEIS on page 181 states: "Entrainment should have only minor impacts on local sport fishing, since sport fishing is not particularly important to this remote coastal region..."

In its report to the California Coastal Commission, the California Department of Fish and Game (at 139) stated that "Sport fishing in the (Pt. Conception) area has historically been low, but more recently the area has become an important destination for both party boats and private boats despite the great distance to the site from the nearest port. The catch per unit effort in the area is recently reported to be high."

The major impact on sport fishing would be the imposition of an exclusion zone which would probably vary from 50-200 yards of the trestle, depending on whether a ship is berthed or not. Consequently, the impact on sport fishing is not expected to be large. It should also be noted that the CPUC FEIS also states that the catch per unit effort for Point Conception is one-half or less of other alternative sites.

13. Local Approval

Page 225 of the DEIS states "Approval from federal, state, and local agencies...is required...."

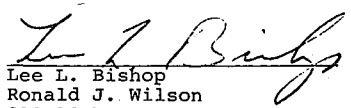
The DEIS should note that pursuant to the California LNG Terminal Siting Act of 1977, local governments are pre-empted in their regulatory and planning roles relative to LNG terminal siting.

It is staff's legal opinion that this Act is unconstitutional.

14. Land Use

Page 117 of the DEIS states that "the Bixby Ranch Corporation is currently planning to develop its coastal properties immediately adjacent to the proposed site." The DEIS should note that any development by Bixby (aside form an LNG-related project) will require approval from the California Coastal Commission. According to the requirements of the California Coastal Act of 1976, the Commission is charged with protecting the scenic and recreational qualities of the area. In addition, any approved development by Hollister and Bixby may require public access to the currently private beaches at Point Conception, pursuant to Sections 30210-30212 of the Coastal Act.

Comment reflected in Section B-9c of the FEIS.



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June 5, 1978

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May 8, 1978

Federal Energy Regulatory Commission
825 North Capitol
Washington D. C. 20426

Dear Sirs:

SUBJECT: PROPOSED LNG TERMINAL, COJO POINT, CALIFORNIA

A LNG terminal at Cojo would be an economical and environmental disaster. We cannot afford to be so short-sighted as to rape one of the last unspoiled coastal areas in California.

I can personally attest to the fact that the sea and weather conditions are very unstable in that area. This alone would eliminate Cojo Point as a possible LNG terminal.

Sincerely,

Paul Slavik

Paul Slavik
11109 Lynrose Street
Acadia, CA 91006

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No response required.

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June 5, 1978

The Honorable Kenneth F. Plumb
Secretary
Federal Energy Regulatory Commission
Washington, D.C. 20426

Dear Mr. Plumb:

Enclosed herewith please find our comments to the Draft Environmental Impact Statement issued on April 21, 1978 in Docket Nos. CP 75-83-2 and CP 75-140.

Please note that our submission includes an appendix containing the comments of Dr. Dale Straughan, a marine biologist, made on behalf of the Fred H. Bixby Ranch Company.

Our comments specify reactions to, including some differences with, the DEIS in a variety of areas, including marine biology, seismicity, historical resources, land use and aesthetics, and alternate access roads and pipeline routes. Accordingly, pursuant to Commission Rule 2.82(c), we hereby notify you of our "desire to be heard" on those issues and our present intention to offer evidence in some or all of those areas.

Staff Counsel has informed us that it is not necessary to serve copies of our comments on other parties to the proceedings for which the draft statement was prepared.

Nevertheless, we have served copies on counsel for the active parties to those proceedings -- the Applicants, Hollister Ranch Owners' Association, the People and the Public Utilities Commission of the State of California, San Diego Gas & Electric Co., the State of Alaska, Sierra Club, and Chevron USA. We have also served copies of this letter on all parties and will, upon request, provide any party with a copy of our comments.

In accordance with Commission Rule 2.82(b), we will submit ten copies of our comments to the Council on Environmental Quality.

Sincerely yours,

George A. Avery
Jeffrey F. Liss

Counsel for the
Fred H. Bixby Ranch Company

Enclosures

cc: All Parties

COMMENTS OF THE FRED H. BIXBY RANCH COMPANY
TO THE FERC'S DRAFT ENVIRONMENTAL IMPACT
STATEMENT FILED IN CP 75-140 and CP 75-83-1

These comments on the Draft Environmental Impact Statement (DEIS) filed by the Staff of the Federal Energy Regulatory Commission in CP 75-140 and CP-83-2 are submitted on behalf of the Fred H. Bixby Ranch Company ("Bixby").*/ In In part I, Bixby comments on the findings of the DEIS as to specific characteristics of the project areas at Point Conception and along the proposed pipeline route, and on the expected impacts of the project thereupon. In part II, Bixby comments on the Staff's evaluation of various alternatives to the project as currently proposed. In part III, Bixby comments on the conclusions reached in the DEIS.

I. CHARACTERISTICS OF AND IMPACTS UPON THE PROJECT AREAS

A. GEOLOGY AND SEISMICITY - Bixby adopts the comments to the DEIS on geology and seismicity made on behalf of

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*/ Proceeding Nos 75-83-2 and 75-140 have been consolidated. Bixby is an intervenor in the consolidated proceeding, Pacfic Alaska LNG Co. Bixby is a California firm that manages 23,000 acres of land in Santa Barbara County on the California coast, bordering the site for the LNG terminal proposed in this proceeding. Bixby's property is in an environmentally pristine area of the coast. Construction of the LNG terminal proposed in this proceeding would have severe adverse impacts on the economic and aesthetic value of Bixby's property.

the Hollister Ranch Owners' Association and the Santa Barbara Citizens for Environmental Defense. Further, Bixby takes exception to Dames and Moore's approach which downgrades the significance of movement in Late Pleistocene time (see DEIS Vol. II-45). Along with movement in Holocene time, movement in Late Pleistocene time also indicates geologically recent movement, assuming the geologic or seismic environment at the site in question has not changed between the Late Pleistocene and the Holocene epochs. Consultants for Bixby have reviewed the evidence discussed in the DEIS and have concluded that there is no evidence that the geologic or seismic environments at the proposed LNG plant site changed between those periods. Thus, if investigation at the site indicates that there was movement in Late Pleistocene time, that movement would constitute evidence of geologically recent activity at the site, regardless of the evidence for or against movement in the Holocene period.

Bixby shares the Staff's skepticism as to Dames and Moore's conclusions that the South and North Branches of the Santa Ynez River Fault are not at least potentially significant. This conclusion by Dames and Moore is inconsistently drawn and is possibly unconservative in light of the fact that these branches are part of the admittedly significant Santa Ynez Fault system. Without evidence to

This is not a comment on staff's DEIS. It takes exception to Dames and Moore's seismic approach.

the contrary, it would be prudent to consider the possibility that future movement on the main Santa Ynez Fault could just as well continue westward along the Pacific-North Branch and South Branch of the Santa Ynez Fault as it could along the Santa Ynez River Fault, as postulated by Dames and Moore. In fact, from a directional point of view, the former would appear to be the more preferable elongation of the main Santa Ynez Fault, as depicted on Plate 12 of Dames and Moore's July 8, 1977 report. In addition, there is evidence of late Pleistocene activity on all three faults. In short, the evidence to date is the same relating to all three faults, and the conservative conclusion must therefore be that they have a similar probability of activity (although the level potential of that activity may or may not be similar).

B. TOPOGRAPHY - At II-141, the DEIS states that the proposed facilities would have "limited impact upon the topography . . . of the areas in which they would be located." The evidence adduced by the DEIS, however, belies that conclusion. As the DEIS relates, construction and operation of the plant and related facilities would have the following impacts on the topography of the areas affected:

(a) Grading of approximately 2 million cubic yards of material at the site;

(b) Changes in the erosion regime of the site caused by the marine trestle and especially by the breakwater for the small boat harbor; this would result,

Comment reflected in Section C-3 of Volume II of the FEIS.

inter alia, in increased sediment deposition and a decrease in sediment supply to the east, leading to erosion of beaches toward Santa Barbara;

(c) Ridge-cutting on over 65 miles of the proposed 112.4-mile pipeline corridor, which is of special concern since much of the area affected is within a high rainfall region;

(d) A tremendous potential for increased erosion due to removal of natural vegetation at the site and along the pipeline route and access roads; and

(e) the potential for significant erosion caused by improper release of water used for hydrostatic testing of the pipeline.

The list above is not exhaustive. Moreover, the discussion of topography at II-141 to 143 reveals that the level of knowledge as to likely impacts is incomplete indeed. For example, the DEIS indicates that "preliminary analysis" leads to a conclusion that the marine trestle "can be built to avoid significant impact on sediment transport;" the DEIS does not reveal, however, what further steps and analyses will be taken to ensure this treatment of the trestle, nor when a final conclusion on the point is likely to be reached. Further, the DEIS does not reveal the likelihood that water used for hydrostatic testing could be released improperly and/or the steps that can be taken to avoid such a consequence. In light of these ambiguities and, more important, in light of the

admittedly sizeable impacts, the DEIS should reflect that the proposed project will have not a "limited" impact on topography but a very real and significant one.

C. SOILS - Bixby agrees that: "Project construction would have the potential for major impacts to the soils of the proposed project area primarily through increased erosion and by altering the soil profile through trenching and backfilling." (II-148) Indeed, the Staff's discussion of impacts on soils at pages II-148 to 154 makes it clear that such major impacts are unavoidable.

No response required.

In this connection, it should be stated explicitly that the extent of unavoidable impact caused by pipeline construction is, to a large extent, a function of the length of the pipeline. While that conclusion obviously follows from the discussion of soils, and, for that matter the discussion of topography as well, it is not stated explicitly in those portions of the DEIS.

The extent of soil-related impacts is not necessarily a function of the length of the pipeline but rather of the types of soils crossed, the sensitivity of these soils to construction related impacts and the use of appropriate mitigation measures.

At II-152, the DEIS points out that: "Severe flooding, should it occur, could have the potential to expose the pipeline or cause its rupture." The DEIS notes, however, that such flooding is "not a common occurence." [Emphasis added.] In light of the extremely serious results that a pipeline rupture would cause, there should be an expanded discussion of how often severe flooding would be likely to occur along

The possibility of a pipeline rupture due to flooding is extremely remote. This statement was included in the DEIS simply to indicate that there was a possibility.

the pipeline route. It is obvious that if there is a statistical likelihood that severe flooding will occur during the lifetime of the project, then a significant risk is assumed even if the likelihood is that such flooding will occur only once or twice during that period. In addition, the DEIS should explore the likelihood that such severe flooding will in fact cause a pipeline rupture; more information is required than simply the knowledge that severe flooding "could have the potential" to expose the pipeline or cause its rupture.

On the same page, the DEIS notes that preliminary soil investigations "have indicated that site foundation conditions are favorable." The DEIS goes on to assure that further study "would be conducted prior to construction." The DEIS should evaluate how reliable it believes the preliminary soil investigations to be. If there is a significant risk that foundation conditions will ultimately be found unfavorable, much time and effort will have been wasted in pursuing the project.

D. WATER RESOURCES - In general, the assessment of the impact of the project on the hydrology of the site and along the pipeline route reveals that the applicant has not yet provided enough information for a proper evaluation to be made. For example, the DEIS reveals that construction wastes from the site could reach the sea; that local ground water flow could be temporarily altered and erosion increased

Recent findings concerning site subsurface conditions, specifically in the area of faulting, are discussed in the "Geology" sections of the FEIS.

because of dewatering discharges; and that insufficient data exists to predict how much water could be withdrawn from on-site water wells without overdrafting the aquifer at the site. The DEIS recognizes that, as to the pipeline route, the applicant has not completed the gathering of site-specific information regarding shorelines, streambanks, adjacent drainage areas, and areas subject to siltation and turbidity. Thus, the DEIS admits that "only generalized comments concerning anticipated hydrologic impacts can be made." (II-155) The DEIS goes on to catalogue a series of potentially serious impacts. It is obvious, therefore, that a proper evaluation has not been made, and that, in light of the potential impacts, one must be made before a decision on the project can be rendered.

No response required.

The DEIS does note that the proposed pipeline crosses eight basins. What is implicit in that statement, and should be stated explicitly, is that the length of the pipeline (112.4 miles) contributes to the impact on hydrology because of the high number of stream basins crossed.

E. OCEANOGRAPHIC IMPACTS - See Appendix A, comments prepared for Bixby by Dr. Dale Straughan.

The study in Appendix A was considered in the preparation of the FEIS.

F. CLIMATE - Bixby adopts the comments on wind and wave conditions at Point Conception made on behalf of the Hollister Ranch Owners' Association and the Santa Barbara Citizens for Environmental Defense.

No response required.

G. VEGETATION - The DEIS points out that a minimum of 100 acres of coastal terrace lands would be disrupted for construction of the access road to the site. That figure assumes use of the existing access easement. The DEIS also points out that if another access road is used, the area of disturbance "could" be much larger. An effort should be made in the DEIS to quantify the likely differences in the impacts on vegetation caused by the potential access road routes.

Comment reflected in Section C-6 of Volume II of the FEIS.

The DEIS also points out that clearing activities at the site present a threat to the rare and endangered plant scrophularia atrata and states that because of the limited range of the plant, the threat "could be of significant detriment to the species' viability." (II-167) In light of this serious threat to a rare and endangered plant, more information must be gathered on the likelihood of damage to and elimination of the plant; it is not enough merely to report that the plant "may be locally eliminated" (id.) by the clearing operations.

Ibid.

The DEIS notes that right-of-way construction would result in the clearing of at least 1,370 acres of vegetation. Obviously, this figure is a direct function of the length of the pipeline, and the DEIS should so state.

Comment noted.

The DEIS should reflect more of an effort to assess the risk to rare and endangered plant species along the pipeline

right-of-way. As the DEIS notes, elimination of even individual plants of such species could, because of their rarity, impair the ability of the species to maintain a stable population in the area. The DEIS, as it stands now, merely admits that the specific risk to these plants is unknown because the pipeline right-of-way has not been surveyed for the occurence of such plants.

Previously addressed in Recommendations 27 and 28 of Volume II of the DEIS.

Further comments on aquatic vegetation appear in Appendix A, prepared for Bixby by Dr. Dale Straughan.

H. WILDLIFE - The DEIS seems unneccessarily restrained in its assessment of the impact of construction at the plant site on terrestrial wildlife. For instance, the DEIS points out that large coastal ravines would be filled during preparation of the site for construction and that more mobile species which make the ravines their habitat (e.g., birds and larger mammals) would emigrate to "any" similar habitat. The DEIS then points out that such similar habitats "are scarce" because of grazing and other human disturbance, and concludes that local populations of wildlife dependent on this habitat "would probably decline." (II-174) There seems to be no doubt about that prediction. In fact, it seems safe to predict not only a decline, but that the local populations of these mobile species might well be nearly eliminated.

Even though the coastal ravines are important wildlife habitat the staff believes that the species of large mammals and birds that frequent them would remain part of the fauna at Point Conception. This conclusion is strengthened by the applicants' proposal to utilize the existing Hollister Ranch road instead of constructing a new road paralleling the railroad. The new proposal would preserve most of the ravine habitat between proposed terminal site and Gaviota.

The discussion of the impact on rare and endangered wildlife species at pages II-177 to 178 of the DEIS is somewhat

confusing. The DEIS refers to Table 19 as a catalogue of the various rare and endangered species potentially affected by construction of the terminal and the pipeline, but then states that most species "would only be minimally affected" by construction and operation of the facilities. (II-177) The discussion then goes on to specify the significant, and very severe, impacts which would be brought on the white-tailed kite, the San Joaquin kit fox, the blunt-nosed leopard lizard, and the prairie falcon. Bixby believes that it was not the Staff's intention to indicate that these four species would "only be minimally affected." The language at II-177 should be adjusted so to indicate.

Comment reflected in Section C-7a of Volume II of the FEIS.

Further comments on impacts on aquatic biota appear in Appendix A, prepared for Bixby by Dr. Dale Straughan.

I. SOCIOECONOMICS - Certain aspects of the socio-economic data provided by the applicants and reflected in the DEIS have been shown during hearings on this application to be inadequate or incorrect. First, the DEIS reflects the applicants' original estimate that the peak construction force will number 1500 workers, who would be active over the eighth quarter of construction. That estimate has been changed to 1600 workers over a six month period, and the DEIS should so reflect. (Witness Olsen, Transcript at 5057) Second, the applicants' estimate that 80% of the labor force would be drawn from the existing Santa Barbara County labor pool

Comment reflected in Section C-8 of Volume II of the FEIS.

could not be supported upon cross-examination in hearings on the application. (Witness Senger, Tr. at 4304 to 4308) Similarly, the applicants' estimates that 70% of the peak construction force would commute to their jobs could not be supported during the hearings. (Id.) Certainly, the DEIS reflects no basis for its conclusion that 80% of the labor requirement will be drawn from the existing County labor pool and that "these workers would commute from their present residences, thus creating negligible impact upon housing or public services." (II-190)

J. LAND USE, RECREATION, AND AESTHETICS - Bixby agrees completely with the Staff's conclusion that the proposed terminal would have a "significant impact on land use" in both the construction and operation phases. (II-193) We would add the following points. First, the DEIS seems to underestimate the effect of the terminal on nearby established recreational areas at Gaviota and Jalama Beach Parks. It seems clear that users of these parks will be affected by increased construction traffic; the DEIS' conclusion that they might be (II-194) is unnecessarily conservative. Similarly, Bixby would not characterize as "minor" the disturbances to users of the Los Padres National Forest caused by the presence of heavy equipment, noise from blasting, and fugitive dust. (II-195) Affected areas of the forest would become clearly less desirable because of these disturbances, and use would

The impact of construction traffic on park users will be determined by the access route, which has not yet been decided. Therefore, the effects of this choice are still unclear.

While it is true that affected areas of the Los Padres National Forest would be less desirable during pipeline construction, the occasional users in these scattered areas would be free to move to any other area in the forest. The overall impact therefore would be minor.

decrease accordingly. Finally, Bixby disagrees with the Staff's minimization of the effect of blasting upon ridge tops along the proposed pipeline route. The DEIS recognizes that blasting will create an "unnatural or artificial look, resulting in a negative aesthetic impact," but goes on to conclude that "few people would be affected by the change." (II-196) The value of the land involved lies not in how many people view its features, but in the fact that it is remote and environmentally pristine. That a relatively few number of people appreciate its beauty is no reason to write off the deleterious effects of blasting on the ridge tops.

Comment reflected in Section C-9 of Volume II of the FEIS.

K. ARCHAEOLOGICAL AND HISTORIC RESOURCES - Bixby endorses the Staff's conclusion that construction of the facilities will cause "significant adverse impact" (II-197) to archaeological and historic resources at the plant site and along the pipeline route. As to the plant site, Bixby takes exception to the language in the DEIS indicating that operations at the terminal will decrease "any" spiritual value associated with the plant site and surrounding mountains. (Id.) The language reflects some doubt as to whether, in fact, the area has spiritual value for present-day Chumash Indians. Due to the presence of numerous ancient settlements and ancient cemeteries sacred to living Chumash, there can be no doubt that the area is sacred to present-day Indian populations. Indeed, Indian populations in the area have already made known, in no uncertain

Staff recognizes the spiritual significance of the Point Conception area for Chumash with traditional beliefs but does not wish to imply the same strong feelings are held by those Chumash who have adopted European religions.

terms, their opposition to operations at and near the plant site. The DEIS reflects a lack of information as to the sacredness of the area; more efforts should be made to understand fully the perspective of the affected Indians.

Bixby reads the final paragraph on page II-197 to mean that the rearrangement of the terminal currently under consideration by the applicants would still have a significant, adverse impact on archaeological and historic resources. Since that conclusion is not stated explicitly, however, Bixby believes the Staff should make itself clear on that point.

As to resources offshore, Bixby takes exception to the suggestion in the DEIS that underwater construction will not have a significant effect on archaeological resources. The applicants' own study makes reference to an investigation by Dr. D.T. Hudson which shows that three underwater sites exist near the construction area, including one only three hundred feet south of the area proposed for construction. Cross-examination of the applicants' archaeology expert established that the areal extent of the latter site is completely unknown (Tr. at 4093-94), raising the possibility that the site may extend very close to or even into the construction zone.

The DEIS reflects the fact that the applicants' proposal will have a significant impact on archaeological resources along the pipeline route. However, the extent of that impact is still unknown. As the DEIS indicates, the route, as presently

These additional efforts are reflected in Section B-10 of Volume II of the FEIS.

The nature of archaeological surveys is such that there is always a degree of uncertainty whether all sites have been discovered. Since cemetaries are expected to be associated with the village sites, construction of the terminal according to an arrangement that avoids the village areas may still impact areas of cultural significance.

The three marine finds in the area yielded a total of four sandstone bowls. Staff believes the underwater survey provided an adequate estimation of the marine archaeological potential.

described, would have have direct adverse impact on at least twenty known cultural areas. The DEIS also states that the right-of-way will be determined after a survey designed to uncover the best alignment for the pipeline from an archaeological standpoint. However, the DEIS reflects no assurances, or even consideration, as to the nature and reliability of whatever survey method is used. Significant impacts thus appear unavoidable.

Recommendation 4.2(d) of the DEIS has been modified to clarify this point.

II. ALTERNATIVES TO THE PROJECT AS CURRENTLY PROPOSED

A. ALTERNATIVE SITES

1. In General - The Staff's discussion of offshore LNG sites reveals a basic flaw in its approach to the question of the need for the proposed project. At page II-265 the Staff establishes as a criterion for any offshore site that it be "capable of being operational within the same general time frame proposed in the Western application," with allowances for processing of an alternative site application. This requirement ties in with the Staff's general approach in rejecting a "no action" alternative.

Comment reflected in Section H-5 of Volume II of the FEIS.

It is one thing to say, as the Staff does, that "there is a need for natural gas." (II-358) That need, however, does not mean that it is therefore in the public interest to accept the applicants' timing requirements. In prior hearings in this proceeding, the applicants have been unable to establish

Ibid.

a convincing case that their timing requirements - LNG from this project delivered no later than the beginning of 1983 -- are actually necessary. Indeed, cross-examination of the applicants' supply witnesses showed that the applicants had not even taken into account in their supply projections a variety of sources with strong possibilities for reaching the market. Bixby is not suggesting that the LNG at issue in this proceeding would not at some point become useful. What we do suggest, however, is that the applicants have not made a convincing showing that it is necessary to construct a terminal as soon as possible in order to meet demand requirements. This is especially true in light of the availability of the pipeline lateral alternative, discussed below, by which the Alaskan Gas would in any case be brought to market. There is sufficient time to study offshore sites or additional onshore sites. If such studies would be beneficial, they can safely be undertaken.

Bixby wholeheartedly agrees with the Staff's decision to give "considerable weight in the final site selection process" to a given site's potential for a seawater exchange system. (II-273, n.1) The potentially serious impacts caused by a terminal that does not have the capacity for seawater exchange are well documented in the DEIS.

No response required.

2. Rattlesnake Canyon - The Staff makes a thoroughly convincing case that Rattlesnake Canyon is environmentally

superior to Point Conception as a potential LNG site. In almost every category examined by the Staff, the environmental impacts associated with construction and operation are shown to be significantly less adverse at Rattlesnake Canyon. Bixby would add the following additional comments. First, if a breakwater is indeed required at Rattlesnake Canyon, the cost ($95 million) would be relatively minor when considered in the overall cost picture for constructing and operating an LNG terminal. In any case, the DEIS should state that the additional cost would be unquestionably worthwhile in light of the advantages gained by siting the terminal at Rattlesnake Canyon instead of Point Conception.

The cost estimates for a breakwater vary considerably. Very high costs, such as suggested by the applicant, would not be unquestionably worthwhile. The lower estimates would of course be.

Second, more study is obviously needed on the question of whether a seawater exchange system with the nearby nuclear power plant would be possible at Rattlesnake Canyon. Such additional study should weigh the feasibility and cost of a seawater exchange system against the likely impact of cold water outfall on marine biota in the relatively colder northern waters around Rattlesnake Canyon.

Comment reflected in Section H-2d of Volume II of the FEIS.

3. Naples/Dos Pueblos - The DEIS makes no ultimate comparison between Naples/Dos Pueblos and Point Conception, largely because the former sites are located in areas that are suspect areas from a seismic standpoint. Bixby believes this approach to be unfortunate. First, the DEIS admits that the Naples and Dos Pueblos sites are "comparable in most impact

Comment reflected in Section H-2d and I of Volume II of the FEIS.

areas to Rattlesnake Canyon." (II-347) Indeed the Staff's consideration of the characteristics and impacts pertaining to Naples/Dos Pueblos makes it clear that those sites are environmentally superior to Point Conception in almost every category. For example, an LNG terminal at Naples/Dos Pueblos would have "significantly less impact on marine vegetation than would the Point Conception proposal." (II-305) Similarly, terrestrial vegetation would be impacted to a far lesser degree at Naples/Dos Pueblos because a much shorter access road would be required there. Overall land use impact would be less serious at Naples/Dos Pueblos because of the presence of industrial operations at the Burmah oil fields, inter alia. The impact on an aesthetics in the area would also be less severe than that at Point Conception, because of the presence of industrial equipment and of the fact that the site slopes away from Highway 101 and could therefore be effectively screened. Finally, the Naples/Dos Pueblos area is not nearly as valuable from an archaeological standpoint.

As to the seismic problems, it is obvious that more investigation is needed. Indeed, the DEIS admits as much at III-301. Recent developments at Point Conception indicate that seismic problems may be presented there which are far greater than those which may ultimately be found at Naples/Dos Pueblos. Because of the great uncertainty in this area, the Staff should not have refrained from making an ultimate

comparison between Naples/Dos Pueblos and Point Conception. The result of that comparison would obviously have been a finding that Dos Pueblos, like Rattlesnake Canyon, is clearly superior to Point Conception.

4. Oxnard - The gist of the Staff's discussion of Oxnard, drawn in large part from previously performed environmental studies of the site, is that Oxnard is a site which is clearly and overwhelmingly superior to Point Conception. Indeed, after discussing the individual characteristics and impacts associated with Oxnard, the Staff states that Oxnard emerges "as the clear choice on environmental grounds" over all other sites considered. (II-347) Bixby believes that this conclusion is fully justified by the Staff's analysis.

No response required.

Three comments on the Oxnard discussion are in order. First, the seismic advantages of Oxnard, identified at II-313, would have to be considered even greater in light of recent developments at Point Conception. When more detailed study is performed, the seismic advantage of Oxnard may be shown to be so overwhelming as to dictate selection of Oxnard over Point Conception on the basis of that factor alone. As to topography, one of the few areas in which Point Conception is assessed in the DEIS as comparable to Oxnard, it is difficult to see how the Staff could come to the conclusion that: "The topographic impact of facilities at Oxnard would not differ significantly from that of the proposed Point Conception

Ibid.

facilities." (II-313) The Staff points out at II-141 that necessary grading at Point Conception would affect approximately 2 million cubic yards of material. In addition the two arroyos which now drain the southern part of the Point Conception site would have to be filled in, and the eastern slope of Canada del Cojo would have to be significantly altered to bring the proposed site to grade. In the Staff's Final Environmental Impact Statement in the Pacific Indonesia proceeding, the assessment of topography impacts at Oxnard stated at page 114 that "since the proposed site is relatively flat, there would be a minimal amount of grading involved in site preparation." (December 1976). In light of the extensive grading and alteration necesary at Point Conception, and the admittedly minimal grading necessary at Oxnard, the DEIS should state that (as with almost every other factor) topographical impacts would be significantly greater at the Point Conception site than at Oxnard.

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Staff agrees. The sentence on page 313 of the DEIS has been removed. Also, see page 337 of Volume II of the DEIS.

As to safety, Bixby endorses the statement in the DEIS that none of the sites considered has a clearcut advantage or disadvantage over any of the others. Except for one instance, the Staff assiduously avoids the pitfalls of the claim that a terminal in a remote location would be safer than a terminal nearer to population concentrations. At page II-346, the Staff appears to at least recognize this generalization, although it goes on to state again that a terminal

at any of the proposed sites could be operated at an acceptable risk level. The generalization is not useful, and it should not receive even the limited credence given it at II-346. For example, while a remote terminal may be further from population concentrations, it is also further from firefighting and medical services available in and around an urban area which could serve to avert or significantly mitigate the effects of a serious LNG accident. The reality that a multitude of factors affect safety is reflected in the Staff's "Comparison of Risks," found in Appendix A, Table 16. The comparison shows the risk of annual fatalities and the probability of fatality per exposed person to be minimal indeed for all sites. The risk of annual fatalities is slightly greater at Oxnard than at Point Conception. However, because of a variety of factors, the probability of fatality per exposed person is greater at Point Conception than at Oxnard. Bixby submits that the Staff's work shows merely that an LNG terminal would be safe at any of the proposed sites, and that no site has a discernible advantage or disadvantage in comparison to any of the others.

Staff agrees.

B. PIPELINE LATERAL ALTERNATIVE

Bixby applauds the Staff's decision to assess in some detail an alternative to the proposed project, pursuant to which natural gas supplies from Cook Inlet would be transported via a connecting pipeline to the Northwest Alaskan project.

Bixby also agrees completely that when the pipeline lateral alternative is compared to the joint project, the pipeline lateral is superior by far in terms of environmental impact, public safety, reliability and flexibility, and economics.

Regarding economics, the DEIS correctly points out that the applicants' own study indicates that the pipeline alternative would have a lower cost of service than the proposed project, even assuming that an existing LNG facility were operating in California. There can be no doubt, therefore, that when the capital and operating costs associated with the California regasification and pipeline facilities are included, the LNG proposal would have an even higher cost of service. Staff's conclusion that "it appears that" such would be the case (I-284) can certainly be stated with more confidence.

Bixby objects to that portion of the DEIS comparing the pipeline lateral alternative with the LNG proposal on the assumption that California facilities would already exist. That comparison is basically irrelevant, for the FERC will have to make a decision on the whole project put forward by the applicants, i.e., a joint terminal to receive Alaskan and Indonesian volumes.

In this connection, the Staff has a responsibility, thus far avoided, to make a firm recommendation. As of now, Staff's conclusion favors the pipeline lateral alternative over the

The FERC staff has taken the position that if the Pacific Alaska gas alone was terminated at Point Conception the applicant would have to submit a new cost of service study.

This comment constitutes a legal argument which is subject matter for legal "briefs", not for inclusion in the FEIS.

project if the impacts associated with building "base" California facilities are included. If those impacts are not included, Staff finds the proposals equivalent in impact. The only relevant comparison is the pipeline lateral versus the project as a whole. Since the Staff recognizes the clear advantages of the pipeline lateral alternative on that basis, it should take the next logical step of recommending that such an alternative be pursued rather than the project as proposed.

This comment constitutes a legal argument which is subject matter for legal "briefs", not for inclusion in the FEIS.

The discussion of "incremental" impacts is not only irrelevant, it is inadequate in several places. For example, Staff seeks to assess incremental effects on marine biota caused by the seawater system at Point Conception and labels those effects as "relatively unimportant." (I-277) In light of the serious problems which the seawater system presents (see, e.g., II-178 to 189), the basis for this conclusion is not at all apparent.

Ibid.

In addition, in drawing the conclusion that the delivery efficiency of the Tok alternative would be slightly less than the efficiency of the incremental LNG project, Staff relies on data which is admittedly outdated. As indicated at I-179, the design for the Canadian portion of the Northwest Alaskan system has been changed, and the resulting updated efficiency data were apparently not available to the Staff when the DEIS was prepared. Rather than stating an outdated conclusion,

Staff disagrees with this opinion. The final design of the Alaskan Northwest pipeline system has not been established and may not be finalized for some time. Therefore, the best information available was included in the DEIS.

Staff should refrain from drawing any conclusion until and unless it can take account of the new efficiency figures.

Finally, Staff should make an effort to assess the possibility that natural gas supplies equivalent to the amounts that would be made available from Indonesia could instead be processed via the pipeline lateral alternative by a re-arrangement of existing export relationships vis-a-vis Cook Inlet gas.

C. ALTERNATIVE ACCESS ROADS AND PIPELINE ROUTES

Bixby stands firm in its belief that the proposed Point Conception terminal would be an environmental tragedy that should be avoided at all costs. However, in the unlikely and unfortunate event that the Point Conception terminal is approved, Bixby is compelled to offer the following comments on the access road and pipeline route alternatives.

1. Access Routes - For the reasons stated in the DEIS, Bixby agrees with the Staff that the Jalama Route is clearly the least desirable alternative. The Jalama route would require more construction than any other route, would entail the removal of more vegetation, including over 100 mature oak trees; would require up to 40 minutes more driving time than the alternatives; and would traverse (and spoil) highly scenic and aesthetically valuable land.

Bixby disagrees with the Staff's retention of the Jalama route in case "the other access roads are not allowed." (II-355) The only basis for the retention of this wholly unacceptable

On December 30, 1977, the Department of Energy approved the applications, as amended, of Pacific Indonesia LNG Company and Western LNG Terminal Associates to import LNG from Indonesia over a 20-year period and to deliver this gas at Oxnard, California. This proposal would deliver 500 million cfd of Indonesian gas. Phillips-Marathon LNG Company is currently exporting about 150 million cfd to Japan. An exchange of Alaskan gas for Indonesian gas would result in a 350 million cfd shortfall. Therefore, such an alternative is unacceptable because the 500 million cfd import has been found to be in the public interest.

While the undesirable characteristics of this route are still described in the access road discussion, the staff does not believe that the Jalama route would be unacceptable.

alternative seems to be that Santa Barbara County had, at some point, scheduled the Jalama Beach access road for improvements. The DEIS does not discuss whether, and when, such improvements will actually be made. This vague indication from the County is no reason to retain a route which is admitted to be an extremely unfavorable alternative.

The potential feasibility of this route is the reason for its retention, not past intentions by the County of Santa Barbara.

Bixby also believes the DEIS should give more detailed consideration to a railroad system alternative. The current one sentence "analysis" is hardly thorough. Especially in light of the fact that the Santa Barbara County Board of Supervisors has recommended railroad access, more detailed consideration is clearly warranted.

Comment reflected in Section H-3 of Volume II of the FEIS.

2. Pipeline Routes - Bixby believes the DEIS should make a firm recommendation that Alternative A (II-256) should be chosen over the proposed route. The advantages of Alternative A are clear - it is shorter; it follows more than twice as much existing right-of-way; it also follows a likely location for the applicants' powerline; it avoids valuable archaeological sites in the Ytias Creek basin; it contains far less oak tree cover; it would involve the removal of less vegetation; and it would be less visible from prime "viewscape" properties in the coastal zone. In light of these clear advantages, Staff's conclusion that Alternative A "may be superior" (II-256) to the proposed route segment is unnecessarily restrained. Unless further study produces any evidence

Staff's final position on this alternative is addressed in Section H-1 of Volume II of the FEIS.

to rebut current indications, Staff should make an unequivocal recommendation in favor of Alternative A.*/

D. CONSERVATION

The DEIS analysis of energy conservation as an alternative to this project is seriously flawed. First, the DEIS admits that it assesses only "conservation achievable through economic incentive," i.e., through methods that improve efficiency of residential gas use (II-475, Appendix E). Thus, as the DEIS admits, such measures as voluntary thermostat setback, cold water laundering, and similar mandatory measures are not included in the Staff's analysis Indeed, of the multitude of conservation measures available, the only ones assessed in the Staff's study are ceiling and wall insulation and the use of storm windows in residences.

Comments reflected in revised appendix to the FEIS.

To be sure, assessment of the energy savings brought about by these measures alone would be useful, since they are particularly beneficial means of conservation. But to assess only these measures and then, on that basis, issue a conclusion as to the feasibility of energy conservation as an alternative to the project seems unfair and unwarranted.

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*/ Bixby is currently evaluating Staff's proposed "multiple use corridor," presented for the first time in the DEIS, and therefore reserves the right to take a position on that proposal in subsequent proceedings.

No response required.

Moreover, the conclusion reflects an unjustified "all or nothing" approach to energy conservation. The DEIS concludes that conservation achievable through retrofit insulation in the residential sector would conserve between 28 percent and 43 percent of the volumes that would be supplied by the proposed project, and that, therefore, such conservation would not be a "feasible alternative" (II-477) to the proposed project. The conservation measures assessed do not stand in a vacuum, however. The pertinent determination -- nowhere made in the DEIS -- is whether the substantial savings realized by such measures and by other conservation measures, plus the supplies likely to be received from supplemental gas sources, are such that the State's energy needs can be met. If so, then energy conservation would serve, quite properly, as a partial solution to the State's energy needs, and the environmental risks presented by this project could be avoided.

As to those risks, the Staff's effort to put a price on "the environmental cost of the proposed project" (II-477) is completely arbitrary. No support is offered or evident for the Staff's evaluation of $0.17/Mcf (less than four percent of the total project cost) as the environmental price to be paid for this project.

III. THE STAFF'S CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS - Bixby agrees with the Staff's conclusions as to the relative merits of Oxnard, Rattlesnake

Canyon, and Point Conception. Bixby believes, in addition, that Naples/Dos Pueblos should also be ranked, and ranked ahead of Point Conception (see discussion in Part IIA3 hereof).

The Staff mentions the added cost of a breakwater at Rattlesnake Canyon as a potential disadvantage. In this connection, Staff should also mention that -- as hearings in Pacific Alaska have conclusively shown -- the Oxnard terminal and related facilities could be built for about half the cost of the proposed Point Conception terminal and related facilities.

Bixby strenuously objects to the Staff's discussion of the California LNG Terminal Act of 1977 (the "Terminal Act"). It is Bixby's belief that the Terminal Act is pre-empted by Federal authority over the siting of natural gas facilities. Indeed, the Staff took the same position in an exhaustive and convincing brief filed in Pacific Alaska last month. Bixby does not understand, therefore, the basis for the Staff's statement that it "realizes that it is within the authority of the FERC and/or the Economic Regulatory Administration to accommodate this act and thereby select a less desirable but still acceptable site." (II-360) For the Federal government to abdicate its pre-emptive and exclusive responsibilities and defer to a state merely because the latter has passed a statute in the field would defeat the purpose for the enactment of the Federal legislation. Such decisionmaking would

Comment reflected in Section H-2d and I of Volume II of the FEIS.

Comment reflected in Section I of Volume II of the FEIS.

This is legal argument which is beyond the scope of the FEIS.

be arbitrary and capricious. The Federal government's responsibility in this proceeding, as always, is to identify and authorize the best course of action from the standpoint of the public interest. If Oxnard is the best site, then Oxnard should be selected, regardless of the dictates of a pre-empted and unconstitutional state statute. The Staff has a responsibility, having come to the conclusion that Oxnard is the best site, to recommend unequivocally that the terminal be sited there.

Staff does recommend unequivocally that the project be sited at Oxnard.

Bixby also objects to the Staff's conclusion that while the alternatives discussed are preferable to Point Conception, the latter is nevertheless "acceptable" from an environmental standpoint. The Staff's criteria for "acceptability" are not defined, either in the conclusion or elsewhere in the DEIS. One obvious criterion, however, must be whether significantly superior, feasible alternatives exist. As Judge Litt wrote in the Initial Decision in El Paso Alaska Co., No. CP 75-96, et al. (1977), it is appropriate for an applicant's proposal "not [to] be certificated either because it is so flawed that it is unacceptable or the recommended alternative is superior." Id. at 114 (emphasis added). In this case, the Staff has concluded that Oxnard "is an alternative site . . . significantly superior to the prime proposed Point Conception site." (III-359) In support of that conclusion, the Staff does a convincing job in the DEIS documenting the serious environmental

Comment noted.

impacts that would be caused by construction and operation of the proposed LNG facility and associated pipeline. In those circumstances, and especially in light of the existence of the superior alternative, there is no basis for a conclusion that Point Conception is "acceptable".

B. RECOMMENDATIONS - In general, Bixby supports Staff's effort to impose conditions on the design and operation of the proposed facilities in the event that they are in fact certificated. Bixby would add the following comments:

First, with respect to the Staff's call for a study on sunken tanks, Bixby believes it essential that the tanks -- and all other facilities susceptible to underground placement -- be buried. More generally, Bixby believes that the terminal should be constructed so that, to the greatest extent possible, it is hidden from view -- specifically from the sea, from along the shoreline, and from the surrounding hills. Tank burial would help to achieve this goal. In addition, the fill resulting from tank burial should be used to build large scale land forms around the entire facility resembling the natural topography. The land near the facility should be landscaped with naturalizing groves of trees, and such landscaping should be rigorously maintained.

As to utilities and service facilities, the paramount goal should be to avoid degradation and interruption of the existing scenic character of surrounding areas. All

The staff agrees that excess overburden should be used to provide screening of the facility to the maximum extent possible. [See Recommendation in Section I of Volume II of the FEIS.]

utility lines and pipes should be below grade, hidden from view. To minimize impacts, new utility and service facilities should be located within or adjacent to existing right-of-ways. In addition, service roads and maintenance routes should be properly installed, landscaped and maintained.

The staff agrees that utility and service facilities should be located on or adjacent to existing rights-of-way and indicates such in the discussions of alternative pipeline routes and access roads.

The comments immediately above are meant to apply only in the unlikely and unfortunate event that Point Conception is chosen as the site for the terminal in question. Bixby stresses again its strong opposition on environmental grounds to a Point Conception siting. The environmental objections to such a siting are brought out well by the FERC's draft statement, and, our comments notwithstanding, we commend the Staff for compiling a convincing case against locating the terminal at Point Conception.

No response required.

APPENDIX A

Comments to Federal Energy Regulatory Commission
Office of Pipeline and Producer Regulation,
on Western LNG Project, Draft EIS,
Vol. II - CP 75-83-2

Prepared by

Dale Straughan

at the request of the Bixby Ranch Company.

June 5, 1978

My name is Dale Straughan. I am a marine biologist and currently a senior research scientist in the Institute for Marine and Coastal Studies at the University of Southern California. I have worked in fields of both basic and applied research in southern California since 1969. I have also conducted marine research in other parts of the United States and the world.

I am preparing these comments at the request of Bixby Ranch Company. My comments are specifically related to the desirability of constructing the proposed LNG terminal at the Cojo site, based on the projected impact of construction and operation of this facility on the marine environment.

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I have reviewed the marine biological sections of the Applicants' statements to the Federal Energy Regulatory Commission; the Draft Environmental Impact Statement (DEIS), Vol. II, CP 75-83-2 filed by the Staff of the Federal Energy Regulatory Commission; the Draft Environmental Impact Report (EIR) filed with the California Public Utilities Commission and Technical Reports 5A*/ and 26; the Draft Biological Impact Analysis filed with the California Coastal Zone Conservation Commission; and scientific literature relating to the proposed construction of the LNG terminal at Point Conception. I have also conducted a personal reconnaissance of the Cojo site and the Point Conception area.

*/ Much of FERC's analysis in this DEIS is based upon Technical Report 5A.

As a result of this research, I have concluded that from a marine ecological viewpoint the proposed LNG terminal should not be sited at Point Conception. This conclusion is based mainly on the following:

1. This is the area of the southern California mainland coastline that is least subjected to population, industrial and agricultural impacts.
2. It is generally regarded as being ecologically rich because it is in the center of a zoogeographic transition zone where northern, southern, and the so-called "transition" species occur.
3. There is no other intertidal area in southern California ecologically equivalent to that found in the Cojo site area.
4. Insufficient data are available on the project design on which to predict accurately the ecological impact of the construction and operation of the LNG terminal.

I support the FERC Staff's view that the site at Oxnard is the most acceptable and would have the least impact to marine resources in southern California.

I will expand on this point, but I would first like to point out the difficulty in preparing useful comments on this project caused by the Applicants' frequent and continuing failures

to offer a firm project design, rather than a mere concept, for various portions of the terminal affecting marine biology. Throughout proceedings on their applications, the Applicants have often made initial information available and then offered changes either close to or beyond the deadline for commenting or responding within the applicable procedures. The Applicants' indecisiveness hampers and delays decisionmaking on the project. It also creates the impression that the Applicants simply do not know what they are doing, inasmuch as biological studies at this site commenced in 1974 and yet, in 1978, the Applicants are still deciding how to build the facility.

In this connection, I point out that the Federal DEIS relies extensively on A.D. Little Technical Report No. 5A, filed in conjunction with the California EIR. At page 65, Report 5A contains the following caveat:

> (Note: at the time of draft EIR preparation (December 2, 1977) the project applicant, Western LNG Terminal Associates, did not have a detailed seawater system design. The following description of the seawater system and its environmental impact is based upon a brief concept description provided by the applicant .... The ultimate system design may differ substantially from that described here. If it follows the same fundamental concepts, particularly in regard to several critical areas that are discussed below, the environmental impact will be substantially the same as that of the system described here.) [Emphasis added.]

The California EIR and Technical Report 5A do not take account of Technical Report 26, prepared on the basis of updated information

on seawater system design submitted by the Applicants to the CPUC. Technical Report 26 (page 1) contains its own caveat, however: "The design modifications described herein were transmitted to the California Public Utilities Commission .... They are unofficial in the sense that they have not formally been incorporated in the application to the Public Utilities Commission." The problem for one who seeks to make useful comments is obvious. The DEIS does not reflect the information in Report 26. Should the comments assume the information in Report 26 will be part of the Applicants' proposal? What is the effect of the caveat to Report 26? As a final fillip, it is my understanding that the Applicants plan to file more design information on June 9, after the deadline for submission of comments.

These problems nothwithstanding, my detailed comments follow.

I. Comments on Specific Points in the DEIS

Let me briefly refer to specific paragraphs in the DEIS, and then I will provide a broader discussion of some of the marine biological problems associated with this project and the draft EIR.

P. 95, paragraph 5

The DEIS pays little attention to the biotic uniqueness of the area. It merely notes that warmer and colder water fishes mix during different times of the year. The area is

actually near the center of overlap of two zoogeographic provinces, so that for an area both north and south of Point Conception species from both provinces occur. The area also contains "transition species," which only occur within this area of zoogeographic overlap. Therefore the area of the proposed LNG terminal falls within a particularly rich ecological area with these three major components of the marine biota.

In addition, while these biotic components extend further north and south of the Point Conception-Cojo site area, the area to the north is exposed to colder open ocean conditions while the area to the south is exposed to steadily increasing pressures from human population, industry, and agriculture. Therefore this mainland area at the western end of the Santa Barbara Channel is unique in the three major components of the marine biota and in the conditions operating in the area.

P. 97, paragraphs 1, 2

Dames and Moore conducted in the period from 1974 to 1976 a series of quarterly marine field studies in the area of the proposed LNG terminal at Point Conception. The DEIS has found these studies to contain the most complete information available. It should also be noted, however, that they are also virtually the only marine studies in the area, and it does not necessarily follow that they are an adequate basis on which to decide the impact of the proposed siting of an LNG terminal on the marine environment.

P. 98, paragraph 1

It is important to note the increase in number of individuals and species of fish immediately surrounding a six-inch diameter pipeline which transversed one of the Dames and Moore survey transects. It can be predicted that the construction of an off-shore trestle and the seawater system will have an artificial reef effect in the area. This is demonstrated to a small extent by the observations at the six-inch diameter pipeline. This indicates that the observations in the area in the absence of these structures do not provide an indication of the biota of the area after these structures have been installed. Without such data or reliable predictions of such data, it is impossible to predict the impact of operation of the proposed seawater exchange system, because it is not known what community of fish will be exposed to this impact.

P. 98, paragraph 2

The figures of number of species of organisms for the site area must be viewed with some skepticism because they include species recorded in the area from Point Conception to Gaviota. The habitats found at Point Conception and Gaviota differ from each other and from the area of the proposed construction site. Therefore it is incorrect to assume that species recorded at either Point Conception or Gaviota will occur at the proposed construction site.

Page between 101 and 102

While no rare and endangered species lists exist for marine algae or invertebrates, these organisms must also be considered as part of the basic marine resources of the area. If other species of biota are to be protected simply on the basis of their rare or endangered status, it would appear that these groups should be considered similarly, and efforts should be made to document the presence or absence of such species in the area.

P. 179

The DEIS relies heavily on the Water Quality/Marine Biology Technical Report No. 5A In Support of Point Conception LNG Project Environmental Impact Report, prepared by Arthur D. Little, Inc. However sections of this may have been modified by later Technical Report No. 26, and I believe the applicant plans to announce further changes in the project on June 9. On these grounds it is doubtful that the present DEIS could predict the impact of construction and operation of the LNG marine facilities when it is unsure what is to be constructed, and where it is to be constructed. This is particularly important when viewed in the light of the California Coastal Zone Commission recommendation that if the Point Conception site is chosen, the marine resources of the area are so valuable that no seawater exchange system should be used.

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P. 185/186 (Cold Water Plume)

The DEIS relies extensively on an assumption of a fairly even, rapid mixing process. Even hot water does not necessarily mix evenly and, in the vicinity of a thermal discharge, areas theoretically outside the immediate influence of a hot water discharge will often be exposed to pulses of hot water.

It is possible that the ejection of the cold water plume even in an upward direction will not readily allow for mixing with ambient water and that the plume will actually sink more or less intact to the bottom and impinge a far greater area of the ocean bottom and water column than allowed for in the DEIS. While this particular subject is not within my area of expertise, it is clear that information on plume dispersion is important in determining the area and impact of the plume. It therefore becomes particularly important to view the Applicants' plume models before the cold water impact on the biota can be assessed. In addition, no matter where the terminal is ultimately constructed, it is important that pre-construction monitoring programs be based on accurate predictions of where the cold water plume will fall.

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II. General Considerations

A. Biological Uniqueness of Point Conception

Returning to more general considerations, I do not believe that it is in the public interest to build the proposed LNG terminal at Point Conception. This is the only area of undisturbed coastline in southern California and should not be exposed to the

possible impacts from the LNG terminal. Two other areas of coastline with limited access (the naval base at Point Mugu and the Marine Corps base at Camp Pendleton) are not ecologically similar and, besides, both are modified by the armed services in their training program. For example, the U.S. Army Corps of Engineers has constructed experimental groins at Point Mugu to determine the impact on intertidal sand movement. Both these limited access areas are also adjacent to sources of industrial, agricultural and population pressures. Much of the Point Conception area is devoted mainly to cattle raising. This is not intensive agriculture that requires large amounts of fertilizer and the addition of pesticides, unlike the farming areas (vegetables, flowers) adjacent to the military bases.

The impact of public pressure on intertidal areas is often overlooked. Nicholson and Cimberg (1971) and Dawson (1959, 1965) and others have documented a pattern of general decline in variety of marine intertidal flora in southern California. Nicholson and Cimberg (1977) have noted that "human activities, such as collecting marine organisms, walking on rocks (crushing plants and animals), and clamming, can disturb intertidal populations." (page 351) While this reduction of biota due to numbers of people walking on rocky shores has been acknowledged, little attention has been given to programs of sandy beach maintenance in southern California. While these are required for recreational needs, they also change the beach habitat in that area. One perhaps subtle change which appears important is the periodic

cleaning of the upper intertidal level of beaches to remove trash and material (kelp, natural oil seep tar) naturally deposited by the tide. The removal of this kelp results in the removal of the food source of the upper intertidal organisms. Beach hoppers (Orchestoidea spp.) are generally absent from areas where these beach maintenance programs are conducted (Straughan, 1977a). Therefore, in our attempts to maintain portions of the ecosystem in as close to natural conditions as possible, it is important to maintain some areas of limited access that also have limited impact from industrial and agricultural operations.

The Point Conception area is biologically unique due to the overlap in distribution of both northern and southern species and the presence of species that are unique to this zoogeographic transition zone. This is documented in some detail in the Draft EIR to the PUC (Little, 1978a). While this transition zone extends over four degrees of latitude, Point Conception is at the approximate center of this area. Point Conception, thus, should be the optimum area for co-existence of these three groups of species. Introduction of stress in part of this area would result in a change in this community balance in the area influenced by the stress. While this unique area extends north and south of the Point Conception area, the ecological conditions change in both directions. To the north, the coastline is exposed to colder water and rougher open ocean conditions. There are no offshore islands to provide any protection. The

Draft EIR, Technical Report 5A, p. 12-11 (Little, 1978a) discusses this in detail, noting the marked change in hydrographic regimes on either side of Point Conception. The region to the south of the proposed siting area becomes gradually more populated and more exposed to intensive agricultural and industrial stresses.

B. The Unique Intertidal Area, and the Applicants' Inadequate Survey Methods

I have conducted a personal reconnaissance of the intertidal area at the proposed Point Conception site (Figure 1). During the last ten years I have conducted, and directed, ecological surveys at over 70 sites on the California mainland from Estero Bay to the Mexican border, and I have personally visited all but one or two of those sites. On the basis of my observations, there is no other ecologically similar intertidal area to that found in the Cojo site area and the coastline for approximately three miles on either side.

My observations indicate that there is a rock platform in the lower intertidal area, part of which is periodically exposed and covered by sand. This occurs throughout the area, except for the sand channel at the mouth of Cojo Creek. The most similar intertidal area occurs to the east of Coal Oil Point (Trask, 1971; Patterson, 1974; Straughan, 1973, 1977b). However, Coal Oil Point is the area of most active natural petroleum seepage in the Santa Barbara Channel and so cannot be regarded as an ecologically similar habitat.

The Applicants (Dames and Moore 1974, 1977) and the draft EIR to the PUC (Little 1978a,b,c) have presented data in which the area between Gaviota and Point Conception itself is regarded as being ecologically similar. Namely, they have presented data from species lists from Gaviota and Point Conception and indicated that only these organisms occur at the construction site. This assumption is not true for the intertidal area, and I therefore suspect it is similarly untrue for the remainder of the ecosystem.

I base this statement on observations made at the Cojo site and a site just south of Government Point in March of this year (Figure 1). Profiles were taken across the intertidal zone at both sites (Figure 2). Sand had been lost from the Cojo site, as noted on previous winter surveys (Dames and Moore 1974, 1977) but had accumulated at the Government Point site. The length of the intertidal area at Government Point was twice that recorded at Cojo (175 feet vs. 360 feet).

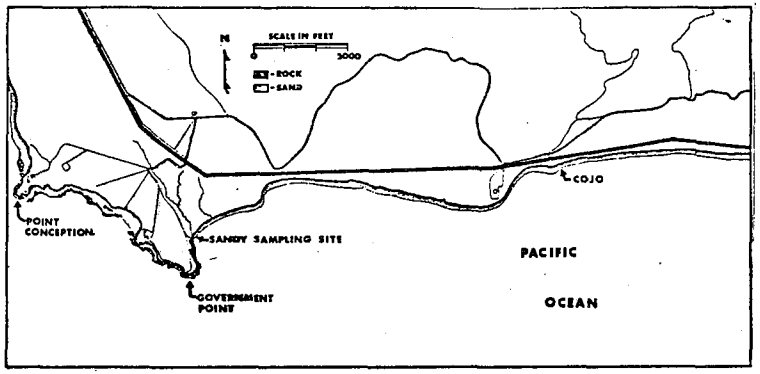

Figure 1. Map showing Government Point and Cojo survey sites.

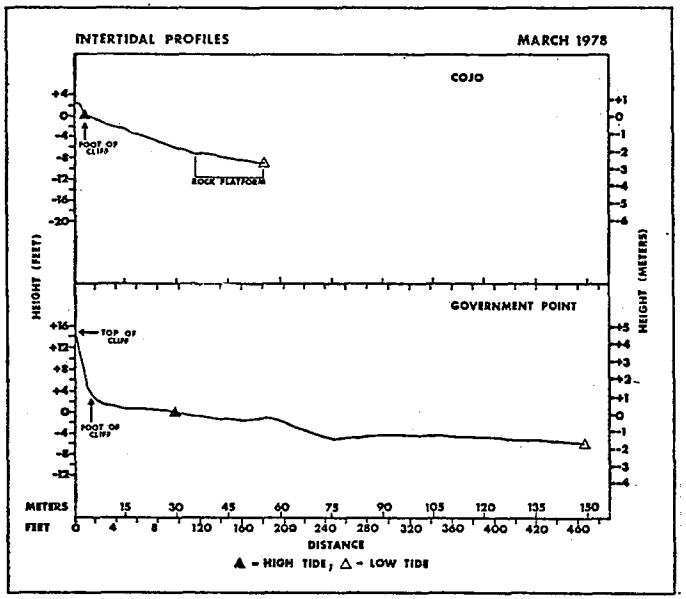

Figure 2. Intertidal profiles at the proposed site of the LNG terminal (Cojo) and at Government Point.

The beach slope was much steeper at Cojo, about one foot in 20 feet, than at Government Point, about one foot in 80 feet. There was a rock platform exposed at Cojo and no rock platform exposed at Government Point. The difference in sandy beach area is probably an important factor. This statement is based on research by Sanders in which he showed that the number of organisms in a given area increases very rapidly with the area of available substrate (Sanders, 1968). This is not a straight line relationship but a much steeper curve.

The grain size, moisture content, and Ohaus organic content of the samples differed (Table 1). These differences include wetter upper intertidal sediments at Cojo than at Government Point (15.2% c.f. 6.1%), higher organic content of lower intertidal sediments at Government Point than at Cojo (0.8% c.f. 0.4%), and the consistently finer sediments recorded at Government Point than at Cojo (mean Ø 2.21 to 2.47 c.f. mean Ø 1.81 to 2.06).

Table 1. Comparison of Physical Parameters of Intertidal Sediments from Cojo (C) and Government Point (GP)

Intertidal Sample	Moisture (%)		Ohaus Organics (%)		Grain Size Mean Ø	
	C.	G.P.	C.	C.P.	C.	G.P.
Upper	15.2	6.1	0.6	0.4	1.95	2.47
Middle	19.3	15.1	0.5	0.5	2.06	2.27
Lower	19.4	21.7	0.4	0.8	1.81	2.21

The distribution of intertidal animals on sandy beaches is related to all three of these parameters (Straughan, 1975, 1977b; Mc Lachlan, 1977). In general the number of species increases with moisture, organic content, and fineness of sediment. Moisture appears to be a limiting factor in the upper intertidal distribution of species. More sandy beach species could extend higher up on the beach at Cojo than at Government Point based on the data in Table 1.

I also question the adequacy of the sampling techniques used in the Applicants' site survey. The inadequacy of these methods is shown by reference to sandy beach surveys. One of the major concerns in such a study is to demonstrate that no rare species will be seriously impacted. I seriously doubt that the Applicants' methods are statistically reliable enough to demonstrate this.

A series of 11 intertidal surveys were conducted by the Applicants at three sites, all within an area of the intertidal zone 1,000 feet long, as part of the Applicants' preconstruction surveys of the Cojo site (Dames and Moore, 1974, 1977). Each survey involved the collection of three samples each at three intertidal levels (upper edge of higher highwater mark, the lower highwater mark, and the wash line at low tide). There was some variability in the size of these samples and in the methods used for collection.

From the details of these sampling methods, they are inadequate in fully documenting the sandy beach biota. The collection of samples at three intertidal levels will not adequately account for intertidal zonation, and unless sampling is spread along the beach there is no measurement of variability due to patterns in sand distribution along the beach. Sand is frequently deposited in a series of cusps and hollows with corresponding variations in species and grain size. Hence, it is important to sample a strip and not a straight line across the intertidal zone.

The largest sample size estimates presented by Dames and Moore (1974) were 1,000 to 1,500 ccs. Therefore, a maximum of 4,500 ccs were sampled at each three intertidal levels. The inadequacy of single line sampling methods can best be demonstrated in Figure 3. This is a comparison between the number of species collected when three intertidal levels (upper, middle, lower boxes) were sampled at the same time and same place and when a stratified random quadrat method of sampling was used (Straughan, 1977b).*/ The box sample at each level was 9,000 ccs or about twice the maximum size of the three quadrats collected at each intertidal level by the Applicants. A comparison of the total number of species collected at the three levels with the total number of species collected by the other method shows that the three level method becomes less and less representative of

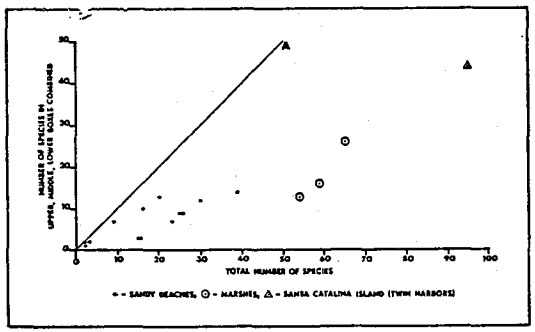

Figure 3. The relationship between total number of species collected if samples were collected at three intertidal levels and if samples were collected using a stratified random quadrat method.

*/ This sampling method is explained in the attached Appendix.

the biota as the biota becomes richer. If all species were collected on all surveys the points would approximate to line A. Also note that of 13 sandy beaches studied, the maximum number of species recorded was 40 by the stratified random quadrat method and 14 by the three level sampling method. (The Twin Harbors site at Santa Catalina island is a very fine grained area, which is called a slough in some definitions, so the data are not comparable.) Also note that on most sandy beaches, 20 to 30 species would indicate a relatively rich area.

The Applicants report that "a total of 24 taxa have been collected from intertidal sand samples of the site." (Little, 1978a, p. 30) Intertidal height distribution data are presented, as well as a subjective indication of abundance for most species. Details are also provided on the size distribution for the sand crab, Emerita analoga, and for the isopod, Excirolana chiltoni (Dames and Moore 1974, 1977).

Unfortunately, the report does not indicate how many of the 24 taxa were recorded on each of the 11 surveys. However, bearing in mind the low level of sampling efficiency employed by the Applicants, the number 24 suggests that the area is extremely rich for a sandy beach in spite of periodic complete loss of sand from much of the sandy beach areas.

Part of the problem with the three level sampling techniques is related to the fact that some species occur in narrow bands which can be missed. In the Applicants' surveys, the intertidal

beach at Cojo was recorded as 100 to 150 feet wide. If the three sample areas were evenly spaced they would be 50 to 75 feet apart. (The description of the sampling program would indicate an uneven spacing with a greater space between the middle and lower intertidal samples than between the upper and middle intertidal samples.) The blood worm, Euzonus mucronata, at times forms narrow zones on the beach. For example on one survey at Carpinteria State Beach, very high densities of E. mucronata were found in a band 20 to 25 feet wide (Straughan, 1973). This band was not at any of the three sampling points as used in the Applicants' report. Hence, very abundant species could go totally unrecorded and numbers of other species could be substantially underestimated, using the Applicants' survey methods.

Likewise, my experience indicates that the rocky intertidal sampling methods were also inadequate. Field surveys of three dimensional communities in which data are recorded in the field and samples collected selectively when the identity of species is uncertain neglect a large number of species (Straughan, 1977c). Likewise, the arbitrary collection of one segment of the survey area in order to determine relative abundance data does not provide for variability of the site as a whole, and I doubt if this sampling can be defended statistically.

On this basis I would also suggest that the other areas of the ecosystem were inadequately sampled and that we still do not know the extent of rare and endangered species that occur at the proposed site.

Sandy beaches occupy a high percentage of the mainland shores between Point Conception and the Mexican Border. Emery (1960) states that there are approximately 253 miles of sandy beaches and approximately 50 miles of rocky shores in this area. The California Coastal Commission has noted this and has determined that south of Point Conception, rocky intertidal areas are a marine resource that require special protection. On the basis of the potential impact on rocky intertidal areas and the offshore kelp beds, the area of the proposed LNG terminal site is in a region designated for the exclusion of power plants. If this area is one that is to be protected from the potential impact of power plants, I also think it should be protected from the potential impact of an LNG terminal.

C. The Seawater Exchange System

One of the problems to be encountered at most sites, but of particular importance to the Cojo site, is the impact of the seawater exchange system on the fish and plankton. This has been recognized as a problem but has not been adequately considered.

I have already noted that the design and position of this system were not finalized at the time the DEIS was written. However, the design used in the DEIS and projected impact were based mainly on the following:

1. research at San Onofre Nuclear Generating Station (SONGS);
2. entrainment data from Southern California power stations;

3. field surveys at the proposed site.

It is doubtful that this provides a sufficient basis for predicting the impact of the system for several reasons. The first is related to the biological uniqueness and undisturbed state of the area. None of the other power stations are in a similar ecological situation, so it is unknown if the same species of fish and/or fish with the same habitat will occur after construction at the proposed site. In other words, it is doubtful if extrapolation of the entrainment data, or research from SONGS, is valid. The surveys at the proposed site provide a record of fish species present prior to construction. However, after construction and during operation these may not be the species that inhabit the area. For example, the underwater structures will have an "artificial reef effect" which will modify the habitat and modify the species distribution and abundance in the area. The change in water flow of the intake itself will also have a differential effect on the fish species. Observations on "artificial reef" structures such as pipelines and jetties in the north Santa Barbara channel would have assisted in evaluating the validity of the data extrapolation.

The intake structures and fish return system have been tentatively modeled on that planned for SONGS units 2 & 3, although there is some oscillation in these plans. These plans have been severely criticized in an evaluation by E.E. De Martini for the Marine Review Committee in the Semi-Annual Report to the Coastal Commission (1978). He states (p. 8-6) that: "In short,

the SONGS units 2 and 3 fish return system, especially the return conduct, seems inadequate overall, but field experiments of fish survivorship following return system discharge are needed to prove this." He particularly notes that (p. 8-4) "juvenile-adult queenfish (Seriphus politus), the species most abundantly impinged by SONGS Unit 1 (Tetra Tech, Inc., 1977), were not sufficiently tested because queenfish had weakened or died prior to testing (Schuler and Larson, 1975)." Queenfish are one of the four dominant species at Point Conception (C.P.U.C. Draft EIR, Tech. Rep. 5A, p. 98). Given the possible changes in abundance and distribution after construction, this observation could become more or less important, depending on the response of the species to these environmental changes.

It is also somewhat distressing to read that "mortality among the entrained marine organisms is expected to be close to 100% even with the use of the fish entrainment system as a mitigating measure" (Draft EIR, Technical Report 5A, p. 12-S) and that "the fish return flow also represents nearly a 15% increase in overall seawater intake and consequently a 15% increase in fish impingement."

In other words I, as a consumer, am being asked to pay for the cost of this fancy fish return system that will actually increase the fish mortality by 15%. I object to both the cost to the marine resources and to the public. It would appear less costly to the marine resources and the consumer to eliminate this from the plan.

To return to the operation of this system, I did not see any attention to the problem of accumulation of sediment in the intake sump and screenwell. There is some mention of "over design" to allow for growth of marine fouling in the seawater intake conduct and fish return conduit, but no mention of ways to cope with this accumulation of sediment. Either there has to be a mechanism for continued removal of this sediment, or the sump will have to be periodically emptied.

I also note no initial provision for the control of fouling within the seawater intake conduits to the intake sump and screenwell and the fish return conduit. I assume that the applicant plans to control this "by rapid water flow through the conduits." However, the fouling will increase turbidity of flow and stress on the fish. There is also no indication that the fouling will not reduce the flow diameter more than predicted, particularly if water flow ceases for any period. If this should occur it would be necessary to treat large fouling organisms with something such as hypochlorite to clean the pipes. There is no provision for neutralizing such substances before they flow into the ocean if this should occur. Also larger organisms require high dosages of hypochlorite in order to kill them and, because it is assumed that a short exposure period would be required, the dosage would be even higher (Straughan, 1972a). The discharge of such waste would definitely have a negative impact on the surrounding discharge area. This possibility has been considered now, but the Applicants have not stated how the problem

of fouling control, particularly in relation to maintaining a low fish mortality, will be solved.

Another, related impact is the location of the intake sump on the longshore movement of sand in the area. The draft EIR Technical Report 5A (p. 8) states that the intertidal area of site is 100-150 feet wide, and that there is a seasonal cut and fill of sand of about 6 feet in depth. On p. 70 of this report, it is stated that the sump for the intake water system would probably be 150 feet long and 80 feet wide. Other diagrams indicate that this is to be constructed in the intertidal area. If this is the case, it would cover the entire intertidal area and interrupt the sand movement so that there would be accumulation of sand on one side of the structure and an area depauperate of sand on the other side of the structure. This has now been considered (Little, 1978c) but, as indicated earlier in this document, it is somewhat indefinite as to whether this change (moving the structure inshore) and others will definitely be implemented. However, even these revised possible plans are incomplete. There is no consideration of the cliff stability after the seawater pipes are installed "through" the cliffs. I also note that there is no provision for protection of these intertidal structures from a tsunami.

On this basis I support the recommendation of the California Coastal Zone Commission that no seawater exchange system be used at the Point Conception site.

D. Oil Spills

One point I wish to make is the inadequacy of the consideration of the impact of possible oil spills at the site. Spills of either bunker C or fuel oil could occur during operations. There is no consideration of the impact of a fuel oil spill. Consideration of bunker C spills takes the form of a suggestion that it will just add to the natural seepage. The predictions are based on an "average" size spill once every three years. There is not usually an "average" spill. There are usually small spills and large spills. The impact of possible large spills was not considered.

Bunker C oil is not the same in chemical composition as the natural seep oil in the Santa Barbara Channel and, in addition, it frequently contains lighter, more toxic cutting fluids. The impact of petroleum depends on a number of factors including chemical composition (Straughan, 1972b).

The impact of the bunker C oil would probably be better compared to that of the San Francisco Bay oil spill, where bunker C was spilled and spread onto sandy beaches and on exposed rocks (Chan 1972, 1975, 1977). The intertidal impact was more prolonged than that recorded after the Santa Barbara oil spill, and Chan (1977) was unable to detect recruitment over a five year period. The spill of Bunker C oil from the Arrow in Canadian waters has had an even greater impact than that recorded in the San Francisco area (Thomas, 1977). There is some evidence in some species of increased tolerance to Santa Barbara

crude at least in the immediate area of Coal Oil Point (Kanter, 1974; Straughan, 1976). However, this is not widespread throughout the Santa Barbara Channel (Kanter, Straughan, Jessee, 1971). It is presently unknown if this increased tolerance is also to bunker C oil and how widespread such a phenomenon is among different species.

In general the heavy black oils are less toxic than the lighter products such as a fuel oil (Ottway, 1971). As shown in the spill from the barge Florida in Massachusetts, fuel oil can be highly toxic and its impact last for 5 or more years (Michael, Van Raalte, Brown, 1975). True, the Cojo situation is an open coastline while the Florida spill was a sheltered area. However, greater impact is predicated from a fuel oil spill than from a Bunker oil spill. The area and magnitude of the impact would depend largely on the size of the spill and weather conditions at the time of the spill.

This discussion shows that the DEIS and the Applicants' reports are definitely inadequate in terms of consideration of oil spills, particularly possible fuel oil spills. These are more difficult to clean up than bunker C oil spills due to the lighter components involved. This area can have rough seas, and under such conditions it is possible that the fuel oil would simply be distributed through the water column and not be able to be cleaned up. This has not been considered in the DEIS. Other aspects not considered are:

1. distribution and impact of possible oil spills;

2. synergistic effects of oil spills and cold water.

There is some disagreement among oil spill experts as to whether there is an increasing or decreasing impact of petroleum with decreased temperature. I think that the short term impact is greater at higher water temperatures while there is prolonged exposure at lower temperatures.

The Applicants indicate that when there are no tankers at the LNG terminal, the kelp close to the terminal can be cut. There has been no consideration of the impact of any small oil spills on this kelp or the associated community, and I submit that at the moment the impact is unknown. In other words the possibility of the impact of such spills on the kelp bed productivity and harvest has been ignored.

III. Conclusions

In summary then, I do not think that the LNG terminal should be constructed at Point Conception because:

1. This is presently the least ecologically impacted of the southern California mainland coast and should not be exposed to this development.
2. The Applicants have not provided final plans on which to predict impacts with certainty, and the DEIS is incomplete
3. The area is generally regarded as being ecologically rich because it is in the center of a zoogeographic

transition zone where northern, southern, and the so-called "transition" species occur.

4. There is no other intertidal area in southern California ecologically equivalent to that found in the Cojo site area.

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Appendix

Comparison of Sampling Techniques.

Figure A-1 presents the layout of the two sandy beach sampling methods discussed in the Comments. In one method, three box samples were collected along a straight line across the intertidal zone as indicated by U,M,L. They are referred to as boxes because they are collected by pushing a metal square box with the top and bottom missing into the sand, and the area of sand within the box is dug out, sieved, etc.

The stratified random quadrat method involves the collection of samples at a random point from each of four quadrats (a,b,c,d) in each ten foot wide strata from high tide to low tide. Hence, samples are collected at four points in every ten foot distance from high tide to low tide. This design was adopted so that species forming narrow bands 20 to 25 feet wide would not be missed. Samples are spread along the beach to record trends in this direction, and samples are randomly placed because of the patchy distribution of some species within the zone.

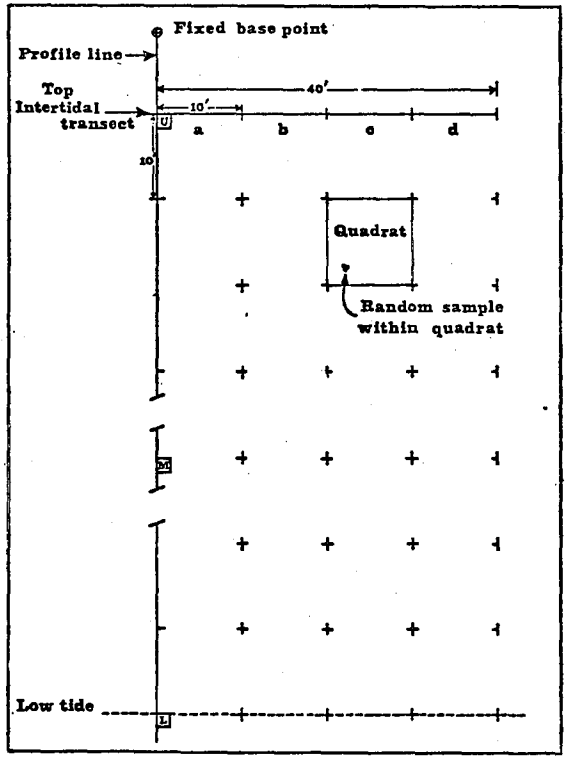

Figure A-1. **Layout of Sandy Beach Sampling Program**

U = Upper Intertidal
M = Middle Intertidal
L = Lower Intertidal

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	November 4, 1939

Education:

1959	B.Sc. University of Queensland
1962	B.Sc. Honors, University of Queensland
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Scholarships and Positions Held:

1953-56	State High School Scholarship.
1957-59	Commonwealth Scholarship.
1960-61	University of Queensland Teaching Fellowship.
1962-65	Commonwealth Post Graduate Fellowship.
Term 1 1966	Demonstrator in Zoology, University of Queensland.
May 1966-February 1967	Senior Demonstrator (initially a 5 year appointment) University College of Townsville.
August 1966-May 1968	Consultant Biologist, Northern Electric Authority of Queensland.
June 1968-May 1969	A.A.U.W. Post-Doctoral Fellowship.
1969-1974	Research Associate, Allan Hancock Foundation.

1969-71	Visiting Assistant Professor, Biology Dept., University of Southern California.
1971-74	Assistant Professor, Biology Dept., University of Southern California.
1973-75	Member, National Assembly of Engineering Committee on Safety of Outer Continental Shelf Petroleum Operations.
1974-76	Research Scientist, Allan Hancock Foundation, University of Southern California.
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Dale Straughan has written over 80 publications and reports. These include papers in scientific journals such as the Biological Bulletin, Bulletin Southern California Academy of Sciences, Micronesia, Australian Journal of Zoology, Marine Pollution Bulletin, Allan Hancock Publications, Journal of Animal Ecology, Journal of Experimental Marine Biology and Ecology, Water, Air and Soil Pollution, U.S.C. Sea Grant Publications, Environmental Protection Agency Technology Series, and Environmental Pollution, as well as reports which are available to the public, to American Petroleum Institute, Western Oil and Gas Association, Southern California Edison, Bureau of Land Management, and the MESA program of NOAA.

These publications and reports are in both basic and applied research in the field of marine ecology.

Lectures, Seminars, Representations etc.

This has included presentations to the Thorne Ecological Association Environmental Reporters, San Francisco Bay Estuarine Association, University of California Irvine, University of California Berkeley, Loyola University and Marymount College, Pomona College, Society of Petroleum Engineers, European Oil Committee, Australian Government, Norwegian Government, National Marine Fisheries Service, MESA program of NOAA, International

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August 1, 1978

The Honorable Kenneth F. Plumb
Secretary
Federal Energy Regulatory Commission
Washington, D.C. 20426

Re: Supplemental Comments, Draft Environmental Impact Statement, Pacific Alaska LNG Co., et al., Nos. CP75-140, CP75-83-2, et al.

Dear Mr. Plumb:

The Bixby Ranch Company, an intervener in the above-captioned consolidated proceeding, hereby supplements its comments to the Draft Environmental Impact Statement issued by the Staff of the Federal Energy Regulatory Commission in April, 1978. Bixby's original comments were timely filed on June 5, 1978. The purpose of these supplemental comments is to bring to the Staff's attention a development that has occurred since the deadline for submitting comments.

The California Coastal Act of 1976 requires the State's Coastal Commission to designate specific areas of the coastal zone as not suitable for the siting of new electric power plants or related facilities. See Section 30413(b), Cal. Pub. Res. Code (Deering 1976). Once the Coastal Commission adopts such designations, the State's Energy Commission -- the authorizing agency for new power plant sites -- cannot approve a new power plant site in a designated area, unless the Coastal Commission makes a specific finding that such a facility "is not inconsistent with the primary uses of such land" and will cause "no substantial adverse environmental effects." Section 25526(a), Cal. Pub. Res. Code (Deering 1976).

In assisting the Coastal Commission to fulfill these obligations, that Commission's Staff issued recently its "Final Staff Recommendation on the Designation of Coastal Zone

Comments reflected in Section B-9 of Volume II of the FEIS.

Areas Where Construction of an Electric Power Plant Would Prevent Achievement of the Objectives of the California Coastal Act of 1976." The Staff recommended that six coastal areas be designated as unsuitable for the siting of power plants. One of the six areas designated as unsuitable was Point Conception, which, of course, is the site proposed for the LNG terminal in the above-captioned proceeding.

The Staff's discussion of Point Conception can be found at pages 32-34 and 95-96 of the Final Recommendation. The following excerpt is typical of the Staff's reasons for recommending a blanket "unsuitable" designation for the Point Conception area, from Gaviota to Vanderberg Air Force Base:

> This is the largest remaining semi-wild area on the southern California coast. It extends from Jalama State Beach southward to Point Conception where the Coastline breaks to the east and continues to Gaviota State Park. The marine resources east of Government Point have been recommended for designation because of the extra-ordinary richness of the kelp beds and their commercial importance (abalone, kelp and spiny lobster). The near shore recommended designation in this area is reinforced by the recreational use of the outstanding surfing breaks along this coast. Additionally, the kelp north of Point Conception is recommended for designation. The ocean waters in the whole Point Conception area are of special educational and scientific value because of the transition from northern to southern marine ecosystems that occurs here. This reinforces the recommended designation of these off-shore resources.
>
> The land area on Point Conception is now recommended for designation because (1) it is the last remaining semi-wild coastal area in southern California, (2) construction of a power plant and transmission corridors, and construction of public services to support the workforce and construction activities, particularly an all weather access road, would be incompatible with its character and current status, and (3) because of its relatively pristine status, Point Conception has high potential for semi-wild recreation, including hiking, nature study and the enjoyment of solitude.

Final Recommendation at 95.

These conclusions provide further support for the view that the LNG Terminal proposed in the above-captioned proceeding should not be sited at Point Conception, a truly precious area of the California coastal zone.

We are submitting herewith, for the FERC Staff's convenience, a copy of the 114-page (plus appendices) Final Recommendation. Because of the length of the document, and because it is available to the public from the Coastal Commission (Cf. FERC Rule 1.26(c)(2)(ii)), we have not served copies of the Final Recommendation on the more-than 150 parties to this proceeding. We have, however, served a copy of this letter on every party.

Thank you very much.

Sincerely yours,

George A. Avery
Jeffrey F. Liss
Counsel for the Fred H. Bixby
Ranch Company

JFL:llk

cc: All parties (w/o encl.)
Robert K. Arvedlund, FERC Staff Counsel
Brian Heisler, FERC Staff Counsel (w/o encl.)
Administrative Law Judge Samuel Z. Gordon (w/o encl.)

Enclosures

COJO TAKES GAS!

Please Read
Thankyou

The article comes from Surfer Magazine, Volume 18, January 1978. No response required.

BY BRIAN ILFORD

To understand the Point Conception LNG (aka Cojo anchorage) controversy, it may help to know a minimal background. Cojo the anchorage dealt with in Dana's epic work, "Two Years Before The Mast," is located on the stretch of coastline that is generically known as "The Ranch." In actuality, The Ranch is a collection of smaller land holdings, including the southern Hollister Ranch, which is under the private ownership of a collective of 100-acre parcel owners; the northern Bixby Ranch of which Cojo Ranch comprises 10,000 acres, Jalama Ranch 16,000, and a small government reserve housing the Point Conception lighthouse are situated on the coast. The actual site proposed for the LNG plant is four miles east of Point Conception at Cojo on land owned by the Southern California Edison Company. (The location was once intended for a nuclear power plant.)

Much of the modern history of the region revolved around the activities of Colonel William Wells Hollister, whose immense land holdings in northern Santa Barbara County included The Ranch, Lompoc, Mission de la Purisima, Sasipuedes, Espada Las Cruces, Santa Anita, Gaviota, Nuestra Senora del Refugio, San Julian, Glen Annie, and Winchester Canyon. The Colonel's holdings at one time totaled 150,000 acres. Hollister also had long-time business association with Bixby, with whom he purchased part of the San Justo landgrant in Monterey. A

leading California citizen-statesman, Hollister was as renowned for his experiments in horticulture (he raised such exotic tropical crops as bananas, coffee, tea and dates) as he was for his civic accomplishments (he was a leading proponent of the Trespass Law; he established Santa Barbara College; built the important wharf at Gaviota, and was largely responsible for bringing the railroad to Santa Barbara).

The Colonel's hospitality was known far and wide, as was his popularity with the ladies. Even after his death, the Hollisters remained a key factor in the development of Santa Barbara County. As a sidelight, one of the most often repeated tales of the Hollister's involves the Colonel's widow Annie. Having been ordered out of her home by the court (due to "clouds on her husband's title" to a portion of their holdings), she exclaimed (referring to the victorious plaintiffs in the court case), "No member of that greaser clan shall ever set foot in my house." True to her word, minutes after her last visit, the home mysteriously burned to the ground. Detectives could find no evidence of arson, and Annie Hollister went to her grave in 1909, professing complete ignorance as to the blaze's origin. Family members to this day contend it was spontaneous combustion.

Due to the large properties (Vandenberg AFB, Bixby Ranch, and Hollister Ranch) all being low-intensity oper-

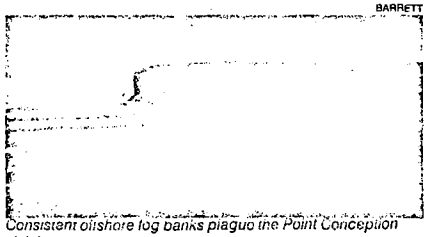
ations, the area presents a large variety of plant and animal species, many unique to this undisturbed area. The kelp beds off of Point Conception provide much of the base for Santa Barbara's commercial fishing industry. In 1966, the Santa Barbara County Board of Supervisors adopted a resolution urging a Federal study into the feasibility of creating a natural seashore out of the Hollister coastal properties. However, their proposal lost impetus with the creation of the Channel Islands National Monument on Anacapa Island. The California Coastal Zone Conservation Commission's 1975 report describes the area as follows: "The surfing there has international renown. The area offers the longest stretch of undeveloped coastline in Central California, and an unprecedented opportunity for preservation with controlled access and a single coastal trail."

The crux of the current dispute is that Western Liquid Natural Gas Terminal Associates (a subsidiary of Pacific Lighting Company of Los Angeles and Pacific Gas and Electric of San Francisco), aided by county and state politicians, plan to put an LNG terminal and plant at Cojo. (In the LNG process, the natural gas is compressed to 1/600th of its normal volume, and cooled to 259 degrees below zero. As the gas is compressed, it turns to liquid. The liquid is loaded on special ocean-going tankers. At the destination, it is unloaded into storage tanks and then run through a regasification facility, raising the temperature of the gas until it attains its normal volume and gaseous state.)

Their Cojo operation calls for a mile-long T-pier (75-feet high in places) with room enough to accommodate two 1,000-foot supertankers, and one waiting to unload, and a protective harbor for the numerous required support boats. Onshore, there will be four 13-story tanks, a regasification plant, and 200 acres of pipeline, as well as a massive access road through the back of the Ranch. Right of way and control facilities will consume 2,158 acres. The terminal is intended to be in full operation sometime in 1982.

The choice of Cojo as the location for the project is a compromise resulting from having two conflicting LNG bills moving through the Legislature simultaneously. One bill, authored by Senator Alfred Alquist (D—Santa Clara) was designed to speed up the terminal-siting process so the firms could move ahead with the project. It would have allowed construction at Oxnard and Los Angeles. The other bill, sponsored by Assemblyman Terry Goggin (D—San Bernardino) and supported by Assembly Speaker Leo. T. McCarthy (D—San Francisco), specified a remote site, and gave the Coastal Commission the final decision over where the terminal would be located. Goggin's bill would have required that the LNG terminal be built offshore unless utilities could prove a plant could not be finished in time to avert gas shortages. Under the new compromise bill, site election authority has been removed from the State Coastal Commission. Instead, the State Public Utilities Commission will have the final yes-or-no authority over selection of a terminal site. The agreement requires a four-mile buffer zone around the terminal. The population density within the buffer zone could be no more than 60 persons per square mile. The bill does not specifically mention Cojo as the terminal site, but the bill's provisions rule out all other conceivable sites. (Cojo was intended originally only as an alternative terminal in the event that the Trans Alaska Canada (ALCAN) gas pipeline was not installed. President Carter and Canadian Prime Minister Pierre Trudeau recently agreed to build the 4,800-mile-long pipeline along the Alaska Highway to bring Alaskan natural gas to the Pacific Coast and substantial parts of the Midwest.)

BARRETT



Consistent offshore fog banks plague the Point Conception vicinity.

Opposition to the LNG plant is mounting, with numerous organizations leading the battle, including: The Sierra Club, Friends of the Earth, GOO—Get Oil Out, Pt. Conception Preservation Committee, Hollister Ranch Owners Association, Cal-Cag—California Consumer Action Groups, CURE—Californians United for Responsible Energy, CAUSE, CED, Ventura Concerned Citizens Committee, Pt. Fermin Homeowners Association, Long Beach. Their principal objections revolve around the destruction of the surfing break and surrounding areas, the inherent dangers of LNG, the unsuitability of the Point Conception area for navigation, the lack of necessity for the plant, due to supplies of gas available from the Alcan Pipeline, and recently secured natural gas deposits in Mexico, Louisiana, Wyoming, Texas, Oklahoma, the availability of other energy sources, legal objections that Western LNG's attempts to secure the Cojo site haven't been carried out properly, and LNG's economic drawbacks in general.

The Cojo LNG conflict obviously has far-reaching effects that go beyond the reprehensible act of destroying some prime surf spots and miles of natural, unspoiled coastline. We will now offer a few of the key issues put forward by both sides, and at the end we will give the addresses of some people you might feel like giving your viewpoints to.

LNG—PRO

AVOIDANCE OF SEVERE SHORTAGES

Gas industry spokesmen and state and county politicians say "energy-short" California must import supercooled natural gas by ship by at least 1981 if the state is to avoid cutoffs of gas to homes and businesses.

LNG SUPERIOR POWER SOURCE

Natural gas is considered by the gas industry spokesmen to be "the cleanest burning fossil fuel, and the most efficient for heating purposes."

JOB LOSSES

"As many as 700,000 people in Southern California could lose their jobs—not only in the companies that shut down, but also in businesses that supply these companies with goods and services. The one sure way to avoid this is to bring liquified natural gas into California before

the winter of 1980-81. To get these new supplies, we need approvals from the State of California *this* year, and we need your understanding and support."—The Gas Company.

LOCAL ECONOMIC PLUSES

"The LNG facility would ultimately be worth something like $2 billion. That would bring in property taxes of about $12 million a year, because we'd not only be able to tax the plant, but also 200 miles of pipeline and all the gas that flows through it. If we can get the LNG facility at Conception, and if the voters approve Los Padres County, it would pay 40% of the county's base tax. We'd be in beautiful shape. The Sierra Clubbers are opposed to a plant in Conception . . . maybe they'd rather see it in the heart of Los Angeles where it might kill millions of people if it blew up. The only thing you'd kill at Point Conception would be three-toed frogs."—Harrell Fletcher, Chairman of the Santa Barbara County Board of Supervisors.

The Building of the LNG plant would employ numerous local residents in both the work force and support categories.

The possibility exists for local landowners to receive large tax breaks for allowing rights of way for the terminal, its pipelines and public access roads.

LNG—CON

NAVIGATIONAL HAZARDS

Bad winds, strong currents, dense fogs and predominant swell patterns of the area would require shutting down tanker unloading operations 24% of the time. Point Conception is known as the Cape Horn of the Pacific, and this entire coastal area is called the graveyard of ships. Nearby Point Arguello was the site of the U.S. Navy's largest peacetime disaster.

EFFECT ON SAND MOVEMENT ALONG COAST

Due to construction of a breakwater for the harboring of smaller support and service boats, the longshore current, which transports sand along the coast, will be changed. Typically, the building of such a structure creates an interruption in the sand movement, causing a buildup on the imposing structure, and a sand loss downdrift. The stability of a sand beach depends on maintaining the dynamic equilibrium of a "sand budget"—a balance between sand brought to a section of beach and that removed from it. The effect of sand buildup and loss on adjacent surfing breaks could radically alter their characteristics.

OIL FOULING CAUSED BY THE SUPPORT AND SERVICE VEHICLES

The continual presence of the necessary boats to run an LNG terminal adds the detrimental effect of continuous oil discharges into the marine eco-system. The impacts of this constant "minor" oil spilling can readily be viewed in any small-craft harbor. A layer of oil scum is invariably present on the water's surface, and the ocean bottom fills with layers of sludge-like residues, which, after a period of years, may be so bad as to require dredging.

TOXIC EFFECTS OF COOLED WATER DISCHARGES

In LNG facilities, large amounts of seawater would be used to heat the supercooled LNG, transforming it to a gas through heat exchanges in the vaporization facility. In the process, the seawater is cooled, and it is returned to coastal waters at temperatures as much as 12° F., below ambient temperatures. Such reductions in temperature can be fatal to marine life, and the total effects of *continual* cold-water discharges on marine eco-systems are unknown as of yet. Unnatural reductions in temperature have a particularly severe effect on embryonic and fetal development, and consequently, the area's abundant commercial fishing industry may eventually be crippled.

ENTRAINMENT KILLS MARINE ORGANISMS

Many marine organisms, including phytoplankton, zooplankton, fish larvae, and small fish, are entrained as water is drawn from the sea for use in the system. Many of these entrained organisms are killed due to pressure and temperature changes, impingement, physical abrasion and chemicals.

CHEMICAL POISONING

Chemical biocides periodically added to the seawater for defouling of the waterpipes adversely affects marine life in the immediate vicinity of the outfall.

SPILL DANGER TO MARINE PLANTS AND ANIMALS

Any live organisms subjected to a dense cold vapor cloud of LNG would be killed. The thermal shock caused by chilling of the surface water would presumably cause further mortalities.

AIR POLLUTION PROBLEMS

The disadvantages of gas-fired vaporizers for baseload use are that a percentage of the plants output would be used to fire the vaporizers and that there would be continuous air pollution emissions.

EXPLOSION HAZARDS

Highly volatile LNG burns one hundred times faster than gasoline, and has six hundred times the explosive power of ordinary natural gas. The gas becomes flammable when it vaporizes and then mingles with air. Spilled onto the surface of water, LNG rapidly turns to vapor. Thus the crash of an LNG supertanker could generate enough friction to create a spectacular fire—equivalent, in fact, to the burning of a hundred Hindenburgs (according to M.I.T. mechanical engineering professor Dr. James Fay). Moreover, vaporized gas could be blown from the harbor into adjacent communities where any single spark or flame could ignite it, creating a huge ball of fire extending back to its source, the supertanker. Fires, explosions, pockets of deadly gas, and blazes ignited by the intense heat of the burning cloud could leave thousands dead and injured. The Rand Corporation states, "In the maximum credible disaster, the release of an entire shipload of LNG, a cloud covering seven square miles would be formed within five to twenty minutes. Until ignition, the cloud would freeze and asphyxiate any living thing caught in its path." In considering the potentials of an LNG disaster, we can examine the following events: 1944—Cleveland, Ohio, LNG tank explosion—133 dead, 300 seriously injured, hundreds of homes, factories and automobiles destroyed, 30 acres flattened. (All this was caused by a tank of only 1/50th the size of the largest LNG tanks built today.)

1973—Staten Island, New York—40 dead when workmen repairing an LNG tank ignited residues of gas and air that had been trapped between the "fireproof" lining of the inner tank and the outer shell.

1977—Qatar on the Persian Gulf—7 killed, 13 seriously injured, tank farm totally destroyed. Fires burned uncontrollably for three days.

The gas magnates maintain that LNG can be moved safely by ship. However, any such claims should be compared with the performance of oil tankers. In the first six months of 1976, the number of oil tankers which smashed into other vessels, ran aground, or suffered fires and/or explosions totaled 419.

COST FACTORS

LNG costs three times as much as domestic gas, and its import will increase U.S. reliance for its energy needs upon such OPEC militants as Algeria. Support of an LNG program is already heavily drawing upon the public treasury. The federal government is helping pay for each $145 million supertanker through loan guarantees and Federal Maritime Administration subsidies. Southern California Gas and other companies desire governmental assistance in paying for the building of the LNG plants. They want an "all events tariff," which will require the consumer to pay higher rates for the gas he uses (to pay for the LNG plant), and these rates will be in effect even if the LNG plant is never finished, is sabotaged, destroyed or otherwise termed unfeasible. In other words, the consumer pays for the LNG plants no matter what, and the gas companies, in turn, sell the new gas supplies brought through the consumer-financed LNG plants at inflated rates. (The estimated cost of the LNG facility is $450 million; the estimated cost of the Trans Alaska Oil Pipeline was $700 million, but the final cost ended up to be $8.5 *billion*.)

LEGAL CONSIDERATIONS

The LNG compromise bill eliminates the necessity of receiving separate permits from the Coastal Commission and local governments. This is a dangerous precedent to set environmentally, since it bypasses the authority of the Coastal Commission.

Since Public Utility Commission rulings can be appealed only to the State Supreme Court, Western LNG can avoid the prospects of time-consuming legal challenges to the project at each step of the permit process and through several tiers of the court system. Both of these steps deprive the public of their rights to legal control and legal recourse.

CONFLICTING INTERESTS

Charges have arisen regarding California Governor Jerry Brown's involvement with the Pertamina Oil Corporation, the Indonesian firm which has contracted to bring LNG to California. Among the variety of things revealed include:

- That former Governor Edmund G. "Pat" Brown was Chairman of the Board of Perta Marketing Corporation in 1974 while his son was running for Governor.
- That Pat Brown controls 31% of Perta Marketing Corporation.
- That Perta Marketing and its affiliates gave $21,000 to Jerry Brown's 1974 campaign.
- That former Governor Brown has lobbied and continues to lobby for the importation of LNG to California, as Chairman of the California Council for Environmental and Economic Balance.

Cojo Point.

LNG opponents also point to the longstanding friendship between former Governor Brown and General Ibnu Sutowo, the former head of Pertamina Oil. Sutowo and several of his associates are now under house arrest in Indonesia for a variety of misdeeds relating to business deals which drove Pertamina Oil into bankruptcy some time ago.

ALTERNATIVE ENERGY SOURCES

Conservation and alternative technologies can eliminate the need for LNG. Non-petroleum energy sources could provide 50% of added generating capacity in California by year 2000. Oil and gas on which California now relies for about 90% of its total primary energy have the potential to cause significant adverse environmental impacts at *all points* of the fuel sequence: extraction, transportation, processing, and consumption. There are several alternatives to continued heavy dependence on oil and gas that are environmentally superior both for the coastal zone and for California, and that help conserve hydrocarbons for more valuable uses such as petro chemicals.

SOLAR ENERGY

Of the "alternative" energy sources, solar energy offers the highest potential and the fewest environmental problems. The sun's energy is unlimited in supply, and it can make a significant and immediate contribution both on a small scale for heating and cooling individual buildings, and on a large scale for major electric power generation. At the present time, the only major obstacle to widespread employment of solar energy is the opposition offered by the commercial energy concerns. "If the oil companies could license the use of the sun, then you would see an immediate use of solar energy."—Ralph

Nader, Consumer Advocate.

WIND ENERGY

Wind energy is pollution free, involves no fuel costs, and is non-depletable. Various sources indicate that by the year 2000, wind energy could provide 20% of our total national electrical energy needs.

SOLID WASTES

Solid wastes represent still another resource with substantial energy potential already exploited in other parts of the world. Half of the 75 million tons of solid wastes produced annually in California is collectible, and the refuse could furnish 10% of the fuel oil needed by utilities at prices competitive with other power generation fuels, or could furnish gas for direct use by residential and commercial customers. Ways of employing solid wastes to generate power include: incineration or direct burning, which produces recoverable heat for production of steam, which in turn can be used in power plants. (St. Louis and Nashville are cities using this approach.) Hydrogenation, which involves adding steam carbon monoxide and a catalyst to organic wastes in a pressurized container, and applying heat to cause chemical reduction into a heavy paraffinic oil and other hydrocarbon forms. Bacterial conversion, which is a process using anaerobic bacteria (which flourish without free oxygen) to decompose organic wastes to produce a mixture that is 72% methane—the principal component of gas. A ton of dry organic waste can produce 10-20,000 cubic feet of methane.

METHANOL

Methanol, or methyl alcohol, is a colorless, odorless liquid which can be made from practically any other fuel—natural gas, petroleum, coal, oil shale, wood, farm and municipal wastes—giving methanol virtually unlimited flexibility in utilizing various energy sources as the economy and conditions dictate, and offering a means of reducing the nation's waste disposal problems.

GEOTHERMAL ENERGY

Geothermal energy represents a very long-term resource that may have the potential to supply up to 15% of the additional electrical energy capacity required by the year 2000. There are 35 potential geothermal resource areas covering more than 15 million acres within California.

NUCLEAR FISSION

The Atomic Energy Commission has predicted that nuclear energy will become the dominant source of electricity in the 1990's, and will account for as much as 60% of the nation's generating capacity in the year 2000. Proponents of nuclear power point out that it is smog free, and that its use reduces air pollution that would otherwise result from fossil fuel power generation, and conserves fossil fuels. ■

The following addresses are provided for anyone wishing to express their opinion regarding the proposed LNG facility at Point Conception:

California Coastal Commission
Attn: Bill Altern
1540 Market St.
San Francisco, CA 94102

Federal Energy Regulatory Commission
825 N. Capitol
Washington, DC 20426

Public Utilities Commission
Attn: Robert Batinovich
350 MacAlister St.
San Francisco, CA 94102

Beardsley, Hufstedler & Kemble

Charles E. Beardsley
1904-1975

Helen Kemble
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Suite 2220
Crocker Bank Plaza
611 West Sixth Street
Los Angeles
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Stephen F Peters
Patricia Phillips
Warren L. Ettinger
John P Olson
Peter O. Israel
Dennis M. Perluss
Florrie Young Roberts
Evelyn Balderman
Cyrus V. Godfrey
Michael E. Friedman
Laurie D. Zelon

June 2, 1978

Kenneth F. Plumb
Secretary, Federal Energy
Regulatory Commission
Washington, D.C. 20426

Re: OPPR-PCCD/EEB
Western LNG Terminal Company
Pacific Gas LNG Terminal Company
Western LNG Terminal Associates
Docket No. CP75-83-2

Dear Mr. Plumb:

Enclosed are three (3) copies of the Comments of Kelco Company To Federal Energy Regulatory Commission On Draft Environmental Impact Statement And In Opposition To Proposed LNG Facility At Point Conception.

If the FERC staff has any questions about Kelco's Comments or would like any additional information, please do not hesitate to contact us.

Sincerely,

BURTON J. GINDLER

BJG:ch

Enclosures

The attached comments/studies have been used in the preparation of Sections B-6 and C-6 of Volume II of the FEIS.

COMMENTS OF

KELCO COMPANY*

TO

FEDERAL ENERGY REGULATORY COMMISSION

ON DRAFT ENVIRONMENTAL IMPACT STATEMENT

AND IN OPPOSITION TO

PROPOSED LNG FACILITY

AT POINT CONCEPTION

OPPR-PCCD/EEB
Western LNG Terminal Company
Pacific Gas LNG Terminal Company
Western LNG Terminal Associates
Docket No. CP75-83-2

Submitted June 2, 1978

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*Kelco Company is a subsidiary of Merck & Co., Inc. A brief description of Merck is attached as Exhibit A to this statement.

Kelco Company, based in San Diego, California, is vitally interested in the proposed LNG facility at Point Conception because Kelco regularly harvests giant kelp (Macrocystis) off Point Conception and in other nearshore waters off the coast of California pursuant to exclusive leasehold rights acquired from the State.

These comments on the Draft Environmental Impact Statement and in opposition to the Point Conception site were prepared for Kelco by the company's special counsel, Burton J. Gindler, Dennis M. Perluss and the Los Angeles law firm of Beardsley, Hufstedler & Kemble, 611 West Sixth Street, Suite 2220, Los Angeles, California 90017 (213) 626-0671, with the assistance of company personnel and consultants retained by Kelco. Data concerning marine biology were provided by Dr. Craig Barilotti, Consulting Marine Biologist, and Kelco's Senior Marine Biologist Ron H. McPeak. Information relating to on-shore site topography and facilities construction was provided by James B. Hewette, Jr., Consulting Civil and Structural Engineer, and Kelco Project Engineer Donald H. Lark. Economic data were supplied by Lamar L. Whitney, Vice President of Kelco, and Don E. Conner, Kelco's Materials Manager. Information relating to weather conditions was provided by Charlie Adair, one of Kelco's kelp harvester captains with more than thirty years of experience in the Point Conception area.

TABLE OF CONTENTS

TABLES AND EXHIBITS

I. SUMMARY STATEMENT

With the possible exception of the Falkland Islands at the tip of South America, no where else in the world are there kelp beds as luxurious and extensive as along the coast line of California. Kelp is one of California's most important natural resources.

From the point of view of the kelp resource, the LNG facility could not be located at a worse place than Point Conception. Bed 32 is one of the finest kelp beds along the California coast and also one of the most productive. The LNG facility proposed at Point Conception lies over a part of Kelp Bed 32 and would directly interfere with the growth and harvesting of the kelp crop there, as well as other commercial and recreational uses of the bed.

Kelco leases the exclusive kelp harvesting privileges for Bed 32 and other kelp beds from the State of California. The peak recorded harvest from Bed 32 was 31,000 tons in 1976. This represented roughly 20% of the total California kelp harvest that year. The alternative sites at Oxnard, Camp Pendleton, Rattlesnake Canyon and Deer Canyon do not contain any harvestable kelp.

Kelp is an important ocean crop. It is the principal source of algin, a powder that has a unique ability to control the behavior of water--from the thickening and stablizing of foods and pharmaceuticals to use in the manufacture of paper

and textile products. The average available harvest from Bed 32 translates to approximately $2,000,000 to $5,000,000 in annual Kelco sales of products containing algin.

In addition, kelp forms an important natural substance in the life chain of the ocean. If properly protected and utilized, the kelp resource will flourish indefinitely. The proposed LNG facility, on the other hand, will someday become obsolete.

Kelco believes that an LNG terminal at Point Conception would be environmentally unacceptable because of its adverse effects upon the unique values of Kelp Bed 32--effects that are not fully or accurately assessed in the Draft Environmental Impact Statement. We therefore urge the Federal Energy Regulatory Commission (FERC) to deny the application for a certificate of public convenience and necessity authorizing the construction and operation of an LNG facility at Point Conception.

If the FERC unfortunately decides to approve the application for the proposed Point Conception site, however, it should try to mitigate the harmful effects of the project upon the environment and upon the kelp industry by imposing conditions relating to the following factors:

Firstly, harvesting of kelp should be permitted at appropriate periods before and during construction, the zone of restricted access during construction should be narrowly defined, and construction should be accelerated. Secondly, permanent structures, such as the trestle and the seawater system, should

be constructed about 1.7 to 2.7 miles to the west of the originally proposed location so as to minimize the effect of the project upon the kelp resource. (Such a move to the west may prove beneficial from an economic as well as an environmental, point of view.) Thirdly, the shipping and auxiliary boat traffic associated with the facility should be kept out of the kelp beds. Fourthly, ships harvesting kelp should be permitted maximum access to the kelp beds consistent with maritime safety.

To the extent that mitigation cannot be achieved, Kelco should receive compensation for the damage caused to its interests by the construction and operation of an LNG facility at Point Conception. However, Kelco considers compensation to be a poor third choice to denial of the certificate and to such protection as can be achieved by imposition of mitigating conditions.

A more detailed description of the reasons for the imposition of the foregoing conditions and a more detailed delineation of each condition follow below.

II. THE KELP INDUSTRY

Giant kelp grows in beds in the near-shore waters of California at depths ranging from 20 to 120 feet. Giant kelp has no root structure such as in land plants. Instead, kelp has a clump of branching, pencil-size strands called a holdfast, which clings to the ocean floor.

While land vegetation takes most of its nourishment through its roots, kelp absorbs nutrients from the water through all its surfaces. The plant thrives where there are strong currents constantly bringing a new supply of nutrients. A mature kelp bed forms a thick "canopy" on the surface, creating a dense, shadowy forest below. Throughout the natural cycle of a kelp forest, mature fronds (stems) continually develop, then die and break away, giving way to new fronds shooting up from the holdfast.

A. The Value Of Giant Kelp

Giant kelp is an important, renewable natural resource that benefits man in a variety of ways. In addition, giant kelp plays a vital role in the ecology of the sea.

1. Kelp's Substantial Commercial Value to Man

Giant kelp's special value to man is due to its high chemical content. Kelp contains iodine, potassium, and other minerals, vitamins and carbohydrates, and has been used for years as a food supplement for humans and animals. Of more value, however, kelp is the principal source of algin, a natural substance obtained from the processing of kelp, with the special ability to control large quantities of water.

Kelco processes harvested kelp into more than 70 algin products. The properties of these products make

them important to a number of industries as highly efficient thickening, stabilizing, suspending and gelling agents.

Algin is used in a wide range of foods including desserts, gels, milk shake mixes, dairy products and canned foods. Salad dressings are emulsified and stabilized with algin. In bakery products, from cake mixes to meringues, texture is improved and moisture is retained. In frozen foods, the stabilizing properties of algin assure smooth texture and uniform consistency on thawing. Beer foam stabilization is one of the more unusual functions performed by Kelco algin.

In the building industry, algin finds wide application in plaster and cement products, such as wall joint cements, texture paints and patching plasters. Algin products are also used in a variety of ways in the textile and paper industries and in the pharmaceutical and cosmetic industries.

The commercial value of the giant kelp, of course, does not end with a listing of the various products in which algin is an important ingredient. Kelco's harvesting, processing and manufacturing operations require a substantial workforce. Kelco currently employs about 800 people and will complete in June 1978 an $8,300,000 expansion of its San Diego plant for processing wet kelp. Kelco's expansion was based on the projected availability of wet kelp, including that produced from Bed 32. The existence of a kelp-dependent workforce--and the salaries earned by those who comprise that workforce--has a substantial radiating effect: new demands for other

products are made, new jobs in other industries are created, and taxes are generated.

2. Kelp's Important Role in Marine Ecology

In addition to its commercial value, giant kelp is an important element in the marine ecological chain: kelp forests provide food, shelter and habitat for attachment of a wealth of marine life. The ecological importance of Macrocystis was realized very early when Charles Darwin (1860) stated:

> "I can only compare these great aquatic forests . . . with the terrestrial ones in the inter-tropical regions. Yet if in any country a forest was destroyed, I do not believe nearly so many species of animals would perish as would here, from the destruction of the kelp."

Luxurious kelp growth in Southern California attracts numerous species of fish and invertebrates. Researchers have identified more than 700 species of fish and lower animals living within the kelp forests of Southern California.

The maintenance of the giant-kelp beds through careful conservation, therefore, provides an invaluable refuge for myriad sea creatures.

B. The Harvesting Of California's Kelp Resource

1. Leasing of State-Owned Kelp Beds

The control of kelp and jurisdiction over persons harvesting kelp is vested in the State Fish and Game Commission. The California Legislature has authorized the Commission to lease to any person, for a period not exceeding 20 years, the exclusive privilege to harvest kelp in beds in the waters of the State; but no lessee may possess an exclusive lease to an area in excess of 50% of the total kelp resources of the State. (California Fish and Game Code §6700.)

Kelco has been in the kelp-harvesting business in California for 49 years. Kelco and the State, through its Department of Fish and Game, have entered into exclusive lease arrangements for a number of specific kelp beds between Carmel Bay and San Diego, including Bed 32, the kelp bed located at the proposed Point Conception LNG terminal site. Pursuant to the leases, Kelco pays California 97 cents per "wet ton" of kelp harvested. In 1977 Kelco paid the State in excess of $100,000 pursuant to those arrangements.

2. The Harvesting Operation

The giant kelp is harvested by Kelco by large, modern harvesting vessels, operated under the regulations of the State Department of Fish and Game. These

harvesters operate like seagoing lawn mowers, pushing large cutting racks through the kelp canopy, gathering the cut kelp on conveyors that carry it aboard.

By state regulation, the kelp is cut only three to four feet below the water surface, leaving intact the remaining portion of the kelp plant. Because of the shallow cut and the plant's ability to regenerate quickly, the giant kelp can be harvested three times each year in the most productive beds in Southern California. (Different conditions in Central California, north of Point Conception, typically permit only a single harvest each year.)

Because of annual differences in nutrient levels, water temperature, weather and other conditions, the productivity of any particular kelp bed can fluctuate substantially from year-to-year. Accordingly, to maintain an efficient and consistent harvesting operation, it is necessary for Kelco to be able to harvest substantial kelp beds in different locations along the California coast.

After it is harvested, the kelp is taken to Kelco's processing plant along San Diego's bay for the manufacture of various refined algin products, which are then sold throughout the world.

3. The Environmental Consequences of Prudent Kelp Harvesting

The harvesting of kelp has grown to near the capacity of the California kelp resource. In years when the kelp crop is less than normal, all of the available kelp canopy is harvested.

However, those harvesting operations have no detrimental effect on the kelp resource. As we have explained, Kelco harvests the kelp only to a depth of three to four feet, allowing prompt regeneration of the canopy. In fact, prudent harvesting as carried out by Kelco may actually benefit the kelp beds. Like most plants, kelp requires light for photosynthesis. Dense surface canopy allows less sunlight penetration to important, developing plants beneath. Regular harvesting, then, clears the surface area so sunlight can penetrate the water and encourage new and heavier growth. (See Draft Environmental Impact Statement, at page 86.)

In addition, regular harvesting probably reduces the amount of litter on adjacent beaches by removing mature kelp fronds that otherwise would slough off and float to shore. (ZoBell, IMR Reference No. 59-3.)

C. The Special Value Of Kelp Bed 32

The proposed LNG terminal site at Point Conception is located within a major portion of Kelp Bed 32,

one of the most valuable kelp resources in California.* Because of the coincidence of a number of factors influencing the development of kelp, its organic productivity in this area is extremely high; the plants frequently grow to much larger sizes than elsewhere in Southern California. In addition, individual plants may live for up to 80 months, significantly longer than kelp plants found in other areas. (North, 1971.)

Kelp Bed 32 produces approximately ten (10) percent of all kelp harvested in the State.** This remarkably productive bed has the potential for yielding 15 wet tons of harvestable kelp per acre per year (using three harvests per year, as Kelco has been doing).***

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*Based on data accumulated during Kelco's many years of experience at Bed 32, Kelco's Senior Marine Biologist, Ron H. McPeak, believes that Figures 25 and 32 in the Draft Environmental Impact Statement (pages 90 and 171), while perhaps accurate depictions of the kelp canopy on the specific dates indicated, do not accurately reflect the normal distribution of kelp canopy in the area of Bed 32. A reasonably accurate representation of the normal distribution of kelp at the Point Conception site, however, is shown in Figure 12 (page 35) of Technical Report No. 26 in Support of the Point Conception LNG Facility DEIR, prepared by Arthur D. Little, Inc., and submitted to the California Public Utilities Commission in April 1978. A copy of that Figure 12 is attached as Exhibit B to this Statement.

**The Draft Environmental Impact Statement (at page 86) states that Kelp Bed 32 accounts for 10 percent of the state's kelp harvest in some years. The California Department of Fish and Game, in its March 31, 1978 report to the California Coastal Commission (at page 97), also states that Kelp Bed 32 yields about 10 percent of the statewide kelp harvest. Kelco's Senior Marine Biologist Ron H. McPeak believes those estimates are accurate.

***Because of temporary low-nutrient conditions in Bed 32, kelp growth was substantially depressed during parts of 1977 and 1978. Studies of the kelp in Bed 32 during those periods would therefore show such temporary, atypical conditions.

(footnote continued on next page)

Kelco has harvested the area now identified as Bed 32 since the early 1940's. Its use of Bed 32 has increased over recent years; and in 1976 Kelco harvested 31,310 wet tons of kelp from Bed 32, representing just under 25% of the company's total harvest. The average available harvest from Bed 32 translates to approximately $2,000,000 to $5,000,000 in annual Kelco sales of products containing algin.

The productivity of Bed 32 is particularly important because of the annual fluctuations in kelp bed yields. When the amount of harvestable kelp is low at other valuable beds (for example, Kelp Bed No. 3 off Point Loma, California), the kelp at Bed 32 may be bountiful. At times Bed 32 is the only significant source of kelp available to Kelco. Accordingly, the availability of Bed 32 for harvesting is essential for the maintenance of efficient, full utilization of the California kelp resource.

In addition, a variety of other marine resources is associated with the rich kelp forests of Bed 32. (See Draft

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(footnote continued from previous page)

Recent diving studies conducted by Kelco's Senior Marin Biologist, Ron H. McPeak, have also revealed that two species of sea urchins are presently grazing in substantial numbers on the attached Macrocystis in Bed 32 in the area to the east of the originally proposed trestle location. However, the presence and movement of the sea urchins may be due to the recent abnormal oceanographic conditions reducing the amount of drift kelp, which is the normal diet of the sea urchin. As those conditions stabilize, sea urchin activity may be reduced. In addition, Kelco has available several methods of controlling destruction of kelp caused by sea urchins. Accordingly, the existence and movement of a substantial sea urchin population in Bed 32 at the present time does not alter Kelco's position that location of the LNG terminal at Point Conception would irreparably damage an important kelp resource.

Environmental Impact Statement, at page 86.) In its report of March 31, 1978 to the California Coastal Commission, the State Department of Fish and Game emphasized the importance of the Point Conception giant kelp to the overall marine environment.

> "Probably the most valuable resource found in the nearshore environment of Point Conception is giant kelp, Macrocystis. Kelp is a harvestable resource, and is of economic value as such, but it is also a major component of the nearshore marine environment supporting a large diverse fauna, which includes valuable sport and commercial resources. In North and Hubbs (1968), Quast reported that the number of fishes found over rocky substrate without kelp was about one-third of the number in a similar habitat with kelp. There is probably a similar relationship with invertebrate resources as well." (Page 97.)

In sum, Kelp Bed 32 is an area of special biological and economic significance. To be consistent with our national environmental policies, any use of this area must be carried out in a manner that will sustain the marine environment and maintain its commercial and recreational value.

(See Nat'l Environmental Policy Act of 1969, §§2, 101, 42 U.S.C. §§4321, 4331.)

III. ADVERSE ENVIRONMENTAL IMPACTS OF LOCATING THE LNG TERMINAL PROJECT AT POINT CONCEPTION

If an LNG terminal project is located at Point Conception, the project will significantly harm the important Bed 32 kelp resource located along the proposed project site. Accordingly, we urge the FERC to deny the application for a certificate of public convenience and necessity authorizing the construction and operation of the LNG facility at the proposed Point Conception site. Should this site unfortunately be selected for an LNG facility, we urge the FERC to impose stringent conditions to protect the kelp resource.

The widest and most productive portion of Bed 32 lies within a two mile radius of the proposed LNG facility. Significant damage to this major portion of Bed 32 will occur during the construction phase of the project, as well as throughout the time the terminal is operated. Although the Draft Environmental Impact Statement (hereinafter "DEIS") recognizes that construction and operation of an LNG terminal at Point Conception will damage the kelp resource there (pages 169-172), Kelco believes that the DEIS does not accurately assess the significance of the damage that would be caused by an LNG terminal.

A. Damage To The Kelp During The Construction Phase Of The Project

1. Construction of the Trestle and Related Structures

Construction of the ship berth and trestle and installation of the seawater system at the proposed site will unavoidably destroy a substantial area of kelp. The trestle itself is described as a 4,600 foot structure extending offshore to a depth of 60 feet. Construction of the trestle will require placement of approximately 75 groups of four 60-inch support piles. One hundred piles are to be used for the berth at the end of the trestle. Installation of the seawater line will require excavation of a 30-to-50 foot wide trench, requiring a 50-100 foot-wide path for a length of approximately 4,400 feet.

As shown in Exhibit B to this Statement (Figure 12 of Technical Report No. 26 prepared by Arthur D. Little, Inc., and submitted to the California Public Utilities Commission in April 1978 [hereinafter "Technical Report No. 26"]), the trestle as proposed will be constructed through an area that normally has a major concentration of kelp. Two of the three seawater line alternatives being considered by the applicant are also located through significant kelp forests.

The actual impact on the kelp resource of constructing these structures depends in large part on the

time construction actually begins and the length of time needed for construction. The DEIS assumes a construction period of 38 months. (Page 11.) Such a 38-month construction period would interfere with at least 9 separate harvests under normal conditions.

In addition, construction may have a long-term impact on the kelp resource. As previously explained, when harvested to a depth of only three to four feet below the surface, the giant kelp at Point Conception is capable of regenerating its thick canopy within an average period of four months. Construction of the trestle and seawater lines will actually destroy many plants at or near their base on the ocean floor. Depending upon the nature of physical conditions in the area during the operation of the project, some plants may never be replaced; and years may be necessary for others to be established and to develop a harvestable canopy.

2. Temporary Restrictions on Access to the Construction Zone

In response to an inquiry from the staff of the California Coastal Commission concerning restrictions on access to the LNG project, Western LNG Terminal Associates indicated that "temporary restrictions" for construction of the trestle and dock and installation of the seawater lines will be imposed over an area "bounded by the extension of onshore property lines to a line 500' seaward of, and parallel

to," the berthing line. This description would create a restricted area one-mile wide and nearly one-mile long.

The need for excluding access to this large area during construction was explained as follows:

> "Within this area will be temporary moorings for barges, cranes and other floating equipment involved in the construction of the facilities."

The reasons given for this restriction make it apparent that these "temporary restrictions" will apply for the entire construction period.

The restricted construction zone includes approximately 370 acres of kelp. Accordingly, using the 38 month construction period estimate contained in the DEIS, more than 16,500 wet tons of kelp will be lost during the construction phase--without any consideration of substantial additional losses during the protracted period of regeneration. (Data concerning the impact of the restricted construction zone are summarized in Table 5.)

B. Damage To The Kelp During The Operation Of The Project

Damage to the kelp resource and loss of harvestable kelp will continue unabated once construction of

the proposed project at Point Conception has been completed and operations have begun. This "operating damage" will result from three different factors: (1) the continued physical presence of the trestle and berthing facility; (2) the activity of auxiliary craft (tugs and line-handling boats, for example) associated with the operation of the terminal; and (3) permanent exclusion zones, imposed either by the project sponsor or the State or more likely by the United States Coast Guard, limiting access to the area surrounding the LNG terminal.

1. Loss of Kelp Resource Due to the Continued Presence of the LNG Trestle

The trestle and its support pilings, of course, will continue to be present long after the construction phase of the project is completed. The presence of these structures at or above the surface of the ocean physically restricts the areas in which the kelp-harvesting vessels can safely conduct their harvesting operations.

2. Loss of Kelp Resource Due to Boat Traffic

The activity of auxiliary craft such as tugs and line-handling boats, through mechanical injury from propeller blades, will destroy kelp fronds at the surface and prevent a harvestable canopy from forming. The extent of such

damage is not possible to estimate without detailed information as to the patterns of boat traffic through the kelp bed.* However, it is clear that unless restricted, auxiliary craft activity will produce one of the most substantial, on-going, harmful impacts on the kelp resource.

Present plans for the proposed Point Conception project apparently call for mooring of tugboats and work boats along the east side of the trestle. (See Arthur D. Little, Inc., Draft Environmental Impact Report for Proposed Point Conception LNG Project, submitted to California Public Utilities Commission on February 28, 1978, at page 2-8.) Unfortunately, this placement of the mooring facilities will maximize destruction of the kelp resource by encouraging boat traffic in areas of greatest kelp concentration (see Exhibit B to this Statement). Obviously, to the extent such traffic is

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*Arthur D. Little, Inc. roughly estimated the area that would be affected by such auxiliary boat traffic as "a rectangle extending shoreward, approximately 3000 feet from the end of the trestle and extending eastward approximately 5000 feet." Arthur D. Little, Inc. (1978), Water Quality/Marine Biology Technical Report No. 5A for the Draft Environmental Impact Report, Point Conception LNG Project, at page 147, submitted to California Public Utilities Commission.

In the summary section of Technical Report 5A, Arthur D. Little describes the estimated affected zone as extending eastward only 500 feet, rather than 5,000 feet as stated in the body of its report (page 21-S). The 500-foot figure appears to be a typographical error; for the summary statement considers the affected area to encompass approximately 400 acres--an area that is consistent with the rectangle described in the body of the report as approximately 3,000 feet by 5,000 feet. (See page 21-S.) The Draft Environmental Impact Statement, at page 188, quotes the incorrect 500-foot figure from the summary section of the Arthur D. Little report.

contained in areas without kelp, damage to this marine resource will be reduced.

3. Loss of Kelp Resource Due to Exclusion Zones

Potentially the greatest threat to the continued use of the important kelp resource located at Point Conception is the likelihood that permanent exclusion zones will apply to the kelp harvesters near the LNG terminal site.

If such an exclusion zone of only 1/2 mile were to be established around the LNG trestle at the location originally proposed, approximately 322 acres of kelp, capable of producing 4,830 wet tons of kelp per year would be lost. If the trestle is constructed 1,500 feet to the east, as has been contemplated by the project sponsor,* such a 1/2 mile exclusion zone would result in the loss of 420 acres of kelp, capable of producing 6,300 wet tons of kelp per year. A two-mile exclusion zone at the eastern trestle location will preclude harvesting of about 25,000 wet tons of kelp per year. (Data relating to the loss of kelp from establishment of various exclusion zones at the original proposed trestle location are summarized in Table 1, attached to this Statement. Comparable data for exclusion zones based at a trestle location 1,500 feet east of the original location are summarized in Table 2.)

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*See Technical Report No. 26, at p. 9.

The United States Coast Guard has not yet proposed permanent exclusion zones for the project, and probably will not do so for some time. However, the Coast Guard has created exclusion zones at other LNG facilities; and, as noted in the DEIS (at page 241), it is reasonable to assume that federal regulations will be adopted governing access to the waters surrounding the Point Conception site if the LNG terminal is located there. The undesirability of the Point Conception site is underscored by the severe impact on the kelp resource that would be caused by the establishment of such exclusion zones.

IV. DENIAL OF PERMIT OR MITIGATING MEASURES FOR THE PROPOSED POINT CONCEPTION LNG TERMINAL SITE

We urge that the FERC deny the application for the Point Conception site, in order to sustain the biological productivity of this important part of California's coastal environment.

California's Department of Fish and Game, in its recent comments on the Draft Environmental Impact Report submitted to the California Public Utilities Commission, has also concluded that the proposed LNG terminal project at Point Conception is incompatible with the invaluable natural resources at that site:

"We believe construction and operation of LNG facilities at Point Conception would substantially diminish both the scientific and fishery resources of the area. From a fish and wildlife standpoint, therefore, it is our position that Point Conception is a poor choice for the location of LNG facilities."

In support of its assessment of the project, the Department placed heavy emphasis on the proposed terminal's impacts on kelp beds and kelp fisheries. (See Comments on Draft EIR by Department of Fish and Game, submitted on April 17, 1978 to Mr. Steven Miller of the California Public Utilities Commission, by Deni Greene, Director, State Clearinghouse. A copy of those comments are attached as Exhibit C to this Statement.)

Should the FERC decide to approve the application for a certificate of public convenience and necessity authorizing the construction and operation of an LNG facility at Point Conception, however, we outline in this section of our Statement a number of mitigating measures that will somewhat diminish the serious detrimental consequences of locating an LNG terminal at that site. Although we urge that employment of those measures be required as conditions of any such use of the Point Conception site, we emphasize that the unavoidable adverse impact on the kelp resource will nonetheless be significant.

We believe that reasonable conditions should be imposed in the following areas of concern:

A. Harvesting Of Kelp Before And During Construction

As recommended in the DEIS (page 364), harvesting of kelp should be permitted before construction of the marine facilities begins. Intensive harvesting immediately before construction commences will reduce somewhat the initial impact of the destruction of kelp plants by the actual construction process, although the plants themselves will nonetheless be lost once construction begins.

Similarly, harvesting of kelp should be allowed at appropriated periods during construction. Permitting harvesting during the construction period will tend to alleviate the injury to kelp harvesting that will be caused by the "temporary restrictions" on access to the construction zone proposed by Western LNG Terminal Associates. No such harvesting, of course, can take place with respect to the plants actually destroyed by construction of the trestle and installation of the seawater system.

In addition, the restricted area surrounding the construction zone should be narrowly defined to permit maximum harvesting of that portion of the kelp canopy unaffected by the actual construction of the trestle and related facilities.

B. Constructing Permanent Structures To The West Of The Original Proposed Location

One significant measure that should be required as a condition of approval is the construction of the trestle and seawater system as far to the west of the original proposed location as is feasible. Specifically, Kelco proposes that the trestle and related structures be constructed approximately 1.7 or 2.7 miles to the west of the originally proposed Point Conception location.

The suggested location 1.7 miles to the west of the originally proposed location is on Bixby Ranch property, near the Cojo Ranch House complex. The on-shore location consists of a gently sloping plateau, which would be recessed from view. The suggested location 2.7 miles to the west of the originally proposed location is near Government Point. The on-shore location consists of a low, wide, meadow-like area, which slopes up from a low coastal bluff.

Either of these locations would provide significant environmental and economic benefits over the originally proposed location.

1. Environmental Benefits

The physical distribution of the kelp growth in the Point Conception area is the key factor that

should control the location of the seaward facilities of the project. An examination of Exhibit B to this Statement, showing the normal distribution of the kelp resource at the proposed LNG site, reveals a very significant fact that should be utilized in locating structures to minimize the effect of the project on kelp: As one moves west from the original proposed trestle location, the kelp concentration (and accordingly the marine life associated with it) decreases dramatically, while it increases as one moves east.

The maximum benefit of such a westward location within the area protected by Point Conception-Government Point is achieved by locating the trestle approximately 1.7 to 2.7 miles to the west of the original proposed location. Accordingly, Kelco urges that the project sponsor be required to construct its trestle and other related structures at such a location unless it is proven infeasible.

Following an initial evaluation of alternative sites, the FERC staff rejected for further consideration a proposed location at Government Point, approximately 2.7 miles to the west of the original proposed Point Conception location, on the ground that it presented "no significant advantage to the Point Conception site." (DEIS, Table 50, at page 282.) Kelco believes the significant differences in the impact of such a westward location on the kelp resource merits further investigation. In any event, a location as far west as possible should be required for the location of the proposed project's trestle and related structures.

The beneficial effects of requiring the permanent structures such as the trestle and berth facilities to be built further to the west are emphasized by comparison of the data in Tables 3 and 4, summarizing the impact of exclusion zones with trestle locations one and two miles west of the original proposed location, with those in Tables 1 and 2, summarizing the same information for the original location and the suggested location 1500 feet to the east. If the trestle were located two miles to the west of the original proposed location, a two-mile exclusion zone would affect only about 324 acres (4,900 tons) of kelp, compared to about 1,460 acres (21,900 tons) at the original location and about 1,668 acres (25,000 tons) at the 1500-feet eastward location.

Locating the permanent structures 1.7 to 2.7 miles to the west of the original proposed location will also mitigate the other sources of harm to the kelp: Actual construction damage will be lessened; the impact of temporary access restrictions during construction will diminish; the permanent effect of the presence of the structures is lessened; the likelihood of auxiliary craft damage to the kelp is lowered; and, as noted, the impact of exclusion zones is dramatically reduced.

Similar beneficial consequences, albeit on a somewhat smaller scale, will result from locating the seawater system in sandy areas in which no kelp is present. Indeed, recognizing the reduced environmental impact of placing the seawater system in sandy areas, engineers for Western

LNG Terminal Associates have prepared a plan of the seawater system located in the Cojo sandy area. (See Technical Report No. 26, at page 9.)

2. Economic and Other Benefits

Certain economic and other benefits would appear to result from construction of the LNG facilities furthur to the west. Although we do not purport to present any detailed studies to this effect, our preliminary examinations support that common-sense conclusion. (Those preliminary studies were conducted by James B. Hewette, Jr., Consulting Civil and Structural Engineer, and Donald H. Lark, Kelco's Project Engineer.) Accordingly, we urge further consideration of such a move to the west for these reasons as well.

a. Cost and Energy Savings

Constructing the permanent structures of the LNG facility either 1.7 or 2.7 miles to the west of the original proposed location would appear to result in significant savings in construction and operating costs. Because the ocean floor drops off more rapidly at each alternative location, both the trestle and the seawater system can reach their operating depths in a much shorter distance, and the special pipeline carrying LNG from the tanker to shore storage

would also be shorter. Thus, for example, the length of the trestle at both alternative locations can be reduced to 2/3 or perhaps 1/2 of the required length at the original proposed location, thereby reducing construction costs.

Even further savings in construction costs would appear to result at a location 2.7 miles to the west because the slope at that location at the Point Conception site is an approximately 3% gradient, compared to an approximately 6% gradient at the original location. The grading operation during construction would likely be less than half that required at the original location.

Operating costs at a location 2.7 miles to the west would also appear to be substantially reduced. Following grading, that location would result in a slightly recessed, level site at an elevation of approximately 60 feet, compared to an elevation of approximately 100 feet at the original proposed location. Energy required to pump the intake seawater to the LNG vaporizing units would, therefore, appear to be reduced by approximately 50% at the westerly location--a significant cost factor in view of the quantities involved.

b. Relationship to Seismic Danger

The DEIS observes that there are no known faults beneath the proposed Point Conception site. (Page

143.) However, a recent seismic study performed by geologist Donald D. Asquith, of Envicom Corp., for the Hollister Ranch revealed the existence of a relatively young and possibly active earthquake fault directly under the original proposed location of the LNG facilities at the Point Conception site. The only information concerning this new fault presently available to Kelco was provided by Hollister Ranch personnel. That information seems to indicate that the fault does not run directly under either proposed alternative westerly location for the permanent structures of the LNG facility at the Point Conception site.

The discovery of this new fault emphasizes the undesirability of the Point Conception site. At the very least, however, if the application for a certificate of public convenience and necessity is approved for this site, the FERC should consider requiring construction of the LNG facilities at one of the alternative locations, if they are indeed sufficiently removed from the direct path of the fault.

c. Impact on Surfing

Conditioning use of the Point Conception site on constructing the permanent facilities at either of the two suggested alternative locations would also greatly reduce the impact of the LNG terminal on the excellent surfing areas located offshore from the original proposed trestle location. The staff of the California Coastal Commission

described those areas and the threat posed by the originally proposed location of the LNG facilities in its Background Information memorandum of April 5, 1978, to "State Commissioners and Interested Parties":

> "Two surfing spots break off the [Point Conception] site: a small reef break, directly in front of the site in the probable path of the trestle; and a 'classic' spot at the western end of Little Cojo Bay, to the west of the trestle location. The trestle would likely permanently inferfere with one spot, while the impact on the other depends on whether restrictions are imposed on surfing and other water activities near the berth and tanker approach route." (Page 15.)

Both the small reef break and the "classic" spot at the western end of Little Cojo Bay are substantially to the east of the two alternative locations proposed by Kelco. Therefore, either the location 1.7 miles to the west of the originally proposed trestle location or the one 2.7 miles to the west would have a substantially reduced impact on the excellent surfing now possible at the Point Conception site.

d. Weather Conditions

Locating the seaward structures of the LNG facility to the west of the original proposed location also appears to provide those facilities with greater protection against adverse weather conditions. As previously explained, the trestle can reach its operating depth in a much shorter distance at the alternative, westerly locations because the ocean floor drops off more rapidly as one moves toward the west. Accordingly, the berthing facilities at the end of the trestle will be closer to shore and will thus be more protected by the on-shore land mass at each of the alternative locations.

Considering all aspects of the weather, including wind, waves and swell, a location 1.7 miles to the west of the original proposed trestle location provides the greatest protection with respect to prevailing weather from the north and northwest. A location 2.7 miles to the west is the next most protected location, while the originally proposed location is the most exposed to the prevailing weather from the north and northwest because the trestle here would be farthest from the shore.*

*A westward location would provide no additional protection in the comparatively few days each year during which the weather moves in from the south. Both the original location and the alternative westerly locations are equally exposed and afford essentially no protection from weather from the south.

C. Restricting Auxiliary Boat Traffic To Areas With No Kelp

Unrestricted auxiliary craft activity near the LNG facility will have a devastating, on-going impact on the kelp resource in the area of operations.

Present project plans call for buoys to be placed to the east of the trestle, shoreward of the LNG berth, to moor tugboats and work boats. As previously noted, placement of these facilities to the east of the trestle encourages maximum boat use in areas in which kelp is located. Precisely the opposite result is necessary to preserve the kelp resource.

Kelco therefore urges that the FERC require the mooring facilities to be located in areas in which no kelp is found. In addition, Kelco requests that such auxiliary boat traffic be restricted to areas in which no kelp is present. Otherwise, the activity of the propeller blades of such craft will continuously destroy a substantial area of kelp canopy.

D. Maximum Access For Kelp Harvesters

The corollary of prohibiting auxiliary craft traffic in kelp areas in the vicinity of the LNG terminal is permitting maximum access for kelp harvesters in such areas, subject only to reasonable requirements of marine safety. While it may be desirable to impose general access restrictions

for the project area, such exclusion zones would severely damage the ability to harvest kelp in Bed 32, as demonstrated in Tables 1-4. On the other hand, there is no reason to prevent harvesters from maximizing the kelp yield from the affected portions of Bed 32, consistent with reasonable safety requirements.

To the extent that such safety requirements may be dependent on whether an LNG tanker is at berth, Kelco urges that the FERC require the project sponsor to cooperate to the fullest extent possible with Kelco personnel, to permit Kelco to schedule its harvesting operations in the most efficient manner possible under the circumstances.*

V. COMPENSATION FOR DAMAGE TO THE KELP RESOURCE

To the extent that employment of the mitigation measures described in Section IV fails to prevent all damage to Kelp Bed 32, Kelco should be compensated for the damage to its leasehold interest in Bed 32--that is, the damage to its exclusive privilege to harvest kelp in Bed 32. California's Department of Fish and Game, which regulates the harvesting in state kelp beds, has also stated that the lease holder--that is,

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*Even with complete information regarding the arrival of LNG tankers, Kelco will be presented with difficult scheduling problems. Thus, even if exclusion regulations are only intermittent, Kelco will experience substantial problems in attempting to harvest in the affected area, and at times will be deprived of otherwise available kelp.

Kelco--should be compensated for any loss of revenue from kelp harvesting. (See Memorandum of April 5, 1978 to Mr. Michael Fischer, Executive Director, California Coastal Commission, Re Recommended Conditions for Onshore LNG Terminal Sites, at page 2.)

It has been suggested that the harmful effect of the LNG terminal project might be offset, and Kelco therefore compensated, by the successful relocation of kelp or establishment of new kelp forests away from areas of project influence. Based upon the present state of the art, Kelco does not believe that this suggestion now provides a viable means of mitigating the damage of the proposed project.

Kelco has done experimentation and field work in an effort to develop new areas of kelp over a twenty-year period. Various techniques have been employed by Kelco's researchers, as well as by researchers from governmental and educational institutions, including culture development, transplanting and field dispersal. Yet no substantial relocation has yet been achieved in the field by anyone.

It is Kelco's position that any damage to the value of its exclusive license to harvest kelp is a compensable taking, for which Kelco is entitled to just compensation in the form of monetary damages. However, Kelco believes that providing monetary compensation for damage to the kelp resource is an undesirable trade-off. Compensation should be viewed as a final condition, to be used only to the extent that all reasonable conditions designed to protect the kelp resource have

failed to prevent injury. In the first place, monetary compensation is never precise; there is, accordingly, no guarantee that Kelco will be made whole by employing this remedial device. More importantly, compensation to Kelco does nothing to preserve the important marine resources located at Point Conception.

Accordingly, while Kelco intends to assert its right to just compensation and believes that express recognition of that right should be imposed as a condition on use of Point Conception as the project site, Kelco urges that the FERC further condition use of Point Conception by requiring the mitigating measures outlined above.

VI. CONCLUSION

Kelco believes that location of the LNG terminal at Point Conception would result in irreparable damage to an important kelp resource. Thus, we urge the FERC to deny the application for a certificate of public convenience and necessity authorizing the construction and operation of an LNG terminal at the proposed Point Conception site.

Although the most significant damage to the kelp resource is unavoidable if the project is located at Point Conception, mitigating measures are available to reduce some of the harmful impact of constructing and operating an LNG terminal in Kelp Bed 32. Accordingly, if the application for Point

Conception is unfortunately approved, we urge the FERC to impose reasonable conditions to protect to the extent possible the kelp resource and those who rely upon it. Finally, and only as an unavoidable last choice, the FERC should provide for payment of compensation to Kelco to the extent that it is harmed by the construction or operation of the facility.

TABLE 1.

IMPA OF EXCLUSION ZONES UPON

KELP HARVESTING AT POINT CONCEPTION

Original Trestle Position per DEIR

Location of LNG Trestle: dated February 28, 1978

	Distance of Exclusion Zone Adjacent to LNG Trestle					
	1/2 Mile		1 Mile		2 Mile	
	East	West	East	West	East	West
(1) Kelp Acreage Included	220	102	470	180	1,180	280
Total Kelp Acreage		322		650		1,460
(2) Tonnage of Kelp (15 tons/acre/year)		4,830		9.750		21,900
(3) Pounds of Algin per Year		241,000		487,000		1,095,000
(4) Minimum Economic Impact	$ 483,000		$ 975,000		$ 2,190,000	
(4) Maximum Economic Impact	$ 803,000		$ 1,620,000		$ 3,646,000	

(1) The kelp acreage was derived by use of Figure 12, Page 35, (Thomas Reid Associates, adopted from Western LNG Terminals Associates, Inc.) of Arthur D. Little, Inc. Technical Report No. 26, dated April, 1978.

(2) The Pt. Loma kelp bed (San Diego, Calif.) has been harvested to capacity for many years. Harvesting records and aerial photographs of the bed demonstrate that 20 tons per acre per year is an accurate harvest yield for Pt. Loma. 15 tons per acre per year is certainly a reasonable figure to assume for a highly productive area such as Kelp Bed 32.

(3) Kelp yields 50 lbs. of algin containing products per ton of wet kelp.

(4) The range of economic impact has been determined by using the range of prices for the various Kelco products containing algin that are manufactured. This, of course, reflects not only the kelp itself but also the materials, chemicals, labor, taxes, etc., that go into the manufacture of products containing algin.

TABLE 2.

IMPACT OF EXCLUSION ZONES UPON

KELP HARVESTING AT POINT CONCEPTION

Location of LNG Trestle: 1500' East of Original Position per Arthur D. Little Techical Report No.26 dated April, 1978.

	Distance of Exclusion Zone Adjacent to LNG Trestle					
	1/2 Mile		1 Mile		2 Mile	
	East	West	East	West	East	West
Kelp Acreage Included (1)	250	170	576	250	1286	382
Total Kelp Acreage	420		826		1,668	
Tonnage of Kelp (15 tons/acre/year) (2)	6,300		12,400		25,000	
Pounds of Algin per Year (3)	315,000		620,000		1,250,000	
Minimum Economic Impact (4)	$ 630,000		$ 1,240,000		$ 2,500,000	
Maximum Economic Impact (4)	$ 1,049,000		$ 2,065,000		$ 4,163,000	

(1)

(2) SEE TABLE 1.

(3)

(4)

TABLE 3.

IMPA OF EXCLUSION ZONES UPON

KELP HARVESTING AT POINT CONCEPTION

Location of LNG Trestle: Trestle Moved 1 Mile West of Original Position

	Distance of Exclusion Zone Adjacent to LNG Trestle					
	1/2 Mile		1 Mile		2 Mile	
	East	West	East	West	East	West
Kelp Acreage Included (1)	75	45	180	100	470	280
Total Kelp Acreage		120		280		750
Tonnage of Kelp (15 tons/acre/year) (2)		1,800		4,200		11,250
Pounds of Algin per Year (3)		90,000		210,000		562,000
Minimum Economic Impact (4)	$ 180,000		$ 420,000		$ 1,124,000	
Maximum Economic Impact (4)	$ 300,000		$ 700,000		$ 1,871,000	

(1)

(2) SEE TABLE 1.

(3)

(4)

TABLE 4.

IMPACT OF EXCLUSION ZONES UPON

KELP HARVESTING AT POINT CONCEPTION

Location of LNG Trestle: Trestle Moved 2 Miles West of Original Position

	Distance of Exclusion Zone Adjacent to LNG Trestle					
	1/2 Mile		1 Mile		2 Mile	
	East	West	East	West	East	West
(1) Kelp Acreage Included	56	44	100	44	280	44
Total Kelp Acreage		100		144		324
(2) Tonnage of Kelp (15 tons/acre/year)		1,500		2,200		4,900
(3) Pounds of Algin per Year		75,000		110,000		245,000
(4) Minimum Economic Impact	$	150,000	$	220,000	$	490,000
(4) Maximum Economic Impact	$	250,000	$	366,000	$	816,000

(1)
(2) SEE TABLE 1.
(3)
(4)

TABLE 5.

ANNUAL IMPACT OF TRESTLE CONSTRUCTION AND OPERATION

	Construction Period (Original Property Line-One Mile Width) (5)	Impact of Physical Trestle Only (200' Each Side)
Total Kelp Acreage Included (1)	370	20
Tonnage of Kelp (15 Tons/Acre/Year) (2)	5,550	300
Pounds of Algin Per Year (3)	277,000	15,000
Minimum Economic Impact (4)	$ 555,000	$ 30,000
Maximum Economic Impact (4)	$ 922,000	$ 50,000

(1)
(2) SEE TABLE 1.
(3)
(4)

(5) The size of the restricted construction zone is based on information supplied to the staff of the Coastal Commission by Western LNG Terminal Associates.

DESCRIPTION OF

MERCK & CO., INC.

Merck & Co., Inc., headquartered in Rahway, New Jersey, is a worldwide company with offices, laboratories, plants, experimental farms, and distribution facilities throughout the United States and in twenty-nine foreign countries. Merck's business is the discovery, development, manufacture, and marketing of human, animal, and environmental health products and services, and specialty chemicals. The Company has facilities in nine California communities and employs over 1,400 people throughout the state. This represents about 10% of our total employment in the United States.

The following is a brief description of the Merck facilities and operations in California:

1. San Diego: The Kelco Division of Merck is headquartered in San Diego and includes an office and research and development facility on Aero Drive, and a plant location on the city's waterfront. The plant is a continuous operation facility which processes kelp harvested from the sea to manufacture algin, and also produces xanthan gum and specialty chemicals used in food processing, industrial, and consumer products.

2. South San Francisco: The Marine Magnesium plant of the Merck Chemical Manufacturing Division is located here. The plant processes magnesium salts from sea water and converts them into industrial and medicinal magnesium products.

3. Oakland: The Pacific Pumping Division of Merck's Baltimore Aircoil subsidiary is headquartered in Oakland. In addition to staff and marketing operations, the division machines and assembles components for centrifugal pumps used in industrial, construction, and agricultural application.

4. Madera: The Baltimore Aircoil subsidiary of Merck has a plant located in Madera where it fabricates metal cooling towers, evaporative condensors, and closed circuit industrial coolers.

EXHIBIT A (Page #1)

DESCRIPTION OF

MERCK & CO., INC.

cont....

5. Costa Mesa: The Merck Sharp & Dohme Orthopedic subsidiary is located in Costa Mesa from where it markets special equipment used by orthopedic physicians in the treatment of bone fractures. The facility also houses the manufacturing operations known as Solar Labs.

6. Merced: Another unit of Baltimore Aircoil is located in Merced. The unit cuts and prepares lumber to specification for use in wooden cooling tower equipment.

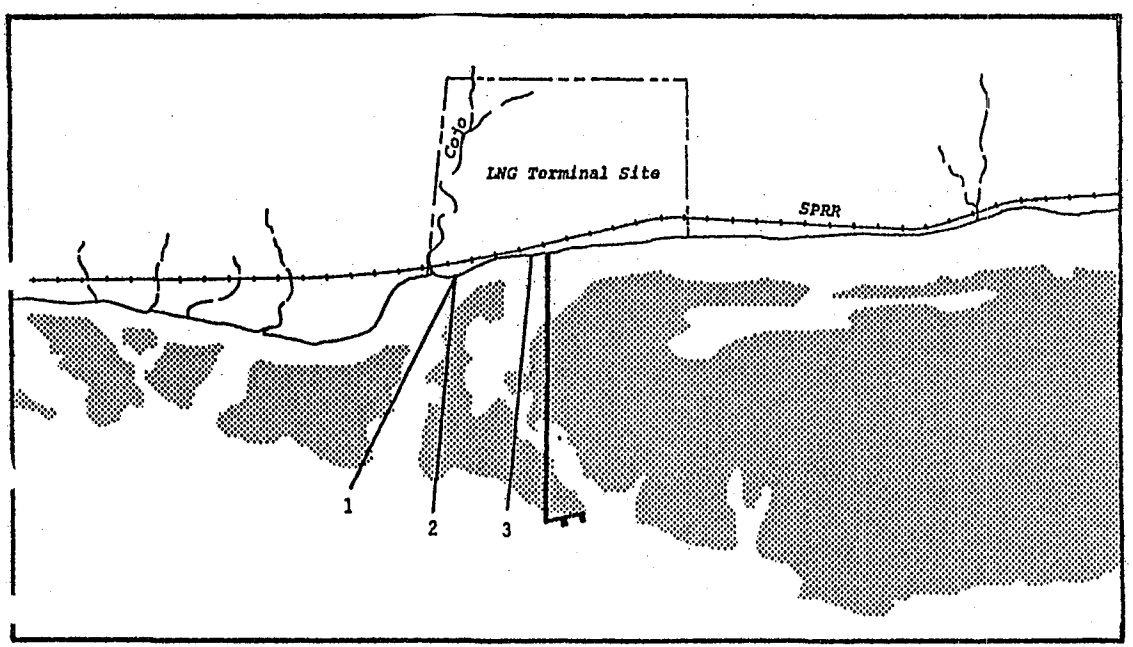
7. Los Angeles: Merck has three separate sales and distribution facilities in the greater Los Angeles area.

8. Sonora/Columbia: Merck has a dolomite (limestone) mine located in Columbia and a calcining plant located in Sonora which supply raw material for the plant in South San Francisco.

9. South San Francisco: Merck also has a separate sales and distribution office in South San Francisco for its Merck Sharp & Dohme division.

EXHIBIT B.

FIGURE 12. KELP DISTRIBUTION



KEY

Area of kelp

Proposed trestle

Seawater line alternatives:
1 - Cojo submarine ravine
2 - Proposed rocky reef
3 - Plant relocated 1500 ft.

mi 0 .5 1
km 0 .5 1 1.5

NORTH

SOURCE: Thomas Reid Associates, adapted from Western LNG Terminal Associates, Inc.

EXHIBIT C

EDMUND G. BROWN JR.
GOVERNOR

State of California
GOVERNOR'S OFFICE
OFFICE OF PLANNING AND RESEARCH
1400 TENTH STREET
SACRAMENTO 95814
(916) 445-0613

April 17, 1978

Mr. Steven Miller
Public Utilities Commission
350 McAllister
San Francisco, CA 94102

SUBJECT: SCH# 78030684 - LIQUIFIED NATURAL GAS TERMINAL
POINT CONCEPTION

Dear Mr. Miller:

This is to certify that State review of your environmental document is complete.

The results of the State review are attached. You should respond to the comments as required by the California Environmental Quality Act. You should address your responses to the commenting agency with a copy to the Clearinghouse.

Sincerely,

Deni Greene

Deni Greene
Director
State Clearinghouse

DG/ddt
Attachment
cc: Ken Fellows, DWR
Mary Schell, Library
Russell W. Cahill, Parks and Rec.
Dr. Knox Mellon, Parks and Rec.
William F. Northrop, State Lands
Harmon Wong-Woo, ARB
D. M. Taub, Transportation
E. C. Fullerton, Fish and Game
Steven Craig, Bakersfield Native American Community
Michael Jay Wilson, Univ. of Calif., Santa Barbara
William F. Northrop, State Lands
Paul D. Olson, Dept. of the Navy
Edward J. Hilton, Kern Co. Planning Department
Albert F. Reynolds, County of Santa Barbara
John L. Geesman, California Citizen Action Group

State of California — The Resources Agency

Memorandum

To : Honorable Huey D. Johnson
Secretary for Resources
1416 Ninth Street, Room 1311
Sacramento, CA 95814

Date: April 5, 1978

From : Department of Fish and Game

Subject: ES - SCH 78030684 - P.U.C. Draft EIR for Proposed Point Conception Liquified Natural Gas Project

The following statements comprise our comments on the above captioned draft EIR dated February 28, 1978, and on the associated Technical Reports which form an important part of the draft document.

The comments consist of a critique of the draft EIR, as well as our assessment of the project based on information available to date.

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Assessment of Project. Since liquified natural gas (LNG) projects were first officially proposed in California, the Department has consistantly maintained that construction and operation of LNG facilities at Point Conception would substantially harm the fish and wildlife resources of the area. These resources are of major scientific and economic importance to California. The scientific importance of the area stems from the unique oceanographic characteristics of the Point Conception region, where a sharp transition occurs between the flora and fauna of cold, northerly waters and warmer southerly waters. The economic importance of the area stems from the valuable fisheries for kelp and other marine resources found in the site vicinity.

We believe construction and operation of LNG facilities at Point Conception would substantially diminish both the scientific and fishery resources of the area. From a fish and wildlife standpoint, therefore, it is our position that Point Conception is a poor choice for the location of LNG facilities.

Comments on the Draft EIR. The draft EIR, in our opinion, inadequately portrays the adverse impacts to fish and wildlife resources and their habitats which would result from the location of LNG facilities at Point Conception. The EIR, therefore, understates the extent of these adverse impacts and the need for mitigation measures to offset the impacts. While we recognize that the California Coastal Commission will be recommending mitigation measures for impacts of the LNG facilities; it is still necessary for the project EIR to accurately identify impacts and the need and nature of possible mitigation measures. We, therefore, recommend that the document be revised to more accurately portray the impacts on fish and wildlife resources and the need for mitigation measures for the following features of the LNG project:

1. Impacts on kelp beds and kelp fisheries.

2. Economic value of commercial kelp fisheries and other commercial fisheries.

3. Impacts on marine birds and mammals.

4. Additional impacts on fish populations due to entrainment and impingement losses should the fish return system not live up to expectations.

5. Impacts on the value of the terminal site as a location for scientific study.

Our detailed comments and specific recommendations regarding the draft EIR follow.

Page 1-7. The document states that several acres of kelp will be destroyed during construction but that regrowth will occur within three months. No mitigation for the damage is offered. Kelp canopy is regenerated within about three months after harvesting the top four feet and not the whole plant. We believe the kelp destroyed during construction may be permanently lost. The economic impact of this loss should be recalculated and the loss due to construction should be mitigated by successful replanting or by other means.

Page 1-11. It is not clear that the project sponsors (Western LNG Associates) are commited to mitigation for fish losses, but are "considering" a fish return system or intake screen. Because the sea water system will have a major impact upon fisheries resources, we believe the sponsors should be commited to fully mitigate fish losses by employing available "state of the art" screening devices, such as Passavant screens.

Page 3-28. We believe the discussion of the fisheries resource is condensed to the point of having little value. Because fish losses due to the operation of the sea water system are identified elsewhere in the document as a major impact, we believe the discussion on page 3-28 should be rewritten to better reflect information in Technical Report 5a. At the very least, readers should be directed to the Technical Report as amended.

With regard to marine mammals and birds neither the draft document nor Technical Report 5a adequately portray populations or potential impacts. (Please see our comments regarding Technical Report 5a for further details).

Page 3-30. We believe the economic values for fish and kelp are grossly underestimated because, a) the values may be taken from figures several years old that do not reflect inflation and increased value of fisheries resources; and b) the valuations do not accurately reflect kelp losses. We believe valuations for kelp should be increased several fold and that the loss of tonnage over 26 acres should be projected for more than three months if the entire stand is removed in the area.

Page 8-7 to 8-20. The draft EIR summarizes the various alternate sites described in detail in Technical Report 23-Alternative Site Analysis. These sites, which are identified as Guaddalupe Dunes, Point Conception, Tajiguas, Oxnard, Camp Pendleton and three offcoast sites (Beechers Bay, off Pitas Point, and off east Santa Cruz Island) are summarized with respect to environmental impacts. The environmental impact rankings are

identical to those contained in Technical Report 23 which portrays Oxnard and Camp Pendleton as environmentally acceptable alternatives while the remaining sites, including Pt. Conception, are classified as only marginal. It is, of course, premature to finalize the alternative site analysis since the California Coastal Commission has made a preliminary recommendation (Appendix E) on proposed LNG terminal sites pursuant to the LNG Terminal Act of 1977 (SB 1081) and has retained five sites for further study and ranking. These sites are Rattlesnake Canyon, Point Conception, Las Varas, Deer Canyon and Camp Pendleton. The final ranking of those sites will not be submitted to the Public Utilities Commission until May 31, 1978.

Comments on Technical Report 5a. Generally this technical report is well written. However, it contains several deficiencies as noted below:

Page 9. The statement that "catastrophic" oil spills (i.e., those causing irreparable ruin) are unlikely at Point Conception is debatable, and we remain concerned about damage that might accompany spilled oil. The document states that bunkering facilities will be constructed to enable LNG tankers to refuel while docked at the terminal. Our past experience indicates that bunkering operations can result in spills that are often of substantial volume. Experience also indicates that oil spills along an open coast are more widespread and more difficult to contain and abate than would be the case if it had occurred within a harbor enclosed by a breakwater. We regard Point Conception as a practically unspoiled area supporting a unique assemblage of marine organisms of unmatched scientific value. Therefore, we believe that any oil spill at that location, even if not "catastrophic", could nevertheless be regarded as disastrous (causing great damage or destruction).

Page 12. We believe the discussion of transition zones would benefit if it included a quantification of the number of distributional limits that occur at Point Conception and contrasted this number with numbers of zoogeographic limits elsewhere along the coast. The scientific value of this phenomenon should also be discussed. Based upon our analysis of the Dames and Moore data cited in the document, we found fourteen fish species and twenty invertebrate species have northern or southern limits of distribution at Point Conception. To our knowledge, at no other site along the entire Pacific U.S. coast, indeed in few other locations worldwide, does such an abrupt faunal break occur. This, coupled with the fact that the area is relatively unspoiled by industrial development and that a well equipped university laboratory is located nearby (at UC Santa Barbara), make Point Conception an area of outstanding scientific value.

Pages 23 & 24. The discussion of commercial fishing should mention the distances that fishermen must travel to fish at Point Conception and compare them with other distances traveled to fish for the same species found at Point Conception. Point Conception also has several fisheries that are as yet much underexploited. This unusual potential should also be discussed.

Pages 25 & 26. We disagree that a small boat launched at Gaviota would take three hours to reach Point Conception; our estimate is that it would take about 1½ hours. Also, our information indicates that a major portion of boats launched at Gaviota go to Point Conception. Attached Table 1 summarizes data collected by Department personnel which has recently been or will soon be distributed in administrative reports. In addition to the data presented in the table, we believe pertinent data should be extrapolated from these administrative reports and presented in the final EIR.

Page 31. The document cites the Dames and Moore study as observing two grey whales offshore at Point Conception. The discussion of marine mammals strongly implies that few occur near Point Conception. By contrast, Rice and Wolman (1971)[3] determined that 95% of grey whales migrating between Yankee Point, near Monterey, and Point Loma, near San Diego, stayed within a few kilometers of the coast. From other data presented by Rice and Wolman, it may be extrapolated that virtually all of the world's California grey whale population passes within a few kilometers of Point Conception. Also, on January 1, 1975, up to fifty grey whales were sighted at Point Conception (Robert Guess, UC Santa Cruz, personal communication). Furthermore, our recent understanding from the UC Santa Cruz group studying the mammal and bird populations of the southern California bight for the Bureau of Land Management is that they consider Point Conception an area of "extreme impact potential" and identified the area as a staging point for grey whales (K. T. Briggs, UC Santa Cruz, personal communication). In light of this information, the effects of the LNG project upon grey whales should be discussed.

Page 35. In addition to the information taken from the UC Santa Cruz study of marine birds near Point Conception, it should be noted that the researchers consider this area to be a "funnel" for migratory birds and have calculated that at certain times of the year some species (e.g., black brant or pink-footed shearwater) could occur in numbers representing a major percentage of the world's population (K. T. Briggs, UC Santa Cruz, personal communication). Project impacts on such species could be important, and should be discussed in the document.

Page 39 - Figure 10-5a. This figure would benefit if it included the lease boundaries for the commercial kelp bed and the boundaries of kelp found in the comprehensive federal surveys conducted in the early 1900's.

Page 41. We believe that the statement that sport fishing is not important is refuted by the addenda offered for pages 25-27 and by the data we have offered above in Table 1. The document should be revised accordingly.

3 Rice, D. W. and A. A. Wolman. 1971. The Life History and Ecoloy of the Grey Whales (Eschrichtius robustus). The American Society of Mammalogists. Special Publication No. 3.

Page 42, Pages 146-149. We believe the discussion of kelp values in general should include the products derived from kelp and their uses. More specifically, we think the value of bed 32 should be stressed. Significant kelp resources occur at Point Conception. We believe that the operation of LNG tankers, tugboats and pilot boats will continuously damage the kelp as they move through the kelp bed resulting in significant economic losses. These losses, coupled with the fact that kelp generally fosters a diverse assemblage of fishes, makes loss of the kelp bed an important issue.

The kelp bed at the site is the fifth largest in the state. It is significant to add that this bed is as large or larger than it was when the Federal Government made its survey of commercial kelp resources in 1912. This is in striking contrast to other kelp beds that were mapped along the southern California coast in 1912 which have since severely dwindled or disappeared.

Kelp harvest is a multimillion dollar business in Califonria. The kelp bed at the proposed site has yielded almost 10% of the state's total wet tonnage and has represented 25% of the leaseholder's annual production in some years. In fact, the industry considers this bed to be the most productive in California.

Most growth occurs at the floating tips of the plants and only the top four feet of kelp canopy are harvested, which enables plants to regenerate. However, propellers on LNG ships and tugs will probably be substantially lower in the water and severe damage will probably result as they pass through the bed. The biological and economic significance of this aspect of terminal operations relative to the kelp bed should be more adequately addressed.

Pages 55, 60, 148-149. We believe the commercial values for kelp are underestimated. The dollar value attributed to Department personnel on page 60 ($25.00 per wet ton) is a value that was determined in 1971. Since that time, inflation and demand for kelp have increased the value of kelp several fold (to $100.00 per wet ton or more, landed value). The values for kelp should be recalculated and presented in the final draft. For example, the losses due to small craft operations would jump from $312,500 to approximately $1,250,000 annually. We believe the loss will be permanent and should be mitigated.

Regeneration of kelp is projected to be totally achieved by natural means three months after construction closes. This projection is valid only if the top four feet of kelp are removed as in harvesting. If whole plants are removed, the kelp could be permanently lost; even if it does return naturally, regrowth will be longer than three months. Any vessel drawing more than four feet will destroy harvestable kelp. These losses should be recalculated and mitigated.

Furthermore, the weight and dollar value attributed to construction are identified as a one-time loss. This assumption would be true if no impediments remained after construction to the continued harvest of kelp and commercial fish species, however, the placement of a marine trestle

will preclude the utilization of these resources for the life of the project. Therefore, these values should be recalculated to show the poundage and value of these resources over the life of the project.

Pages 64-68. The volume of seawater needed to warm LNG should also be given in millions of gallons per day.

Page 131. We question the statement that turbidity from the waste plume will not cause significant biological impacts. Kelp growth could be significantly and adversely affected by turbidity, and this question should be addressed in the report.

Page 131-140. This section deals with the cold water (12°F below ambient) discharge from the LNG plant and its impacts on marine organisms. While the time exposure within the plume may be short, the exposure to a temperature reduction of up to 12°F will be rapid and the resultant shock, especially to nonswimming organisms, could cause significant losses. The effects and magnitude of these losses should be determined and included as part of the losses attributed to the seawater system.

Page 136. Discharge should also be quantified as gallons per minute and cubic feet per second.

Pages 140-141. Volumes of discharge other than seawater and thermal exchange should be quantified. Also, we suggest total residual chlorine as a parameter to be monitored.

Pages 143-144. The amount of oil contamination from natural seeps should be quantified and then contrasted to the amount projected from accidental spills. In our view, three oil spills per year resulting from offloading Bunker C fuel and resulting in the deposition of "tarry blobs" on the beach could represent a large scale increase in oil contamination and adversely affect marine life. This discussion does not include fueling of LNG tankers (183-190 calls per year). If the rate of spillage for fueling tankers is similar to that for offloading supply ships bringing Bunker C to the terminal (20 calls per year) the rate and amount of spillage could be several times those portrayed. This question should also be addressed in the document.

Pages 146-147. We believe that significant damage to kelp will occur not only from propeller damage as ships pass through the bed but also as a result of turbidity caused by propeller wash. The value of kelp should be indicated because the kelp affected by ships may be totally destroyed. But even if all the kelp is not destroyed, it will probably be lost to commercial harvesters because the damage will occur below the four foot cutting depth (LNG ships will draw about 50 feet of water).

Page 148 - Table 19. The calculations of commercial species lost annually to activities of small craft and fuel tankers apparently do not consider the potential for future expansion of fisheries in the area if not prevented by LNG operations. This question should be analyzed in the document.

Pages 150-151. We believe the losses of kelp will not be localized effects; rather the effects of kelp bed destruction will have statewide, if not national, implications because the bed is now so productive (as noted above) and because products derived from kelp are used in foods, paints, and many other products. The document should be revised accordingly.

Page 154. Contrary to implications on this page, we again disagree that oil spill contamination is a minor impact.

Page 166. We disagree that intake location is unimportant in regard to impacts to fish. Kelp beds and their associated rocky reefs tend to attract fish. We believe that location of intakes on sandy bottoms away from reef areas could substantially reduce the numbers of fish entrained in the intake structure.

Comments on Technical Report 23 - Alternative Site Analysis. This report presents a two-phase site evaluation of various proposed alternative LNG sites. Both onshore and offshore sites were evaluated. Phase I analysis consisted of twenty-six onshore sites and twenty-four offshore sites. These sites were initially screened with respect to site requirements and environmental impacts. Five onshore sites and three offshore sites were retained and examined in greater detail.

With respect to environmental impacts of the proposed project, the Oxnard and Camp Pendleton sites were ranked as acceptable sites while the Tajiguas, Point Conception and Guadalupe Dunes sites were considered marginal. We agree with this evaluation.

This concludes our comments. If there are any questions regarding our comments, please contact Mr. John Day at 445-1383.

Director

cc: P.U.C.

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GAVIOTA - Independent Sport Fishing Data - July 1, 1975 - June 30, 1976 [1/]

	No. of parties	No. of anglers/divers	No. of hours	No. of days sampled	No. of fish/invertebrates taken
Weekday fishermen	40	102	548.2	15	
Weekday divers	9	28	146.5		2,969
Weekend fishermen	123	342	2,157.2	19	
Weekend divers	52	164	999.8		

Projected Annual Total

No. of parties	No. of anglers/divers	No. of hours	No. of days sampled	No. of fish/invertebrates taken
696	1,775	9,539	261	
157	487	2,549		31,873
673	1,872	11,508	104	
285	898	5, 473		

COLETA - Independent Sport Fishing Data - July 1, 1975 - June 30, 1976 [1/]

	No. of parties	No. of anglers/divers	No. of hours	No. of days sampled	No. of fish/invertebrates taken
Weekday fishermen	55	109	819.5	15	
Weekday divers	2	3	11.		2,385
Weekend fishermen	173	446	2,303	21	
Weekend divers	21	50	253.9		

Projected Annual Total

No. of parties	No. of anglers/divers	No. of hours	No. of days sampled	No. of fish/invertebrates taken
957	1,897	14,259	261	
35	52	191		24,181
857	2,209	11,405	104	
104	248	1,257		

	No. of parties	No. of anglers/divers	No. of hours	No. of days sampled	No. of fish/invertebrates taken	
Weekday fishermen	16	30	232	5	2,110	
Weekday divers	3	11	76			
Weekend fishermen	124	381	2,284.8	21		3,870
Weekend divers	90	267	1,676		1,760	

Projected Annual Total

No. of parties	No. of anglers/divers	No. of hours	No. of days sampled	No. of fish/invertebrates taken	
835	1,984	12,110	261	29,621	
157	574	3,967			54,329
614	1,887	11,315	104		
446	1,322	8,300		24,708	

COLETA - Independent Sport Fishing Data - July 1, 1976 - June 30, 1977 2/

	No. of parties	No. of anglers/divers	No. of hours	No. of days sampled	No. of fish/invertebrates taken	
Weekday fishermen	33	66	416.8	12	2,872	
Weekday divers	3	6	29			
Weekend fishermen	459	1,126	7,252.7	34		3,176
Weekend divers	42	103	533.9		304	

Projected Annual Total

No. of parties	No. of anglers/divers	No. of hours	No. of days sampled	No. of fish/invertebrates taken	
718	1,436	9,065	261	22,789	
65	130	631			25,201
1,404	3,444	22,185	104		
128	315	1,633		2,412	

1/ Wine, Vickie & Therese Hoban. 1976. Southern California Independent Sportfishing Survey Annual Report, July 1, 1975 - June 30, 1976. State of Calif., Resources Agency, Dept. of Fish and Game, Mar. Res. Adm. Rept. No. 76-14.

2/ Wine, Vickie. 1978. Southern California Independent Sportfishing Survey Annual Report, July 1, 1976 - June 30, 1977. State of Calif., Resources Agency, Dept. of Fish and Game, Mar. Res. Adm. Rept. No. 78-2.

BRIDGERS, TROLLER ASSOCIATES
LANDSCAPE ARCHITECTS AND ENVIRONMENTAL PLANNERS

April 26, 1978

Mr. Bradford Lundborg, Chairman
California Coastal Commission
631 Howard Street
San Francisco, California 94105

Re: Deer Canyon Alternate L.N.G. Terminal Site

Dear Mr. Lundborg:

This letter is to serve as a written statement of my testimony in the Commission's public hearing in Oxnard on April 12, 1978, in support of the Deer Canyon location for California's remote mainland L.N.G. Terminal. The record of site evaluation proceedings to date indicate some opposition to all of the sites under consideration, especially by people in the vicinity. The same "not in my backyard" position can be expected regarding this Ventura County site.

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My comments as a representative for the landowner, who has offered his land for the L.N.G. Terminal, will be directed mainly to point out some of the advantages of this location and to clarify some misconceptions about construction of an L.N.G. Terminal at Deer Canyon.

First, the Commission staff and consultants have confirmed our contention that the rugged terrain provides isolation for the on-shore terminal facilities for safety, noise and visibility. Contrary to opinions that have been expressed, all grading for the terminal can be done on the site with no haulaway needed. To support this statement, I have enclosed our engineering calculations and computer models for the earthwork at Deer Canyon (Exhibit 1 enclosed). Simply expressed, this data shows a completely different concept for creation of the level surfaces for the onshore facilities, and much less soil or rock to be moved. Instead of cutting the canyon down nearly to sea level, this concept utilizes the terrain to best advantage by modeling the canyon sides to form terraces at a higher elevation with least disturbance to the oceanward-facing bluffs. We have estimated between 10 and 15 million cubic yards of grading will be needed, dependent on refinement of engineering work. It should be stressed also that the grading work at Deer Canyon will not delay construction of the terminal, as stated by Point

No response required.

5336 FOUNTAIN AVENUE, LOS ANGELES, CALIFORNIA 90029 TELEPHONE (213) 469-2145
SAMUEL W. BRIDGERS, F.A.S.L.A. CALIF. LIC. NO. RLA-129 HOWARD E. TROLLER, A.S.L.A. CALIF. LIC. NO. RLA-338

Conception proponents.

The enclosed schedule, Exhibit 2, for engineering and construction time for three sites - Point Conception, Oxnard and Deer Canyon - show that total time needed is approximately the same for either site. The project schedules for Point Conception and Oxnard are copies from F.P.C. Environmental Impact Statements. The Deer Canyon project schedule was prepared by our engineering consultants based on their experience actually designing and building L.N.G. terminals.

Pipeline costs and routing appear to be of major significance in determining best site and ranking. The applicants for Point Conception propose 157 miles of 34" pipe to Gosford, in Kern County at a cost of $107,773,000. By contrast, a 50 mile pipeline from Deer Canyon to the existing Quigley Canyon Pressure Limiting Station near Newhall would require only $60,368,000. It may be interest to the Commission to inquire why the applicant for Point Conception recently has stated that they would pipeline from Deer Canyon to Gosford in Kern County (the Point Conception connection point) when earlier they had proposed connecting from Oxnard to the Quigley Station. There appears to be an inconsistency in their proposal for such a long pipeline, possibly to discredit the Deer Canyon alternate site.

Although the costs and timing of the L.N.G. facility is of main concern to the Public Utilities Commission, recent memos from your staff indicate that the Coastal Commission is evaluating these factors in determining site rankings also. At the March 21 workshop in Ventura County, the applicant gave a cost of $798 million for the Point Conception site and $1.8 billion for the Deer Canyon site. This is quite interesting and quite deceptive inasmuch as our highly competent engineering consultants have estimated a total cost of only about $530 million. A cost saving of $260 million or more should most certainly be taken into consideration by both commissions for L.N.G. site ranking and selection.

Some concerns were expressed in the Coastal Commission workshop in Ventura County on March 21 about fire hazards and inadequacy of local fire fighting equipment. Your attention is directed to the Deer Canyon Request for Nomination previously submitted to your staff. Please note that the terminal will include a very elaborate fire protection system for about every conceivable fire that might happen. The fire protection equipment includes two fire trucks that may be called into service for off-site fires in the vicinity, thus enhancing local County fire protection services. It should be noted also that the L.N.G. Terminal facilities and the fire protection system described in this

engineering study for the Deer Creek site has been reviewed and approved by the Federal bureaus and fire underwriters.

Another point regarding safety of the Deer Creek L.N.G. facility that may not have been brought to your attention is the method of crossing under the Coast Highway. The concept proposed in the Request for Nomination is a 2-chamber thick-walled concrete box under the highway and continuing for some distance along the trestle to forestall any highway source of fire or act of sabotage. The cryogenic pipes and other piping would be contained within this concrete tunnel under the highway.

Local concern was expressed also about increased traffic on the Coast Highway. It should be re-emphasized that there is no need for any movement of massive amounts of soil and rock from the site as was stated March 21 and at other times by the applicant. Further, our engineering consultants, who are quite familiar with installations of this type, consider it more feasible to bring all large and heavy equipment and materials to the project with barges from fabrication yards at Port Hueneme or the L.A.-Long Beach Harbor areas in preference to trucking everything to the site. After the terminal is operating, the small number of personnel going to the site, most likely from the Oxnard-Ventura Plain, would generate insignificant additional vehicular traffic on the Coast Highway.

After lengthy environmental review of feasibility of the Deer Canyon site for the possible L.N.G. Terminal and subsequent review of various technical reports prepared by experts for the Coastal Commission and others, we are even more of the opinion that Deer Canyon should be first-ranked for the remote mainland site.

Sincerely yours,

BRIDGERS, TROLLER ASSOCIATES

Samuel W. Bridgers

Samuel W. Bridgers
President

cc: C.C. Commissioners & Staff
R. Batinovich, CPUC
R. Arvedlund, FERC
L. Aull, A.D. Little & Co.

SWB/wrk

NOTICE OF NEW ADDRESS
820 HOLLYWOOD
BURBANK, CA. 91505

BRIDGERS, TROLLER ASSOCIATES
LANDSCAPE ARCHITECTS AND ENVIRONMENTAL PLANNERS

May 16, 1978

RECEIVED BY
MAY 22 1978
L. W. M.

Ms Susanne Landon
California Public Utilities Commission
350 McAlister Street, Room 3076
San Francisco, Calif. 94102

Subject: LNG Alternate Siting Hearing Testimony

Dear Ms Landon:

Following our brief discussion at the Coastal Commission hearing in Los Angeles May 15, I am enclosing a copy of the testimony I presented to the Commission regarding the Deer Canyon alternate site. Also enclosed is a copy of my testimony statement to A.L. Judge Haley in Oceanside on May 12. These are advance copies directly to you of our testimony now of record, which you would no doubt receive through channels shortly.

With suggested rankings being what they are to date and public reactions being expressed regarding all of the sites, it is apparent to us that it is in our best interests and C.P.U.C.'s to do all that is necessary to give the Deer Canyon site as fair a shake as possible for first choice of sites, or at the least a high ranking. So these copies of our testimony direct to you are with this in mind.

Sincerely,

BRIDGERS, TROLLER ASSOCIATES

Samuel W. Bridgers

Samuel W. Bridgers

c.c. R. Arvedlund, DOE with enclosures

No response required.

5336 FOUNTAIN AVENUE, LOS ANGELES, CALIFORNIA 90029 TELEPHONE (213) 469-2145
SAMUEL W. BRIDGERS, F.A.S.L.A. CALIF. LIC. NO. PLA-121 HOWARD E. TROLLER, A.S.L.A. CALIF. LIC. NO. PLA-339

BRIDGERS, TROLLER ASSOCIATES
LANDSCAPE ARCHITECTS AND ENVIRONMENTAL PLANNERS

May 15, 1978

Mr. Bradford Lundborg, Chairman
California Coastal Commission
631 Howard Street
San Francisco, California 94105

Re: LNG Siting Rankings

Dear Mr. Lundborg:

This letter is the written statement of the testimony I intend to present to the Coastal Commission in the scheduled hearing on May 15, 1978, regarding Commission review and public hearing on staff recommendation on ranking and terms and conditions for possible remote onshore LNG Terminal siting. My testimony is being presented as representative for the Deer Canyon site landowner, the Mansdorf Trust.

My comments are directed to recommended ranking of the Deer Canyon site. We request the Commission to rank the Deer Canyon site higher than the staff has recommended for several reasons.

First, recent reports prepared for probable LNG sites indicate Camp Pendleton has less favorable maritime conditions than Deer Canyon, has very heavy constant traffic and recreational use nearby, is close to a nuclear facility, and the marines will not release the land in time to avoid a serious shortfall of natural gas for California consumers.

Second, Point Conception has a serious seismic problem and is a sacred Indian area. Deer Canyon does not have seismic and archeological problems and has better maritime conditions than it or any of the sites.

Third, staff evaluated Deer Canyon using a worst case LNG Terminal concept, but did point out several conditions that could decidedly influence your final rankings. Therefore, we urge the Commission to make your final rankings on the basis of our concept which satisfies staff's recommended conditions; and it offers several other incentives to make Deer Canyon a better choice for first ranking.

Fourth, the Commission should consider short term and long term effects of LNG siting at each location. We suggest that a Deer

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Canyon LNG use is short-term insofar as it commits 100 to 150 acres only of land and a small area of open ocean offshore for 20 to 30 years to import needed energy and later it may be converted to coastal resources which will include at least three valuable recreational resources--2 to 2 1/2 miles of beach, a fishing and boating pier (the LNG trestle and berth having at least a 100 year life), and a coastal area already nearly surrounded by state parks.

Fifth, Deer Canyon is a better choice than Rattlesnake Canyon for first ranking because Rattlesnake is near a nuclear facility, will require a huge breakwater and sea bottom rock clearing that may cost much more than estimated, and may destroy a vast area of marine environment; and Rattlesnake wind and wave conditions are the most severe of all the sites, having possible serious implications for reliability of natural gas delivery.

Sixth, the Deer Canyon site is available now. On the request of the Coastal Commission, this site was offered for alternate site nomination. This request for nomination was significantly unique from all others. A willing landowner came forward, and presented with the request a sound and feasible scheme for an LNG facility at Deer Canyon that will not take forever to build. We are confident it will take no longer to build and begin operating the terminal at Deer Canyon than anywhere else onshore if the facilities are built the way we have suggested, and State and Federal clearances are timely.

In fact, we are willing and prepared to provide the land, design and construct the LNG Terminal at the Deer Canyon site as we have described it; and believe the people of California and the State's utilities will get a better deal and at less cost than the facility proposed for Point Conception.

I would like to submit with this written statement for this Commission's consideration in site rankings and the Public Utility Commission's later consideration for final site selection several exhibits that support this letter and data we have supplied you earlier. These exhibits include a) letter of intent for design engineering and construction of the Deer Canyon LNG Facility, 2) five pages of questions with responses by our engineering consultants directed to ranking and siting LNG and the Deer Canyon site concept we proposed, c) a more definitive construction schedule for the Deer Canyon LNG Facility based on our conceptual design, which shows a 53 month project schedule. These exhibits should amply illustrate to both State Commissions that our estimated costs before debt service for Deer Canyon are much more favorable than other estimates that have been prepared regarding the applicant site and alternate sites.

The Coastal Commission with this information in hand now has better data to assist in ranking the Deer Canyon alternate site and a

responsible alternative concept for a mainland LNG Terminal to weigh against proposed facilities at Point Conception. After serious review of this data along with technical reports coming to the Commission after the Commission's staff prepared its ranking recommendations, we are confident that the Deer Canyon site will be first-ranked by the Coastal Commission.

The Coastal Commission staff deserves commendation for the objective and impartial way they have approached the LNG siting issue under the very tight time constraints imposed upon them, and their cooperative attitude in this entire ranking effort.

Sincerely yours,

BRIDGERS, TROLLER ASSOCIATES

Samuel W. Bridgers

Samuel W. Bridgers,
President

Encl. Exhibits 1,2,3

cc Ltr: C.P.U.C-A.L.J. Haley 5/11/78
fr. S.W.B.

Mansdorf Trust

811 N. ALTA DR.
BEVERLY HILLS, CA. 90210
(213) 276-6922

TO Coastal Commission
RE Ranking of LNG sites

May 15,1978

Dear Commissioners:

As a conservationist, a concerned citizen and the property owner, I respectfully submit the following comments for your consideration in ranking the LNG sites.

I believe the Deer Canyon site should be ranked in first place because the Maritime Factors as analyzed by the Coastal Commissions' consultants, John J. McMullen Associates show Deer Canyon to be superior to Rattlesnake Canyon and Point Conception for the following reasons:

WIND The average days per year that the wind velocity is greater than 25 knots, at Rattlesnake Canyon; 43.92, at Point Conception; 22.74, at Deer Canyon 10.56.

General Wave Regime which affects maritime operations is better at Deer Canyon than sites to the north as stated on page 3-29 of the McMullen report.

Seismic wave and tsunami waves ; Rattlesnake Canyon would receive the highest tsunamis. (P. 3-37 Mc Mullen report).

Wave limitation on LNG carrier operations or the number of days per year that the swells exceed the limit for docking at Rattlesnake Canyon 72.6, Point Conception 23.7, Deer Canyon 16.4 (P. 3-40).

Swells The number of days per year that the swells exceed the limit while the carrier is berthed are: Rattlesnake Canyon 72.3, Point Conception 3.66, Deer Canyon 2.56 (P. 3-42)

Visibility The number of days per year that the visibility is less than one nautical mile are: Rattlesnake Canyon 40.3, Point Conception 12.4, Deer Canyon 14.7 (P. 3-45)

Current The annual average currents at the sites are: Rattlesnake Canyon 1.5 knots, Point Conception 0.525 knots, Deer Canyon 0.55 knots . Current greatly affect the ability of the LNG ships to approach the berth safely, moor and remain at the berth.

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Berth Availability which is defined as that time during which a ship may approach, moor and remain at its' terminal without being delayed are concluded to be:

A. Rattlesnake Canyon there is about a 90% chance that the gas supply to the consumer would be interrupted each month during the year.
B. Point Conception is 70% in the Spring to about 40% in the Fall.
C. Deer Canyon is 45% in the Spring to about 10% in the Fall. (P.3-59 of the McMullen report)

Deer Canyon has the lowest probability of at least two 3 day delays even when there is a breakwater at Rattlesnake Canyon.

Natural Hazards to Navigation Rattlesnake Canyon has rock outcroppings that will interfere with the safe approach and docking of a carrier. The rocks reefs and shoals have a potential impact on the placement of a trestle, berth and breakwater and on the approach route. These hazards will have to be blasted out at great cost and a great disruption to the marine ecology.

There is one rock hazard at Point Conception and none at Deer Canyon. (P. 3-69 and 3-72)

Even finding the hazards at Rattlesnake Canyon will require wire dragging the area which will destroy large beds of kelp.

Atmospheric Stability Conditions which is of utmost importance because it determineshow far an accidental LNG vapor plume will travel. According to the McMullen report Page 3-85 the plume would travel farthest a higher percentage of time at Rattlesnake Canyon decreasing from north to south making Deer Canyon the optimum site excluding Camp Pendleton.

Anchorage In case it becomes necessary for an LNG carrier to be anchored , Rattlesnake Canyon has the worst conditions for anchoring while Deer Canyon has some of the best. (P. 3-111)

Vessel Observations and Ship Masters Interviews
Show both Rattlesnake Canyon and Point Conception as being an area of rough seas and high winds.

Impact of offshore oil and gas development.
Only Point Conception may be affected in the relatively near future by oil and gas production. (P. 3-76)

With regards to the breakwater at Rattlesnake Canyon, the cost of $173,000,000 is not firm it can go much higher. Even with the 6450 foot breakwater not all the adverse conditions will be mitigated. The southern swells will still exceed the operating limits an average of over six days a year. The turning and maneuvering space inside the breakwater will be limited, increasing the likelyhood of an accident.

There has been no evaluation of the annual dredging that may be required to maintain the depth inside the breakwater.Nor has the denuding effect of the downstream beaches been evaluated. These effects can be very costly and is contrary to the aims of the Coastal Commission which is to preserve the beaches and not have them destroyed or adversely altered.

The armor stone that is needed to construct the breakwater will probably come from a coastal area and will cause irreparable damage and scarring in a zone you are trying to protect.

The trestles both at the Rattlesnake Canyon site and the Point Conception site will be longer and costlier than at Deer Canyon.

Regards the highway traffic situation at the Deer Canyon site, it is obvious that the staff were influenced by misinformation given to them by the applicant and the lack of information as to how the facility at Deer Canyon was to be constructed.

A portion of the trestle including the section crossing under the Coast Highway will be built first so that the heavy equipment can be barged in and not interfere with the highway traffic. While the portion under the highway is being constructed, there will be a minimum of two lanes open at all times thus never interfering with the normal flow of traffic.

It is estimated that about 200 truck loads may use the highway. These trucks would be scheduled at one or two per night after working and recreational hours. This stretch of the highway is almost deserted at night even during the summer months.

All parking for workmen during construction will be within the site area and never on the highway.

The 550,000 truck loads of earth to be exported from the site is misinformation distributed by the applicant. The true fact is, it will not be necessary to export even one truck load from the site. Besides having the adjacent canyon to accept any surplus material that may be generated the cut and fill on the site ,balances out.

There is absolutely no significant impact on the local traffic.

As to the noise from blasting, this is blown out of all proportion to the true facts. The Coastal Commissions' consultant estimates about 10 to 15% may have to be blasted. Adjusting for the true amount of earth which is less than half the yardage claimed by the applicant, there will be little or no blasting. Any blasting that may take place could not disturb anyone since the closest dwelling is one and one half miles away.

The immediate area around the proposed Deer Canyon site is used by very few persons, not over ten to twenty and then only in the summer months. The children from the camps never use the site because there is very little sandy beach, no life guard and no toilet facilities. The site is seldom ever used by commercial fishermen or recreational divers because it is too far from any boat mooring.

According to the Coastal Commissions' consultants and staff, they agree that the archaeological resources at Deer Canyon are less significant than at Rattlesnake Canyon or Point Conception. They also agree that it has less significant and valuable natural resources.

A trestle will cost over $100,000,000 but if it is built at Rattlesnake Canyon or Point Conception, the public would be deprived of this valuable asset because of the limited public access to both locations. Another valuable asset to be considered are the improvements to the local beaches from a portion of the revenues generated by the tidelands docking facility lease. The life expectancy of the LNG facility is 20 to 30 years because of the limited supply of LNG. The Coastal Commission should be concerned about the future as well as the present.

Still another benefit to be derived from a facility at Deer Canyon is the preservation for future use of approximately 2000 acres of privately owned land which would otherwise be sub-divided for residential uses.

If Deer Canyon becomes an LNG terminal, we will dedicate two miles of beach to the State for park purposes, at no cost to the taxpayers.

The cost of grading on the site is estimated at about $15,000,000 and the benefits from the grading make this site the safest and least objectionable. The facility is tucked away in a canyon, out of sight. The canyon walls act as fire breaks, if a fire should occur, it can easily be contained. The canyon location also adds to the ease of security and fire protection and isolates the facility from the surrounding area.

Deer Canyon affects the least amount of private property since it is surrounded by thousands of acres of park wilderness. It does not disturb land presently used for agriculture.

To sum it all up, these are some of the reasons why Deer Canyon should be ranked first.

1. It is the safest site for the approach and berthing of LNG carriers.

2. It is a more dependable site for the uninterrupted flow of gas to the consumer.

3. It is the least disruptive of the marine ecology.

4. It is the safest and easiest site to protect from the viewpoint of fire and security.

5. It is the least disruptive of the archaeological and natural resources of the other two sites.

6. It does not adversely affect any of the categories protected by the policies of the California Coastal Act of 1976.

7. The improvement of the beaches from the revenues generated will benefit the public much more than the other sites.

8. Because it does not require a breakwater and the trestle and pipeline are much shorter than at the other sites, the cost of constructing the facility is much less and the time for completion will be shorter.

9. The greatest benefit to the Coastal Commission and the general public is the dedication of two miles of beach and the eventual use of the trestle as a recreational pier. This alone should rank Deer Canyon in first place.

I am sure, given all the facts that you will make the right decision.

Thank you

Lee Mansdorf

Exhibit AY
CPUC Case A57626

BRIDGERS, TROLLER ASSOCIATES
LANDSCAPE ARCHITECTS AND ENVIRONMENTAL PLANNERS

May 11, 1978

Administrative Law Judge J. F. Haley
350 McAlister Street, Room 3076
San Francisco, California 94102

Re: Comments on Draft Environmental Impact Report - Western LNG Terminal Company's Point Conception LNG Terminal Application, Case A57626

Dear Judge Haley:

This letter is presented to the California Public Utilities in response to request for comments on the abovenoted Draft Environmental Impact Report. I have been representing the landowner, the Mansdorf Trust, in submitting for consideration the Deer Canyon site as a possible alternate location for a mainland LNG Terminal Facility conforming to the requirements of S.B. 1081.

In addition to submitting a request for nomination of the Deer Creek/Canyon site in Ventura County to the California Coastal Commission, I have submitted to the California Public Utilities Commission rather extensive technical data supporting feasibility of this site for the prospective LNG Terminal. However, the CPUC staff has chosen to review other alternative sites in preparing the Draft E.I.R.

In view of the fact that the Coastal Commission staff has prepared and released recommendations for ranking of alternate sites which include the Deer Canyon site, I am requesting as the landowner's representative that the CPUC staff evaluate and prepare a supplement to the Draft E.I.R. to treat the Deer Canyon site equally with the applicant site and the alternate sites that were evaluated in the Draft E.I.R. as released for comments.

Further, by reference, I request that the data delivered already to the California Coastal Commission regarding the Deer Canyon site be included in the record of your proceedings concerning Case A 57626, inasmuch as we have voluntarily made efforts to independently evaluate feasibility for an LNG Terminal facility at this location and have reason to believe it is deserving of more serious consideration by the C.P.U.C. in its site selection proceedings.

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SAMUEL W. BRIDGERS, F.A.S.L.A. CALIF. LIC. NO. RLA-129 HOWARD E. TROLLER, A.S.L.A. CALIF. LIC. NO. RLA-339

Please be advised also that the data that was delivered to the Coastal Commission and the Public Utilities Commission is the product of more than a year of competent engineering and presents a different concept for the LNG facility which we believe is superior in all respects to the alternate site studies prepared by others for the Deer Canyon site. This concept as presented in our opinion is superior to the applicant proposal for the Point Conception site also, taking into consideration environmental, economic, timing, safety, reliability of delivery, and other factors. Therefore, we believe our alternate approach as presented has to date been taken too lightly, perhaps because it came from a source other than the applicant.

Since we are quite convinced at this time that the Deer Canyon site and our concept for the LNG Terminal facilities is the best of all of the sites remaining eligible for selection, it is in the best interest of the people of California for the Public Utilities Commission to develop a record of administrative procedures on selection of the possible Deer Canyon alternate site as strong as the applicant site's record.

We will be pleased to assist the Commission and the applicant in whatever way we can.

Sincerely yours,

BRIDGERS, TROLLER ASSOCIATES

Samuel W. Bridgers,
President

cc: Mansdorf Trust
B. Lundborg, Chrmn. C.C.C.

LNG SITING RANKINGS 5/15/78

Recommended Rankings by State Departments
(to Coastal Commission 5/15/78)

Bureau of Mines & Geology -

1. Camp Pendleton
2. Rattlesnake Canyon
3. Deer Canyon
4. Point Conception
5. Las Varas

Dept. of Fish & Game

1. Camp Pendleton
2. Deer Canyon
3. Rattlesnake Canyon
4. Point Conception

Memo on Rankings -

Chumash Indians Classify & Use -

Point Conception - Sacred Worship Area & Archeolog
Site
Rattlesnake Cyn. - Burial Ground
Deer Canyon - Medicinal Gathering Area

MAILGRAM SERVICE CENTER
MIDDLETOWN, VA. 22645

Mailgram

4-058690E205002 07/24/78 ICS IPMRNCZ CSP LSAB
1 2132766922 MGM TDRN BEVERLY HILLS CA 07-24 0341P EST

AUG 14 1978

LEE MANSDORF
820 NORTH HOLLYWOOD WAY
BURBANK CA 91505

THIS MAILGRAM IS A CONFIRMATION COPY OF THE FOLLOWING MESSAGE:

2132766922 MGM TDRN BEVERLY HILLS CA 269 07-24 0341P EST
ZIP
GOVERNOR BROWN
STATE CAPITOL
SACRAMENTO CA 95814
LNG SITING DECISION BY THE PUC APPEARS EMINENT FAVORING POINT CONCEPTION SUCH DESISION IS NOT IN THE BEST INTEREST OF CALIFORNIA NATURAL GAS CONSUMERS THE MOST ACCEPTABLE ALTERNATE SITE DEER CANYON IS BEING IGNORE BECAUSE OF MISINFORMATION AND BIASED TECHNICAL DATA BY WESTERN LNG TERMINAL ASSOCIATES TO INFLUENCE PUC SELECTION OF POINT CONCEPTION HOWEVER NEW INFORMATION VITAL TO SITE SELECTION MUST BE EVALUATED SERIOUSLY BY STATE BEFORE THE DECISION SPECIFICALLY THE LNG TERMINAL CAN BE CONSTRUCTED AT DEER CANYON WITH UNDERGROUND STORAGE FOR HALF THE COST OF SURFACE TANKS AND WOULD BE 100 TIMES SAFER AND FAR SUPERIOR ENVIRONMENTALLY WITH NO SIGNIFICANT DELAY IN SUPPLYING NEEDED GAS TO CALIFORNIA IF STATE AND FEDERAL AGENCIES COOPERATE. IT IS MOST IMPORTANT FOR YOU TO INTERCEDE NOW IN SITING DELIBERATIONS. DEER CANYON CAN NOT BE IGNORED ANY LONGER POLITICALLY OR TECHNICALLY. THIS LOCATION HAS NO ACTIVE EARTHQUAKE FAULT ON SITE, IS NOT SACRED INDIAN LAND AND IT IS FAR LESS SACRED ENVIRONMENTALLY AND DEFINITELY HAS SUPERIOR WIND AND WAVE CONDITIONS A DEER CANYON LNG TERMINAL CAN BE BUILT FOR ONE THIRD LESS COSTS THAN AT POINT CONCEPTION BESIDES WHICH THE STATE WOULD BENEFIT BY GETTING OVER 2 MILES OF VALUABLE BEACH AS A GIFT. BECAUSE THE LNG TERMINAL AT DEER CANYON WOULD BE SO SUPERIOR ENVIRONMENTALLY AND ECONOMICALLY TO ANY OTHER MAINLAND OR OFFSHORE SITE, WE URGE YOU TO INSTRUCT THE PUC TO INVESTIGATE PROMPTLY AND FAIRLY THE INFORMATION RECEIVED FROM WESTERN LNG AND ALLOW US TO PRESENT THE NEW INFORMATION ABOUT UNDERGROUND STORAGE AND COST SAVINGS THAT WAS JUST MADE AVAILABLE TO US

SINCERELY

SAMUEL W BRIDGERS
BRIDGERS TROLLER ASSOCIATES
820 NORTH HOLLYWOOD WAY
BURBANK CA 91505
15:42 EST

FEDERAL ENERGY REGULATORY COMMISSION
JUL 31 9 58 AM '78
RECEIVED
OFFICE OF THE CHAIRMAN

MGMCOMP MGM
TO REPLY BY MAILGRAM SEE REVERSE SIDE FOR WESTERN UNION'S TOLL - FREE PHONE NUMBERS

A

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Comments noted.

Pacific Alaska LNG Associates

700 South Flower Street
Suite 3300
Los Angeles, California,
U.S.A. 90017

Telephone 213/627-3550
TWX 910/321-3946

June 5, 1978

Mr. Kenneth F. Plumb, Secretary
Federal Energy Regulatory Commission
825 North Capitol Street, N. E.
Washington, D. C. 20426

Re: Pacific Alaska LNG Company, et al.
Docket Nos. CP75-140, et al.

Dear Mr. Plumb:

Please find enclosed an original and seven conformed copies of Applicants' comments on the Draft Environmental Impact Statement prepared and issued by the Commission Staff on April 21, 1978, in connection with the facilities proposed to be constructed by Western LNG Terminal Company in the above-docketed proceeding.

Pursuant to Section 2.82(b) of the Commission's General Policies and Interpretations, ten copies of these comments are being transmitted to the Council on Environmental Quality. In addition, copies are contemporaneously being served upon the Presiding Administrative Law Judge, the Commission Staff Counsel, and all parties permitted to intervene herein.

Very truly yours,

E. R. Island
Attorney

ERI:lb
Enclosures

cc: Honorable Samuel Z. Gordon,
Presiding Administrative Law Judge
Brian J. Heisler,
Commission Staff Counsel
All Parties

411

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

In The Matter of	)	
	)	
PACIFIC ALASKA LNG COMPANY	)	Docket No. CP75-140
WESTERN LNG TERMINAL COMPNAY	)	Docket No. CP75-83-2

COMMENTS OF PACIFIC ALASKA LNG ASSOCIATES AND WESTERN LNG TERMINAL ASSOCIATES ON FEDERAL ENERGY REGULATORY COMMISSION STAFF'S DRAFT ENVIRONMENTAL IMPACT STATEMENT

VOLUME I

E. R. Island
P. O. Box 54790, Terminal Annex
Los Angeles, California 90054

Malcolm H. Furbush
Peter Hanschen
77 Beale Street
San Francisco, California 94106

Page 13, Second Paragraph - The diameter of the fire control water line on the trestle is shown here as 8 inches and 10 inches on Page 27; 10 inches is the correct diameter.

Comment reflected in Section A.2 of Volume I of the FEIS.

Page 19, Lines 20 and 21 - Not all excess vapor produced would be sent to the shore facilities. Some vapor will be burned in the ships' boilers as fuel to mitigate air quality impacts.

Comment reflected in Section A.2 of Volume I of the FEIS.

Page 27, Third Paragraph - In addition to the three 2500 gpm pumps on land, a 3500 gpm diesel engine driven pump will be at the dock that can be used to pump salt water to the land-based fire control water system.

Comment reflected in Section A.4 of Volume I of the FEIS.

Page 45, Lines 32-36 - The DEIS states that the LNG facility site is within the Soldotna (soil) series and specifically the Soldotna silt loam. Actually, the site surface soils are muskeg and peat (see DEIS Vol. I, Page 40, Line 10).

The U.S. Department of Agriculture (Rieger, et al.) places the site in Soldotna silt loam. While an organic cover was described by the applicant, it should be noted that no such deposits currently exist on the site since virtually all vegetation has been removed from the site.

Page 111, Second Paragraph - Reference is made to housing. According to the Overall Economic Development Program spokesman, Frank McIlhargey, the apartment vacancy factor in Kenai and Soldotna is approximately 30% today. He also states that about 600 single family dwelling units were built in 1977 and an equal number are scheduled for construction this year.

Comment reflected in Section B.8 of Volume I of the FEIS. As stated in Section C.8, housing is not expected to be a serious concern due to the applicant's proposed construction work camps.

Page 151, Lines 17 and 20 - References to Los Angeles Harbor are incorrect. The correct words to substitute are Point Conception area.

Comment reflected in Section C.5 of Volume I of the FEIS.

Page 152. References are made to a forest on the property. The plant site, except for border trees has been cleared.

Comment reflected in Section C.6 of Volume I of the FEIS.

Page 172, Lines 31, 32 and 33 - To the maximum extent possible, ships will burn LNG boil-off while in the port area to keep air quality at, highest levels possible. Any bunker C fuel burned in port will be 0.5% sulfur fuel.

Comment reflected in Section C.12 of Volume I of the FEIS.

Page 184, Item 2 - The statement on vapor generation per cubic foot of liquid should be clarified. When one cubic foot of LNG vaporizes, about 230 cubic feet of vapor is produced at the boiling temperature of -260°F; 620 cubic feet of vapor is produced only after the vapor is warmed to ambient temperature.

Comment reflected in Section C-13 of Volume I of the FEIS.

Page 185, Item 3 - Freeze burns are a highly unlikely cause of death. If the plume is cold enough to freeze people, the natural gas concentration will be so high that asphyxiation would be a more likely cause of death. This high concentration normally only occurs very close to the pool of spilled liquid and is not a hazard to the public.

Comment noted.

Page 186, Lines 26 and 27 -LNG ship design makes LNG release from groundings and rammings of fixed objects a very low probability. The necessary physical features to cause any such release are not present on the route of the vessels.

Staff disagrees that the physical features to cause releases due to groundings are not present on the route of the vessels.

Page 186, Last Paragraph

Professor Fay has reduced some of his earlier vapor dispersion distances, and Dr. Burgess has indicated general agreement with the SAI approach. However, neither change would make a substantial change in FERC's risk assessment.

Staff agrees.

Page 187, Last Paragraph - The FERC DEIS analysis found that the tanker casualty rate for the Nikiski area was high, being nearly double the mean casualty rate of 4.4×10^{-3} casualties/trip and 7.04×10^{-3} mean single-trip casualty rate/year. This section neglected to state there have been no LNG ship casualties in Nikiski. Over 265 voyages were completed through September 1977 from Nikiski to Japan. Using a 50% confidence factor, the expectation of a collision (for 265 voyages) in Nikiski is 2×10^{-3}. As the data base increases, this value will drop accordingly. This information indicates that the FERC casualty rate of 7.04×10^{-3}/trip/year may be unnecessarily high.

The casualty rate is derived using Cook Inlet data, including those transits involving LNG vessels. There is no basis presented to justify a 50 percent confidence factor.

Page 196, Fifth Paragraph - The dry chemical systems on the tank vents are operated manually from a remotelocation at grade level or the control room. No automatic operation is planned for the vent stacks.

Comment reflected in Section D.1 of Volume I of the FEIS.

Page 196, Last Paragraph (Continued on Page 198) - The diameter of the fire water pipeline on the trestle is 10 inches, not 8 inches.

Comment reflected in Section D.1 of Volume I of the FEIS.

Page 198, First Paragraph - The main fire water loop only uses one pump for circulation. A second pump is used for circulating heated water during the winter.

Comment reflected in Section D.1 of Volume I of the FEIS.

Page 199, First Paragraph - The dry chemical fire truck does not have a water pump. A second fire truck is designed as a water pumping fire truck.

Page 203, Item C, Third Paragraph - No primary pumps are planned for inside the LNG storage tanks at Nikiski.

Page 209, Item 3, Second Paragraph - Tankers for use in the Alaska trade have two independent propulsion systems, so that the total loss of propulsion is extremely unlikely. Therefore, a tanker casualty due to loss of the propulsion system has an extremely low probability.

The two independent propulsion systems are described on page 212 of the DEIS. Staff agrees that a casualty due to loss of propulsion has a low probability. The effectiveness of the double hull is discussed on page 211 of the DEIS.

Page 209, Lines 37, 38 and 39 - See comment for Page 186, Lines 26 & 27.

Page 211, Lines 17 and 18 - The Sun ships will not be ice-strengthened as there is no ABS requirement for ice-strengthening of ships for our trade. However, the ships will be constructed of special steels for low temperature area service.

Comment reflected in Section D.3 of Volume I of the FEIS.

Page 211, Lines 38 and 39 - Correct wording here would be "The Gaz-Transport membrane design..." rather than "This containment design...".

Page 212, Final Sentence - The bow thruster will not provide steering capability at high speeds.

Comment reflected in Section D.3 of Volume I of the FEIS.

Page 213, Figure 37 - The typical midship section shown is the incorrect midship section. A midship section showing the Sun ships with the McDonnell Douglas/Gaz-Transport design should replace this midship section.

Comment reflected in Section D.3 of Volume I of the FEIS.

Page 214, Line 14 - 300 kw is incorrect. The correct number is 600 kw.

Comment reflected in Section D.3 of Volume I of the FEIS.

Page 214, Lines 29 and 30 - The word separate should be inserted between "A" and "collision" to read "A separate collision avoidance...".

Comment reflected in Section D.3 of Volume I of the FEIS.

Page 214, Lines 33 and 34 - The words "...and a Doppler depth sounder." should be deleted as they are redundant.

Comment reflected in Section D.3 of Volume I of the FEIS.

Page 214, Line 37 - The following sentence should be added, "Doppler speed logs and docking systems will also be installed."

Comment reflected in Section D.3 of Volume I of the FEIS.

Page 215, Line 24 - The correct wording for the phrase "...dual fuel decks of the two boilers." is "...the boiler dual fuel burner location."

Comment reflected in Section D.3 of Volume I of the FEIS.

Page 215, Line 27 - Between the words "the" and "emergency" the words "machinery space" should be inserted.

Comment reflected in Section D.3 of Volume I of the FEIS.

Page 215, Lines 30 and 31 - Delete the sentence, "Fixed foam spray heads would be located at the boiler flat in the machinery space bilge area." Insert the following sentence, "Halon 1301 systems will protect the control rooms, and fixed CO_2 will protect the machinery spaces."

Comment reflected in Section D.3 of Volume I of the FEIS.

Page 216, Lines 30 and 31 - "...the boil-off vapor system would be tested with nitrogen." should be replaced with "...all cryogenic systems will be tested at operating conditions...". Certain tests (leak, strength, etc.) will be performed prior to putting the system in operation. However, N_2 could be used as a "running test" medium, though this is not currently planned.

Page 216, Line 31 - "One cargo tank..." should be changed to "The cargo tanks..."

Page 216, Lines 35, 36 and 37 - The sentence should read "Operation of the boil-off system will be checked during gas trials."

Page 216, Last Paragraph - It should be noted that sea trials will take place prior to gas trials.

Page 264, First Paragraph - The estimated completion date of early 1983 for the Northwest Alaskan project has already been extended to 1984 and further delays are probable.

As of May 1978 the official Northwest Alaskan Pipeline Company position, as expressed in Volume I, No.3 of Alaskan Newsline, is that operation will begin in 1983.

Page 264, Second Paragraph - The 270 miles is additional R/W from Susitna to Fairbanks. Full-size main line would be required from Tyonek to Fairbanks, a distance of 330 miles. The distance from Tyonek to Tok is 362 miles.

The applicant already proposes "full size" main line from Tyonek to Beluga. Therefore, the figures of 330 and 362 must be reduced by about 11 miles. (See the applicants' comment on page 275.)

Page 267, Fifth Paragraph - Five compressor stations would be required for the entire Tok alternate - Birch Hill - Beluga - Palmer - Glennallen Tok.

Comment reflected in Section H.3 in Volume I of the FEIS.

Page 271, Third Paragraph - Study showed 5 stations to Tok and 6 to Fairbanks.

Six stations would not be required for the staff's route.

Page 272, Last Paragraph - $4.06 is calculated on an average basis in California. Filing was based on an incremental basis resulting in a 1983 Cost of Service of $3.64.

Comment noted.

Page 273, Table 38 - Pipeline right-of-way mileages for the Tok alternative are considerably different from our proposal because of the new layout suggested by the Staff. Also, they assumed only a 50 foot construction right-of-way compared to our 100.

The applicant's detailed environmental report on the Tok alternative utilized a 50-foot right-of-way.

Page 274, Line 6 - Relocation of the underwater crossing of Cook Inlet from the site proposed by Applicant is arbitrary and was selected without the detailed studies made by Applicant. The crossing location proposed by Applicant was chosen because it was considered the best for construction and environmental reasons.

This statement is not supported by the applicant's environmental report. (See Exhibit Z-IV, pages 8-47.)

Page 274, Last Paragraph - Our report assumed Pacific Indonesian LNG would be exchanged, so did not include additional pipeline facilities from Antioch to Panoche in our Capital and Cost of Service estimates.

No response required.

Page 275, Second Paragraph - While the staff pipeline route eliminates 108 miles of 20" (or smaller) on-shore pipeline and 5 miles of dual pipeline across Turnagain Arm, it does require 16.5 miles of underwater line across

The applicant's study utilizes only 20-inch onshore pipeline. Therefore, the "(or smaller)" insert is gratuitous.

Cook Inlet and will require 351 miles of 24" main from Beluga to Tok compared to 267 miles in our proposal. There does not appear to be a clear cost advantage for the alternate.

The DEIS does not claim a cost advantage.

It is acknowledged that both refrigeration and insulation of the pipeline probably will not be required but that one of the two will be needed. Elimination of insulation which is the more costly of the two results in a 15-cent reduction in the 1983 Cost of Service for the Tok alternate.

No response required.

Page 275, Third Paragraph - The $4.03 Cost of Service for the Tok alternative results from considering transportation in the Northwest System incrementally. All customers receiving service through the Northwest System are likely to share in any cost benefits of expansion, so average cost is the appropriate cost to use for south Alaskan volumes to California customers through that system. This results in a cost of service of $4.64. Conversely South Alaskan LNG, when delivered through an expansion of California facilities, will go to the same customers as will the base Indonesian volumes. Accordingly, the appropriate cost to the California customers is incremental. This results in a cost of service of $3.64. If the pipeline alternative were chosen over the LNG proposal, the terminal costs allocated to the PacAlaska project would have to be shifted to the PacIndonesia project resulting in a higher cost for that gas. Using an incremental terminal cost, the cost of PacIndonesia gas remains the same whether South Alaska gas arrives by ship or pipeline.

No response required.

The allowance for cost over-runs was included because President Carter's "Decision and Report to Congress on the Alaska Natural Gas Transportation System" concludes that "over-runs of 30 per cent or more should be expected in Alaska and Canada" (Page 150).

We assert that cost overruns will occur to the proposed project as well. A case in point involves the analysis of geologic faults at Point Conception and the fact that the conditions imposed by the State of California will also result in higher costs for the LNG project.

Page 276, Fourth Paragraph - The lower efficiency of the pipeline and capacity limits of the Northwest system will result in less gas being delivered to California.

The pipeline designs are not yet finalized, but the staff agrees that this appears to be the case.

Page 279, Third Paragraph - It would seem that, if fuel costs in the Northwest system are to be rolled in, so should all other costs be averaged with the result of a higher cost of service as noted above (Page 275 - Third Paragraph). The reference that the Applicant's pipeline efficiency evaluation is based on the Northwest Alaskan System as proposed is in error. The incremental pipeline efficiency of 82.1% is based on a 1440/1680 psig, 48 inch pipeline. The 1680 psig segment starts at Whitehorse, the entry point for MacKenzie Delta gas into the Northwest Alaskan System.

The discussion on page 279 indicates that the fuel utilized was not rolled in.

Error corrected. However it is still true that the pipeline designs are not finalized and so the 83.3 percent may still be invalid. The 82.1 percent figure has been revised to 83.3 percent.

Page 279, Fourth Paragraph - The argument that flexibility and reliability all favor the Tok Alternative is unsupported. The Philips Marathon LNG Plant at Nikiski, Alaska, has been in operation for over nine years with no safety or reliability problems.

No response required.

Page 280, First Paragraph - Capacity of the Cook Inlet to Tok pipeline could be increased readily, but the capacity of the Northwest System would be a limiting factor particularly when MacKenzie and other Canadian Gas supplies are added.

No response required.

Page 280, Third Paragraph - Gathering systems are substantially the same. The FERC Staff revision differs only in that some portions of the gathering system become transmission lines.

The applicant has misread the DEIS. The DEIS states that the gathering systems are quite similar (not the same). There are major differences in the transmission lines considered by the staff and the applicant.

Page 281, Conclusion - Applicant generally agrees, although the methods of calculating and comparing Cost of Service estimates should be clarified as previously noted.

A discussion of how cost of service figures were determined is beyond the scope of the environmental impact statement.

Page 283, Lines 18-19 - Point Conception is characterized as having an unspoiled nature. The term "rural" may be more descriptive of Point Conception's nature than "unspoiled", in view of the following developments that exist near the site: (1) Southern Pacific Railroad tracks; (2) oil storage tanks, equipment sheds, and caretaker's shack around Government Point; (3) small beach cabana west of Canada del Cojo; (4) residences, barns, and sheds on Hollister Ranch; and, (5) homes and other improvements on 16 residential parcels on the Hollister Ranch. The Point Conception site itself has been used for cattle grazing.

Sections C.8 and H.2 of Volume II address the unspoiled nature of Point Conception and identify the site's conflict with its existing use.

Page 284, Second Paragraph - Applicant's Study did not indicate that the pipeline alternative would have a lower cost of service if an existing LNG facility were operating in California.

Comment reflected in Section H.3 of Volume I of the FEIS.

Page 288, First Paragraph - Flexibility of the Tok pipeline is restricted by the capacity of the Northwest System.

No response required.

Page 289, 1.(f) Comment - Use of the Swanson River Oil Field gas pipeline to transport gas produced at West Fork, Birch Hill, and Beaver Creek would be contingent on successful negotiations with the Kenai Pipeline Company, its parent company, and approval from the Alaska Pipeline Commission. There is no assurance that such negotiations would be sucessful, or that the State of Alaska would approve this alternative.

No comment required.

Page 290, Item 8 - Analysis of the hydrodynamic behavior of a large spill into the dike at Nikiski should not be required. The high dike should easily eliminate any splashing or overflow, due to its height, vertical sides and closeness to the tank.

Comment reflected in Section C-13 of Volume I of the FEIS.

PAGE 292 CONCLUSIONS AND RECOMMENDATIONS, (POTENTIAL RECOMMENDATION) (21) Comment - Attached is a preliminary engineering and economic feasibility evaluation for sunken-silo-type underground storage tanks. The construction duration of the facility would increase from 24 to 30 months depending on weather conditions. This would increase the construction period from 35 months to a minimum of 59 months. The construction cost of the facility is estimated to increase by $23,000,000 (mid 1977 dollars) if this recommendation is imposed, with a $147,000,000 million increase in total investment requirements due primarily to AFUDC carrying charges accruing over longer periods of time.

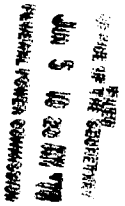
This evaluation does not include an assessment of the environmental impact of ingrounding the LNG storage tank.

The study has been reviewed and the potential recommendation has been removed.

Page 330, American Bureau of Shipping - ABS classifies all U. S. Flag merchant vessels, not all merchant vessels. However, many foreign flag merchant vessels are classified by ABS.	Comment reflected in Appendix C of Volume I of the FEIS.
Page 399 - See comment for Page 186, Vol. I, Lines 26 & 27.	See identified comment for response.
Page 437, Second Paragraph - For comparative cost of service as see Comments to Page 275.	The sentence on the economic comparison has been deleted from the appendix dealing with system energy efficiencies.
Page 437, Third Paragraph - Fuel costs probably would be lower until MacKenzie Delta Gas is brought on line.	The staff agrees.

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

In The Matter of	)	
	)	
PACIFIC ALASKA LNG COMPANY	)	Docket No. CP75-140
WESTERN LNG TERMINAL COMPNAY	)	Docket No. CP75-83-2



COMMENTS OF PACIFIC ALASKA LNG ASSOCIATES AND WESTERN LNG TERMINAL ASSOCIATES ON FEDERAL ENERGY REGULATORY COMMISSION STAFF'S DRAFT ENVIRONMENTAL IMPACT STATEMENT

VOLUME II

E. R. Island
P. O. Box 54790, Terminal Annex
Los Angeles, California 90054

Malcolm H. Furbush
Peter Hanschen
77 Beale Street
San Francisco, California 94106

Page 6, Lines 24-28 - Project plans do not include construction and operation of the small boat harbor described in this paragraph.

Comment reflected in Section A of Volume II of the FEIS.

Page 9, 10 - Revisions to the seawater system configuration and pipe sizes have been filed with FERC as Exhibit No._____(JWO-24) entitled Seawater System Study.

Ibid.

Page 14, Line 17 - The ships will not follow the 50 fathom curve. The ships will continue down the normal coastal traffic corridor and turn into the southbound vessel traffic lane in the Santa Barbara Channel. Once south of the terminal and clear of all traffic, the ships will turn toward the terminal.

Page 47, Lines 9-11, Page 361, Lines 12-17 - The DEIS suggests that based on the results of the Dames & Moore study, one cannot rule out the occurrence of major earthquakes on the South branch of the Santa Ynez fault. Therefore, the staff has recommended seismic design parameters in excess of that proposed by Dames & Moore. The DEIS staff recommends that the LNG facilities at Point Conception be designed to withstand a maximum earthquake of Magnitude 7-1/2 with a peak bedrock acceleration of at least 0.6g. The staff indicates that an earthquake of this size should not induce structural failure which could discontinue facility services.

No response required.

Based on the historic seismicity and tectonics of the site region, it is Dames & Moore's opinion that an upper level event of Magnitude 7-1/2 along

the Santa Ynez fault system is conservative and appropriate for seismic design of the proposed LNG facility at Point Conception. However, Dames & Moore does not concur that 0.6g is the appropriate design bedrock acceleration.

No response required.

Based on the relative amounts of recent deformation along various faults of the Santa Ynez fault system and the historic seismicity of the western Transverse Ranges, it is Dames & Moore's opinion that if a major earthquake occurs along this system during the design life of the facility it will most likely occur along the main branch of the Santa Ynez fault and could extend into the Santa Maria Basin. Therefore, it is Dames & Moore's opinion that the nearest significant seismogenic structures lie north of the site in or bordering the Santa Maria Basin.

No response required.

For conservatism, Dames & Moore assumed that the postulated Magnitude 7-1/2 earthquake will occur on the nearest of the Santa Maria Basin faults - the Santa Ynez River branch fault.

No response required.

The conservatism used in selecting the Santa Ynez River branch fault as the controlling seismogenic structure within the Santa Ynez fault system should not be misconstrued and taken one step further by assigning the recommended design magnitude to the South or North branches of the Santa Ynez fault system. As discussed above, there is strong geologic and tectonic evidence that indicates that the Santa Ynez North and South branches are relatively insignificant faults. Therefore, the added conservatism of assuming that the design event will occur on the South branch (or the North branch) is, in Dames & Moore's opinion, unwarranted.

Previously discussed on pages 44-47 of Volume II of the DEIS. No additional evidence has been provided which would change the analysis in the DEIS.

The likelihood of a significant earthquake on the North or South branch is extremely remote. Therefore, it is Dames & Moore's opinion that the recommended design peak acceleration of 0.6g is overly conservative for design of the proposed facility. Dames & Moore has recommended for design 0.4g corresponding to a Magnitude 7-1/2 earthquake on the Santa Ynez River branch fault.

See staff last response on previous page.

It should be noted that for purposes of providing a complete geotechnical design for the Point Conception LNG facility, additional seismic criteria were recommended and include; (1) a randomly occurring Magnitude 5-1/2 earthquake with a corresponding 0.5g peak acceleration; and (2) a major earthquake (8+) on the San Andreas fault system. It is Dames & Moore's opinion that the combination of the three seismic events (random Magnitude 5-1/2, Magnitude 7-1/2 at 12 miles, and Magnitude 8+ on the San Andreas system,) cover the broad spectrum of possible strong ground motion expected at the proposed site and provide sufficient conservatism for design. The combination of events is compatible with the multiple seismic design recommendations proposed by the Applicant and the DEIS for the Nikiski, Alaska LNG facility.

No response required.

In summary, it is Dames & Moore's opinion that the combination of recommeded seismic events will provide for a safe, and reliable operation of the proposed facilities at Point Conception.

No response required.

Page 82, Lines 19-21 - California boxelder is a species that is common in central California (including the Santa Ynez-Santa Rosa Valleys). It is present in lower Canada del Cojo but is otherwise seldom encountered along the Santa Barbara County coast (i.e., south of the Santa Ynez mountain crest).

Comment reflected in Section B-6 of Volume II of the FEIS.

Page 95, Line 27 - Because no official list or legal status designates any species as "sensitive," this category should be deleted. All non-game species not specifically permitted to be taken are officially "protected" species; some of these species are "fully protected". Subsequently, some fully protected and other species (or subspecies) have been designated "rare", "endangered", or "threatened" under State of Federal law; only these categories should be included in Table 19.

Table 19 of the DEIS has been modified.

Page 96, Table 19 - The title of this table should be expanded to reflect the fact that it actually deals with rare, endangered, fully protected, protected, and game species (including subspecies as defined in the Endangered Species Act of 1973). Additional information on individual species discussed in this table is given below.

Table 19 of the DEIS has been modified.

Ringtail is fully protected under California law.

Mountain lion is protected under California law; there is a moratorium on taking them until 1982.

Black bear is a big game species that may be taken only during hunting season in Santa Barbara and Kern Counties (limit one adult bear per season per hunter); San Luis Obispo County is closed to bear hunting.

Aleutian Canada goose is not listed under California law; consequently, it is "protected".

Golden eagle is fully protected under California law.

Prairie falcon is not listed under Federal law, except as a migratory bird (Federal Register 16 November 1977, pg. 59359). It is protected under California law as are all raptors.

White-tailed kite is fully protected under California law.

Sandhill crane is fully protected under California law.

Only two subspecies of Ensatina are protected (Ensatina eschscholtzi croceater, yellow-blotched salamander; E. e. klauberi, large-blotched salamander). However, the area from Point Conception through the Central Valley is not included in their range. Therefore, this species should be deleted from the table.

Page 121, Lines 1-3 - It is the surf rather than the beaches near the Point Conception site that is used by surfers. Water access to the beach and land access to the water are closed to the general public. Available information suggests that current active use of the area is quite low. Public access to the surfing areas is by water only. During quarterly offshore surveys at the area over a 2-year period, casual observations by Dames & Moore marine biologists and oceanographers indicated an average of about 10 surfers per day in the area. Discussions with Mr. David Felt (1978) suggest that these observations reflect a reasonable estimate of surfer use on an average day. Based on boat launches from Gaviota Beach State Park in the direction of Point Conception (3-4 per day average) and number of people in the boats (3-4 people average), Mr. Felt estimated that 9 to 16 surfers could be using the area on an average day.

The beaches are available to the public below the mean high tide line. A recent article (attached as a separate comment to the DEIS) in "Surfer" magazine indicates continued interest in the surfing areas off of Point Conception. The DEIS does not indicate the amount of usage of the sites, but merely that the areas are well known and are used despite access restrictions.

Reference: Felt, D., 1978, California State Department of Parks and Recreation, Park Ranger, Gaviota Beach State Park, personal communication, February 24.

Page 127, Lines 28-30 - Review of Dames & Moore side-scan sonar data by marine archaeologists identified the presence of a modern shipwreck in the Point Conception area. However, the shipwreck is located about 8000' to the west of the trestle in Cojo Anchorage, not an area that would be affected by construction of the seawater exchange system and marine trestle.

Comment noted.

Page 137, 4th paragraph - Point Conception is located within the South Central Coast Air Basin. This area (Point Conception) is a maintenance area for PO_x, TSP and CO.

The Federal maintenance area designation for Point Conception has not yet been changed to reflect southern Santa Barbara County's inclusion in the South Central Coast Air Basin, a state designation.

Page 141, Line 32; Page 142, Line 1; Page 246, Lines 28 and 32; Page 247, Lines 11 and 14 - A breakwater is not proposed at the Point Conception site, and reference to such should be deleted.

Comment reflected in Volume II of the FEIS.

Page 144, 2nd paragraph, last sentence: The sentence mis-states the displacement required to damage the pipeline.

Reference is made to Technical Report No. 3 of the CPUC Draft EIR, "Seismic Hazards Analysis of The Point Conception Pipeline," page 3-Z, 3.4 Faulting, "Newmark (8) has noted in detail the problem of pipe displacement under a fault. He notes that if backfill is properly applied to buried pipe for the Trans-Alaska pipeline that displacements on the order of 5 to 10 feet can be accommodated even if the fault breaks directly under the pipeline."

The numbers quoted in the DEIS are from material provided by the applicant.

The Applicant also points out that there exists no record of failure of a modern, high tensile steel, large diameter, electric welded, gas transmission pipeline as a result of a seismic event. This includes records covering the Tehachapi, San Fernando, and Anchorage earthquakes.

Ibid.

Also, reference is made to the article, "Fault Movement Effects on Buried Oil Pipeline," by R. P. Kennedy, H. W. Chow, and R. A. Williamson (Transportation Eng. J. 103, 617-33, 1977, Sept. 17 pp) which discusses the use of simplified analysis procedures to estimate the behavior of a shallow buried pipeline subjected to large fault movement. It concludes that under conditions of good design, a shallow buried pipe placed in loose to moderately dense cohesionless soil can withstand fault movements as large as 20 feet.

Ibid.

Page 146, 5th paragraph - Applicant's affiliates have installed thousands of miles of pipelines in California, including installations in Thousand Oaks, Needles, and other areas where expansive soils exist. No history exists where installation in such soils has been deleterious to the pipeline or its coating, and the condition to remove such soil or avoid such areas by the pipeline routing is considered unwarranted and not substantiated by history, records, or code requirements.

This statement was not intended to be a "condition" - see revised text.

Page 146, 6th paragraph - The San Joaquin Valley north of Taft is traversed with pipelines operated by So. Calif. Gas Co., PG&E, and oil companies. The Applicant has not experienced "severe construction problems," and where natural drainage is intercepted by this pipeline, provision will be made to control, channel, or divert the flow to prevent ponding. Routing the pipeline to avoid natural drainage is not practicable, and any condition to do so is unwarranted.

This comment satisfies staff's concerns. Therefore, no such condition will be required.

Page 148, Lines 20-32 - The DEIS states that site grading and excavation would increase erosion and sediment loss. The DEIS also states that site erosion should be temporary and controllable through the use of erosion control devices such as diversion ditches. Dames & Moore believes the latter statement to be more correct. Erosion can be controlled and should not increase. Dames & Moore believes that grading should reduce the rates of erosion now naturally occuring.

Site preparation and grading would remove vegetation and compact the soil promoting increased runoff and erosion during rainy periods. With appropriate control techniques the resulting sedimentation could be held to a minimum.

Page 148, Lines 36-43, and Page 152, Lines 1-4 - The DEIS states that due to their steep side slopes, dike walls would be highly susceptible to erosion. It also states that localized slumping could occur until the embankments are adequately stabilized. Actually, side slopes will incorporate drainage terraces and other features to control erosion. If design studies indicate the need, dike walls can also be coated to control erosion. Also, the embankments will stabilize by compaction as they are constructed.

No response required.

Page 157, Lines 19-23 - More recent construction plans include the use of seawater for hydrostatic testing of LNG tanks. Each LNG tank will require about two days to fill and testing should be completed within one week. Seawater used in the tests will then be discharged through the seawater outfall line. Use of seawater, rather than freshwater, will reduce the demand for the latter. The seawater will meet appropriate water quality standards and upon discharge, will behave as a buoyant effluent (slightly warmer than the receiving waters).

Comment reflected in Section C-5b of Volume II of the FEIS.

Page 158, last paragraph - The vessels will be 130,000 M^3 size. Using the main condenser the in-port temperature difference will be 7.4°F above ambient seawater temperature. At sea the temperature will be 5.9°F. The approximate gallons per minute in port is 12,000, at sea the amount of water is 67,000 gallons per minute.

Comment reflected in Section C-5b of Volume II of the FEIS.

Page 160, Lines 1 and 2 - A grounding in the vicinity of Point Conception will not cause oil spillage as the bottom is soft mud and the hull would not be penetrated.

Figure 1 of applicant's data submittal of June 30, 1978, shows the substrate in the vicinity of the berth to be bedrock.

Page 160, Lines 13 and 14 - The correct berth orientation is 255 degrees. The berth will not be a finger pier, it will be an L shaped berth connected to a trestle.

Comment reflected in Section C-5b of Volume II of the FEIS.

Page 169, Lines 1 and 10 - The phrases "would remain bare indefinitely" and "would remain bare" are not accurate. A more appropriate statement might be "would revegetate very slowly". Native herb and shrub species (as well as introduced species) in the area are commonly observed colonizing areas that have been stripped of soil as a result of landslides and other disturbances.

Comment reflected in Section C-6 of Volume II of the FEIS.

Page 170, Lines 30-44 - The DEIS indicates that the seawater lines may be constructed through the Cojo delta (sand channel) or through the kelp bed. The terminal site location has been shifted about 1,500 feet to the east to avoid disruption of archaeological sites. As a result, the marine facilities have also been shifted. The berthing facility remains at the previously proposed location; however, the trestle base has been shifted about 400 feet to the east. The seawater lines have been shifted to the east about 600 to 800 feet to pass through an area of low kelp density.

Ibid.

Page 172, Line 1-5 - The DEIS expresses the opinion that location of the seawater intake in the kelp bed would be a poor location from the standpoint of fish entrainment. While there is no existing sytem in operation to provide a basis for comparison, much can be learned from review of the fish losses sustained at coastal power plants in the Southern California Bight

Comment reflected in Section C-7b of the FEIS.

and from the scientific literature. Fish impingement losses for a period of five years at nine power plants (14 seawater systems) were reviewed. The plants vary greatly in general location and with respect to ecological characteristics of the supply waters. However, 80-90 percent of the total fish loss (numbers of individuals) of each flow is sustained by some combination of the following species: northern anchovy, queenfish, white croaker, shiner surfperch, walleye surfperch and white surfperch. Other species of fish also occur in abundance in the intake areas but are infrequently entrained. Apparently, the six species which are entrained are more susceptible. Review of published studies on kelp beds fished reveals that only walleye and white surfperches are common inhabitants of kelp beds; thus, location of an intake in a kelp bed offers a real possibility of reduced losses of the other four species. Conversely, it is believed that an intake located in the Cojo sand channel would result in a substantial entrainment of these species, since the channel is anticipated to be an avenue of concerted onshore-offshore movement.

Relatively few fish species are restricted to a kelp bed habitat, and the majority of species commonly occur in a variety of habitats. Indeed, many of the fish species which occur in kelp beds are common to abundant around seawater intakes, but are rarely entrained. Thus, it is reasonable to conclude that the behavioral characteristics of these species reduce the probability of entrainment. Perhaps the greatest concern with a kelp bed intake is that substantial numbers of juvenile fishes which use the kelp bed as a nursery area will be lost. Since there will be an area clear of kelp surrounding the intake, the probability of entraining these fish should be reduced.

Page 172, Lines 25-33 - See Comments for Vol. II, Page 157, Lines 18-22.

Comment reflected in Section C-6 of Volume II of the FEIS.

Page 177, Line 25 - The prairie falcon is not designated rare, endangered, threatened, or fully protected by State or Federal law. It is like all other species of raptors in California, protected by State law.

Comment reflected in Section C-7a of Volume II of the FEIS.

Page 177, Lines 29-36 - Studies by the California Department of Fish and Game show that San Joaquin kit foxes tolerate human disturbance to the extent that some reside in suburban areas about Taft and Bakersfield. These studies also indicate that San Joaquin kit foxes maintain multiple dens within their territories.

Comment noted.

Page 178, Line 4 - According to California law, the prairie falcon is a protected species of raptor, as are owls, hawks, etc. It is not a fully protected species as are the white-tailed kite, greater sandhill crane, golden eagle, and others. It is not designated rare, endangered, or threatened and should not be included under this subheading.

Comment reflected in Section C-7a of Volume II of the FEIS.

Page 178, Lines 36-40 - See Comments for Vol. II, Page 157, Lines 18-22.

Comment reflected in Section C-5b of Volume II of the FEIS.

Page 179, Lines 17-23 - The DEIS cites ADL's prediction that the Point Conception LNG terminal seawater system will entrain roughly 40,000 pounds of fish per year. ADL selected the Los Angeles Department of Water and Power's Scattergood Generating Station on Santa Monica Bay as a model of the fish entrainment losses expected at Point Conception due to anticipated similar seawater flow rates (170,000 gpm vs. 176,000 gpm). This choice was inappropriate for three reasons: (1) the biological and oceanographic differences

Comment reflected in Section C-7b of Volume II of the FEIS.

between Point Conception and Santa Monica Bay are great; (2) the Scattergood flow rate of 170,000 gpm is a weighted-average, the maximum flow rate being 344,000 gpm; and (3) the velocity cap at Scattergood is retrofitted to the intake and different in design from those in use at Southern California Edison (SCE) plants with which it is compared. These latter two differences may account for the great disparity in fish loss reported at Scattergood compared to the two SCE intakes at El Segundo; such great differences are not expected to result from natural differences with facilities located within a few miles of one another, so that differences in fish loss are likely due to different flow rates and intake technology. Since the intake at Point Conception will be fitted with a velocity cap of improved design, it is more appropriate to interpolate between El Segundo Units 1-2 and Units 3-4 for an estimate of fish loss. Thus, ignoring biological differences between sites, an annual fish loss at 12,000 to 18,000 pounds is a reasonable estimate. This estimate is less than half that reported for Scattergood (40,000 pounds). ADL correctly concludes that the present state of knowledge about most marine species does not provide the basis for assessing the significance of such losses.

Page 179, Lines 38-44 to Page 180, Line 1-21 - The DEIS cites commentary in the ADL Report (No. 5A) to the effect that mortality of entrained organisms is expected to be close to 100% even with the use of a fish return system as a mitigating measure. ADL ignored the use of a velocity cap at the intake to reduce fish entrainment as a mitigation measure, but considered its use as "conventional engineering practice". This is inappropriate since a circular

Comment reflected in Section C-7b of the FEIS.

velocity cap of the type proposed by the Applicant has proven effective in tests by SCE in reducing the number of fish which are entrained. As a result, no consideration is given to the amount of fish likely to be kept out of the seawater system, and emphasis is placed on saving those which are entrained.

The following sources provide information on development, testing, and effectiveness of the velocity cap as a fish impingement mitigation measure:

Downs, D.I., and K.R. Meddock, 1974. Design of fish conserving intake system. Journal of the Power Division, ASCE, Vol. 100, No. PO2, Proc. Paper 11008, December 1974, pp. 191-205.

Schuler, V.J., and L.E. Larson, 1975. Improved fish protection at intake systems. Journal of the Environmental Engineering Division, ASCE, Vol. 101, No. EE6, Proc. Pager 11756, December, 1975, pp. 897-910.

Weight, R.H., 1958. Ocean cooling water system for 800 MW power station. Journal of the Power Division, ASCE, Vol. 84, No. P06, Proc. Pager 1888, December, 1958.

These published papers chronicle studies that were conducted by Southern California Edison Company. Evidence of the effectiveness of the earliest version of the velocity cap emplaced in June 1957 at the El Segundo Generating Station, Units 1 and 2, is given in the paper by Weight (Figure 9). It shows that the annual fish impingement rate in 1956-57 was 272.2 tons which was reduced in 1957-58 to 14.95 tons after velocity cap was in place; thus, the velocity cap led to a 95% reduction in fish entrainment. This velocity cap was nearly square (29 x 23 feet).

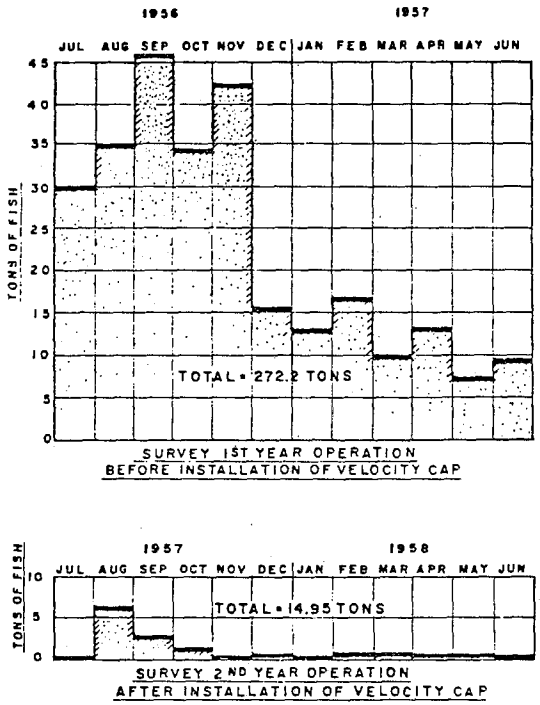


FIGURE 9. EL SEGUNDO STEAM STATION, UNITS 1 & 2, FISH LOSS BEFORE AND AFTER INSTALLATION OF VELOCITY CAP

(ADAPTED FROM WEIGHT, R.H. 1958. J. POWER DIV., PROC. ASCE, VOL. 84, NO. PO 6)

DAMES & MOORE

Subsequent investigations in the field and througn laboratory experimentation revealed that the square velocity cap in use at all Southern California Edison generating stations with offshore intakes is characterized by areas of non-uniform higher than average velocity in which the majority of fish are entrained. These observations have led to the development and testing of a uniform flow velocity cap which is circular. Results of laboratory tests using scale models of the rectangular and circular velocity caps indicate that entrainment by an intake equipped with the circular cap should be 60 to 70% less than that by the rectangular tested velocity cap. The results of these studies are described in the papers by Downs and Meddock and by Schuler and Larson.

The DEIS restates ADL Technical Report #5A to the effect that the fish return system to be installed at Point Conception will be highly ineffective due to mechanical trauma of transit through the seawater system which will lead to direct mortality or increased susceptibility to predation on return to the ocean. In rebuttal, it should be noted that this system is the product of an extensive research and development effort by Southern California Edison Company for implementation at San Onofre Nuclear Generating Station Units 2 and 3 presently under construction. The system has been modelled and tested in the laboratory, but has not been used in practice. At present, the system is the state-of-the-art for an open coast facility and required 4-5 years to develop. Alternative systems could possibly be developed, but would likely take a similar length of time after which it would also be laboratory tested.

With regard to the trauma experienced by fish in transit of the intake conduit, it is interesting to note that ADL (p. 84) indicates that survivorship of entrapped fish can be high if a power plant screenwell provides quiet water areas for the fish. This suggests that damage of fish during transit of the intake conduit must be fairly minimal. Thus, the prognosis given could well be more promising than indicated.

Page 180, Lines 39-45 to Page 181, Lines 1-19 - The DEIS quotes regarding ADL observations of entrainment impacts at southern California power plants which led ADL to infer that the magnitude of entrainment at Point Conception can produce high and locally significant losses on relatively sedentary fish (e.g., rockfish or barred surfperch) by depleting the local area of the intake of nearly all juvenile and adult fish and subsequently capturing the occasional new recolonizers of the area. ADL's inference, or in fact hypothesis, is not based on cited evidence. ADL assumes that the general absence or presence of low numbers of sedentary species in entrainment fish loss records for coastal generating stations reflect the rarity of these fishes in the local area of the intake. The absence of barred surfperch in entrainment records is largely a reflection of their distribution. All power plants in southern California with offshore intakes have the intake located in 30-35 feet of water with a riser bowl extending about 12-15 feet off the bottom. The vast majority of barred surfperch occur in the surf zone out to depths of about 15 feet of water where they feed heavily on sand crabs (Emerita). Consequently, their behavior and distribution preclude frequent encounters with an offshore intake. Therefore, rarity of this species in the local area is likely, but has little to do with the impact of an intake.

The staff is of the opinion that with a lack of agreement regarding the intake location, the mortality rate and number of entrapped fish, in addition to uncertainties regarding the susceptibility of various species to entrapment, the movements of local fish populations and the behavior in kelp beds of kelp-bed associated adult and juvenile fishes, that fish species specific impacts cannot currently be accurately determined.

Rockfish are not generally common or abundant in the local area of many offshore intakes since the nearshore habitat is mainOy sedentary; the major sources of rocky habitat are the intake and discharge conduits themselves and associated armor. Accordingly, the amount of suitable, albeit artificial, substrate is very limited and rockfish populations would be expected to be small. Thus, one would not expect large numbers to be entrained.

A limited number of power plants have offshore intakes located near a substantial amount of natural or artifical rocky substrate. In these areas, rockfish species normally expected in nearshore waters occur in some abundance; the blue rockfish is probably most common. However, even where rockfish are common to abundant (as near Redondo Beach Generating Station Units 7 and 8), they are not entrained in large numbers. Thus, most rockfish species in the nearshore zone are not readily susceptible to intake entrainment, which explains their absence in plant intakes.

ADL assumes that surfperch must be very susceptible to intake entrainment due to their viviparous reproduction and concentration of all life history stages in the nearshore area. It is a misconception to assume that viviparity per se should lead to a surfperch being more susceptible to the entrapment by an intake than an oviparous species or that the loss of one pregnant female surfperch is necessarily greater than the loss of one oviparous female. The goal of reproduction is the replacement of each individual as the sum of its reproductive activities during the individual's lifetime. Vivipa-rity places a greater burden on the female so that she must provide all of the nourishment to the limited number of embryos she carries; in addition to this

energetic cost, the pregnant female is a less capable swimmer and is probably more susceptible to predation (by natural predators or an intake). These costs are apparently offset by an increased likelihood that each juvenile surfperch is released into the appropriate habitat at parturition. Surfperch should only be more susceptible to intake predation if pregnant females are diffentially attracted to an intake, or if an intake is located in an area used for migration of pregnant females.

It is reasonable to assume that young surfperch (year class 0) would be most susceptible to entrainment since their swimming abilities are much less than those of older and larger individuals. However, the Marine Review Committee (1977) study of in-plant mortality at San Onofre Nuclear Generating Station Unit 1 indicated that only 0.8 percent of the impinged fish were of year class 0 in 1976. In comparison, field samples comprised 12.2 percent of the young of the year. These results suggest that young of the year are not overly, or differentially, susceptible to entrainment.

The results of the Marine Review Committee (MRC) (1977) study should be used with caution as the MRC points out (pp. 8-14). The estimates of walleye surfperch abundance were based on studies in April 1977; samples taken in the previous December indicated substantially higher density. Also, the abundance of young of the year is probably a premature estimate since the parturition period extends from April to June (Rechnitzer, A.B., and C. Limbaugh, 1952. Breeding habits of Hyperprosopon argenteum, a viviparous fish of California. Copeia, No. 1, pp. 41-42). Consequently, if the study period

included May and June, it is likely that young of the year would have represented as much as 40 to 50 percent of the population, and overall population density would have been higher. In sum, heavy reliance on preliminary data is inappropriate.

Finally, there is no known evidence to support the supposition that at the time of seawater system startup, there is likely to be a large pulse of fish entrainment as all of the fish are removed from the area of the intake. It is true that fish populations were not monitored appropriately, if at all, when southern California power plants began operation; thus, there is no documentation of this event. Subsequent operational monitoring programs have not provided evidence of depletion of surfperch populations in the vicinity of an intake. It cannot be denied that impingement losses are in some cases recorded in sizeable figures. However, these losses have yet to be placed in a perspective that is relevant to the maintenance of the fish populations sustaining those losses. It seems reasonable to argue that, if the losses are of catastrophic proportions, then the effects on populations should be readily evident in the studies conducted to date.

Page 181, Line 39 to Page 183, Line 9 - In ADL's effort to develop a "worst case" impact of entrainment on plankton, the likely existence of compensatory mechanisms operating at all trophic levels in the plankton community is not taken into consideration. However, they do allude to the presence of compensatory mechanisms operating in zooplankton populations (Page 183, Lines 1-9). Compensatory mechanisms also are present in phytoplankton populations.

Comment noted.

For example, the growth of phytoplankton populations is often limited by the availability of nutrients. Consequently, a reduction in phytoplankton density due to predation or entrainment reduces competition for nutrients by phytoplankters and provides a stimulus for increased production. Those phytoplankters which are entrained and discharged offshore are not lost to the ecosystem, but are likely consumed by zooplankton. Thus, the capacity of site phytoplankton to support natural zooplankton populations may well be undiminished due to the seawater system.

Page 183, Lines 10-17 - The losses of northern anchovy eggs and larvae appear to be large when presented without information to provide perspective. Abundant schooling fishes like northern anchovy broadcast immense numbers of eggs into the plankton, although less than 0.001 percent may attain reproductive age. This extremely high natural mortality rate places entrainment mortality in proper perspective.

Comment reflected in Section C-7b of the FEIS.

A crude estimate of the reproductive potential of the northern anchovy can be made given estimates of: (1) the biomass of the spawning stock, (2) the number of females in the stock, and (3) the frequency of spawning and number of eggs produced annually by each female.

Messersmith and others (1969), using data from 1951 to 1966, note that northern anchovy populations off southern California have been increasing and estimate the total California spawning population to be between 2.25 and 2.81 million tons; the population (assumed adults) off southern California in 1967 was estimated to be 1.895 million tons. Collins (1969) determined that

during the peak spawning season females comprised 62.5 percent of the population and are somewhat heavier than males of comparable length. From Collins' data, it is estimated that an average mature female would be about 120 millimeters standard length and would weigh about 17.5 grams. Considering the southern California population only (1.895×10^6 tons) and converting to grams, the female spawning biomass is 1.08×10^{10} grams or 6.0×10^{10} females.

Frey (1971) states that for purposes of population estimation, it can be assumed that each mature female anchovy spawns twice a year, and that a female releases between 4,000 and 21,000 eggs during each spawning period. For the purposes of the present assessment, it is assumed that a mature female produces 2.5×10^4 eggs annually (equal to the average of 4,000 and 21,000 times 2). Thus, the adult female anchovy population off southern California produces 1.5×10^{15} eggs annually.

The DEIS cites ADL Report #5A. ADL's estimate of annual northern anchovy egg and larvae loss due to entrainment (64×10^6 eggs and 137×10^6 larvae equals 201×10^6 planktonic forms) can be placed in perspective as a percentage of the total egg production of the estimated southern California population. Dames & Moore calculates that the Point Conception facility would lead to a worst case mortality of 1.34×10^{-9} percent of northern anchovy annual egg production.

References: Collins, R.A., 1969. California Department of Fish and Game, Bulletin 147, pp. 56-75.

Frey, H.W., ed., 1971. California Department of Fish and Game, pp. 148.

Messersmith, J.D., and others, 1969. California Marine Review Committee, CALCOFI Report 13, pp. 32-38.

.ge 185, Lines 8-26 - There is little evidence to support the contention that chlorinated and brominated organic compounds are sufficiently persistent to be subject to bioaccumulation and subsequent magnification through the food chain. ADL admits in the report cited in the DEIS that little is understood of this process. It seems advisable to provide substantiation through citation of pertinent literature or presentation of the results of original research on the topic. If such substantiation is nonexistent, then this topic is based on pure speculation and should be so stated.

Comment reflected in Section C-7b of Volume II of the FEIS.

Page 187, 1st paragraph - Section 1.2.7. Thiophene is not used as an odorant. One of the odorants used in the natural gas industry is thiophane (correct chemical nomenclature is tetrahydrothiophene) and is sometimes confused with thiophene. Thiophene is a toxic chemical, while thiophane is not considered toxic within normal use concentrations.

Comment reflected in Section C-7b of Volume II of the FEIS.

Page 195, Lines 10-12 - See comments for Vol. II, Page 121, Lines 1-3 regarding surfing use near the proposed Point Conception site.

See staff's previous response to comment for Volume II, page 121.

Page 197, Lines 37-40 - The 75-acre laydown area would be adjacent to the current eastern boundary of the proposed plant site. Archaeological sites SBa-1502 and -1505 are on the property to be acquired by Applicant but are well to the west of both the proposed location of operating facilities and the laydown area. Consequently, construction-related activities (parking, materials, storage, and concrete batching plant) within the laydown area would not have an impact on either of the two archaeological sites.

The FEIS has been changed to reflect this modification.

Pages 201 - 211 - The methodology used and the results stated appear valid, however, there is revised emissions inventory and changes in operational procedures that will greatly influence the results. These revised parameters are in WLNG's EPA application for New Source Review. Some of the major revisions include: Use of 0.5 wt. % sulfur fuel oil for LNG tanker use within the port area; use of LNG boil-off in ships boilers while in port area; lower fuel consumption by ships while approaching, pumping and departing the dock.

Comment reflected in Section C-11 of Volume II of the FEIS.

Page 203, Lines 5, 6 and 7 - The operation of the vessels will involve the use of boil-off to the maximum extent possible while within close proximity, i.e., three miles of the shore, and while berthed at the terminal.

Ibid.

Page 203, Line 11 - Maximum sulfur content will be 0.5% not 2% when the ships are within 3 miles of the terminal.

Ibid.

Page 209, End of first full paragraph. Fuel conversion plants are one of the facilities identified in the 28 major source categories in the CAA (Clean Air :ct). We do not agree that fuel conversion plants appear to include LNG regasification plants. It should be noted, however, that information contained in WLNG's application to the EPA for New Source Review sets our emissions at less than 100 STY for all criteria pollutants.

Ibid.

Page 218, Item 2 - See Comment, Volume I, Page 184, Item 2.

Comment reflected in Section C-12 of Volume II of the FEIS.

Page 219, Item 3 - See Comment, Volume I, page 185, Item 3.

Comment noted.

Page 220, Third Paragraph - The statement as to groundings is inconsistent with the DEIS analysis in Appendix A.

Staff disagrees.

Page 220, Lines 31 and 32 - See comments for Page 186, Vol. I, Lines 26 & 27.

Staff agrees.

Page 221, Items 3 and 5 - These items are not characteristic of any particular model, but are input factors used in all of the models. Major changes in either factor can greatly affect the results of all models.

The different uses of these input factors is indeed the reason for the wide variance of plume travel predictions.

Page 221, First Paragraph - The probability of ignition of an unconfined vapor cloud traveling over a densely populated area does approach unity. This is not the case for sparsely populated areas like Point Conception or over water. There is a high probability of ignition of a vapor cloud resulting from a ship collision.

Staff agrees that there is a high probability of ignition resulting from a ship collision and quantifies this on page 222 of Volume II of the FEIS.

Page 221, Last Paragraph - The use of ship casualty rates for seven major U.S. ports as a starting point for the tanker casualty analysis at Point Conception is indeed conservative. Using this number would have estimated eight (8) casualties to date in LNG shipping. [(1.2×10^{-3}) (3400) (2) 8] We know of only one, at Canvey Island, England, which was very minor and most likely would not have been reported under the U.S. Coast Guard system. It was not a casualty resulting in a leak or spill.

No response required.

Page 222, Third Paragraph - The pool fire radiation level estimated is too large because it was calculated with L/R = 6. For large fires, such as the pool fire anticipated, L/R = 2 is more realistic. This reduction in L/R will result in a decreased hazard distance.	Using the Thomas correlation, this is true; but for conservatism the equations by Raj and Kaleiker in AGA IS-3-1 were used.
Page 222, Lines 5 and 6 - See comment for Page 186, Vol. I, Lines 26 & 27.	See staff's response to comment for page 186, Volume I, lines 26 and 27.
Page 223 - See Comments, Volume I, Page 185, Item 3.	Comment noted.
Page 230, First Paragraph - In the final design, temperature rise sensors may not be used. They would be replaced by ultraviolet detectors.	Comment reflected in Section D of Volume II of the FEIS.
Page 230, Second Paragraph - The dock area will have a separate water pumping system to provide fire exposure protection.	Ibid.
Page 230, Third Paragraph, Third Sentence - "The foam would decrease the downwind vapor dispersion from an LNG spill,.." The foam will enhance the downwind vapor dispersion and thus decrease the vapor dispersion distance.	Ibid.
Page 230, Third Paragraph - Dry chemical systems on tank vents are not related to LNG spills. They are for vent fires only. Two or more sensors must be activated before automatic fire protection systems discharge.	Ibid.
Page 231, Second Paragraph - The plant will be designed to have a self-sufficient fire protection system.	Comment noted.
Page 238, Line 29 - The water depth of 60 feet as stated is incorrect. The correct figure is 50 feet.	A later filing states 52-56 feet.

Page 240, Second Paragraph - The operating conditions under which ships will not berth are winds in excess of 25 knots and waves with a significant wave height of 6 feet or greater. These criteria do not apply to staying at the dock.

The paragraph only states that unloading would stop.

Page 240, Line 33 - The word booster should be changed to service.

Comment reflected in Section D of Volume II of the FEIS.

Page 241, Lines 24 through 27 - See comment for Page 14, Line 17.

Ibid.

Page 247, Lines 1-5 - See comments for Vol. II, Page 251, Lines 15-24 concerning further industrialization in the general project area.

The possibility of future industrial development is considered to be a long-term impact.

Page 247, Lines 6 and 7 - The LNG vessel traffic will not increase the vessel traffic in the Point Conception area by any appreciable amount.

Comment reflected in Section E of Volume II of the FEIS.

Page 247, Line 11 - Reference is made to a breakwater at Point Conception. A breakwater will not be required or installed. This comment also applies to the comment on a breakwater in Line 14.

Ibid.

Page 248, Lines 1-2 - In discussing potential impacts of the proposed project on cultural resources, reference is made to possible destruction of standing structures. No standing structures of archaeological or historical significance have been identified to date on the Point Conception site or along the gas transmission pipeline, electric transmission line, and access road routes.

The standing structures are a barn and the remains of a farmhouse in Ytias Creek, and an altered adobe structure in Tepusquet Canyon, all identified in the CPUC study. However, since these can be easily avoided, reference to these structures has been deleted in the FEIS.

Page 251, Lines 15-24 - It is suggested that the presence of the LNG facility and access road could attract further industrial development, with resultant permanent alteration of land use patterns in the general project area. The fact is that additional industrial development would be subject to Santa Barbara County planning and zoning controls. This would provide a means for controlling industrial growth within the general project area, and assuring that any permitted development would be consistent with long-term objectives and goals of Santa Barbara County.

Comment reflected in Section C-9 of Volume II of the FEIS.

Page 253, Lines 22-25 - See above comments.

Ibid.

Pages 260 and 261 - b) Alternate B (This section describes the proposed alternate route B from Tepusquet Canyon to Painted Rock Ranch). The description provided and the listed advantages compared to the listed disadvantages do not support the recommendation by staff that this alternative is superior to Applicant's proposed route for the following reasons.

1. Third paragraph, Staff completely ignores the impact that the increased pipeline length would have on the length of "loop" pipeline required to transport the maximum design volumes. Instead of 45 miles of 34" loop pipeline as proposed and exhibited by the Applicant, the total length of loop required if Alternate B were adopted would be 52.0 miles. This means that the beginning of the 34" pipeline loop would have to start where Alternate B leaves the Cuyama Valley and curves northeast up and along the backs of a series of ridges between Red Rock and Carrizo Canyons and across the environmentally sensitive Caliente Range. By contrast, the start of the Applicant's proposed loop would start at MP 67.4, west of Painted Rock Ranch, on the Carrizo Plain and go northeast from there.

There are other solutions than building an additional 7 miles of pipeline loop as noted in the FEIS. It would indeed be desirable for all pipeline looping to be constructed on the Carrizo Plain, avoiding the Caliente Range.

2. Fifth paragraph, The disadvantages as listed are considerably understated. Each of the 12 river crossings would require excavation to depths below calculated scour, and the installation of heavy, concrete-coated pipe. Also, Highway 166 would most likely be crossed by the pipeline as often as the river. Boring these crossings could be extremely difficult--or virtually impossible if heavy rock was encountered on the river bottom terrain. In addition, through traffic on Highway 166 would be virtually stopped during working hours with the heavy pipeline equipment working in this curving, narrow, restricted passageway.

The Staff's Alternate B route traverses approximately 21 miles through the Cuyama River Valley and Tepusquet Canyons whereas the Applicant's route between MP 38.5 and MP 65.5 only makes lateral crossings at Pine Canyon and the Cuyama River. Staff's discounting of problems involving archaeological sites by following highway cuts and fills does not face up to the fact that much of the Cuyama River route is narrow, and extremely difficult for a pipeline route to be selected with the constraints proposed.

Applicant does not concur with Staff's recommendation that Alternate B has less environmental impact than the Applicant's preferred route between MP 38.5 and MP 65.5. Alternate B is 20% longer for this portion of the pipeline, and the potential impact on archaeological sites could be considerable. In summary, Alternate B adds 5.0 miles of single pipeline and 7.0 miles of loop pipeline, with 21 miles of pipeline constructed in an archaeological sensitive area with many complexities. In the opinion of the Applicant, the disadvantages of Alternate B far outweight any advantages stated by the Staff when compared to the Applicant's proposed route.

Staff believes that the pros and cons of Alternative B have been accurately stated. The estimated number of river crossings is predicated on paralleling the highway, not crossing it more than once or twice. If the applicants want to parallel the river, then many highway crossings, but few river crossings would be required. The new route of Highway 166 is relatively straight and broad; and much of the old highway (which has been abandoned) would probably be made serviceable as a detour route. In any event, nowhere is the Cuyama route as narrow and restricted as the ridgetops along the applicant's route. With regard to archaeological impacts, Western has since provided staff with maps of Alternative B marking the location of known cultural properties. Only one recorded site is in this section of the valley, well away from the alternative route. All factors considered, Alternative B remains the superior route.

Page 269, Criterion 2 - The minimum water depth should be 50 feet, not 40 feet.	Staff disagrees.
Page 269, Criterion 3d - It should be noted that the breakwater illustrated in Figure 39 on Page 285 does not satisfy this criterion.	Ibid.
Page 271, Criterion 7d - It should be noted that the rocky bottom in the Rattlesnake area does not meet this condition.	Ibid.
Page 271, Criterion 7g - It should be noted that Rattlesnake Canyon site does not meet this criterion.	Ibid.
Page 271, Criterion 7i - It should be noted that Rattlesnake Canyon again does not meet this criterion.	Ibid.
Page 272, Criterion 9a - Once more the Rattlesnake site does not meet this criterion.	Ibid.
Page 273, Criterion 11a - This is another criterion that Rattlesnake Canyon site does not meet.	Ibid.
Pages 269 - 274 - Table 48, Site Identification Criteria. The Rattlesnake Canyon site violates 9 of 11 Site Identification Criteria set forth in Table 48. On that basis, the Rattlesnake Canyon site should not be considered unacceptable or retained for further consideration.	See last response.

Site Identification Criteria	Facts Concerning Rattlesnake Canyon Site	
1. Suitable oceanographic conditions.	1. The U. S. Coast Guard has determined that this site is undesirable and the poorest of the 5 sites considered by the California Coastal Commission. Even with a 362 million dollar breakwater, fog and poor visibility would severely restrict operations and jeopardize supply reliability. The rocky coast line and offshore area present dangerous and undesirable maritime conditions. In the event of tug failure due to line breakage etc., the prevailing onshore winds would quickly put a vessel on the rocks.	Poorest - yes. Unacceptable - no. It would also be interesting to find out where Point Conception ranks among the five sites. Relatively speaking this is true, but only slightly more severe than Point Conception.
2. Suitable bathymetric conditions.	2. Not including the breakwater, 1.6 million cubic yards of submerged rocks and shoals would have to be blasted and transported to an approved location in order to provide an unobstructed entry channel 50 ft. deep. A massive breakwater must be constructed to provide protection from the prevailing winds and waves. This breakwater would have to be designed for a wave crest elevation of + 35 feet. After construction continous maintenance dredging may be required.	This comment is only true if an inappropriate berth location were selected. Depths over 60 feet occur 4,000 to 5,000 feet offshore. Only a nearshore breakwater would require significant maintenance dredging.

Site Identification Criteria	Facts Concerning Rattlesnake Canyon Site	
3. Suitable navigational conditions.	3. During the summer months reduced visibility will be a major factor causing significant delays to ships approaching or leaving the berth.	This is true at any site.
5. Disruption to other land uses.	5. (b) Avila Beach and Port San Luis are respectively 3 miles and 1.6 miles south from the site. 2,000-6,000 people a day use Avila Beach. From 30-365 recreational boaters use Port San Luis. Boaters and fishermen will have a direct view of the trestle, breakwater and LNG ship traffic.	Comment noted.
	Avila Beach Road, only two lanes wide, is the only access road to Avila Beach and Port San Luis. Construction traffic would severely affect access to the valuable recreational area.	Comment noted.
	Approximately 140 acres of prime agricultural land will be lost to industrial use.	Comment noted.
7. Factors affecting safety.	7. (g) 1.6 million cubic yards of submerged rocks will have to be removed and disposed of at an approved location to make a clear 50 ft. channel. This work represents excessive expense.	See staff's previous response on previous page.
	(i) Sea conditions at Rattlesnake are so unacceptable that a $362 million breakwater will have to be built to protect tug operations from waves. No protection can be effective against the prevailing on-shore winds which in case of tug failure will tend to blow a ship on to the nearby rocks.	Ibid.

Site Identification Criteria	Facts Concerning Rattlesnake Canyon Site	
8. Consequences of accidents.	8. (a) Recreational and residential population within 4 miles of the site is as much as 10,000 people during the course of a day. On an average day, only 50 to 150 people come within 4 miles of the Point Conception site.	A detailed risk analysis was presented as Attachment A of Volume II of the DEIS.
	Also a large residential development project near Avila Beach, within 4 miles of the site, has existing, valid permits for 1,000 dwelling units (approximately 2,000 persons).	Ibid.
9. Factors affecting system.	9. (a), (b) and (c) See previous comments to criteria numbers 1, 2, 3 and 7.	See staff previous responses.
10. Environmental impact A. Physical impact.	10. (b) See previous comments to criterion No. 2.	Ibid.
	(c) Approximately 140 acres of prime agricultural land will be lost.	Comment noted.
	(d) At least four Chumash Archaeological Sites listed on the National Register of Historic Places and a possible prehistoric period ceremonial shrine are located on the site and would be adversely impacted, if not destroyed.	Previously discussed on page 297 of Volume II of the DEIS.
B. Biological impact.	(a), (b), (c). Rattlesnake Canyon is clearly the least preferable site since it is in some ways the most sensitive environment, and a number of important impacts from the project would be difficult or impossible to mitigate.	It would be possible and desirable to design a terminal at Rattlesnake Canyon which would have little effect on Pecho drainage. Staff agrees that any adverse effects on this stream would be significant and should be avoided. A concrete culvert is no more necessary here than it is at Cojo Creek. Further, the site is presently agricultural and less sensitive than the Point Conception area.
	A good riparian community of plants and animals along Pecho Creek, a running stream, will be destroyed since a concrete culvert would need to be substituted for the natural streambed.	

Site Identification Criteria	Facts Concerning Rattlesnake Canyon Site
11. Ecomonic cost	11. (a) $362 million will have to be spent to build a breakwater at Rattlesnake Canyon. The entire installation would cost $766,000,000 more than at Point Conception and would cause a 36 months delay.

References: Arthur D. Little, Inc., 1978. Alternative Site Analysis, Las Varas/Rattlesnake Canyons Sites Supplement, Technical Report No. 23, In Support of the Point Conception LNG Facility DEIR April 1978.

Letter to LNG Task Force, California Coastal Commission, from Department of Transportation, United States Coast Guard, April 7, 1978; Reference: LNG Terminal Siting and Related Conditions.

This dollar figure is at issue in this case.

Page 281, Table 50 - Rattlesnake Canyon - It should be noted that in the berth availability and reliability study conducted by the California Public Utilities Commission Staff, it was shown that the Rattlesnake Canyon site, even with a breakwater, would not reliably maintain gas throughput of 1.3 Bcfd on a 20 year basis.

While the staff would agree that berth downtime is high, the system would still be acceptably reliable.

Page 285, Figure 39 - The breakwater shown in this figure will not adequately protect a berth to allow the vessel to berth bow out and for tugs to be made-up prior to the vessel reaching the immediate vicinity of the berth. This breakwater design is by no means acceptable for safe marine operations. A more extensive and costly breakwater and considerable blasting of rock for a clear ship channel would b necessary for proper marine operations to be even barely acceptable.

Comment noted.

Page 289, Line 40 - Marine surveys taken of the Rattlesnake Canyon area have indicated numerous submerged pinnacles. Full bottom surveys and massive blasting and removal of approximately 1.6 million cubic yards of rock would be required to make this site acceptable with safe bottom conditions.

A berthing area further out than the applicant's design would remove much of this concern.

Page 289, Lines 40, 41 and 42 - The Applicant has estimated that a massive breakwater with costs in the range of 350 to 400 million dollars would be required to make marine operations barelv acceptable at Rattlesnake Canyon. These same comments apply to the two paragraphs on Page 290 concerning oceanography.

There have been much less dollar estimates than the applicant's.

Pages 289-300 - This portion of the DEIS discusses Rattlesnake Canyon as an alternative to the proposed Point Conception site. The following paragraphs provide additional information that should be considered in any evaluation and comparison of the two sites.

An estimated 1,600,000 cubic yards of underwater rock must be removed from the area offshore of Rattlesnake Canyon to provide a clear approach for the LNG ship to the unloading dock. Marine blasting would be necessary 7 days a week for 67 weeks. The excavated rock would be barged to an EPA-approved dumping site. No such removal of underwater rock for a clear ship approach is required at Point Conception.

See previous staff response to this comment.

Six very rare or rare and endangered plant species may potentially occur on the Rattlesnake Canyon site. These include black-flowered figwort, sanicles, Jones layia, Chorro Creek box thistle, Hoover's bentgrass, and Pecho manzanita.

Construction and operation of LNG facilities at Rattlesnake Canyon may adversely affect critical habitat for the endangered American peregrine falcon (Thelander, 1978), primarily along the coastal bluff. Although peregrine falcons are sighted rarely at the Point Conception site, the site and vicinity are not considered critical habitat for peregrine falcons. Elimination of coastal bluff habitat and increased human disturbance at the Rattlesnake Canyon site may adversely affect a variety of marine and land birds that may potentially use this habitat for breeding, feeding, and resting. Although coastal bluff habitat is present at the Point Conception site, the variety of birds using the bluffs is not expected to be as great as at the Rattlesnake Canyon site. The bluffs at the Point Conception site are considered to be less suitable for many marine birds.

The threatened sea otter, a fully protected marine mammal in California, is known to live and breed in the ocean waters offshore of the Rattlesnake Canyon site. A major sea otter population study has been conducted at the site on a continuing weekly basis since 1974 providing research material for the U. S. Nuclear Regulation Commission and the California Department of Fish and Game. The area from Point Buchon to Point San Luis, in which the Rattlesnake Canyon site lies, is used by the protected harbor seal for breeding and haul out. No protected marine mammals are known to reside in the ocean waters offshore at the Point Conception site.

The Rattlesnake Canyon site is cultivated and as such is unlikely to support endangered species where the onsite facilities would be located. An equally lengthy list of endangered plants occur at Point Conception, where one rare plant (black-flowered figwort) is known to occur on the site itself.

The nearest known nesting peregrines to Rattlesnake Canyon are at Morro Rock, about 12 miles north of the site. Both Rattlesnake Canyon and Point Conception have significant bird populations which may be affected by terminal construction. Neither site is significantly superior with respect to impact on birds.

Previously discussed on page 294 of Volume II of the DEIS.

Important archaeological resources are known to occur at both the Rattlesnake Canyon and Point Conception sites. Applicant has proposed revisions to the facility layout for the Point Conception site that will mitigage adverse impacts on major archaeologicl resources. The CPUC's consultant Arthur D. Little, Inc. (1978) has indicated that it is not possible to design a facility layout at the Rattlesnake Canyon site that will avoid damage to major archaeological sites.

Staff concurs. The contention that no major impact would occur at Point Conception cannot be accepted until it is demonstrated that cemetaries expected to be associated with the aboriginal villages do not lie within the area of proposed development.

Surface seawater temperatures of 45°F or less have been measured in the vicinity of Rattlesnake Canyon. Subsurface temperatures, which would be characteristic of a seawater exchange system's intake water temperature, would normally be lower. The coldest surface seawater temperature measured offshore of Avila Beach (about 4 miles east of Rattlesnake Canyon) from 1960 through 1976 was 42°F (National Ocean Survey, 1977). These temperatures appear to be sufficiently colder than at Point Conception such that the current design temperature depression (12°F) across the seawater vaporizers would have to be reduced. This would require a significantly increased volume of seawater to be passed over the vaporizers, and/or increased expenditure of energy to pump the seawater.

Comment noted.

Because the volume of water used relates directly to the amount of plankton and fish entrained, the increased water requirement at Rattlesnake Canyon would lead to greater impacts on the marine biota than at Point Conception.

Comment noted.

This source of impact would represent an incremental increase in impacts on the marine biota due to Diablo Canyon Nuclear Generating Station, commercial and sport fishing, and sea otters.

References: Arthur D. Little, Inc., 1978. Alternative Site Analysis, La Varas/Rattlesnake Canyons Sites Supplement, Technical Report Number 23, In Support of the Point Conception LNG Facility DEIR, April 1978.

National Ocean Survey, 1977. Unpublished Data, National Oceanic and Atmospheric Administration.

Thelander, C. G., 1978. Envirodyne, San Jose, California, personal communication.

Comment noted.

Page 294, Line 1 to Page 295, Line 12 - The DEIS does not describe the marine invertebrates and fishes of the Rattlesnake Canyon site in its section on "Wildlife". The fishes of the site area are diverse and abundant. The California Department of Fish and Game report on Fish and Wildlife Resources of Five Proposed Onshore Liquefied Natural Gas Terminal Sites (Prepared for California State Coastal Commission, March 31, 1978) summarizes the catch of nearshore commercial species from 1971 through 1975 (Table 10, p. 145). These data, when compared in terms of catch per shoreline mile (to reduce differences due to fish block size), indicate that 128,216 pounds per mile are taken annually off Rattlesnake Canyon compared to Point Conception (16,233 pounds). Thus, the potential impact of the seawater system could be greater at Rattlesnake Canyon than at Point Conception.

Previously identified in Table 51 of DEIS.

Page 294, Lines 14-16 - The Rattlesnake Canyon site has significant numbers of sea otters immediately offshore of the site. As many as 100 or more sea otters have been observed by biologists studying the otters.

Comment reflected in Section H-2 of the FEIS.

Page 295, Lines 14-45 - That Rattlesnake Canyon is superior to Point Conception in its land use impact is not supported by the facts. A. D. Little, Technical Report No. 23 prepared for the California Public Utilities Commission states: "The specific site area in winter 1977-1978 is farmed for snow peas and barley. The soil along the terrace in this area is very fertile, prime agricultural land, in part because of extensive native American middens which have added organic materials and carbonate from shell fragments." (A.D. Little, Technical Report Number 23 (Supplement), April, 1978 prepared for the California Public Utilities Commission, Page 13).

Staff agrees that the project would involve prime agricultural land at Rattlesnake Canyon. However, as noted in the A. D. Little report, this land is reserved for agricultural use only by default, due to the presence of the nuclear facility (p. 13). By contrast, Point Conception is specifically zoned for agricultural and large-lot residential use, and the presence of a new industrial facility in this area would be contrary to the existing character of the surrounding land, (oil storage tank notwithstanding). It is the lack of planned land use conflicts at Rattlesnake Canyon which make it superior to Point Conception.

The LNG terminal would remove approximately 140 acres of prime agricultural land from use, irretrievably because of the soil loss during site preparation.

The Point Conception site is presently used for cattle grazing. An oil storage tank is located nearby. A railroad crosses the site above the coastal bluff.

Page 296, Lines 17-21 - The very opposite is true. A terminal at Rattlesnake Canyon would have substantial impact on recreational activities while the terminal at Point Conception would have minimal impact on recreational users.

Extensive boating and fishing offshore would be affected by a breakwater construction and marine blasting at Rattlesnake Canyon. Recreational population within four miles is considerably larger than at Point Conception. Visitors to Avila State Park, three miles south of the site, had a reported 1977 attendance of 982,401 persons. Recreational users and fishermen at Port San Luis, is estimated to range from 50-425 people per day. The nonpermanent recreational population is expected to increase significantly in the future in the Rattlesnake Canyon area. (A. D. Little, Technical Report Number 23 [Supplement], April, 1978, prepared for the California Public Utilities Commission, page 15, lines 28 - 36).

The trestle, breakwater, and LNG tanker operations would be visible from ten or more miles away at Pismo Beach, and the onshore terminal would also be highly visible from ships and small craft that venture out of San Luis Obispo Bay from the fishing recreational harbor at Port San Luis. Approximately 10,000 sport fishermen per year will be able to see the trestle and breakwater at Rattlesnake, compared with 264 sport fishermen able to see the trestle at Point Conception. (A. D. Little, Technical Report Number 23 [Supplement], April, 1978, prepared for the California Public Utilities Commision, page 19, line 21).

Page 296, Lines 33-38 - A. D. Little Technical Report Number 23 (Supplement), April 1978, prepared for the California Public Utilities Commission, Page 19 states: "The National Park Service's Inventory of Significant Geological, Fossil, and Marine Sites and Features concludes that the area from Point Buchon South to Lion Rock near where the nuclear facility is located ' ... is definitely of national significance and is eligible for entry into Registry of National Landmarks.'"

Staff disagrees. Breakwater construction and marine blasting would have a short-term effect on offshore boating and fishing, and some long-term impacts due to the presence of an industrial facility and tanker traffic. Views of a trestle and breakwater and possibly even LNG tanker operations from a distance of 10 miles away are not incompatible with typical marine vistas. The fact that these recreational uses would be screened from the industrial facility itself is the major advantage of Rattlesnake Canyon. Finally, the estimate of 10,000 fishermen who could see the terminal is excessive, and not reflected in the A. D. Little report. With proper positioning and screening, views of the terminal from nearby boaters would be limited.

"Further, 'this site includes some of the finest seascapes found along the southern California coast. Beautiful marine terraces cover much of the coastal area .. .' The area south of Lion Rock includes the LNG site and is part of the same basic physical form and biological setting of the area referenced above."

"Construction of the LNG terminal here [at Rattlesnake] would add a major industrial element to a natural setting noted for its beauty.

The quote here and in the A. D. Little report is taken out of context. The area of "scenic beauty" was specifically limited to the coastline north of the nuclear facility. The area from Lion Rock south to Avila Beach has not been designated by any governmental body for its scenic characteristics. The Power Plant Siting Study of the California Coastal Commission did not exclude power plants from this area.

Page 297, Lines 20-30 - Construction of a terminal facility in the area of Rattlesnake Canyon would result in the destruction of a number of significant native American settlements. It is not possible for a facility to be built at this location without causing major adverse impacts. The associated pipeline has potential for significant impact to cultural resources. The contrary is true at Point Conception. The significant archaeological sites there can and will be avoided.

Staff concurs however staff cannot accept the contention that significant sites at Point Conception can be avoided until it is demonstrated that no aboriginal cemetaries expected to be associated with the villages would be disturbed by construction.

Page 300, Lines 28-36 - The DEIS does not mention Port San Luis and the population there. Concentrations of temporary population in vicinity: Port San Luis, 1.6 miles south; base for 10-60 commercial fishermen daily, 30-365 daily non-beach recreation users. (A. D. Little, Technical Report Number 23, (Supplement), April, 1978, prepared for the California Public Utilities Commission, Page 86) Also, there is an oil storage facility approximately 1.5 miles east of this site. During the day, approximately 2,000 to 6,000 people use Avila Beach. Terminal construction traffic would adversely impact the already overburdened Avila Beach Road, the only access road to Avila Beach, Port San Luis and the Rattlesnake Canyon site.

The risk estimates in Attachment A are based on receptors located nearest to the tanker route and therefore exposed to the greatest risk.

Also, the Port San Luis Harbor District has submitted to the county and the Coastal Commission a proposal for extensive harbor improvements (including 1,500 berths) and associated commercial and recreational development.

Page 310, fourth line from bottom - LNG ships will burn LNG boil-off and low sulfur (0.5 wt. %) fuel oil while in the port area.

Comment reflected in Section H-2d of Volume II of the FEIS.

Page 311 - LNG Tanker Emission - The figures shown do not take into consideration the Applicants intent to use 0.5% sulfur fuel and LNG boil-off during approach to the terminal and while berthed.

Ibid.

Page 323, Table LNG Tanker Emission - Revised emissions for LNG tankers will reduce the figures stated in this table.

Ibid.

Page 325, e) Pipeline Routes from Alternative Sites, i. Rattlesnake Canyon to Kettlemen Route.

Comment: The route and required facilities described ignore the fact that compression facilities are required at Gosford for any pipeline from Rattlesnake Canyon that connects with the PG&E 34" pipelines north of the Shafter pressure limiting station and, in addition, 8.6 miles of 34" pipeline must be installed from Gosford west to connect with the PLS Line No. 225. Applicant has provided the California Public Utilities Commission Staff with a preferred route from Rattlesnake Canyon to Gosford, and an alternate route from Rattlesnake Canyon to Shafter. Both of these routes are considered by the Applicant to be superior to the Rattlesnake Canyon to Kettleman Route.

The route from Rattlesnake Canyon to Gosford is 20 miles longer than the Kettleman Route, crosses rougher terrain, more national forest, and does not follow existing pipeline right-of-way. The environmental impact of the additional facilities at Gosford necessary for use of a Kettleman tie-in would be relatively minor. Staff remains convinced that the Kettleman Route is environmentally superior.

Page 344, Lines 36-39 - The proposed revisions to the plant layout at Point Conception have been designed to avoid impact to major archaeological resources at the site. The CPUC's consultant Arthur D. Little, Inc. has indicated that it would not be possible to design a plant layout for the Rattlesnake Canyon site that would avoid impact to major archaeological resources (see comments for Pages 289-300).

See previous staff response to comment for page 297.

Page 345 first paragraph Section X - WLNG has adopted the proposed mitigation measure of the use of LNG boil-off in the ships' boilers while in the port area. The U. S. Coast Guard has ruled that utilization of the boil-off is acceptable.

Comment reflected in Section H-2d of Volume II of the FEIS.

Page 347, Lines 16 and 17 - Massive blasting required to make bottom conditions suitable has apparently not been considered nor has the impact on archaeological sites.

See staff's previous responses to this comment.

Page 347, Lines 23-25 - Applicant has agreed to several plans which will substantially mitigate environmental conditions at the site.

1. The existing access road will be utilized with slight modifications, thus avoiding all known archaeological sites.

The applicant's March 1978 assessments of the proposed Improved Hollister Ranch road access route states that it would potentially impact seven of nine known archaeological sites near this route.

2. An existing electrical transmission line will be upgraded by installing larger wooden poles and wires to carry 60 KV thus eliminating the environmental impact of a new electrical transmission line corridor.

Comment noted.

3. Except for standby diesel power, plant power requirements will be supplied from off-site generating source.	Comment noted.
4. The sea water exchange system will be designed and operated to minimize adverse impact.	Comment noted.
5. Ships in approaching the terminal and at the terminal will operate on L.N.G. boil off except for Coast Guard required oil fired pilot lights, utilizing very low (0.5% sulfur oil.	Comment noted.
6. By shifting the site 1500' East, all known archaeological sites will be preserved and protected.	Staff cannot accept this contention until it is demonstrated that cemetaries expected to be associated with the Point Conception villages do not occur within the project area.
7. Access for religious observance will be provided for native American Indians.	Comment noted.
8. At present the local Ranch Owners Association denies public access to the area. Applicant will provide access and recreational facilities for waterborne surfers and boaters. Moorings will also be provided free for visiting boaters.	Comment noted.

Page 360 Lines 33 - 39 - In evaluation of total project cost for the Alternate Rattlesnake Canyon Site, the construction cost of the breakwater was based on an alignment that will provide a protected area with sufficient length for the LNG vessel to slow down, make up tugs and be turned around and berthed with the bow toward the harbor entrance. This 9,300 foot long conceptual breakwater was estimated to cost $362 million (mid 1977 dollars). The California Coastal Commission's consultant, J. J. McMullen, original breakwater referred to in the DEIS at a cost of $95 million has subsequently been revised. The revised arrangement has been estimated at $173 million in their final report.

Comment noted.

Applicant commissioned an independent review of the J. J. McMullen breakwater concept and cost estimate which is attached. It was concluded that when the J. J. McMullen breakwater concept is corrected for under estimation of the volume of quarystone for stability of armament protection for the design wave, the estimated cost would increase from $173 million to $367 million.

Comment noted.

In their review of the J.J. McMullen breakwater concept, the California Public Utilities Commision LNG Task Force concluded on page IV-14 in their Alternate Siting Report, April, 1978

> "By applying the same unit costs developed in staff's analysis of the applicant's breakwater plan, the alternate plan is estimated to save $8 million in breakwater construction and $44 million in blasting while increasing the cost of the trestle $39, million and the LNG unloading system (cryogenic line, etc.) $21 million. This results in a net increase in costs of $8 million above that of WLNG's breakwater plan.

Comment noted.

In summary, this alternate design results in a minor cost increase, a substantial decrease in protected harbor area and may eliminate the necessity of underwater demolition."

Comment noted.

Preliminary constructed estimates cost have been prepared which show the Rattlesnake Canyon alternative site would cost about $426 million more in construction costs than would the Point Conception site. This results in an added investment requirement by Applicant of $800 million.

Comment noted.

PAGE 363, CONCLUSIONS AND RECOMMENDATIONS (14) - There are no backup signal lines at the LNG terminal since all control systems and the mechanical equipment affected will "fail" to their safe positions due to failures of either instrument air, electric power, or damage to pneumatic tubing and electrical wiring.

Recommendation has been deleted.

Page 364, Recommendation (19) -

a) See comment to Recommendation (20) below.

b) An evaluation of the state-of-the-art mechanisms to minimize fish impingement by placing screens at the point of intake was made.

There are no screened intakes operating in an ocean regime (storm waves) anywhere in the world. The fact that such a system does not currently exist provides the rationale for not using it at Point Conception. The design criteria for this project properly requires the exclusive use of systems which have proven operational reliability. Advancing the state-of-the-art dramatically decreases the operational reliability, a result which cannot be permitted in this portion or any other portion of the facility design.

Comment reflected in Section C-7b and revised recommendations in the FEIS.

Page 366, Recommendation (34) - Applicant suggests that this recommendation be restated as follows: "Surplus soil material from cut and fill operations and excess rock debris from trenching and right-of-way preparation will be disposed of in accordance with the terms and conditions of the permitting governmental agency, or, in the case of private property owners, in accord with the terms of the easement agreement."

A conditional requirement to transport surplus soil to mountain tops (without soil) does not appear to serve any useful purpose.

The intent of this recommendation is as follows. In the mountainous areas soils are generally thin, especially on ridgetops. As a result, establishing a plant cover after construction could be quite difficult. In other areas of the pipeline route where soils are deeper, construction and cut and fill operations often create excess soil material. Where these two areas are in close proximity the excess soil material could be transported to the ridgetops and utilized as additional cover to aid in establishing vegetation rather than being disposed of in an area where it would serve no purpose.

Page 366, Recommendation(35) - Applicant suggests that this recommendation be restated as follows: "Where the pipeline right-of-way crosses agricultural fields, the Applicant shall backfill material in accord with the terms of the easement agreement of the private property owner. Where government-leased agricultural land is crossed by the pipeline, backfill will be in accord with the conditions of the permit issued by the permitting governmental agency."

Compacting backfill in 6 inch lifts in agricultural land could result in an undesirable relative compaction condition that would be incompatible with the native adjacent soil. Accepted current pipeline practice is to mound excess soil over the pipeline ditch to compensate for subsidence.

Comment reflected in Sections C-4 and I of Volume II of the FEIS.

Page 369, Potential Recommendation (44) - Attached as requested is an engineering & economic feasibility study, which at this point in the total site design review must be preliminary only. This preliminary study shows that the visual impact of the LNG storage tanks might be reduced at a construction cost of $16,000,000 (mid-1977 dollars) for two LNG storage tanks, and a schedule impact of one additional year of construction time, increasing the phase I construction period from 37 months to 49 months. Applicant's increased investment requirement on this basis would be $60,000,000.

Comment reflected in Section D of Volume II of the FEIS.

Page 369, Potential Recommendation #45 - The recommended combined corridor is not technically feasible for a plant access road, gas pipeline and electric transmission line in rugged terrain of the type that exists inland of the coastal terrace in the vicinity of Point Conception. Requirements for these facilities differ. Roads should have limited grades and curves of sufficient radius to accommodate the expected traffic. Pipelines should be installed along ridges where the grades and curves would not be feasible for a roadway. Electric transmission lines typically will span deep canyons over slopes too steep for roads and undesirable for pipelines. Furthermore, an existing powerline and Hollister Ranch road constitute a usable common corridor.

Comment reflected in Section H-3 of Volume II of the FEIS.

The corridor suggested by the FERC recommendation partially coincides with a 500 foot wide Southern California Edison electrical transmission line easement. Edison acquired this easement from the Hollister Ranch to transmit electrical power from their proposed power plant. In addition to the 500 foot wide easement, there is also a 20 foot wide road easement granted to Edison for the purpose of constructing and maintaining the above-mentioned power line. This secondary easement follows an existing jeep trail, which is very twisting and, at times very steep. It is essentially located within the 500 foot wide easement, but in many locations it meanders in and out as necessitated by the very rugged terrain.

However, Edison presently has a 16 KV line, on a combination of single and double wooden poles, that travels from Gaviota to the site and beyond, approximately following a straight line at a distance of about two or three thousand feet inland from the beach. The same transmission line route can be use to bring the needed electrical power to the site, however, the existing poles would have to be replaced in order to accommodate the 66KV voltage lines. No new right-of-way need be created. Concerning the access road, it is not feasible to construct such a road in FERC combined corridor - Alt. A. Between elevation 1200 and 1700+, there is a ridge with steep slopes, particularly on the north side. Grading a road over this ridge would result in excessive cut and fill (7 million cubic yards plus) and an unacceptably steep grade of 24% for a distance of over 2,000 feet. The remainder of the grades would be 11% for 1,500 feet, 10% for 1,500 feet, 7% for 6,000 feet, 6% for 2,000 feet.

Although the above grades do not appear to be excessive when compared to some grades on the existing Hollister Ranch Road, they indeed have a greater impact on the speed and safety of the traffic. The grades on the FERC corridor would all be consecutive, in the same uphill direction for a distance of four miles without relief of any level or downhill intervening grades. The Hollister Ranch road is a succession of short (500 feet maximum) steep, uphill and downhill grades, having only a limited impact on the speed of traffic.

To overcome the 24% grade, it would be necessary to bore a 1,500 feet tunnel, at approximately elevation 1,100; or make a 400 feet deep cut through the ridge which would result in a width of cut at the top of over 1,600 feet. Volume of this cut alone would be over 6 million cubic yards with no area for disposal. Neither of these last two alternatives appear to merit further consideration. In 1977 dollars, the estimated direct cost of the road and tunnel would be approximately 29 million dollars compared with 5.7 million dollars for the modification of the existing Hollister Ranch road. Construction time for the road and tunnel would be 42 months, having the effect of delaying plant start-up at least 3 years. These additional construction costs combined with a 3 year delay would increase [illegible] more than 100 million dollars.

Page 364, Recommendation (20) - A diffuser outfall is not required for the seawater discharge line since the thermal effect of the proposed single discharge port is insignificant. The 2°F differential isotherm (used as a discharge boundary by the Regional Water Quality Control Board) will not touch the ocean bottom, will not exceed 400 feet in length from the discharge, nor will it exceed 200' feet in width. The maximum surface temperature differential on the surface at 150 feet from the discharge is 3.5°F, at 200 feet it is 2.5°F and at 400 feet it is 1.3°F. The affected zone of temperature depressed water is approximately 400' long by 200' wide at its widest point encompassing a volume of about 1/2 million cubic feet.

Comment accepted - Recommendation deleted.

Natural seawater temperature at this location varys from an extreme range of 23°, to a median (more the 50% of the time) of 9.4°. Daily variations are, median 2.5° and extreme is 6°. There is no apparent reason to extend the discharge into deeper water.

Page 364 Recommendation (22) - Applicant has commented previously on pipeline route Alternative B. Again, in summary, Alternative B adds 5 miles of length to the pipeline route, adds 7 miles of length to the pipeline loop, and traverses 21 more miles of archaeological sensitive areas. Because of these serious disadvantages, Applicant believes that this recommendation should not be made a condition for the pipeline route.

See staff's previous response.

In steeply sloped mountainous area, experience has shown that a pipeline should not be installed in side slopes where earth movement can damage it, but rather should be installed along ridges. Side hill construction involves considerably more cutting to provide a construction bench for pipelaying and future maintenance.

The above analysis indicates that a combined-corridor concept along alternate A is not feasible. The only new right of way that will be opened under Applicant's proposal would be that for the pipeline; existing powerline right-of-way would be used to bring in power; and the existing Hollister road would be used for access with minor modification.

Page 382, Line 18 - Nine LNG tankers will be used between Indonesia and California.

Comment reflected in Attachment A of the FEIS.

Page 389, Table 2 - Fifty percent of the rammings reported here happened at piers and would not be likely to cause an LNG spill from an LNG carrier due to their unique construction. Also, the grounding of the LNG vessel would not be likely to cause a spill of LNG, due to the double hull construction.

Previously discussed on pages 406-411 of Volume II of the DEIS.

Page 393, Table 4 - The 19 casualties listed are all of sufficiently low energy that the probability of any of them damaging an LNG vessel enough to cause a spill is negligible.

Table 4 is only to be used to determine historical accident rate distribution, not probability of a spill.

Page 407, Lines 17 and 21 - 165,000 M^3 tankers will not be employed at Point Conception.

The DEIS doesn't suggest that 165,000 m^3 tankers will be used.

Page 412, Section D, Third Paragraph, Second Sentence - The probability of the vapor cloud dispersing evenly in all directions and causing fatalities of all of the population covered approaches zero.

Staff agrees. The method is used for conservativeness only.

Page 421, Table 10 - There is an error in the exponent on Line 12 of this table and all tables through #15. Each exponent should be increased by 1, i.e.: Line 8 x Line 11 on Table 10 should be $3.96 \times 10^{-4} \times .9 = 3.56 \times 10^{-4}$ not 3.56×10^{-5}.

Thank you.

Page 431 - The opening sentence states that, "In the event of an LNG spill on water, liquid will spread by diffusion to a maximum pool size and evaporate as it spreads." This is not the case. The spread of the liquid by diffusion is very minimal. The primary spread of the liquid is caused by the gravitational forces.

Comment reflected in Attachment A of the FEIS.

Western LNG Terminal Associates

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June 30, 1978

Mr. Kenneth F. Plumb
Secretary
Federal Energy Regulatory Commission
825 North Capitol Street, N. E.
Washington, D. C. 20426

Re: Pacific Alaska LNG Associates, et al.
Docket No. CP75-140, et al.

Dear Mr. Plumb:

As you know, permits for dredge disposal in California are required from the Corp of Engineers. The following information, which will be sent to the Army Corp of Engineers as an amendment to our permit application currently pending before them, has just been completed. It is sent to you for your information and consists of comments concerning alternative locations for disposal of dredged materials associated with construction of the offshore seawater pipelines at the proposed Point Conception LNG facilities site. The three locations include nearshore waters off Drake, deep ocean disposal, and onshore disposal.

Very truly yours,

Jane C. L. Goichman

JANE C. L. GOICHMAN
Attorney for
WESTERN LNG TERMINAL ASSOCIATES

JCLG/ej
Enclosure

cc: Honorable Samuel Z. Gordon,
Presiding Administrative Law Judge
Brian Heisler,
Commission Staff Counsel
All Parties

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Comments reflected in Sections A and C-5b of Volume II of the FEIS.

Vol. II, Pages 15, 170, and 178 - The DEIS discusses potential impacts associated with construction of the proposed seawater pipelines. The applicant has developed more detailed information concerning pipeline location and construction. These plans and related environmental considerations are discussed below.

Western LNG will apply for a Dredged Material permit from the U.S. Army Corps of Engineers to dispose of material excavated from seawater system pipeline trenches. The location, construction, and operation of the seawater system have been described by Fluor Engineers and Constructors, Inc. (May, 1978). The seawater system pipelines will be constructed through predominantly rocky bottom with intermittent areas of medium to coarse sediment. Trenching will require blasting to fracture the rock for removal by clamshell dredge. It is anticipated that the rock removed will average 0.5- to 1.0-foot in diameter. This material should be unpolluted due to the remote location. An estimated 146,000 cubic yards (180,000 cubic yards bulk volume) of material will be removed (Hawkins, 1978).

The Environmental Protection Agency Ocean Dumping Regulations and Criteria (Federal Register, Vol. 42, No. 7, Section 228.4e) indicate that options are available for ocean dumping of dredged material subject to specific conditions of Dredged Material permits issued by the U.S. Army Corps of Engineers. Basically, the first option is to dispose of dredged materials at an approved designated dredged material site. The second option is to select an alternative ocean dumping site in the case where a recommended existing disposal site is not feasible to utilize. A third option is disposal of dredged material at an approved landfill site (Section 221.1j). The nearest approved ocean dumping site to Point Conception is located off Port Hueneme, California (Section 228.12a, p. 71) within a 1,000-yard radius of a point location at 34°05'00"N and 119°14'00"W. This site is approximately 64 nautical miles from the Point Conception site. Because of the considerable distance of this dumping location from Point Conception, the applicant is considering an alternative nearby ocean dumping site(s) and has also examined a landfill disposal alternative.

OCEAN DUMPING SITES

The applicant is considering applying for one of two ocean disposal sites. Because the majority of dredged material will be rock and the remainder medium to coarse sediment of unpolluted character, an environmentally acceptable site could be located in nearshore waters (minimum depth 60

feet). The applicant discussed the feasibility of proposed alternative ocean dumping sites with representatives of the U.S. Fish & Wildlife Service, National Marine Fisheries Service, California Department of Fish and Game, and the U.S. Army Corps of Engineers (Los Angeles District) at a meeting held on June 16, 1978. It was generally agreed that the dredged materials could possibly be disposed of in a manner and at a location such that the material could provide a beneficial use as an artificial reef. Alternatively, the dredged materials could possibly be disposed of at a site in deeper water offshore of the site.

Nearshore Site - Drake

The applicant suggests that an ocean dumping site could be established in 60 to 90 feet of water directly offshore of Drake about 5 miles east of the Point Conception site (Latitude 34°27.2', Longitude 120°18.3') (Figure 1). This area is characterized by predominantly rocky bottom to a depth of 30 to 40 feet, which occurs relatively close to shore (approximately 1,800 feet). The area supports a narrow kelp bed in depths of 15 to 40 feet; the kelp bed is greatly restricted in breadth compared to the Point Conception site to the west and areas to the east. The bottom at depths in excess of 40 feet is comprised of fine sand and silty fine sand that appears to have inundated a submarine canyon. In water depths of 60 to 90 feet, sediment thickness varies from approximately 10 to 40 feet. The applicant proposes that dredged material comprised of 0.5- to 1.0-foot diameter rock deposited appropriately in 60 to 90 feet of water should provide suitable substrate for the growth of kelp and most species generally associated with kelp. Kelp normally grows attached to rock rubble at the Point Conception site in 60- to 80-foot depths, but does not form a canopy at these depths. Dredged material would be loaded on bottom-dump barges to be towed to the disposal site. The material would be deposited to form a reef on the bottom with significant relief.

Discussion at the June 16 meeting focused primarily on whether this site and the character of the dredged materials would qualify as an officially designated artificial reef. Criteria for the installation of artificial reefs are given in the U.S. Army Corps of Engineers General Permit GP003 for Artificial Reefs (November 10, 1977). Item g(2) of the permit indicates that the material to be used shall be limited to large quarry rock among other materials. As described above, the dredged material will probably be of smaller diameter, and as a consequence, will not provide large crevices or interstitial spaces among the rocks.

Item M of the permit indicates that "No new reefs shall be placed within (1) one nautical mile of any existing natural reef habitat, rocky shore habitat, extensive natural outcropping, shipping lanes, channels, anchorages or other areas of heavy traffic, nor further than 10 nautical miles from the mouth of any developed harbor or marina." Dredged materials would have to be deposited in about 80 feet of water offshore of Drake to meet this condition. It appears that the other conditions of the General Permit could be met at this site.

If the Drake site is approved for disposal of rocky dredged materials, the use of the materials to form an artificial reef should result in a long-term beneficial impact. Adverse impacts should be limited to the covering of benthic organisms presently associated with sedimentary bottom. The location of the area being considered could conflict with designated California halibut trawl grounds. In this area, the State of California Fish and Game Code (1977) provides for halibut trawling from a depth of 150 feet to within 1 nautical mile of shore (about 80 feet deep off Drake). The extent of use of this area for halibut trawling is presently unknown. The site should not interfere with other commercial or recreational fisheries; to the contrary, crab and lobster fisheries should be enhanced, and partyboat and sports fishing out of Gaviota (5 miles away) should be enhanced. The volume of dredged material would require up to 180 trips by bottom-dump barges (assuming an average 1000 cubic yard capacity) towed by tugs just outside of the kelp bed. The one-way distance from the LNG terminal site to Drake is roughly 5.5 miles. The tug and barge traffic should not interfere with shipping.

Offshore Site - Cojo

If the applicant and appropriate state and federal agencies are unable to put the dredged materials to a beneficial use, then the applicant proposes to dispose of these materials offshore of the site (Latitude 34°25.5', Longitude 120°26.6') (Figure 1). The area being considered is located about 2 miles to the southwest of the site in roughly 120 to 240 feet of water. The bottom is primarily fine sand and silty fine sand with sediment thickness of 10 to 30 feet. The applicant proposes that a large area be designated for disposal of dredged material so that it can be more effectively dispersed. Use of this area for disposal should not affect the commercial trawl fishery that operates outside the 3-mile contour, and should have only a very limited effect on the California halibut trawl fishery in depths of 120 to 150 feet. Adverse environmental effects

should be restricted to the covering of organisms on sedimentary bottom to be replaced in a short time by organisms normally associated with rocky substrate in these depths.

LAND SITE - SOUTHERN CALIFORNIA EDISON COMPANY PROPERTY

Another alternative for disposal of dredged materials is at a land site. Current plans for an access road to/from the Point Conception site involve minor improvements to the existing Hollister Ranch Road. These improvements would not be sufficient to upgrade the road to a condition where it could sustain the volume of heavy truck traffic that would be associated with hauling the dredged materials from the Point Conception site to an offsite disposal area. Therefore, the most likely land disposal site would be a ravine on the Southern California Edison Company property adjacent to the proposed LNG site. The ravine would be filled with the dredge materials.

Dredge materials would be barged from the offshore construction area to a temporary dock (specifically constructed for the disposal alternative) along the beach. The material would be offloaded into trucks (probably 10- to 12-cubic yard capacity) for transport to the ravine disposal location. A special haul road would have to be constructed through the bluffs and across the Southern Pacific Railroad tracks (discussions with Southern Pacific Railroad would be necessary to define the manner of crossing). A roadway would also have to be constructed to the ravine fill location. Up to approximately 180 barge trips could be required, as well as possibly between 15,000 and 18,000 truck trips.

This alternative would have environmental impacts that will vary in significance depending on the locations of the dock, haulage road network, and ravine to be filled. The following types of impacts would be expected to occur. Dock construciton would result in the elimination of a small area of intertidal habitat, which would be a minor short-term impact. Haul road construction would eliminate wildlife habitat and eliminate or disturb individuals of some species of wildlife, a matter of potentially high significance where the road would traverse the bluffs. The possibility would also exist that the haul road would result in disturbance or elimination of archaeological sites. Truck traffic on the haul road associated with transport of dredge spoils would incrementally increase currently anticipated, construction-related, adverse visual and auditory impacts on onsite and offsite receptors (wildlife and people). Emissions related to truck and barge traffic would futher contribute to a decrease in local and regional ambient air quality anticipated during construction of the LNG facilities.

Filling the ravine would result in the elimination of wildlife habitat, individuals of some species of wildlife, and stream biota associated with the drainage. Although there are numerous ravines in the project vicinity, filling the ravine will result in an incremental permanent reduction in the number of such resources in the area. This would also contribute to a long-term change in the natural aesthetic qualities of the area, which could potentially have significant adverse visual effects on offsite viewers.

This dredged material disposal alternative contains no elements that could be considered as measures to enhance the environment.

ENVIRONMENTAL FEASIBILITY

Disposal of dredged materials offshore of Cojo would be the least costly of the three alternatives. Impacts on the environment would be expected to be minor, but this alternative would provide no opportunities for enhancement of the environment. Disposal in nearshore waters off of Drake would be more costly, but potential environmental impacts should be relatively minor. However, this alternative does afford the opportunity for environmental enhancement through use of the dredged materials to form an artificial reef, which should result in a long-term beneficial impact (suitable substrate for kelp growth and development of kelp-associated fauna). The land disposal alternative would be the most costly of the three. In contrast to the other two alternatives, dredged material disposal on the Southern California Edison Company property could result in potentially significant environmental impacts related to special construction requirements (e.g., a temporary dock and haul road) and the necessity to fill a coastal ravine. This alternative does not provide any opportunities for enhancement of the environment.

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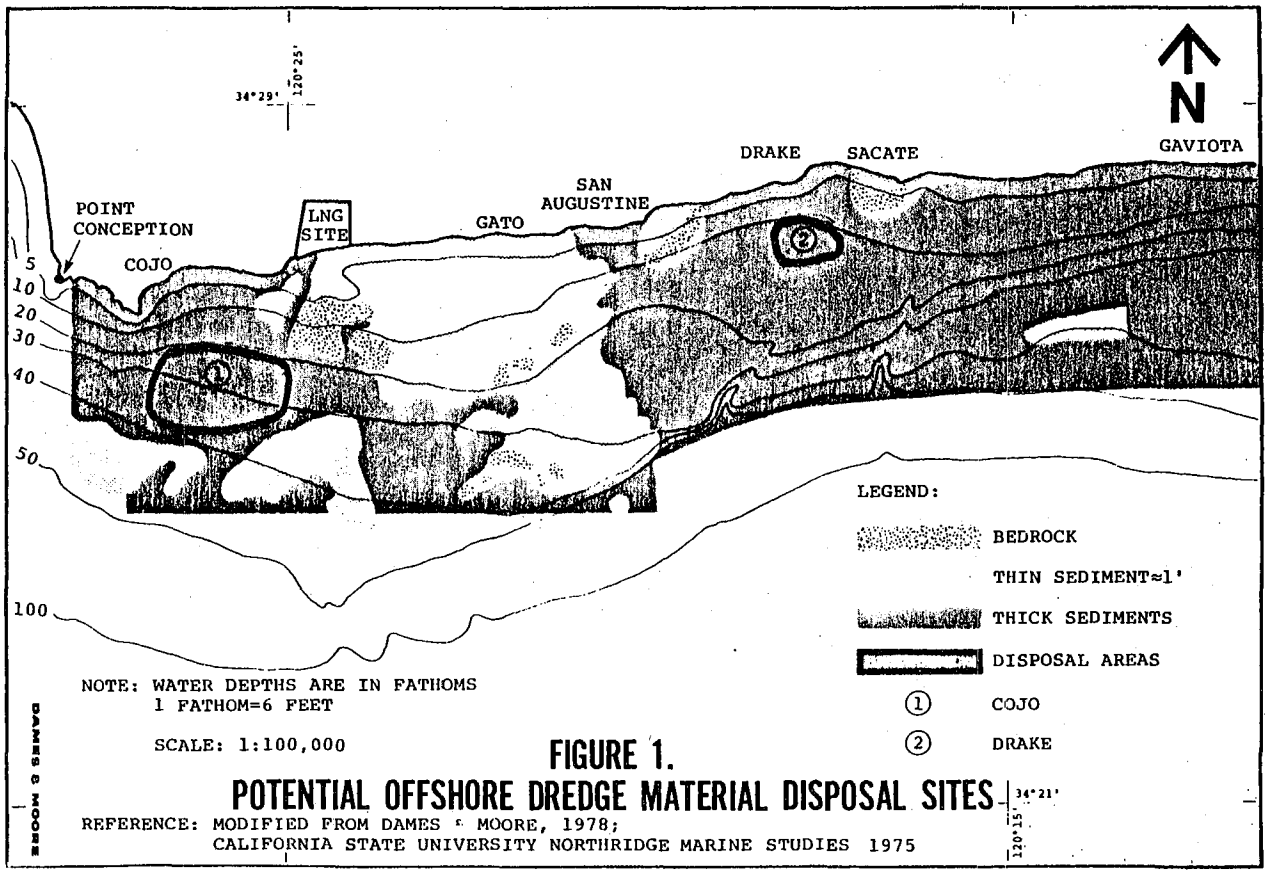

FIGURE 1.

POTENTIAL OFFSHORE DREDGE MATERIAL DISPOSAL SITES

REFERENCE: MODIFIED FROM DAMES & MOORE, 1978;
CALIFORNIA STATE UNIVERSITY NORTHRIDGE MARINE STUDIES 1975

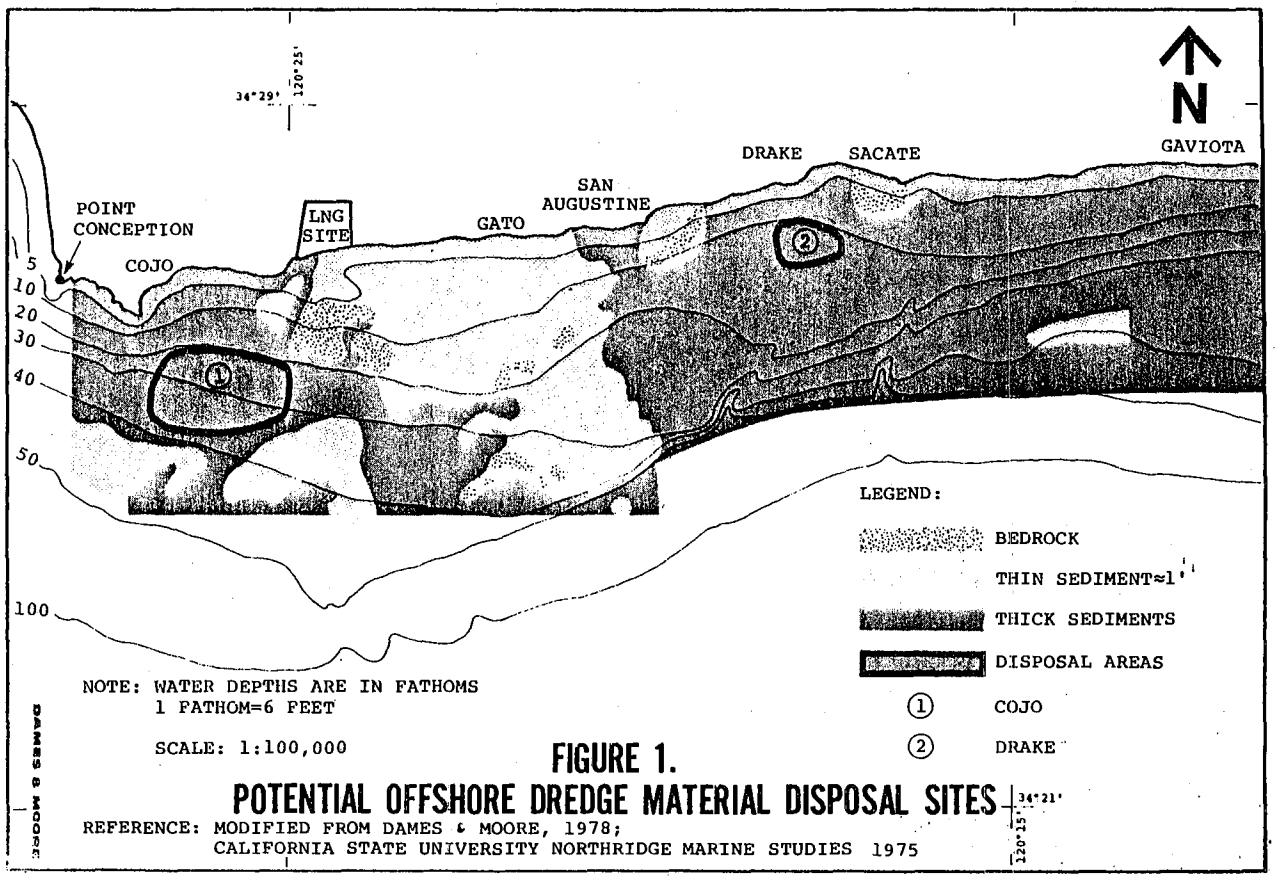

FIGURE 1.

POTENTIAL OFFSHORE DREDGE MATERIAL DISPOSAL SITES

REFERENCE: MODIFIED FROM DAMES & MOORE, 1978;
CALIFORNIA STATE UNIVERSITY NORTHRIDGE MARINE STUDIES 1975

Reports, Studies, Technical Papers, etc.
Attached to Letters of Comment But Not Reprinted in the FEIS

Title	Author	Submitted By
"Final Staff Recommendations on the Designation of Coastal Zone Areas Where Construction of an Electric Power Plant Would Prevent Achievement of the Objectives of the California Coastal Act of 1976"	California Coastal Commission (CCC) staff	George A. Avery, Counsel for the Fred H. Bixby Ranch Company
"Santa Barbara County Board of Supervisors Recommended Terms and Conditions" (April 10, 1978) and "Addendum" (May 8, 1978) and the County's letter of April 11, 1978, to Assemblyman Gary Hart.	Santa Barbara County Board of Supervisors	Santa Barbara County Board of Supervisors
Prospective Ventura County Site for Deepwater Crude Oil Port, LNG Terminal, Offshore Oil and Gas Port or Pipeline Terminal at Deer Canyon, Ventura County, California	Design/Development West Inc.	Samuel W. Bridgers
Draft Environmental Impact Report for Deer Creek-Deep Water Port, LNG and Pipeline Terminal	Samuel W. Bridgers Neal Lansing Douglas Nisbet Richard O'Hare	Bridgers, Troller Assoc.
Engineering calculations and other data for the earthwork and construction of an LNG terminal at Deer Canyon.	Bridgers, Troller Assoc.	Bridgers, Troller Assoc.
"California Offshore LNG Terminal Study: Interim Report"	CCC staff	CCC
The Earthquake Resistant Design of Five LNG Import Terminals in California	H.J. Degenkolb & Asso. Engineers	CCC

Title	Author	Submitted By
Final Report Evaluating and Ranking LNG Terminal Sites	CCC staff	CCC
Ibid.	CCC	CCC
"Fish and Wildlife Resources of Five Proposed Onshore LNG Terminal Sites"	California Dept. of Fish & Game	CCC
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Cultural Resources: A.D. Little Technical Report #8	Chester King and Steve Craig	California State Historic Preservation Officer
"Preliminary Analysis of a Stone Tool from a Probable Early Man Site Near Point Conception, Santa Barbara County, California"	Clay A. Singer	Robert O. Gibson
"National Register of Historic Places Criteria, Determinations of Eligibility, and Guidelines" (36 CFR 61 and 36 CFR 63)	National Park Service	Keeper of the National Register, U.S. Department of the Interior
Letter from Captain D.M. Taub, USCG, to CCC	USCG	Pacific Alaska LNG Asso.
Letter from Omar J. Lillevang to Mr. W.L. Brown, Western LNG Terminal Associates	Omar J. Lillevang, Consulting Engineer	Pacific Alaska LNG Asso.

Title	Author	Submitted By
Memorandum of Understanding Between the U.S. Coast Guard and the Materials Transportation Bureau for Regulation of Waterfront LNG Facilities	DOT	Pacific Alaska LNG Asso.
"Preliminary Evaluation of the Economic and Engineering Feasibility of Inground Storage Tanks for South Alaska LNG Facility"	Fluor Engineers and Constructors	Pacific Alaska LNG Asso.
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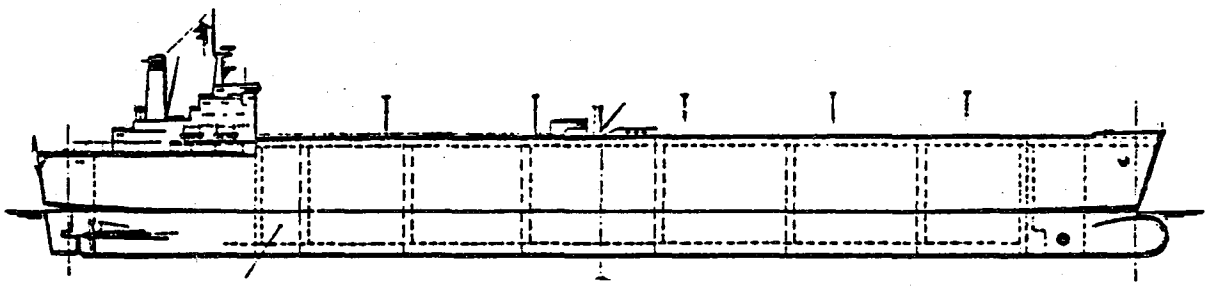
"Summary of Nine Years of Wind Data Collected at the Point Arguello Life Boat Station"	U.S. Air Weather Service	John Staffier, Counsel for Hollister Ranch Owners' Asso. and Santa Barbara Citizens for Environmental Defense
Newspaper article, "Indians Occupy LNG Site-Holy Land at Pt. Conception Vandalized by Bulldozers"	Santa Barbara News and Review, May 18, 1978	Ibid.
"The Systems Approach and Tank Vessel Safety"	W.D. Snider, Comm., USCG	USCG

ATTACHMENT A

ANALYSIS OF THE RISK TO THE PUBLIC FROM THE MARINE TRANSPORTATION OF LIQUEFIED NATURAL GAS IN COOK INLET, ALASKA AND SOUTHERN CALIFORNIA



The transportation of liquefied natural gas (LNG) poses an unusual hazard not found with most flammable materials. Because of the low atmospheric boiling point of natural gas, -258.7°F (-161.5°C or 112°K), LNG must be handled and stored in well-insulated containers to maintain a liquid state. In the event of an accidental release, LNG would contact a warmer environment, allowing it to accept heat and vaporize. Initially cold and negatively buoyant, the LNG vapors would gradually gain heat from the surroundings and would achieve positive buoyancy at temperatures above -188°F (151°K). Until atmospheric dispersion dilutes the concentration of the LNG vapors below the lower flammable limit (LFL) of 5 percent, a source of ignition could initiate a fire and endanger the public.

It is especially important to consider the risks from the marine transportation of LNG because such large quantities are involved. Western has proposed to use two 130,000-cubic meter LNG tankers for the Pacific Alaska trade and estimates a fleet of 9 tankers of about 120,000- to 125,000-cubic meter capacity for the Pacific Indonesia trade (125,000 cubic meters is equivalent to about 4.42 million cubic feet of liquid or 33 million gallons). An accident in transit could rupture one or more cargo tanks and spill large quantities of LNG over water. Upon contacting water, LNG would vaporize and form a potentially flammable vapor cloud. The presence of ignition sources at the spill could initiate an intense LNG pool fire. Should the spill occur near shore, it is possible that populated areas could be affected.

This study assesses the risk to the general public posed by the marine transportation of LNG in Cook Inlet, Alaska, and at several potential receiving terminals in California. The risk assessment for Cook Inlet is based on 52 annual shipments. The analysis of the proposed terminal site at Point Conception and alternate sites at Oxnard, Naples, and Rattlesnake Canyon is based on the maximum development permitted by California law--estimated to be 193 annual deliveries for the proposed tanker sizes. The study will estimate a numerical value for these risks and compare them to risks experienced in everyday life. Through an accident sequence model, the probability of a casualty is calculated as the product of the conditional probabilities of all intermediate events considered necessary for a casualty to occur. The sequence of events has been divided into four major problem areas:

A. The annual probability of an accident occurring to an LNG tanker in transit.

B. The probability of an LNG spill occurring because of a tanker accident.

C. The probability of the formation of a flammable vapor cloud or an LNG pool fire. 1/

D. The expected fatalities resulting from exposure to a flammable vapor cloud and radiation from a pool fire.

The product of these four events yields the estimated fatalities per year.

The basis for the study is an analysis of historical accident data of marine casualties. Since the operating experience of LNG tankers is too limited at the present time for a valid data base, casualty statistics for petroleum tankers will be used instead. The design and operation of petroleum tankers most closely approximates the proposed LNG tankers, although the latter incorporate superior design and operational features. Where it can be demonstrated that features of the LNG tankers provide for safer operation than common petroleum tankers, appropriate reduction factors will be used.

In the proposed project, the actual design for all the LNG tankers has not yet been determined. Cargo containment systems for LNG tankers are presently divided into two general categories: (1) "freestanding" self-supported tanks, which have sufficient strength when properly mounted in the hull to support their own weight and the weight and dynamic forces of the cargo and (2) "membrane" tanks, in which a thin metal barrier supported by insulation which transmits the weight and dynamic forces of the cargo to the inner hull structure of the vessel contains the liquid. Of these systems, five designs are normally considered for the LNG fleet: spherical tank designs by either Kvaerner-Moss or Chicago Bridge and Iron, the Conch freestanding tank, and membrane tank designs by either Gas Transport or Technigez.

Although different in design and construction, the various cargo containment systems incorporate similar basic safety standards, so that the risk analysis is valid for any design finally chosen. Table 1 lists the principal characteristics of a 125,000-cubic meter LNG tanker. Figure 1 illustrates a typical 125,000-cubic meter tanker. The characteristics of the 130,000-cubic meter LNG tankers proposed for the Pacific Alaska

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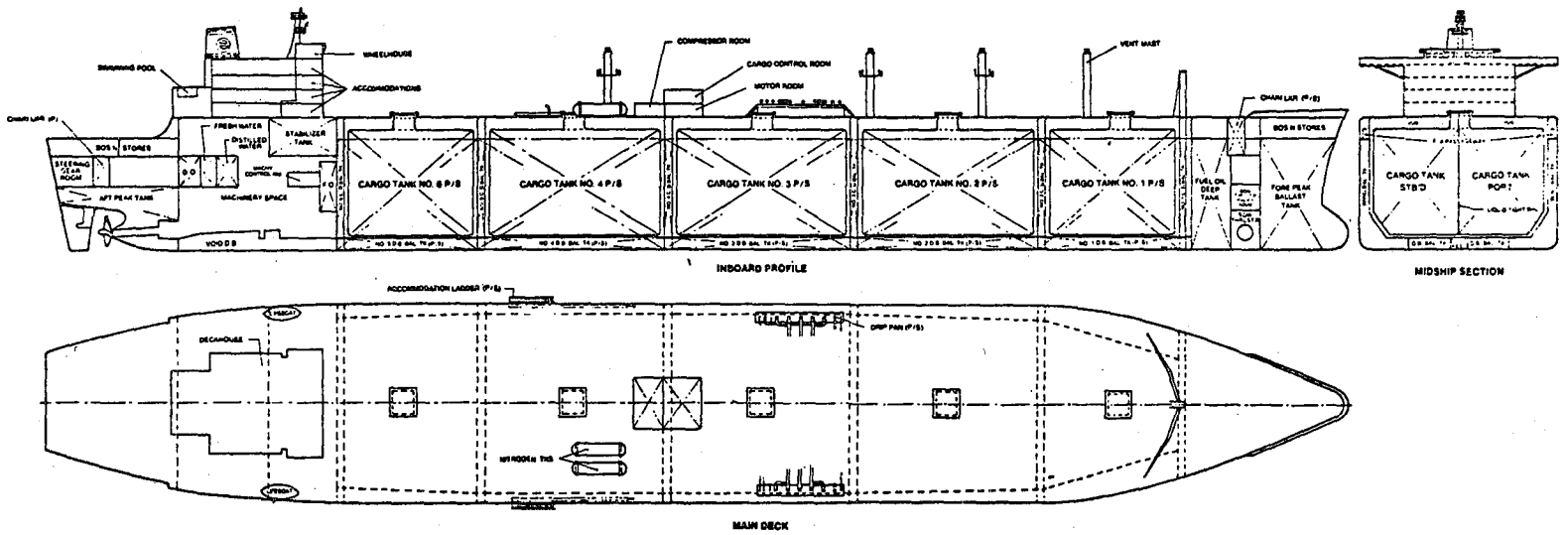
1/ Reduction factors for meteorology are not considered in estimating the risks from an LNG pool fire. Therefore, this section does not appear in the analysis of radiation hazard.

TABLE 1

PRINCIPAL CHARACTERISTICS
OF A 125,000-m^3 LNG CARRIER

Length overall	932 ft
Length between perpendiculars	887 ft
Beam	140 ft
Draft, loaded	36 ft
Depth of hull	94 ft
Displacement, loaded	95,000 LT
Block coefficient	0.74
Maximum continuous rating	43,000 SHP
Service speed	18.5 kts
Ballast capacity	53,000 LT
Bow thruster	2,000 HP
Number of cargo tanks	5
Cargo boil-off	0.25%/day
Power plant	Geared steam turbine single screw
Crew	12 officers, 22 crewmen
Loading or discharge time	Approximately 14.5 hrs
Fuel oil capacity	6,500 LT



PRINCIPAL CHARACTERISTICS

	ENGLISH
LENGTH OVERALL	932 ft
LENGTH BETWEEN PERPENDICULARS	887 ft
BEAM	140 ft
DEPTH	94 ft
DRAFT, LOADED	36 ft
DISPLACEMENT, LOADED	95,000 LT
SHAFT HORSEPOWER, MAXIMUM	43,000 HP
CLASSIFICATION, ABS	+ A1 (E) + AMS + ACC
	LIQUEFIED GAS CARRIER

Figure 1

Typical 125,000-m^3 LNG Tanker

trade are described in Volume I of the EIS. For this study, the consequence from a flammable vapor cloud and radiation from a pool fire is based on a one-tank spill of 30,000 cubic meters from a 130,000-cubic meter LNG tanker.

A. ANNUAL PROBABILITY OF AN LNG TANKER ACCIDENT

1. An estimate of the probability of an LNG tanker accident is based on an analysis of historical data for petroleum tankers with appropriate reductions to account for the superiority of the proposed LNG tankers. The number of petroleum tankers now in service of comparable size to the proposed LNG tankers is relatively limited for a valid data base. The world tanker fleet consisted of approximately 350 tankers of that size range (50,000 to 70,000 deadweight tons) during 1969 and 1970. 1/ However, an analysis of 1,416 tanker casualties 2/ was unable to determine any clear relationship between tanker size and casualty frequency. 3/ Therefore, in order to expand the data base, this study will consider a wide range of tanker sizes, but such tankers will be large enough to be comparable to the LNG vessels.

The U.S. Coast Guard Information and Analysis staff in Washington, D.C., compiles casualty data for various waterways in the United States. A casualty report is required whenever a casualty in U.S. waterways results in actual physical damage in excess of $1,500, injury causing anyone to be incapacitated for more than 72 hours, or loss of life. Beginning with fiscal year 1969, computer printouts are available for individual waterways which list information on the type of casualty, extent of damage, characteristics of the vessel involved, and conditions existing at the time of the accident.

Since the purpose of this study is to estimate the impact of LNG tanker accidents on the general public, only those casualties which could result in an LNG spill or pool fire are considered. Those types of casualties are collisions (ship to ship), rammings (ship to object), and groundings. Other casualties, such as equipment or structural failures, are more prevalent among older tankers, and it is difficult to correlate

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1/ An Analysis of Oil Outflows Due to Tanker Accidents, A Note by the United States, U.S. Coast Guard, page 16.

2/ For the purpose of this report, a casualty is defined as an accident involving a ship and should not be construed as a human fatality or injury.

3/ Analysis of Oil Outflows..., p. 44.

these casualties to the new LNG vessels. In any event, it is unlikely that such casualties could result in a cargo tank rupture. The cargo containment systems are unique to the LNG vessels, and their susceptibility to mechanical failure is not known at this time. Whether the sophisticated monitoring and precautionary systems will mitigate mechanical failures or will themselves be subject to breakdown is debatable.

A casualty rate per transit is developed by relating tanker casualties to the number of tanker trips for the same location and time period. Annual summaries of vessel trips and cargo volume throughput for ports in the United States and its territories are available in Waterborne Commerce in the United States, compiled by the U.S. Army Corps of Engineers. The number of inbound and outbound trips are classified by ship draft and vessel type (self-propelled, nonself-propelled, passenger and dry cargo, tanker, tugboat, or towboat). 1/ However, the U.S. Coast Guard printout lists casualties by fiscal year and classifies vessel size according to gross tons and length. So that the sample sets for both trip and casualty data include the same size range of vessels, it is necessary to relate ship draft to either gross tons or ship length. Unfortunately, no direct relationship exists, and individual casualty files must be examined.

For this study, the average annual number of round-trips for a particular port is the average of inbound and outbound transits for all self-propelled tankers having a draft of 18 feet or greater. Individual casualty files are examined to determine the date, the tanker draft, and the exact location of the casualty to correlate with the trip data.

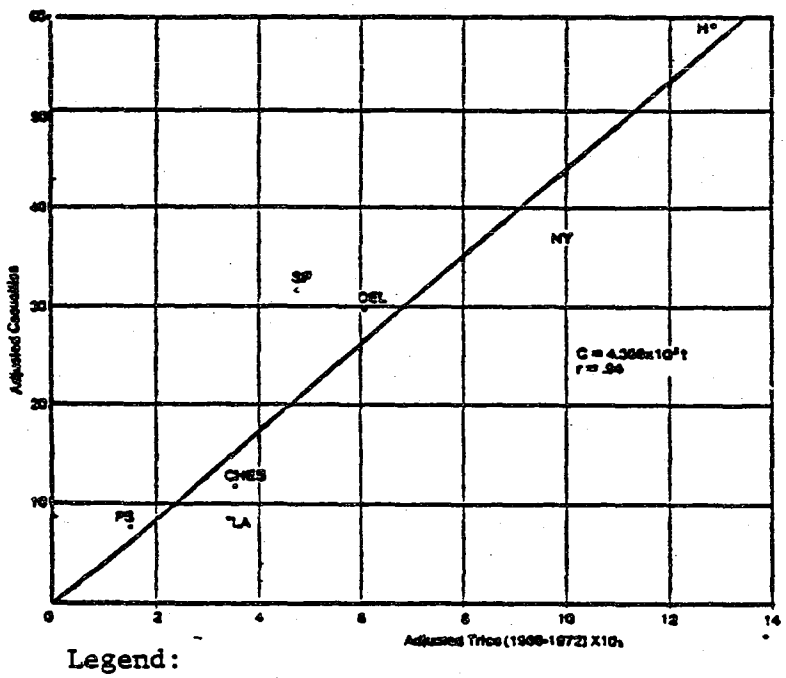
The single-trip accident rate for a particular waterway is calculated by dividing the number of casualties by the number of trips for the same period of calendar years. The use of casualty data and tanker trips for a period of several years should provide an adequate data base for estimating the mean casualty rate. This figure reflects the most probable number of accidents which may occur. Because casualties fluctuate from year to year, the actual number of accidents in any particular year may exceed the mean accident rate.

1/ Tabulations of self-propelled tankers generally consist of carriers of petroleum products. In some waterways, a small portion of the tankers may be carriers of nonpetroleum products. Casualties of these tankers are included for consistency.

In some locations, the operational experience of tankers is too limited or nonexistant. In the absence of casualty statistics and trip data from which to calculate a mean accident rate, an estimate can be made based on the experience of other port areas. An Oceanographic Institute of Washington survey of tanker casualties for seven major port areas in the United States found that a strong correlation exists between tanker casualties and tanker trips. 1/ The data consisted of a total of 185 tanker casualties and 41,908 tanker trips occurring over the 4-year period 1969 through 1972. The resultant plot of casualties versus trips for each port, as shown in Figure 2, can best be approximated by a straight line having a slope of 4.4×10^{-3} casualties/trip.

Figure 2

Tanker Casualties Versus Tanker Trips
For Seven U.S. Port Areas 2/



Legend:

Ches - Chesapeake Bay
Del - Delaware Bay
H - Gulf Coast
LA - Los Angeles/Long Beach
NY - New York
PS - Puget Sound
SF - San Francisco

1/ Offshore Petroleum Transfer System for Washington State, A Feasibility Study, December 16, 1974.

2/ Source: Offshore Petroleum Transfer System, p. V-45.

2. The single-trip accident rate from the preceeding section is the sum of three types of casualties--collisions, rammings, and groundings--based on historical data for petroleum tankers. Subsequent sections will show that certain design features of the LNG tankers should make them less susceptible to casualties and spills than common petroleum tankers. Appropriate reduction factors will be introduced in order to apply the tanker casualty rates to the LNG tankers. However, the reduction factors do not apply equally to each type of casualty, so it will be necessary to distribute the casualty rate among the three types.

Where sufficient data are available for a particular waterway, the casualty statistics may be distributed directly into the three categories. However, in many locations the number of casualties on record is too low for a valid distribution. In these areas, average distribution figures for that particular type of waterway (harbor, coastal, etc.) will be employed.

An analysis by Porricelli of 1,416 worldwide tanker casualties occurring during 1969 and 1970 provides a breakdown of casualties by type and location. 1/ Also available are data on 1,587 worldwide tanker casualties occurring in 1971 and 1972. 2/ The casualty types include groundings, rammings, collisions, fires, explosions, structural failures, mechanical breakdowns, and others. The location where a casualty occurred is classified according to the following types of waterways: piers, harbors, entrances, coastal, sea, and unknown. The number of casualties for each type and location presented in Table 2 is based on the data from both sources. The numbers in parentheses indicate the fraction of a casualty type for a particular location. For example, 47 collisions out of 250 casualty types were located at piers; therefore, the number in parentheses is $47/250 \approx 0.19$. Since this study is concerned only with collisions, rammings, and groundings, the remaining casualties have been eliminated from the analysis.

TABLE 2

TANKER CASUALTY BY TYPE AND LOCATION

Location	Casualty Type			
	Collisions	Rammings	Groundings	Total
Piers	47 (.19)	196 (.78)	7 (.03)	250
Harbors	361 (.47)	166 (.21)	244 (.32)	771
Entrances	137 (.33)	30 (.07)	247 (.60)	414
Coastal	186 (.49)	18 (.05)	178 (.46)	382
Sea	24 (.71)	9 (.26)	1 (.03)	34
Unknown	30 (.39)	15 (.19)	32 (.42)	77
Total	785 (.41)	434 (.22)	709 (.37)	1928

1/ J.D. Porricelli, V.F. Kieth, R.L. Storch, "Tankers and the Ecology," Transactions of the Society of Naval Architects and Marine Engineers, Vol. 97, 1971.

2/ J.J. Henry Co., Inc., An Analysis of Oil Outflows Due to Tanker Accidents, 1971-1972, November 1973.

This information allows a casualty rate to be distributed into the three types of accidents, regardless of the data available for a particular waterway.

3. A U.S. Coast Guard study of 22 major U.S. ports and waterways concluded that some types of casualties could be avoided by implementing vessel traffic systems (VTS). 1/ Each area was evaluated on the basis of economic losses, pollution incidents, deaths and injuries resulting from vessel casualties, and the effectiveness of various levels of VTS in reducing those losses. Those areas studied are listed in Table 3, beginning with the ports and waterways most in need of VTS. For each location, an estimate has been made of the effectiveness of the recommended level of VTS in reducing casualties. The levels of VTS indicated in Table 3 are as follows:

1. Vessel Bridge-to-Bridge Radio Telephone (L_0).

2. Regulations (L_R) - For example, regulations establishing a relationship between tow boat characteristics and size of tow.

3. Traffic Separation Scheme (TSS) (L_1).

4. Vessel Movement Reporting System (VMRS) (L_2) - A system in which vessels relay navigational information to a shore-based control center.

5. Basic Surveillance (L_3) - Shore-based radar for observing vessel positions and movements.

6. Advanced Surveillance and Automated Advanced Surveillance (L_4,L_5) - Collision avoidance radar and computer interfaced components.

The effectiveness of a VTS at a particular location would depend on the level of VTS and the nature of the casualty. VTS appears most effective in reducing collision casualties and

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1/ Vessel Traffic Systems Analysis of Port Needs, August 1973.

TABLE 3

VTS REDUCTIONS FOR 22 U.S. PORTS OR WATERWAYS

Port or Waterway	FY69-72 Number of C/R/G Cases	FY69-72 # Vessels In C/R/G	FY69-72 # Vessels in Type 1 Accidents[2]	VTS Level Selections	Estimated % reduction in all C/R/G by selected VTS levels	Estimated % reduction in Type 1 accidents by selected VTS levels[2]
New York	320	611	172	$L_0 2L_2 2L_3$	29	52
New Orleans	237	564	211	$2L_2 L_3$	19	33
Houston/Galveston	145	329	172	$L_2 L_3$	25	38
Sabine-Neches (ICW 265-290)	143	310	131	$L_0 2L_2$	23	24
Chesapeake Bay	116	229	64	$L_0 L_2 L_3$	17	52
ICW 80-99 (Morgan City)	83	248	126	$L_R L_2$	36	15
ICW 107-129 (Cote Blanche)	41	140	116	L_4	53	63
Baton Rouge	55	126	71	L_2	35	49
San Francisco	81	124	12	$L_2 L_5$	7	17
ICW 50-69 (Houma)	37	109	63	L_2	40	60
Chicago	58	118	16	L_R	-	-
Delaware River & Bay	107	167	28	L_0	-(1)	-(1)
Tampa	108	204	20	L_0	-	-
Puget Sound	42	83	33	L_2	5	12
Mobile	51	101	3	L_0	-	-
Detroit River	44	65	12	L_0	-	-
ICW 155-179 (Vermillion River)	26	82	59	L_0	-	-
St. Louis	29	114	8	L_0	-	-
Long Island Sound	30	55	13	L_0	-	-
LA/LB	29	53	4	L_0	-	-
Corpus Christi	30	43	7	L_0	-	-
Boston	15	29	3	L_0	-	-

[1] The presence of a dash (-) in these columns indicates that no VTS effort was recommended.
[2] Collisions in meeting, passing, and overtaking situations

Source: Vessel Traffic Systems, Analysis of Port Needs, U.S. Coast Guard Study Report, August 1973, p. D-1.

least effective in rammings. VTS would not prevent casualties directly resulting from mechanical failures, groundings and rammings caused by winds or currents, collisions caused by pleasure craft, or rammings at piers and docks.

In areas where a VTS is scheduled to become operational coincident with the startup of an LNG project, reduction factors should be applied to the risk analysis. Because VTS does not uniformly reduce all types of casualties, reduction factors must be applied by casualty type.

Three port areas to date--San Francisco Bay (operational in August 1972), Puget Sound (operational in September 1972), and Houston/Galveston (operational in February 1974)--have been operated under the VTS systems.

Cook Inlet, Alaska

1. A computer printout of vessel casualties occurring in Cook Inlet, Alaska, for fiscal years 1969 to 1975 was prepared by the U.S. Coast Guard. 1/ The screening of the printout and the examination of individual reports was performed as previously described in Section A.1 of this report. The number of casualties involving self-propelled tankers having a draft greater than 18 feet are listed by type for each calendar year in Table 4. Rammings (ship to object collisions) are subdivided into two categories--rammings at docks and rammings with ice fields.

Table 4 provides an indication of the nature of the navigational hazards for tanker operations in Cook Inlet. The most frequent casualty type for the study period was ramming, either at docks or with ice fields. The harsh winters of 1970-71 and 1971-72 resulted in a large number of rammings with ice fields and ice-related casualties. In most cases, rammings at docks were found to result from severe environmental factors such as ice, strong winds, strong tidal current, or a combination of factors. These external forces were either the cause of the casualty or a contributing factor in all but 2 of the 19 total casualties.

1/ The staff is indebted to Lieutenant James Commerford and Lieutenant James Fernie, Information and Analysis Staff, Merchant Marine Safety Division, U.S. Coast Guard, for these data.

Only one incident of a collision involving a tanker was recorded. In this case, a fishing craft struck a tanker in Kennedy Entrance. The tanker received little damage; however, the fishing craft sank. At this time, collisions appear to be a minor hazard for Cook Inlet because of the low volumes of traffic and wide areas of navigable waters.

TABLE 4

TANKER CASUALTIES, 1969-1974
COOK INLET, ALASKA

Calendar Year	Casualty Types			
	Collisions	Rammings at Docks	Rammings with Ice	Groundings
1969	0	2	0	1
1970	0	1	0	1
1971	1	2	3	0
1972	0	3	3	0
1973	0	0	1	1
1974	0	0	0	0
Total	1	8	7	3

The approximate locations of the casualties are shown in Figure 3. Most of the incidents are clustered around the petroleum docks at Nikiski and Drift River and in the inlet's upper region where ice and tidal currents can be most severe. Far fewer casualties are found in the lower regions of Cook Inlet which experience less severe ice problems.

The annual number of tanker trips in Cook Inlet must be estimated, since complete trip data are not available. Data on tanker transits for Anchorage, Alaska, are tabulated by calendar year in Waterborne Commerce of the United States. However, this source does not include tanker trips for the petroleum docks at Drift River and Nikiski, which account for a major portion of

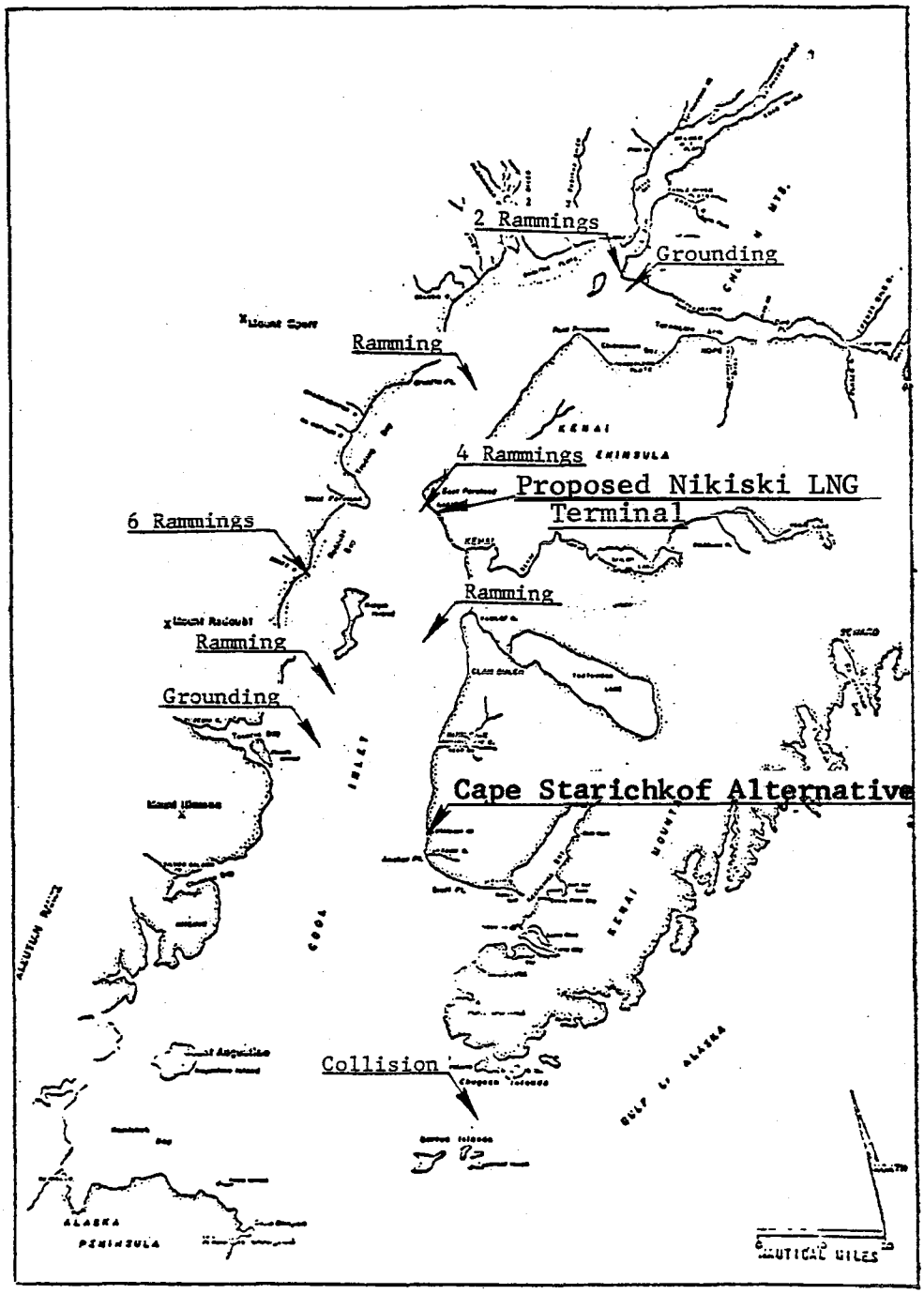

Figure 3

Locations of Tanker Casualties, 1969-1974
Cook Inlet, Alaska

the tanker traffic in Cook Inlet. An estimate of tanker trips for these locations has been based on oil production figures. 1/ Table 5 lists the estimated tanker trips in Cook Inlet for each calendar year.

The mean single-trip casualty rate for Cook Inlet is calculated from the total casualties in Table 4 divided by the total tanker trips from Table 5.

$$\text{Casualty Rate} = 19 \text{ casualties}/2{,}698 \text{ trips}$$

$$= 7.04 \times 10^{-3} \text{ casualties/trip}$$

TABLE 5

ESTIMATED ANNUAL TANKER TRIPS, 1969-1974
COOK INLET, ALASKA

Calendar Year	Anchorage	Nikiski	Other	Total
1969	91	129	245	465
1970	84	129	245	458
1971	70	129	245	444
1972	72	129	245	446
1973	65	129	245	439
1974	72	129	245	446
Total	454	774	1,470	2,698

In comparison with other waterways, the casualty rate for Cook Inlet is high, being nearly double the mean casualty rate of the seven U.S. ports. However, these ports do not have the ice hazard found in the upper and middle regions of Cook Inlet.

1/ Alternative Sites for LNG Facilities in the Cook Inlet/Kenai Peninsula, Alaska Area, Oceanographic Institute of Washington, October 2, 1975, pp. 4-12 to 4-15.

2. Because of the unique navigational hazards in Cook Inlet and the large number of casualties, it is appropriate to distribute the casualties among the three types directly from the data in Table 5. The average casualty distributions presented in Section A.2 of this report would not accurately characterize Cook Inlet.

DISTRIBUTION OF CASUALTY TYPES
IN COOK INLET

Collisions - 0.05

Rammings - 0.79

Groundings - 0.16

3. In the absence of any proposal to implement a VTS in Cook Inlet, reduction factors do not apply.

Cape Starichkof, Alaska

1. The casualty rate for Cook Inlet serves as the basis for estimating the casualty rate for the Cape Starichkof alternative site. The Cook Inlet casualty rate previously estimated is applied directly in the analysis of the Nikiski site. Tankers enroute to Cape Starichkof would pass through a shorter segment of Cook Inlet than those enroute to Nikiski. As a result, their exposure to potential casualties in Cook Inlet would be reduced. Therefore, the casualty rate for Cape Starichkof should be less than for Nikiski.

The casualty rate for Cape Starichkof is estimated by a ratio of the trip distances to the two sites. From Kennedy Entrance, the distances to Cape Starichkof and Nikiski are approximately 53 and 110 miles, respectively. The single trip casualty rate for Cape Starichkof is:

$$\text{Casualty Rate} = (53 \text{ miles}/110 \text{ miles}) \times 7.04 \times 10^{-3} \text{ casualties/trip}$$

$$= 3.39 \times 10^{-3} \text{ casualties/trip}$$

This estimate assumes that tanker casualties are randomly distributed throughout Cook Inlet. However, ice-related casualties are more prevalent in the northern sections of the inlet. As a result, the casualty rate for Cape Starichkof is probably overestimated.

2. Because of the unique navigational hazards in Cook Inlet and the large number of casualties, it is appropriate to distribute the casualties among the three types directly from the data in Table 5. The average casualty distributions presented in Section A.2 of this report would not accurately characterize Cook Inlet.

DISTRIBUTION OF CASUALTY TYPES
IN COOK INLET

Collisions - 0.05

Rammings - 0.79

Groundings - 0.16

3. In the absence of any proposal to implement a VTS in Cook Inlet, reduction factors do not apply.

Proposed and Alternate Sites in California

The proposed site at Point Conception and the alternate sites at Naples, Rattlesnake Canyon, and Oxnard have little or no shipping data associated with them to determine a shipping casualty rate specific to each site. Therefore, the historical casualty rate of 4.4×10^{-3} casualties/trip shown in Figure 2 was first used for the Oxnard area and then applied to the Santa Barbara Channel area between its entrance south of Point Conception and Oxnard by dividing the casualty rate by the length of the channel, thus obtaining a casualty rate per mile. This per-mile rate was then applied to the shipping approaches to the Naples, Rattlesnake Canyon, and Point Conception sites.

The staff feels that these rates, based on seven congested U.S. port areas, overestimate the probability of an LNG casualty and thus add a conservative element to this assessment. In fact,

during the 8 years since the vessel traffic lanes were established, there have been no collisions or other types of casualties involving vessels exceeding 100 tons deadweight in the Santa Barbara Channel. 1/

Point Conception, California

1. Point Conception currently has no commercial port facilities which would provide historical data on tanker traffic. The analysis of the U.S. Coast Guard printout for southern California waters found no tanker casualties in the vicinity of Point Conception. In the absence of both casualty and trip data, the mean accident rate from the seven-port study was used to determine a casualty rate for Point Conception. It was assumed that accidents would occur at the average rate, 4.4×10^{-3} casualties/trip, between the entrance to the Santa Barbara Channel 5 miles south of Point Conception and the port of Oxnard--a distance of approximately 85 miles. This accident rate per mile was then applied to the proposed 28-mile long LNG tanker route between Point Conception and the open ocean off Point Arguello. Using these assumptions, the rate at which casualties would be expected to occur along this route is:

$$\text{Casualty Rate} = 1.20 \times 10^{-3} \text{ casualties/trip}$$

Since the mean accident rate used in deriving this casualty rate was based on ports and harbors which have experienced a higher traffic density than that which is expected for Point Conception, the staff feels that this rate overestimates the hazards of the proposed Point Conception terminal and introduces a conservative element into this risk analysis. 2/

The majority of the LNG tanker route through California waterways would be well offshore in order to avoid coastal traffic. The tankers would begin an approach to Point Conception just off Point Arguello and follow a course north of the Santa Barbara Channel to the proposed LNG facility. Since the proposed terminal would be used only by the LNG tankers and barges delivering Bunker-C fuel oil, the traffic density would be low for major portions of the tankers' voyage. However, at the approach to Point Arguello, LNG tankers would encounter existing coastal traffic as well as increased oil tanker traffic resulting from

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1/ John J. McMullen Associates, Inc., "Draft Vessel Traffic Analysis" (1977), p. 4-89.

2/ The Coast Guard in comments to the DEIS indicated that in the last eight years only one tanker accident has occurred in the Traffic Separation Scheme involving a vessel over 100 DWT.

the completion of the Alyeska oil pipeline. Although small boat traffic around Point Conception is heavy in the summer, boats of that size would be unable to inflict major damage on an LNG tanker in a collision.

2. The casualties for Point Conception are distributed according to type in the same manner described for Oxnard.

DISTRIBUTION OF CASUALTY TYPES
FOR POINT CONCEPTION

Collisions - 0.38

Rammings - 0.27

Groundings - 0.35

3. Since VTS has not been proposed for Point Conception, no VTS reduction factors apply.

Oxnard, California

1. Oxnard currently has no shoreside docking facilities for petroleum tankers and consequently lacks the historical data required in calculating the mean casualty rate. Port Hueneme, located adjacent to Oxnard, has experienced some tanker traffic, as shown in Table 6.

TABLE 6

ANNUAL TANKER TRIPS, 1969-1974
PORT HUENEME, CALIFORNIA

Calendar Year	1969	1970	1971	1972	1973	1974
Trips	N 1/	N 1/	2	8	58	51

1/ N--Data not tabulated.

The analysis of the U.S. Coast Guard printout for southern California waterways, which included Port Hueneme, found no tanker casualties in the Port Hueneme/Oxnard area. In the absence of casualty data, the mean casualty rate from the study of seven U.S. ports is used for Oxnard.

$$\text{Casualty Rate} = 4.4 \times 10^{-3} \text{ casualties/trip}$$

This casualty rate probably overestimates the potential hazards of the proposed Oxnard terminal since the mean accident rate was based on ports and harbors which have experienced a higher traffic density than that anticipated for Oxnard. Since the proposed Oxnard terminal and its access routes would be used only by LNG tankers, areas of potential collisions with other ships would normally be limited to the crossing of the northbound lane of the Santa Barbara Channel on the inbound voyage.

However, it must be noted that current levels of oil tanker traffic in the Santa Barbara Channel may increase as a result of the completion of the Alyeska pipeline. It was originally projected that three tankers would depart daily from Valdez, Alaska, increasing to five or six daily departures at the project's maximum capacity. Various receiving terminals on the west coast of the United States have been suggested, but at this time the exact route and destination of the tankers is uncertain. It is possible that all tankers may proceed to Long Beach Harbor, which would substantially increase traffic in the Santa Barbara Channel.

2. The data from Table 2 are used to distribute the casualties by types. The proposed Oxnard terminal would consist of an entrance, a separated shipping lane, and a pier. Accordingly, the casualties are distributed by the combined data for three types of waterways--entrances, harbors, and piers.

DISTRIBUTION OF CASUALTY TYPES FOR OXNARD

Collisions - 0.38

Rammings - 0.27

Groundings - 0.35

3. VTS has not been proposed for Oxnard, so VTS reduction factors do not apply.

Naples, California

1. The site at Naples currently has no docking facilities which would provide historical data on tanker traffic. Therefore, the casualty rate for the 39.0-mile long approach is determined in the same manner as for Point Conception. For purposes of this study, it was assumed that the LNG tankers would follow the Santa Barbara Channel to the point closest to the Naples site, then turn northward toward the proposed docking facilities.

$$\text{Casualty Rate} = 2.05 \times 10^{-3} \text{ casualties/trip}$$

2. The casualties for Naples are distributed according to type in the same manner described for Oxnard.

DISTRIBUTION OF CASUALTY TYPES FOR NAPLES

Collisions - 0.38

Rammings - 0.27

Groundings - 0.35

3. Since VTS has not been proposed for Naples, no VTS reduction factors apply.

Rattlesnake Canyon, California

1. The site at Rattlesnake Canyon has no docking facilities which would provide historical data on tanker traffic. Therefore, the casualty rate for the 20.8-mile long approach is determined in the same manner as for Point Conception and Naples.

$$\text{Casualty Rate} = 1.09 \times 10^{-3} \text{ casualties/trip}$$

It should be noted that this site is located on the open coast and there is no defined shipping channel to the site. The shipping route used in this study would run in a generally northwestern direction from a docking facility approximately 4,500 feet offshore. It would parallel the coast approximately 1.5 miles offshore to Point Buchon, where it would head toward open seas.

2. The casualties for Rattlesnake Canyon are distributed according to type in the same manner as described for Oxnard.

DISTRIBUTION OF CASUALTY TYPES
FOR RATTLESNAKE CANYON

Collisions - 0.38

Rammings - 0.27

Groundings - 0.35

3. Since VTS has not been proposed for Rattlesnake Canyon, no VTS reduction factors apply.

B. PROBABILITY OF A SPILL FOLLOWING AN ACCIDENT

1. The accident rates in the preceding section estimate the annual probability of an accident without regarding the magnitude of damage. It is likely that only a small portion of accidents would be severe enough to rupture a cargo tank and spill LNG. This section estimates the probability of an LNG spill based on pollution-causing incidents (PCI) for petroleum tankers and the appropriate LNG reduction factors.

Of the 1,928 collisions, rammings, and groundings listed in Table 2, 395 were sufficiently severe to damage tankers and spill oil. Spill frequency has been calculated by dividing the number of PCI's by the total number of casualties for each casualty type and location. Table 7 presents the number of PCI's and the fraction of casualties which resulted in spills

(indicated in parentheses). For example, 11 PCI's occurred as a result of the 47 collisions at piers shown in Table 2. Therefore, the fraction of the PCI event (indicated in parentheses) is $11/47 \approx 0.23$.

TABLE 7

FRACTION OF POLLUTION-CAUSING INCIDENTS BY CASUALTY TYPE AND LOCATION

	CASUALTY TYPE			
Location	Collision	Ramming	Grounding	Total
Piers	11 (.23)	20 (.10)	0 (0)	31 (.12)
Harbors	53 (.15)	18 (.11)	48 (.20)	119 (.15)
Entrances	41 (.30)	4 (.13)	49 (.20)	94 (.23)
Coastal	65 (.35)	1 (.06)	71 (.40)	137 (.36)
Sea	7 (.29)	2 (.22)	0 (0)	9 (.26)
Unknown	1 (.03)	1 (.07)	3 (.09)	5 (.06)
Total	178 (.23)	46 (.11)	171 (.24)	395 (.20)

Table 7 provides the basis for estimating the fraction of tanker casualties of sufficient magnitude to cause a spill. However, these factors cannot be used directly, because they fail to account for the amount of oil spilled. The actual oil outflows ranged from minimal spills to the total loss of the tanker.

It must also be noted that the data from these studies were prepared to determine the amount of global oil pollution resulting from tanker casualties. The LNG tanker risk study is concerned not only with the quantity of the spill but also with the rate of the spill. The LNG vapor dispersion presented in Attachment 1 estimates the worst-case hazard for various spill sizes by assuming that the entire quantity of LNG is spilled instantaneously and evaporates in less than 6 minutes. Spills occurring over longer periods of time would have a reduced range of hazardous conditions.

Previous risk analyses performed by the staff have considered the worst-case event to be the instantaneous spill of the entire contents of an LNG tanker. A spill of such magnitude would require the simultaneous rupturing of all five separate cargo tanks of the LNG tanker. Physical constraints on maximum vessel speed and maximum casualty damages make the possibility of an instantaneous release of more than one tank implausible. This is not to imply that the total destruction of a loaded LNG vessel and consequent loss of its entire contents is not possible, but such a catastrophic, noncredible event would require extraordinary circumstances which the staff considers to be extremely remote.

To estimate the maximum credible spill which could occur for each casualty type and the probability of such an event, the actual amounts of oil outflows were analyzed for the PCI's in Table 7. The analysis was limited to tankers larger than 5,000 deadweight tons (about one-tenth the deadweight of a 125,000-cubic meter LNG tanker) with spills occurring at piers, harbors, or entrances. Only those PCI's in which the amount of outflow was reported or estimated from damage reports were included in the analysis.

Both the absolute and relative amounts of outflows were examined. Because of the large size range of tankers in the data, the fraction of a tanker spilled provides a better means of comparing oil spills to potential LNG spills. The probability of spill size with respect to fraction of tanker spilled for collisions, groundings, and rammings is illustrated in Figure 4.

The probability of a one-tank spill, approximately 20 percent of the tanker contents, is estimated for collisions based on the data for 35 collision PCI's presented in Figure 4. Only one collision of the 35 cases resulted in a spill of about 20 percent of the tanker. The fraction of one-tank spills per collision PCI is estimated to be 1/35 or about 0.029. The probability of a one-tank spill from a collision is therefore the 0.029 factor multiplied by the number of collision accidents involving spills at piers, harbors, and entrances, as shown in Table 7, and divided by the sum of collision incidents for similar locations shown in Table 3:

$$(0.029) \times \frac{(11 + 53 + 41)}{(47 + 361 + 137)} = 0.006$$

For collisions involving LNG tankers, the maximum credible event is considered to be the spill of one cargo tank. The rupture of two adjacent cargo tanks would require a collision occurring at the bulkhead intersection between the tanks. The additional structural material at this location would provide

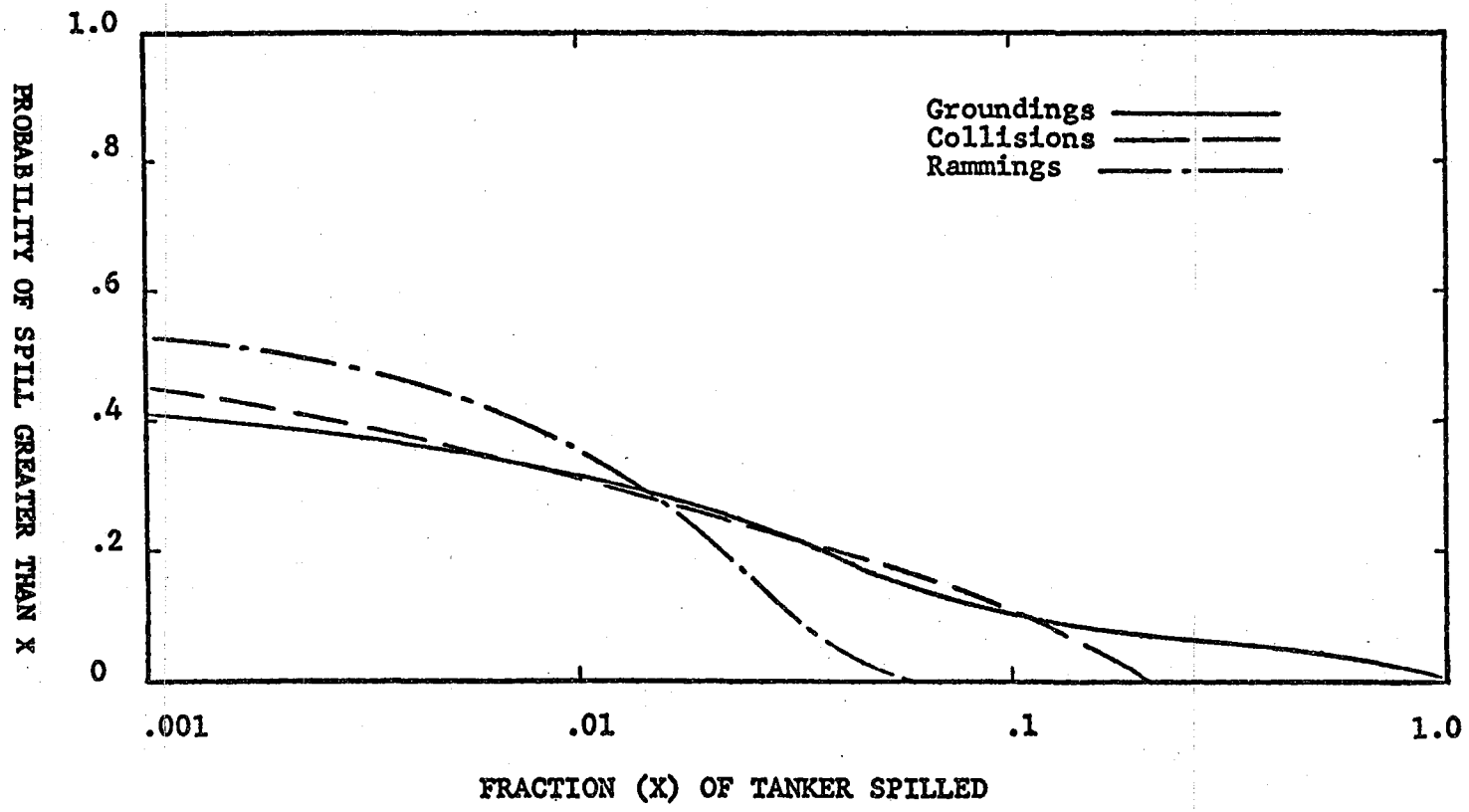

Figure 4

Probability of Spill Versus Size at Piers, Harbors, and Entrances

greater resistance to damage than at the center of a cargo tank. For a two-tank spill to be the worst-case event for collisions, impact would have to occur between the cargo tanks with sufficient energy to spill the entire contents of both tanks in less than 6 minutes. The probability of such a high-energy collision is negligible. This viewpoint is supported by the data in Figure 4.

A one-tank spill is also considered to be the maximum credible event for groundings. The fraction of one-tank spills from grounding PCI's is estimated from Figure 4 to be 0.07. Unlike collisions, some groundings were reported with outflows as large as the entire tanker. These large spills resulted from tankers which stranded and subsequently broke up and sank, with the entire cargo considered as the outflow. However, such an event is not instantaneous and may take days to complete. If an LNG tanker were stranded, the double-hull structure should be effective in preventing or at least delaying the break-up of the tanker. The double-hull also provides containment for the spill, which further reduces the outflow. In addition, the double-bottom structure would both reduce the probability of rupturing a cargo tank and minimize the extent of cargo tank damage in groundings. As a result, the probability of the instantaneous spill of more than one cargo tank in groundings is considered negligible. The probability of a one-tank spill from a grounding is therefore the 0.07 factor multiplied by the number of incidents involving spills at piers, harbors, and entrances, as shown in Table 7, divided by the sum of grounding events for similar locations as shown in Table 2:

$$(0.07) \times \left(\frac{48 + 49}{7 + 244 + 247} \right) = 0.014$$

Figure 4 shows that the spills from rammings are much smaller than the contents of one cargo tank. The probability of a one-cargo tank spill from rammings is negligible.

2. The design of the proposed LNG tankers incorporates features which have been recommended for petroleum tankers to reduce the potential for oil spills in the event of a casualty. 1/ Double-hull construction and lateral bow thrusters should make the LNG tankers less likely to incur cargo tank damage than the conventional petroleum tankers upon which the spill factors were developed. Appropriate reduction factors are discussed for each casualty type in the following sections.

1/ J.D. Porricelli, et al., "Tankers and the Ecology."

Recent studies of grounding incidents by Card and Bovet suggest that a double-bottom hull structure having a height equal to one-fifteenth of the beam (B/15) would greatly reduce the likelihood of oil spills in grounding casualties. 1/ The data from both studies relating depth of grounding penetration to vessel beam have been combined and plotted in Figure 5. Of the total 41 cases, only 7, or about 15 percent, were found to exceed the B/15 depth.

The individual cargo tanks of the proposed LNG tankers would be contained within a double-hull structure. The bottom of the cargo tanks would be separated from the inner hull by a layer of insulating material approximately 1 foot thick. Therefore, in order for a grounding casualty to rupture a cargo tank, the outer and inner hulls and the cargo tank would all have to be penetrated.

The heights of the double-bottom hull structure for 130,000-cubic meter and 165,000-cubic meter tankers have been plotted in Figure 5. When the actual height of damage is considered, only one case was sufficient to penetrate the cargo tanks in the 130,000-cubic meter tanker, while none would have penetrated a cargo tank in the 165,000-cubic meter tanker. To be conservative, a reduction factor is based on the B/15 double-hull height, which was sufficient to prevent inner-hull penetration in 85 percent of the cases. Therefore, the reduction factor in grounding casualties is 0.15.

The probability of a tanker sustaining cargo tank damage in a collision-type casualty depends on several factors: the displacement and construction of both vessels, the velocity of the striking vessel and its angle of impact with the struck vessel, and the location of the point of impact along the struck vessel. An analysis has been made by Arthur D. Little, Inc. to determine the collision resistance of the "Ben Franklin," a 120,000-cubic meter LNG tanker employing the Conch Ocean membrane tank system. 2/ According to the empirical method developed by Minorsky, a striking ship speed in excess of 3.4 knots could damage the most vulnerable cargo tank. 3/ This critical velocity was based on a right-angle collision by a 38,000-ton displacement striking vessel. Obviously other angles

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1/ J.C. Card, "Effectiveness of Double Bottoms in Preventing Oil Outflow from Tanker Bottom Damage Incidents," Marine Technology, January 1975, pp. 60-64. Also, D.M. Bovet, Preliminary Analysis of Tanker Groundings and Collisions, U.S. Coast Guard, January 1973.

2/ Arthur D. Little, Inc., "The Collision Resistance of the 'Ben Franklin.'"

3/ V.U. Minorsky, "Analysis of Ship Collisions with Reference to Protection of Nuclear Power Plants," Journal of Ship Research, October 1959.

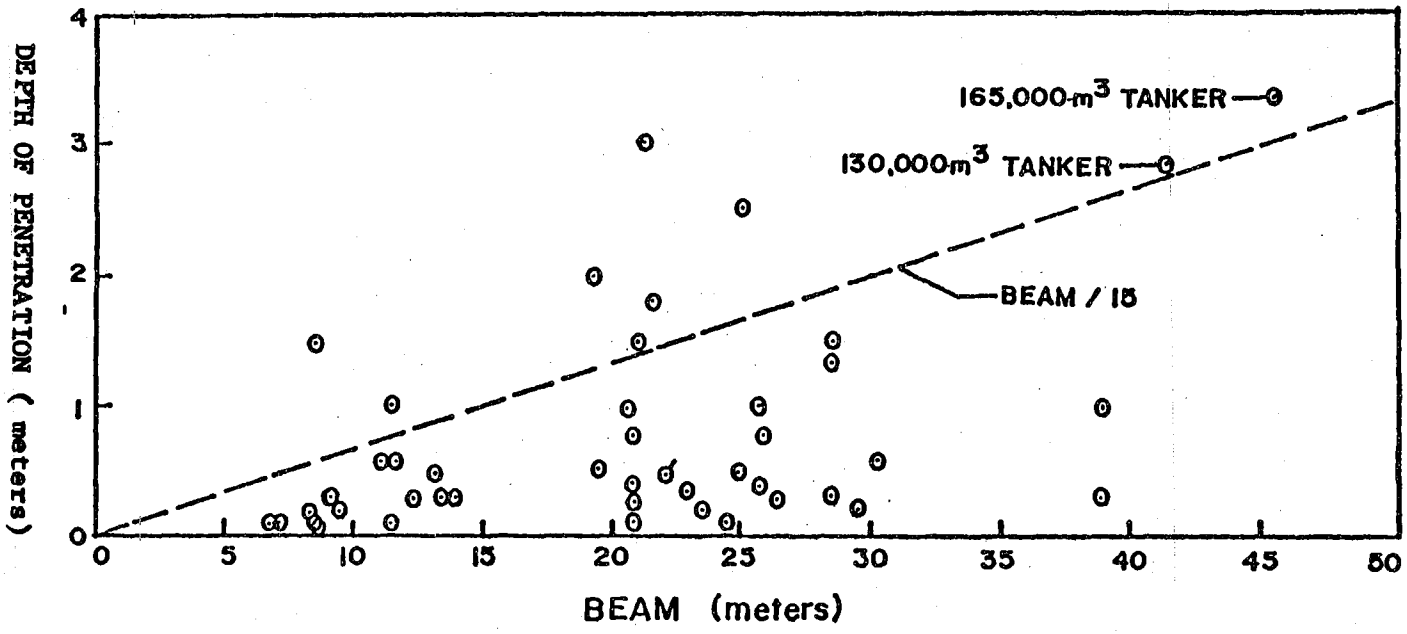

Figure 5

Vertical Extent of Grounding Damage Versus Tanker Beam

of impact or striking ships of different displacement would produce different critical velocities. However, this illustrates that the double-hull construction may not be effective in preventing cargo tank damage in many of the collisions which may be encountered.

Similar conclusions were found in analyses of historical collision data. The Bovet study of 52 collisions found that the median depth of penetration was about 5.2 meters. This value compares favorably with Comstock's mean penetration depth of 4.8 meters in his analysis of 67 collisions. 1/ However, the double-hull construction should be effective in reducing the probability of spills in low-energy collisions. To account for the protection of this design feature, a reduction factor is derived from the historical data of Bovet and Comstock. Bovet's data indicate that in 75 percent of the collisions studied, the collision penetration depth exceeded the depth of the double-hull of a 130,000-cubic meter LNG tanker. Comstock's study found 75 percent exceeded the double-hull depth. A reduction factor of 0.75 could therefore be used for collision-type casualties. This factor should be considered conservative because it was based on collisions with common vessels and therefore does not account for the additional collision resistance provided by the inner hull and the cargo tank walls of the LNG tankers.

Two design features of the LNG tankers should reduce the likelihood of a cargo tank sustaining damage in a ramming-type casualty--the lateral bow thruster and the structural material separating the forwardmost cargo tank from the bow.

Porricelli's study found that 60 percent of the ramming incidents occur at piers and at speeds generally less than 2 knots. 2/ It is at the low speeds around piers that rudder steering is least effective; however, a lateral bow thruster can greatly increase maneuverability and aid in docking maneuvers. Figure 6 illustrates the turning moment characteristics (a measure of a vessel's maneuverability) for a 60,000-deadweight tonnage tanker equipped with a lateral bow thruster. At low speeds, where the rudder effect approaches zero, the bow thruster is most effective. At higher speeds, the bow thruster serves as a safety feature by providing steering capability in the event of rudder failure.

1/ J.P. Comstock and J.B. Robertson, Jr., "Survival of Collisions Damage Versus the 1960 Convention on Safety of Life at Sea," Society of Naval Architects and Marine Engineers Transactions, Vol. 69, 1969.

2/ "Tankers and the Ecology," pp. 189-190.

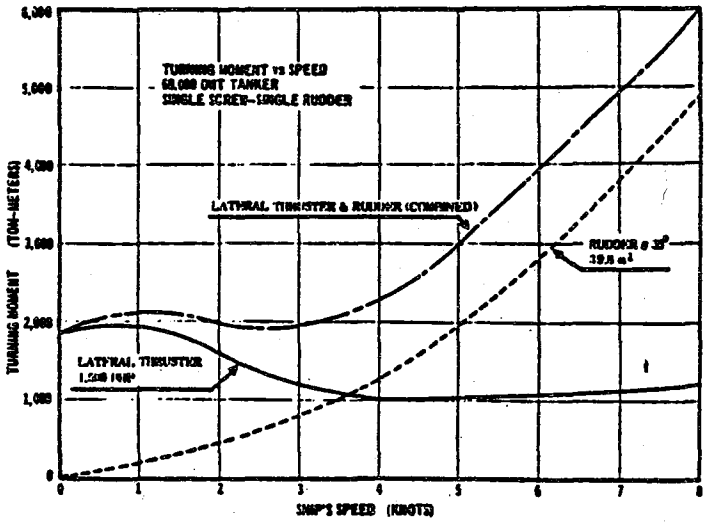

Figure 6

Turning Moment Characteristics

Source: J. D. Porricelli, et al., "Tankers and the Ecology," p. 190.

Of the three casualty types under consideration, rammings are generally the least severe, resulting in the lowest fraction of PCI per incident and the lowest amount of oil outflow per PCI. Bovet's analysis of 1,416 casualties found that the 222 ramming incidents contributed only 1.08 percent of the total outflow. Of the 23 outflows caused by rammings, 2 occurred at entrances, 6 in harbors, and 15 at piers.

The combination of the lateral bow thruster and the forward structural material should prevent cargo tank damage at piers and limit spills to high-speed rammings with fixed objects. There is a lack of data from which to develop a reduction factor for these design features, as well as a question of whether a bow thruster is a necessity rather than an option as a ship's length increases. However, it is felt that the combination of both features is at least as effective in preventing cargo tank damage in rammings as the double-bottom hull structure is in grounding casualties. The same reduction factor, 0.15, could therefore be used for rammings.

C. PROBABILITY OF A PLUME AFFECTING POPULATED AREAS

During an accident sufficient to rupture one or more LNG cargo tanks, it is possible that sparks or flames could ignite the vapor cloud at the spill site. Such an event would prevent the downwind spread of potentially flammable vapors and minimize the risk to the general public in more distant areas. However, an extreme hazard would exist for the tanker crew and anyone in the proximity of the fire.

In the absence of an ignition source at the spill site, the potentially flammable vapor cloud would drift downwind until the forces of dispersion would dilute the vapor concentration below the lower flammability limit (LFL). Until that point were reached, an ignition source could initiate a plume fire and endanger the nearby population.

The probability of ignition of the LNG vapor cloud at the spill site is almost a certainty for collision-type casualties. 1/ To be conservative, it is assumed that in 90 percent of the collisions, ignition of the plume will occur at the spill site, yielding a reduction factor of 0.10.

1/ The U.S. Coast Guard shares this viewpoint and has so testified at the Distrigas Corporation/Eascogas LNG Inc. hearings in Docket Nos. CP73-47 et al. and CP73-132 et al. before the FPC. Transcript Volumes 43 and 44 and Eascogas LNG Inc., Transcript Volume 26.

Little data are available on the probability of plume ignition in groundings and rammings. Because of the high energy required to rupture a cargo tank in rammings and because the mechanisms involved in rammings are similar to collisions, it is felt that the same probability of ignition applies.

In groundings, the damage occurs beneath the water surface. This should reduce the potential ignition sources compared to the other casualty types. Because of the paucity of data and in the interest of conservatism, it is assumed that no ignition would occur; therefore, the reduction factor for groundings is 1.0.

D. RISK TO THE GENERAL PUBLIC

Under most conditions, the greatest hazard to the general public would result from an unignited vapor cloud drifting over a populated area. The magnitude of the hazard would depend on the land use of the area swept by the cloud. In rural or sparsely populated areas having few or no ignition sources, it is possible that a vapor cloud would not be ignited. In this case, the plume would continue drifting downwind until dispersion forces diluted the vapors below the LFL and eliminated the potential hazard.

In residential or industrial areas, a vapor cloud would be exposed to numerous potential sources of ignition. In this situation, it is unlikely that the cloud would achieve its maximum range without ignition. Instead, the cloud would probably ignite soon after reaching land and burn back to the spill site.

The fatalities in populated areas resulting from a vapor cloud are assumed to equal the entire population within the swept area of the cloud. In theory, the number of fatalities could equal the population within the maximum range of the cloud. However, the likelihood of early ignition in most cases would limit the range of the cloud to less than the maximum. As noted in Attachment 2, the radiation hazard from a vapor cloud fire is not considered significant, so only those within the cloud are counted as fatalities. A method for estimating the expected fatalities as a function of ignition sources is presented in Attachment 3.

In some locations, it is possible that an LNG pool fire could pose a greater hazard than those associated with an ignited vapor cloud. For LNG facilities located in remote areas or having marine terminals well offshore, the fatalities from radiation exposure from a pool fire would be less than those from the ignition of a vapor cloud drifting over land. However, an LNG pool fire in a confined harbor or channel could cause greater fatalities than a drifting vapor cloud. The evaporating pool of LNG would fuel an intense fire resulting in high levels of thermal radiation covering a wide area. It has been conservatively estimated that 20 percent of the population located within this area would be unshielded by buildings or other structures and therefore could sustain severe burns or death.

Attachment 2 to this study describes procedures for estimating radiation levels at various distances from an LNG pool fire. Difficulties arise in selecting a value of radiation to use in estimating fatalities from radiation levels and time of exposure. The staff has therefore selected a radiation level of 5,300 Btu/hr-ft^2 and an exposure time of 5 seconds to estimate potential fatalities. This is the level at which blistering occurs upon 5 seconds of exposure. Exposure to these levels has been found to result in second-degree burns. Interpolating from Table 1 of Attachment 2, a one-tank pool fire of 30,000-cubic meters would yield a distance of about 3,830 feet to the 5,300 Btu/hr-ft^2 radiation level.

A method for analysis of vapor plumes from an LNG spill on water is presented in Attachment 1. As shown in Figure 1 of the attachment, the maximum range of flammable vapors for a one-tank spill of 30,000 cubic meters is about 1.3 km or 4,265 feet. With the exception of the Nikiski site, all of the proposed or alternate sites have tanker routes and terminal approaches over 4,400 feet from the nearest populated area. Therefore, the risk to the general public from either a flammable vapor cloud or hazardous radiation from an LNG pool fire would be negligible for the Point Conception, Naples, Rattlesnake Canyon, Oxnard and Cape Starichkof sites. Approximately four residences are located within 4,265 feet of the proposed docking facilities at Nikiski. The risk to these people is minimal, however, because of their limited exposure to possible spill-causing collisions. (An accident would have to occur along the first 2,800 feet of the proposed 110-mile long Cook Inlet passage.) It is estimated that the individual fatality risk from radiation of an LNG pool fire is 5.87×10^{-11} fatalities/person/yr. The individual risk from a flammable vapor cloud based on the FERC cloud model is approximately 1.19×10^{-9} fatalities/person/yr.

However, it must be noted that considerable disagreement exists within the scientific community on the modeling of LNG vapor clouds. Various attempts to predict the complex behavior of an LNG spill and the subsequent dispersion of flammable vapors have yielded a wide range of results ranging from a fraction of a mile to 50 miles. A recent U.S. Coast Guard study reviews and compares seven current models to identify the reasons for the differences in predictions. 1/ In discussing the FERC vapor cloud model, the study questioned the low vapor release rate and the use of neutral atmospheric stability for plume dispersion.

While no reasonable solution to the controversy appears to exist at this time, the great disparity among the various models must be considered in an objective determination of public risk. 2/ Therefore, this study will consider vapor cloud distances greater than those predicted in Attachment 1 in assessing the consequences from an LNG spill.

The basic modeling techniques presented in Attachment 1 remain unchanged. However, the rate of vapor release has been changed, and the vapor dispersion is now modeled for a wide range of atmospheric stability class/windspeed combinations. (See Table 8.) The vapor release rate of Attachment 1 has been replaced by a rate suggested by Feldbauer based on empirical data. (See pages 84 to 87 of the above-referenced study.) This does not imply that the staff concurs with the equations presented by Feldbauer nor that the staff considers the distances associated with stable atmospheric conditions to be credible. Under stable conditions and low windspeeds, the effects of topography are important, and the frequent shifts in wind direction would enhance the horizontal dispersion of the plume. Nevertheless, these modifications to the vapor cloud model were done to permit a wide range of distances to be generated as a function of meteorology, regardless of real world considerations.

1/ "Predictability of LNG Vapor Dispersion From Catastrophic Spill Onto Water: An Assessment," April 1977.

2/ The staff is presently conducting independent research to resolve the controversy with the active participation of Science Application, Inc. and Dr. Jerry Havens, consultant to the U.S. Coast Guard.

TABLE 8

DOWNWIND DISTANCE TO LOWER FLAMMABLE LIMIT (km) -- 30,000-m^3 SPILL

Windspeed		Stability Class					
Range (kts)	mean (m/sec)	A	B	C	D	E	F
0-3	1.502	0.6	1.2	2.1	5.8	11.1	26.6
4-6	2.458	0.6	1.2	2.1	5.9	11.3	27.1
7-10	4.470	0.5	1.0	1.8	4.9	9.2	21.6
11-16	6.929	0.5	0.9	1.6	4.2	7.8	18.1
17-21	9.611	0.5	0.8	1.4	3.7	6.8	15.6
21	12.520	0.4	0.8	1.3	3.3	6.1	13.7

The analysis of individual risk focuses on the populated areas nearest each of the proposed and alternate LNG marine terminals and tanker routes to each site. In each case, an estimate of fatalities per year (F/yr.) is made by identifying all possible spill locations and the associated meteorological conditions which could expose the population to a flammable vapor cloud. For each spill location, windspeed, wind direction, and stability class, a unique probability and consequence is determined. The summation of all possible combinations yields the F/yr., expressed mathematically as

$$F/yr = \sum_j P_{cloud_j} \times \sum_i P_{(su\theta)_i} \times E(F)_i$$

where $P_{cloud\ j}$ is the annual probability of a flammable vapor cloud forming at location j. This probability is determined from Tables 10 to 15.

For a vapor cloud forming at location j, a large number of combinations windspeeds (u), wind directions (θ), and stability classes (s) are possible. The probability of each unique

combination of s, u, and ϕ is represented by $P(su\phi)$. The probabilities are obtained from the STAR programs for locations near the various sites. 1/

Each vapor cloud i defines a unique consequence, the expected fatalities, $E(F)_i$. $E(F)_i$ is a function of the maximum range of flammable vapors for cloud i and the number of ignition sources in the vapor cloud path. Attachment 3 presents a method for calculating $E(F)_i$.

Although the estimated F/yr is based on the rupture of an LNG cargo tank and subsequent formation of a flammable vapor cloud, other potentially hazardous events are considered in the analysis. The probability of a cargo tank spill followed by ignition at the spill site is shown in Tables 10 to 15. This event could create hazardous radiation levels extending radially about 3,830 feet. However, for all sites except Nikiski, no populated areas are located within this distance, and therefore the consequences to the public from this event are negligible. At Nikiski, the risk from radiation was found to be several orders of magnitude less than the vapor cloud hazard. Smaller releases of LNG could result from piping leaks or operational spills at the marine terminal. The volume of LNG spilled in these cases would be orders of magnitude less than the

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1/ National Climatic Center, "Wind Distribution By Pasquill Stability Classes: Kenai, Alaska, January 1966 - December 1970," Asheville, N.C., October 19, 1972. (For Nikiski and Cape Starichkof)

---- "Wind Distribution By Pasquill Stability Classes: Santa Barbara, California, 1960 - 1964," Asheville, N.C., November 11, 1970. (For Naples)

---- "Wind Distribution By Pasquill Stability Classes: Point Arguello, California, 1960-1964," Asheville, N.C., N.D. (For Point Conception)

---- "Wind Distribution By Pasquill Stability Classes: Vandenburg Air Force Base, January 1961 - December 1970," Asheville, N.C., August 19, 1974. (For Rattlesnake Canyon)

---- "Wind Distribution By Pasquill Stability Classes: Oxnard, California, 1960-1964," Asheville, N.C., September 16, 1974.

instantaneous release of a 30,000-cubic meter cargo tank. For these events, the range of flammable vapors would be restricted to the vicinity of the release and would not affect the public.

Individual risk is expressed as the fatalities per exposed person per year. From the estimated F/yr and the associated exposed population (E), the average individual risk is calculated.

$$\text{Individual Risk} = (\text{F/yr})/\text{E}$$

Populated areas near each site which could experience the highest individual risk were identified. These estimates are presented in Table 9. The large vapor cloud distances in Table 8 could expose other populated areas to a risk. Although the individual risk has not been quantified for other areas, their greater distance or smaller exposure to a potential spill location significantly reduces the probability of exposure to a flammable vapor cloud. As a result, the individual risk at these locations would be less than those for the populated areas chosen.

The exposed populations for all the locations shown in Table 9, with the exception of the Rattlesnake Canyon site, represent permanent residential populations. The area surrounding the Rattlesnake Canyon site is unpopulated and the 25-man workforce at the Diablo Canyon Nuclear Power Plant was selected as the nearest exposed population. (It is estimated that this number of work personnel would be present at all times.)

The risk to an exposed population has been quantified in two ways--the expected number of fatalities per year (a measure of societal risk) and the risk to an individual. Individual risk is more readily compared to the risks experienced from common manmade and natural hazards and serves as the primary basis for judging the safety of the sites. The expected fatalities per year reflect the concentration of population in the vicinity of the site and tanker route. For example, it is estimated that the permanent population within 4 miles of the Oxnard site is approximately 105,000. The large number of receptor areas in the vicinity of this site contribute to the total expected fatalities per year of 6.3×10^{-3}. This value is several orders of magnitude higher than that at the remote sites, where the fatalities per year are based only on a single receptor area.

While the entire 105,000 people at Oxnard would be exposed to a potential hazard, the areas along the coast and nearest the LNG tanker route would experience the greatest risk; e.g., the individual risk estimated for Census Tract 44, Blocks 113-118, is representative of the highest risk areas. The risk for locations farther inland is negligible because of the high probability of vapor cloud ignition from the first ignition sources.

E. CONCLUSION

The analysis of public risk from the possible marine transportation of LNG from Cook Inlet, Alaska, to points in California considered events which could affect nearby populated areas. Neither a flammable vapor cloud, radiation from an LNG pool fire, or minor spills and leaks would cause casualties among the general population at Point Conception, Naples, Rattlesnake Canyon, Oxnard, or Cape Starichkof. The total individual risk for the Nikiski site was estimated to be approximately 1.20×10^{-9} fatalities per exposed person per year.

However, the staff recognizes the considerable controversy over the maximum range of flammable vapors from an LNG spill on water. In the interest of conservatism, additional risk estimates were based on vapor cloud distances considerably greater than those predicted by the FERC model in Attachment 1. These risk estimates are presented in Table 16 along with those from other manmade and natural risks.

As shown in Table 16, the individual risks estimated for the proposed and three alternate sites in southern California ranged from 1.82×10^{-7} to 8.32×10^{-7} fatalities per exposed person per year. The highest individual risk was estimated for the small populations in the vicinity of several of the remote sites, while the coastal areas at Oxnard would have a lower level of risk. For receptor areas located nearest the tanker route, individual risk is primarily a function of the proximity to the tanker route and the local meteorological conditions, since it is assumed that the vapor cloud has a low probability of being ignited by the first several sources. Therefore, a tanker route close to shore and prevailing onshore winds could increase the level of individual risk. It is for this reason that some of the remote sites would have a slightly higher individual risk for the few exposed people. However, the societal risk would be much greater at Oxnard, illustrated by the expected fatalities per year which are two orders of magnitude higher than those at the remote sites.

The risks from the transportation of LNG to any of the four locations in southern California are comparable to the risks from natural events such as lightning, tornadoes, and hurricanes. The staff believes that this level constitutes an acceptable risk to the public. The risks for the proposed Nikiski and Cape Starichkof alternate sites are an order of magnitude less than for the California sites and are also considered acceptable.

TABLE 9

RISK ESTIMATES FOR PROPOSED AND ALTERNATE SITES

Location - Receptor	Maximum Expected Fatalities Per Year [1]	Exposed Population	Probability of a Fatality Per Exposed Person Per Year [2]
Point Conception:			
Cojo Ranch	1.13×10^{-5}	15	7.83×10^{-7}
Naples:			
Dos Pueblos Ranch	1.21×10^{-5}	21	5.74×10^{-7}
Rattlesnake Canyon:			
Diablo Canyon Nuclear Power Plant	2.08×10^{-5}	25	8.32×10^{-7}
Oxnard:			
a) Census Tract 44 (Blocks 113-118) [3]	6.17×10^{-5}	339	1.82×10^{-7}
b) Population Within 4 Miles of Site	6.3×10^{-3}	105,000	1.82×10^{-7} To Negligible
Nikiski	3.15×10^{-6}	65	4.39×10^{-8}
Cape Starichkof:			
Anchor Point	1.51×10^{-6}	91	1.48×10^{-8}

1/ A measure of societal risk.

2/ A measure of individual risk.

3/ Receptor area representative of the coastal area at Oxnard with the highest individual risk.

TABLE 10

PROBABILITY OF AN LNG CARGO TANK SPILL,
FLAMMABLE VAPOR CLOUD, AND POOL FIRE
POINT CONCEPTION, CALIFORNIA

	CASUALTY TYPES			
	Collisions	Groundings	Rammings	Total
Annual Probability of an LNG Tanker Casualty [1]				
(1) Historical Casualty Rate (Casualty/Trip)	-	-	-	1.20×10^{-3}
(2) Casualty Type Distribution	.38	.35	.27	-
(3) VTS Reduction Factors [2]	1.0	1.0	1.0	-
(4) Annual Number of LNG Tanker Trips	-	-	-	193
(5) Annual Casualty Rate (Casualty/Yr.) = (1)x(2)x(3)x(4)	8.80×10^{-2}	8.11×10^{-2}	6.25×10^{-2}	2.32×10^{-1}
Probability of a Spill in the Event of a Casualty				
(6) Historical Spill Frequency (PCI [3]/Casualty)	.006	.014	NEG	-
(7) LNG Tanker Reduction Factors	.75	.15	-	-
(8) Annual Spill Rate (Spills/Yr.) = (5)x(6)x(7)	3.96×10^{-4}	1.70×10^{-4}	-	5.66×10^{-4}
Probability of Forming a Flammable Vapor Cloud				
(9) Probability of No Ignition at Spill Site	0.1	1.0	-	-
(10) Probability of a Flammable Vapor Cloud = (8)x(9)	3.96×10^{-5}	1.70×10^{-4}	-	2.09×10^{-4}
Probability of an LNG Pool Fire				
(11) Probability of Ignition at Spill Site	0.9	0.0	-	-
(12) Probability of a Pool Fire = (8)x(11)	3.56×10^{-4}	-	-	3.56×10^{-4}

1/ For the purpose of this report, a casualty is defined as an accident involving a ship and should not be construed as a human fatality or injury.

2/ VTS - Vessel Traffic System - Reduction factors apply only to waterways with VTS scheduled to become operational coincident with the proposed LNG project.

3/ PCI - Pollution Causing Incident

TABLE 11

PROBABILITY OF AN LNG CARGO TANK SPILL, FLAMMABLE VAPOR CLOUD, AND POOL FIRE
RATTLESNAKE CANYON, CALIFORNIA

	CASUALTY TYPES			
Annual Probability of an LNG Tanker Casualty 1/	Collisions	Groundings	Rammings	Total
(1) Historical Casualty Rate (Casualty/Trip)	-	-	-	1.09×10^{-3}
(2) Casualty Type Distribution	.38	.35	.27	-
(3) VTS Reduction Factors 2/	1.0	1.0	1.0	-
(4) Annual Number of LNG Tanker Trips	-	-	-	193
(5) Annual Casualty Rate (Casualty/Yr.) = (1)x(2)x(3)x(4)	8.03×10^{-2}	7.39×10^{-2}	5.70×10^{-2}	2.11×10^{-1}
Probability of a Spill in the Event of a Casualty				
(6) Historical Spill Frequency (PCI 3//Casualty)	.006	.014	NEG	-
(7) LNG Tanker Reduction Factors	.75	.15	-	-
(8) Annual Spill Rate (Spills/Yr.) = (5)x(6)x(7)	3.61×10^{-4}	1.55×10^{-4}	-	5.16×10^{-4}
Probability of Forming a Flammable Vapor Cloud				
(9) Probability of No Ignition at Spill Site	0.1	1.0	-	-
(10) Probability of a Flammable Vapor Cloud = (8)x(9)	3.61×10^{-5}	1.55×10^{-4}	-	1.91×10^{-4}
Probability of an LNG Pool Fire				
(11) Probability of Ignition at Spill Site	0.9	0.0	-	-
(12) Probability of a Pool Fire = (8)x(11)	3.24×10^{-4}	-	-	3.24×10^{-4}

1/ For the purpose of this report, a casualty is defined as an accident involving a ship and should not be construed as a human fatality or injury.

2/ VTS - Vessel Traffic System - Reduction factors apply only to waterways with VTS scheduled to become operational coincident with the proposed LNG project.

3/ PCI - Pollution Causing Incident

TABLE 12

PROBABILITY OF AN LNG CARGO TANK SPILL, FLAMMABLE VAPOR CLOUD, AND POOL FIRE OXNARD, CALIFORNIA

	CASUALTY TYPES			
Annual Probability of an LNG Tanker Casualty [1]	Collisions	Groundings	Rammings	Total
(1) Historical Casualty Rate (Casualty/Trip)	-	-	-	4.43×10^{-3}
(2) Casualty Type Distribution	.38	.35	.27	-
(3) VTS Reduction Factors [2]	1.0	1.0	1.0	-
(4) Annual Number of LNG Tanker Trips	-	-	-	193
(5) Annual Casualty Rate (Casualty/Yr.) = (1)x(2)x(3)x(4)	3.24×10^{-1}	2.99×10^{-1}	2.30×10^{-1}	8.53×10^{-1}
Probability of a Spill in the Event of a Casualty				
(6) Historical Spill Frequency (PCI [3]/Casualty)	.006	.014	NEG	-
(7) LNG Tanker Reduction Factors	.75	.15	-	-
(8) Annual Spill Rate (Spills/Yr.) = (5)x(6)x(7)	1.46×10^{-3}	6.28×10^{-4}	-	2.09×10^{-3}
Probability of Forming a Flammable Vapor Cloud				
(9) Probability of No Ignition at Spill Site	0.1	1.0	-	-
(10) Probability of a Flammable Vapor Cloud = (8)x(9)	1.46×10^{-4}	6.28×10^{-4}	-	7.74×10^{-4}
Probability of an LNG Pool Fire				
(11) Probability of Ignition at Spill Site	0.9	0.0	-	-
(12) Probability of a Pool Fire = (8)x(11)	1.31×10^{-3}	-	-	1.31×10^{-3}

1/ For the purpose of this report, a casualty is defined as an accident involving a ship and should not be construed as a human fatality or injury.

2/ VTS - Vessel Traffic System - Reduction factors apply only to waterways with VTS scheduled to become operational coincident with the proposed LNG project.

3/ PCI - Pollution Causing Incident

TABLE 13

PROBABILITY OF AN LNG CARGO TANK SPILL, FLAMMABLE VAPOR CLOUD, AND POOL FIRE NAPLES, CALIFORNIA

	CASUALTY TYPES			
	Collisions	Groundings	Rammings	Total
Annual Probability of an LNG Tanker Casualty [1]				
(1) Historical Casualty Rate (Casualty/Trip)	-	-	-	2.05×10^{-3}
(2) Casualty Type Distribution	.38	.35	.27	-
(3) VTS Reduction Factors [2]	1.0	1.0	1.0	-
(4) Annual Number of LNG Tanker Trips	-	-	-	193
(5) Annual Casualty Rate (Casualty/Yr.) = (1)x(2)x(3)x(4)	1.50×10^{-1}	1.39×10^{-1}	1.07×10^{-1}	3.96×10^{-1}
Probability of a Spill in the Event of a Casualty				
(6) Historical Spill Frequency (PCI [3]/Casualty)	.006	.014	NEG	-
(7) LNG Tanker Reduction Factors	.75	.15	-	-
(8) Annual Spill Rate (Spills/Yr.) = (5)x(6)x(7)	6.75×10^{-4}	2.9×10^{-4}	-	9.65×10^{-4}
Probability of Forming a Flammable Vapor Cloud				
(9) Probability of No Ignition at Spill Site	0.1	1.0	-	-
(10) Probability of a Flammable Vapor Cloud = (8)x(9)	6.75×10^{-5}	2.90×10^{-4}	-	3.58×10^{-4}
Probability of an LNG Pool Fire				
(11) Probability of Ignition at Spill Site	0.9	0.0	-	-
(12) Probability of a Pool Fire = (8)x(11)	6.07×10^{-4}	-	-	6.07×10^{-4}

1/ For the purpose of this report, a casualty is defined as an accident involving a ship and should not be construed as a human fatality or injury.

2/ VTS - Vessel Traffic System - Reduction factors apply only to waterways with VTS scheduled to become operational coincident with the proposed LNG project.

3/ PCI - Pollution Causing Incident

TABLE 14

PROBABILITY OF AN LNG CARGO TANK SPILL, FLAMMABLE VAPOR CLOUD, AND POOL FIRE NIKISKI, ALASKA

	CASUALTY TYPES			
Annual Probability of an LNG Tanker Casualty 1/	Collisions	Groundings	Rammings	Total
(1) Historical Casualty Rate (Casualty/Trip)	-	-	-	7.04×10^{-3}
(2) Casualty Type Distribution	.05	.16	.79	-
(3) VTS Reduction Factors 2/	1.0	1.0	1.0	-
(4) Annual Number of LNG Tanker Trips	-	-	-	52
(5) Annual Casualty Rate (Casualty/Yr.) = (1)x(2)x(3)x(4)	1.83×10^{-2}	5.86×10^{-2}	2.89×10^{-1}	
Probability of a Spill in the Event of a Casualty				
(6) Historical Spill Frequency (PCI 3/Casualty)	.006	.014	NEG	-
(7) LNG Tanker Reduction Factors	.75	.15	-	-
(8) Annual Spill Rate (Spills/Yr.) = (5)x(6)x(7)	8.24×10^{-5}	1.23×10^{-4}	-	2.05×10^{-4}
Probability of Forming a Flammable Vapor Cloud				
(9) Probability of No Ignition at Spill Site	0.1	1.0	-	-
(10) Probability of a Flammable Vapor Cloud = (8)x(9)	8.24×10^{-6}	1.23×10^{-4}	-	1.31×10^{-4}
Probability of an LNG Pool Fire				
(11) Probability of Ignition at Spill Site	0.9	0.0	-	-
(12) Probability of a Pool Fire = (8)x(11)	7.41×10^{-6}	-	-	7.41×10^{-5}

1/ For the purpose of this report, a casualty is defined as an accident involving a ship and should not be construed as a human fatality or injury.

2/ VTS - Vessel Traffic System - Reduction factors apply only to waterways with VTS scheduled to become operational coincident with the proposed LNG project.

3/ PCI - Pollution Causing Incident

TABLE 15

PROBABILITY OF AN LNG CARGO TANK SPILL,
FLAMMABLE VAPOR CLOUD, AND POOL FIRE
CAPE STARICHKOF, ALASKA

	CASUALTY TYPES			
Annual Probability of an LNG Tanker Casualty [1]	**Collisions**	**Groundings**	**Rammings**	**Total**
(1) Historical Casualty Rate (Casualty/Trip)	-	-	-	3.39×10^{-3}
(2) Casualty Type Distribution	.05	.16	.79	-
(3) VTS Reduction Factors [2]	1.0	1.0	1.0	-
(4) Annual Number of LNG Tanker Trips	-	-	-	52
(5) Annual Casualty Rate (Casualty/Yr.) = (1)x(2)x(3)x(4)	8.81×10^{-3}	2.82×10^{-2}	1.39×10^{-1}	1.76×10^{-1}
Probability of a Spill in the Event of a Casualty				
(6) Historical Spill Frequency (PCI [3]/Casualty)	.006	.014	NEG	-
(7) LNG Tanker Reduction Factors	.75	.15	-	-
(8) Annual Spill Rate (Spills/Yr.) = (5)x(6)x(7)	3.97×10^{-5}	5.92×10^{-5}	-	9.89×10^{-5}
Probability of Forming a Flammable Vapor Cloud				
(9) Probability of No Ignition at Spill Site	0.1	1.0	-	-
(10) Probability of a Flammable Vapor Cloud = (8)x(9)	3.97×10^{-6}	5.92×10^{-5}	-	6.30×10^{-5}
Probability of an LNG Pool Fire				
(11) Probability of Ignition at Spill Site	0.9	0.0	-	-
(12) Probability of a Pool Fire = (8)x(11)	3.57×10^{-5}	-	-	3.57×10^{-5}

1/ For the purpose of this report, a casualty is defined as an accident involving a ship and should not be construed as a human fatality or injury.

2/ VTS - Vessel Traffic System - Reduction factors apply only to waterways with VTS scheduled to become operational coincident with the proposed LNG project.

3/ PCI - Pollution Causing Incident

TABLE 16

COMPARISON OF RISKS

Accident Type	Annual Fatalities 1/	Probability of Fatality Per Exposed Person Per Year 1/
Motor Vehicle	55,791	2.5×10^{-4}
Falls	17,827	1.0×10^{-4}
Fires & Hot Substances	7,451	4.0×10^{-5}
Drownings	6,181	3.3×10^{-5}
Firearms	2,309	1.0×10^{-5}
Air Travel	1,778	1.0×10^{-5}
Falling Objects	1,271	6.2×10^{-6}
Electrocution	1,148	6.2×10^{-6}
Lightning	160	5.0×10^{-7}
Tornadoes	91	4.0×10^{-7}
Hurricanes	93	4.0×10^{-7}
All Accidents	111,992	6.2×10^{-4}
100 Nuclear Power Plants	-	2.0×10^{-10}
LNG Tanker Accident 2/		
Point Conception	1.13×10^{-5}	7.83×10^{-7}
Naples	1.21×10^{-5}	5.74×10^{-7}
Oxnard 3/	6.3×10^{-3}	1.82×10^{-7}
Rattlesnake Canyon	2.08×10^{-5}	8.32×10^{-7}
Nikiski	3.15×10^{-6}	4.39×10^{-8}
Cape Starichkof	1.51×10^{-6}	1.48×10^{-8}

1/ U.S. Nuclear Regulatory Commission, Reactor Safety Study, WASH-1400, October 1975.

2/ Staff's estimated probabilities. Based on vapor cloud distances considerably greater than predicted in Attachment 1.

3/ The annual fatalities for Oxnard were estimated for the population located within 4 miles of the site; the fatalities per exposed person per year represent the maximum value for receptors on the coast of Oxnard.

ATTACHMENT 1

VAPOR PLUME ANALYSIS FOR LNG SPILLS ON WATER

Nomenclature

a - function of stability class (m)

b - exponent to determine σ_y (dimensionless)

c,d - functions of stability class (degrees)

d' - diameter of the source measured at time of consideration (meters)

g - gravitational acceleration, 9.814 meters/sec^2

h - liquid regression rate, 1 inch/minute (assumed)

he - initial height of vapor cloud (m)

H - cloud height (m)

K - constant = 2 (assumed)

q - source strength at neutral buoyancy (gms/sec)

Q - heat transfer rate (lb/sec)

r - radius of pool (ft)

r_e - maximum pool radius (ft or m)

r_n - radius of vapor cloud at neutral buoyancy (m)

s - length of a side of an area source (meters)

t - time (sec)

te - time to LNG evaporation (sec)

T - temperature (^oK)

u - wind speed (m/sec)

V - volume of vapor cloud (m^3)

Vo - volume of spilled LNG (ft^3)

X - downwind distance from source (km)

Xo - normalizing distance = 1 km

x_y - distance to virtual source (km)

C - vapor concentration (gm/m^3)

ρ_a - density of air at 273°K, 1.293×10^{-3} gms/cm^3

ρ_L - density of liquid LNG, 28.3 lbs/ft^3

ρ - density of gaseous LNG (gms/cm^3)

ρ_w - density of water, 62.4 lb/ft^3

σ_y - standard crosswind deviation of the plume concentration (m)

σ_{y_o} - initial crosswind standard deviation (m)

σ_z - standard vertical deviation of the plume concentration (m)

θ_p - half angle of horizontal plume spreading (degrees)

SPREAD AND EVAPORATION OF LNG ON WATER

In the event of an LNG spill on water, the liquid will gravitationally spread to a maximum pool size and evaporate as it spreads. This maximum pool size and time to evaporation is of interest and can be quantitatively estimated. For an instantaneous spill of a volume of LNG on water, several models have been suggested to determine the maximum pool radius and evaporation time. A summary of the pertinent equations and authors is as follows. 1/

Author	Equation for Maximum Radius	Equation for Evaporation Time
Fay	$r_e = 4.70\ Vo^{5/12}$	$te = 3.3\ Vo^{1/3}$
Hoult 2/	$r_e = 10.4\ Vo^{5/12}$	$te = 14.5\ Vo^{1/3}$
Hoult 3/	$r_e = 7.3\ Vo^{3/8}$	$te = 7.9\ Vo^{1/4}$
Otterman	$r_e = \frac{7.6\ Vo^{3/8}}{h^{1/8}}$	$te = \frac{12.4\ Vo^{1/4}}{h^{1/2}}$
Raj/Kalelkar	$r_e = \frac{7.4\ Vo^{3/8}}{h^{1/4}}$	$te = \frac{8.8\ Vo^{1/4}}{h^{1/2}}$
Muscari	$r_e = \frac{9.07\ Vo^{3/8}}{h^{1/4}}$	$te = \frac{10.56\ Vo^{1/4}}{h^{1/2}}$

1/ B. Otterman, "Analysis of Large LNG Spills on Water; Part I: Liquid Spread and Evaporation," Cryogenics (August 1975), pp. 455-460; Elizabeth M. Drake, Testimony in Hearings before the Federal Power Commission, Nov. 26, 1975.

2/ Ice formation model.

3/ Nonformation of ice model.

where density of LNG was assumed to equal 28.3 lbs/ft^3

V_o = volume of spill (ft^3)

r_e = maximum pool radius (ft)

t_e = time to evaporation (sec)

h = liquid regression rate (inch/minute)

A comparison of each model for various size spills is shown in Table 1 for the case of a 1-inch per minute liquid regression rate, which is equivalent to a constant boiling rate of 30,000 Btu/hr-ft^2. As can be seen from Table 1, there is agreement in the models presented by Hoult (non-ice), Otterman, Raj/Kalelkar, and Muscari for the 1-inch per minute regression rate case. This is not surprising, since each of these models differ only in their constant values, i.e., the radius and time are functions to the three-eighth and one-fourth powers, respectively.

A sharp difference can be noted between these four models and Hoult's ice model. Oddly enough, Fay's predictions are in agreement with the four non-ice models. This is indeed suspicious, because the presence of ice would tend to decrease the vaporization rate per unit area with time as the ice thickness beneath the spill increases. Since both Hoult and Fay assumed ice formation, one would expect their respective estimates to be in agreement; however, the opposite is true.

The environmental staff's former plume analyses were based in part on Hoult's ice formation model. However, significant study has since indicated that conclusive experimental evidence does not currently exist which would clearly indicate whether ice formation occurs. The environmental staff now believes that an ice formation model does not accurately estimate the areal spread and rate of evaporation of a large LNG spill. While the environmental staff would agree that perhaps small amounts of "slosh" ice might exist, its presence would not be compatible with the formation of sheet ice of some finite thickness. In addition, Hoult's ice model neglects the sensible heat loss by the ice as it cools. Since this heat loss can be significant, Hoult's assumption is not fully justified. As a result, Hoult predicts larger ice growth, and consequently a longer time requirement for complete evaporation and a greater extent of pool spread.

TABLE 1

COMPARISON OF LNG SPREADING MODELS

Model	4,000 M^3		10,000 M^3		24,000 M^3		100,000 M^3		
	t_e (min)	r_e (feet)	t_e (min)	r_e (feet)	t_e (min)	r_e (feet)	t_e (min)	r_e (feet)	Heat Transfer Medium
Fay	2.9	656	3.9	960	5.2	1,385	8.4	2510	Ice
Hoult	8.5	1,130	11.4	1,650	15.4	2400	25	4,300	Ice
Hoult	2.5	628	3.2	890	4.0	1,250	5.7	2,100	1 inch per minute
Otterman	4.0	650	5.0	915	6.3	1,270	8.9	2,170	Regression
Raj/Kalelkar	2.8	630	3.6	890	4.4	1,236	6.3	2,110	Regression
Muscari	3.4	774	4.3	1,092	5.3	1,516	7.6	2,589	Regression

For purposes of calculating the behavior of an instantaneous spill of LNG on water, the environmental staff has chosen the method of Raj and Kalelkar and a liquid regression rate of 1 inch per minute. This regression rate corresponds closely to a Bureau of Mines' average observed evaporation rate of 0.037 lbs/ft^2-sec., which corresponds closely to a heat flux rate of 30,000 Btu/ft^2-hr. Higher regression rates have been suggested; however, uncertainties of the regression rate do not have a major influence on predicted pool radius sizes, since r_e is proportional to $h^{-\frac{1}{2}}$. If, for example, the regression rate is doubled, the pool radius would decrease only by approximately 15 percent. The selection of the Raj/Kalelkar model does not imply that the other three suggested models cannot be used for estimation purposes; it simply means that the environmental staff's calculated predictions will be within ± 20 percent, allowing for differences between the various models and uncertainties in the estimation of boiling rates.

For a 37,500-cubic meter spill from a sudden and complete release of a single ship storage tank of the 165,000-cubic meter capacity vessels presently being designed, the maximum pool radius is estimated to be about 446 meters, which would evaporate in approximately 300 seconds (5 minutes). For a 25,000-cubic meter spill from a single ship storage tank of the 125,000-cubic meter capacity vessels presently under construction, the maximum pool radius is estimated to be about 383 meters, which would evaporate in approximately 270 seconds (4½ minutes).

GRAVITY SPREADING OF LNG VAPOR

After the liquid has evaporated, it is at 112°K, but has expanded to a negatively buoyant vapor with a volume of vapor to liquid ratio of approximately 250. Therefore, the initial height, h_e, of the cloud can be expressed as:

$$h_e = \frac{250\ Vo}{\pi r_e^2}$$

on the assumption that the negatively buoyant cloud is of circular shape. For a 37,500-cubic meter spill, the calculations show that the cloud is in the shape of a thin pancake about 892 meters in diameter and 15.0 meters thick. For a 25,000-cubic meter spill, the shape of the cloud is approximately 766 meters in diameter and 13.57 meters thick.

As the cloud continues to gain heat from both the water and surrounding air, the cloud will expand from negative to neutral buoyancy at which point the vapor density of the cloud equals the density of air, which occurs at a vapor temperature of 151°K. During this expansion process to neutral buoyancy, the primary mechanism for cloud spread is considered to be that of gravity spreading rather than atmospheric diffusion, i.e., the effects of atmospheric motion and the entrainment of air due to spreading motions are neglected in the analysis. A further assumption is that the rate of vapor spread is greater than local wind velocity. As the vapor cloud approaches neutral buoyancy, gravity spreading rates will decrease rapidly. When spreading rates become less than local wind velocity, gravitational effects also become negligible. Therefore, at the point of neutral buoyancy, all further dilution of the cloud is considered to be primarily due to atmospheric diffusion, although some gravitational effects may still influence additional mixing.

The spread equation as a function of time is: 1/

$$\frac{dR}{dt} = \left[Kg \left(\frac{\rho - \rho_a}{\rho_a} \right) H \right]^{1/2} \qquad (1)$$

where g = acceleration of gravity

ρ = cloud density

ρ_a = density of ambient air at 273°K

K = constant = 2

H = cloud height

Substitution of $H = V/\pi r^2$ yields

$$\frac{dR}{dt} = \left[\frac{Kg}{\pi} \left(\frac{\rho - \rho_a}{\rho_a} \right) \frac{V}{r^2} \right]^{1/2} \qquad (2)$$

1/ Otterman, p. 455-460.

Integration yields

$$r^2 = \left[\frac{4Kg}{\pi}\left(\frac{\rho - \rho_a}{\rho_a}\right) V\right]^{\frac{1}{2}} t \qquad (3)$$

From the ideal gas law:

$$\frac{dT}{T} = \frac{dV}{V} \qquad (4)$$

where $\frac{dT}{T} = \frac{(151^oK - 112^oK)}{112^oK} = 0.348$

or

$$V_N = 337\ V_o$$

From this amount of expansion, Equation 3 can then be used to calculate the radius of the cloud at neutral buoyancy for the 37,500-cubic meter spill in the following manner:

$$r^2 = \left[\frac{4Kg}{\pi}\left(\frac{\rho - \rho_a}{\rho_a}\right) V\right]^{\frac{1}{2}} t$$

where $k = 2$

$g = 9.814$ meters/sec^2

$\rho_a = 1.293 \times 10^{-3}$ gms/cm^3

$$\rho = \rho_{Log\ mean} = \frac{1.747 \times 10^{-3} - 1.293 \times 10^{-3}}{\ln\left(\frac{1.747 \times 10^{-3}}{1.293 \times 10^{-3}}\right)}$$

$\rho = 1.51 \times 10^{-3}$ gms/cm^3

$$V = V_{Avg} = (37{,}500\ m^3)\left(\frac{250 + 337}{2}\right)$$

$$= (37{,}500\ m^3)\ (293.5)$$

$r^2 = 6796t$ where r in meters, t in seconds

If the specific heat of methane at $T_{Ave} = \frac{151^{\circ}K + 112^{\circ}K}{2} = 131.5^{\circ}K$ equals:

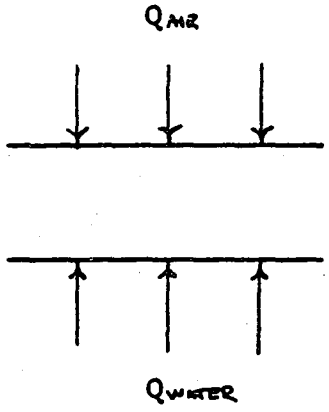
$$Cp \simeq 0.5 \text{ cal/gm}^{\circ}\text{c} \quad \underline{1}/$$

$$\therefore \quad q_M = Cp\,\Delta T = (0.5 \text{ cal/gm}^{\circ}\text{c})\ (\Delta T = 39^{\circ}\text{c})\ (454 \text{ gms/lb})$$

$$= 8853 \text{ cal/lb}$$

$$= 35.1 \text{ Btu/lb required to raise cloud from negative to neutral buoyancy.}$$

Heat Input



$$Q_{TOTAL} = Q_{WATER} + Q_{AIR}$$

$$= \frac{kA\,\Delta T_w}{\sqrt{\pi \alpha t}} \underline{2}/ + hA\Delta T_A$$

where $\alpha = (k/\rho C_p)_{water}$ = thermal diffusivity

$= 1.419 \times 10^{-7}$ meter^2/sec

k = thermal conductivity of water

$= 3.1259 \times 10^{-4}$ Btu/sec-meter-$^{\circ}$F

1/ Carl L. Yaws, "Physical and Thermodynamic Properties, Part II Alkanes: CH_4, C_2H_6, C_3H_8," Chemical Engineering, May 12, 1975, pp. 89-97.

2/ J.P. Holman, Heat Transfer, McGraw-Hill Inc., second edition, 1968, pp. 79-80.

$$A = \pi r^2 = \pi\ (6796t),\ \text{meter}^2 \text{ for } t = \text{sec.}$$

h = heat transfer coefficient of air

$= 2.9899 \times 10^{-3}\ \text{Btu/m}^2 - \text{sec} - {}^{o}\text{F}$

$$\Delta T_A = \Delta T_w = (\Delta T)_{Avg} = \frac{\Delta T_2 - \Delta T_1}{\ln(\Delta T_2/\Delta T_1)}$$

$$\Delta T_2 = T_{water} - T_{negative\ cloud}$$

$= 273^{o}K - 112^{o}K = 161^{o}C$

$= 289.8^{o}F$

$$\Delta T_1 = T_{water} - T_{neutral\ cloud}$$

$= 273^{o}K - 151^{o}K = 122^{o}C$

$= 219.6^{o}F$

$$\Delta T_{Avg} = (289.8 - 219.6)/\ \ln\left(\frac{289.8}{219.6}\right)$$

$= 253.1^{o}F$

Defining $\dot{m} = \frac{Q}{q_n} = \frac{Q_w + Q_a}{q_n}$ and $\rho_{LNG}\ V = \int_0^t \dot{m}\ dt$

$$\dot{m} = \frac{(3.1259 \times 10^{-4})(3.14)(6796t)(253.1)}{(35.1)\left[(3.14)(1.419 \times 10^{-7})\right]^{\frac{1}{2}} t^{\frac{1}{2}}} + \frac{(2.9899 \times 10^{-3})(\pi)(6796t)^{(253.1)}}{35.1}$$

$$\dot{m} = 7.20588 \times 10^{4}\ t^{\frac{1}{2}} + 460.07\ t$$

and

$$\rho_{LNG}\ V = \int \dot{} 7.20588 \times 10^{4}\ t^{\frac{1}{2}} + 460.07\ t$$

$$\rho_{LNG}\ V = \frac{7.20588 \times 10^{4}\ t^{3/2}}{3/2} + \frac{460.07\ t^{2}}{2}$$

$$\rho_{LNG} V = 4.8039 \times 10^4 \; t^{3/2} + 230.035 \; t^2 = 37.5 \times 10^6 \text{ lbs}$$
$$= 3.75 \times 10^7$$

$$\therefore \; t = 82 \text{ seconds}$$

and

$$r_N = 746.5 \text{ meters}$$

Calculations for other spill sizes are given in later sections of this report. The corresponding times to go from negative to neutral buoyancy can be calculated by equation 3.

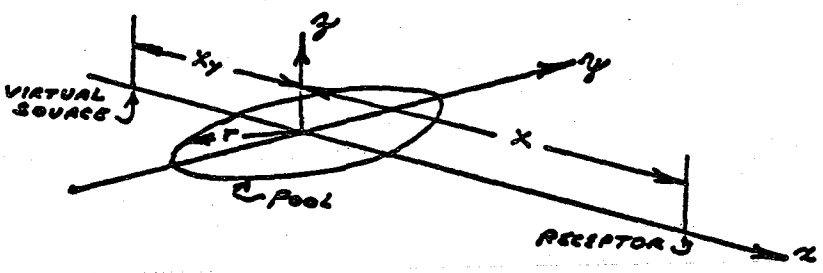
The above analysis assumed a "no wind" condition. If wind is present, the cloud will move in the same direction as the wind, a distance of ut, i.e., wind speed multiplied by the time involved. However, it should be remembered that the above analysis would only be applicable for low wind speeds and/or until dR/dt equals the assumed wind speed, i.e., $\frac{dR}{dt} = u$.

DISPERSION BY WIND

Under conditions when there is a persistent wind from a given direction, the vapor plume from an open water spill of LNG will drift downwind and disperse laterally and vertically. In order to investigate the extent of the potentially flammable plume, the approximate procedure by Turner is used. 1/ This procedure describes the downwind dispersion of gas from an extended area source where the spread has a Gaussian distribution.

In this procedure, area sources are handled by converting them to equivalent or "virtual" point sources. In the conversion process, both the downwind distance and source strength are dependent on the particular source-receptor configuration. In the conversion process, the area is treated as a "virtual" point source with the area source having an initial horizontal standard deviation, σ_{y_o} . A "virtual" distance, Xy, can then be found that will give this standard deviation. Then equations for point sources may be used, determining σy as a function of X + Xy. This concept is illustrated in the following sketch:

1/ D. Bruce Turner, "Workbook of Atmospheric Dispersion Estimates," Environmental Protection Agency, Publication No. AP-26, 1972.



For a square area source σ_{yo} is given approximately by 1/

$$\sigma_{yo} = \frac{s}{4.3}$$

where s = length of a side of the area

For a circular source:

$$\sigma_{yo} = \frac{d'}{4.3} \qquad (5)$$

where d' = diameter of the source measured at the time of consideration.

The expression for σ_z remains unchanged in this treatment because it has been assumed that the emissions within the area are not from varying effective stack heights. Thus, the expressions for σ_y and σ_z can be expressed by:

$$\sigma_y = 465.1 \quad (X + Xy) \tan \theta p \quad 2/ \qquad (6)$$

$$\theta p = c - \left[d \ln \frac{X + Xy}{Xo} \right] \quad 2/ \qquad (7)$$

$$\sigma_z = a X^b \quad 2/ \qquad (8)$$

where

X = downwind distance, km

Xy = virtual distance for initial σ_{yo}, km

θp = half angle of horizontal plume spreading, degrees

1/ Turner, "Workbook of Atmospheric...".

2/ Derived from computer subroutines and other material sent by D. Bruce Turner to Robert Arvedlund of the FPC staff on April 16, 1975.

c, d = functions of stability class, degrees

Xo = normalizing distance, = 1 km

a = function of stability class, meters

b = exponent to determine σz, dimensionless

σy, σz = dispersion parameters, meters

Values of the parameters c and d are given in Table 2. 1/

TABLE 2. Values of c and d Used to Calculate θp

Stability Class	Value, degrees	
	c	d
A	24.167	2.5334
B	18.333	1.8096
C	12.500	1.0857
D	8.333	0.72382
E	6.250	0.54287
F	4.167	0.36191

Values of the parameters a and b for the D Class stability condition are given in Table 3. 2/

1/ John R. Zimmerman and Roger S. Thompson, "User's Guide for Hiway, a Highway Air Pollution Model," Environmental Protection Agency, Publication No. EPA-650/4-74-008, February 1975. Also used in Turner's computer subroutine for calculation of σy and σz values.

2/ Bruce Turner's computer subroutine for calculation of σy and σz values and followup personal communication between Bruce Turner and Robert Arvedlund of the FPC staff on April 23, 1975.

TABLE 3. Values of a and b Used to Calculate σ_z for D Class Stability Condition

Downwind Distance (km)	a (meters)	b (dimensionless)
0.3 - 1	32.093	0.81066
1 - 3	32.093	0.64403
3 - 10	33.504	0.60486
10 - 30	36.650	0.56589
> 30	44.053	0.51179

The point source equation also is given by Turner, and a simplified version is used here for ground level concentrations along the centerline of the plume. 1/ These simplifications yield:

$$C = \left[\frac{q}{\pi \sigma_y \sigma_z u}\right] \exp\left[-\frac{1}{2}\left(\frac{H}{\sigma_z}\right)^2\right] \quad (9)$$

where

C = vapor concentration, gms/m^3

q = average vapor generation rate, gms/sec

σ_y, σ_z = crosswind and vertical standard deviations, meters

u = wind speed, meter/sec

H = effective emission height, meters

1/ Turner, "Workbook of Atmospheric...".

Equation 9 is based on the assumption that the vapor generation rate is constant over the considered period of time. Because the distribution of vapor is Gaussian, the plume dimensions are characterized by the standard deviations σ_y and σ_z, which are functions of the distance downwind. The concentration, C, is taken along the centerline of the plume at ground level as if there were no rise of the center of mass of the vapor as it warms.

In this analysis, the neutral "D" meteorological condition is used from the six stability categories given by Turner. The more stable "E" and "F" categories are normally limited to rural areas on clear nights and having a low wind. Under these conditions, the wind direction shifts frequently and tends to spread the plume horizontally. In addition, it is felt that the more stable "E" and "F" stability conditions would have little effect on a methane cloud with density much less than that of air. The neutral "D" condition is associated with overcast skies during day or night and occurs frequently in maritime climates.

The Pasquill stability classes are for gases, such as sulfur oxide, or aerosols which remain suspended in the air over long periods of time. These materials generally are more dense than the air in which they are undergoing diffusion. Methane, on the other hand, has a density much less than that of air. Thus, it is not entirely clear that the neutral "D" condition is the most appropriate for demonstrating the dispersion of such a light gas. The unstable "C" condition may be more suitable for such a demonstration. This condition gives an upward push to heavy pollutants, and thus may be more representative of the dispersive behavior of a light gas in air.

For all calculations, a 5 mph (2.235 meters/sec) wind is used, since that wind speed is thought to give the longest plumes. Although the use of a lower wind speed would predict a greater range of potentially flammable vapors, in practice, wind speeds below 5 mph are characterized by frequent shifts in direction which tend to increase horizontal dispersion and reduce the downwind range. Stronger winds disperse vapor plumes more readily and make them less of a downwind hazard.

In this analysis, a detailed quantitative treatment of the gain or loss of heat by methane from the air, from vapor condensation, or from solar radiation have been neglected. As previously mentioned, vapor condensation can be important because condensation of moisture releases heat which tends to increase the buoyancy of the cloud. In addition, the plume dispersion is assumed to be undisturbed by nearby land features such as hills, trees, or structures. Also, no consideration is given here to the possibility of plume ignition during its dispersion. The downwind distance to the lower flammable limit (LFL) of methane must now be determined. The LFL is represented by 5 percent concentration of methane vapor and is given by:

$$C = \frac{(.05)(\rho)}{620} = 36.6 \text{ gms/m}^3$$

where ρ = liquid LNG density

$= 4.54 \times 10^5$ gms/m^3

For a 37,500-cubic meter spill:

Solution of equation 5 yields

$$\sigma_{yo} = \frac{dn}{4.3} = \frac{2\ (746.5 \text{ meters})}{4.3}$$

$$\sigma_{yo} = 347.2 \text{ meters} \qquad (10)$$

From Figure 3.2 of Turner or equations 6 and 7

$$Xy = 6.06 \text{ km} \qquad (11)$$

Substitution of equations 6, 7, 8, 10 and 11 into 9 for a 2.235 meter/sec wind speed condition yields:

$$C = \frac{q \exp\left[-\frac{1}{2}\left(\frac{H}{\sigma_z}\right)^2\right]}{\pi\,(465.1)(X + 6.06)\tan\left[c-(d \ln(X + 6.06))\right] aX^b\ (2.235)}$$

where X = downwind distance, km

C = LFL concentration, gms/m^3

q = source strength

H = average effective emission height, meters

$$= \frac{V_{Avg}}{\pi r_{MC}^2} = \frac{(293.5)(37{,}500 \text{ m}^3)}{(3.14)(596 \text{ m})^2}$$

H = 9.87 meters

At neutral buoyancy, the primary emission rate will be that from heat transfer from the air:

$$q = \frac{hA}{C_p} = \frac{(2.9899 \times 10^{-3}\ \text{Btu/m}^2\text{-sec-}^\circ\text{F})(\pi r_y^2)}{(0.5\ \text{Btu/lb}\ ^\circ\text{F})}$$

$$q = 1.0449 \times 10^4\ \text{lbs/sec}$$

$$q = 4.74 \times 10^6\ \text{gms/sec}$$

From Table 1 and by trial and error using Table 2, it can be determined that equation 9 takes on the form:

$$C = \frac{4.74 \times 10^6 \exp\left[-\frac{1}{2}\left(\frac{9.87}{32.093\ X^{.64403}}\right)^2\right]}{\pi(465.1)(X+6.06)\tan\left[8.333-(0.723821\ln(X+6.06))\right]32.093X^{.64403}(2.235)}$$

or

$$C = \frac{45.25 \exp\left[-\frac{1}{2}\left(\frac{9.87}{32.093\ X^{.64403}}\right)^2\right]}{(X+6.06)\tan\left[8.333-(0.72382\ \ln\ (X+6.06))\right]\ X^{.64403}}$$

By trial and error, a downwind distance, X, is found corresponding to a concentration, C, of 36.6 gms/m^3. Solution of this process shows that when X = 1.53 km, the given LFL concentration is found to be approximately 36.6 gms/m^3.

The same procedure can be carried out for various other LNG spill sizes, and these are shown in Table 4 and plotted in Figure 2.

TABLE 4

PARAMETERS FOR LNG SPILLS; NEUTRAL "D" CONDITION AND 5 MPH WIND

Volume Spilled (10^3 m^3)	Maximum Pool Radius Re (meter)	Time to Evaporation Te (sec)	Cloud Radius To Neutral Buoyancy Rn (meter)	Time From Negative To Neutral Buoyancy Tn (sec)	σ_{yo} (meters)	Xy (km)	X = Downwind Distance to LFL (km)	(miles)	(feet)	σ_y (meters)	σ_z (meters)
100	644	384	1124	114	522.8	9.57	2.82	1.75	9252	657	63
75	578	355	995	103	462.8	8.35	2.35	1.46	7710	577	56
50	496	321	845	91	393.0	6.96	1.85	1.15	6069	485	48
37.5	446	300	746	82	347.2	6.06	1.53	0.95	5019	425	42
25	383	270	632	72	293.9	5.03	1.20	0.75	3937	356	36
10	272	215	435	54	202.3	3.32	0.73	0.45	2395	242	25
5	209	180	323	42	150.2	2.39	0.50	0.31	1640	178	18
1.25	124	128	183	27	85.1	1.28	0.3	—	—	—	—

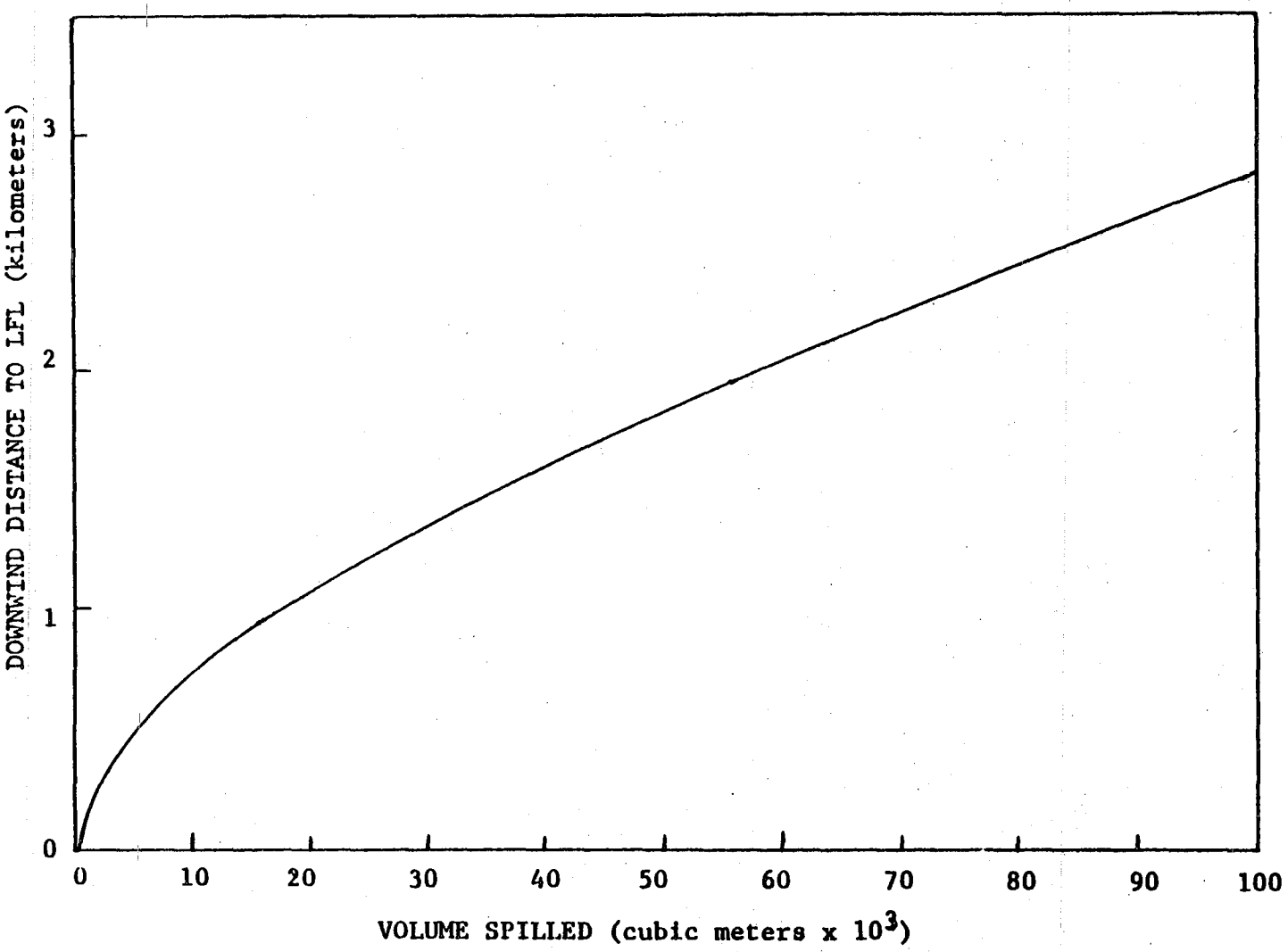


Figure 2

DISTANCE TO LFL FOR LNG SPILLS ON WATER

ATTACHMENT 2

THE RADIATION HAZARD FROM AN LNG FIRE ON WATER

If LNG is released on water, it will spread and evaporate to form a potentially flammable vapor cloud which may then drift to an ignition source. The resulting flame may flash back to the source of the spill, producing a burning pool of LNG. The thermal radiation emitted by this fire may present a serious hazard to the surroundings. Depending on the size and duration of the fire, the radiation may injure or kill people, ignite combustible materials (such as wood, plants, and cloth), and collapse steel or other metal structures from the developed thermal stresses.

In order to estimate the extent of this thermal radiation hazard, it is necessary to know the flame diameter, the angle of flame tilt (due to wind), and the burning rate.

The flame diameter is assumed to equal the pool diameter. Using a gravity spread model, an expression for the burning pool radius as a function of time was developed. The equations for the spread and evaporation of LNG on water as presented in the vapor plume analysis were used. The burning rate was used as the evaporation rate, since the fire actually serves to increase the evaporation rate.

It was assumed that the LNG ignited at or shortly after the beginning of the spill. After ignition, the burning pool spreads at a rate described by the gravity spread equation, equation (1):

$$\frac{dr}{dt} = \left[\frac{kg}{\pi}\left(\frac{\rho_w - \rho_{LNG}}{\rho_{LNG}}\right)\frac{V}{r^2}\right]^{\frac{1}{2}} \qquad (1)$$

Integration yields:

$$r^2 = \left[4\,\frac{kg}{\pi}\left(\frac{\rho_w - \rho_{LNG}}{\rho_w}\right)V\right]^{\frac{1}{2}} t \qquad (2)$$

For a burning pool, using the equations by Raj and Kalelkar:

$$r_e = \frac{7.4(1324125)}{(1.369)^{\frac{1}{4}}} = 1352 \text{ ft.} = 412 \text{ m}$$

The time to evaporation for a burning pool is given by:

$$te = \frac{8.8(1324125)^{\frac{1}{4}}}{(1.369)^{\frac{3}{2}}} = 255 \text{ sec.}$$

At evaporation:

$\rho_{LNG} = 28.3 \text{ lb/ft}^3$
$\rho_w = 62.4 \text{ lb/ft}^3$
$g = 32.2 \text{ ft/sec}^2$
$V = 1{,}324{,}125 \text{ ft}^3$
$t = 255 \text{ sec.}$
$r_e = 1352 \text{ ft.}$

$$k_{evap.} = \frac{\pi (1352)^4}{4(32.2)(.55)(1{,}324{,}125)(255)^2} = 1.72$$

Substituting this into equation (2) yields:

$$r^2 = 7166t \qquad (3)$$

A maximum allowable radiation intensity of 1,500 BTU/hr-ft^2 is recommended by Louden 1/ for objects exposed less than 20 minutes. In this case, the duration of the fire is under 5 minutes. Furthermore, using this intensity value as a safety level allows sufficient time for any individuals to seek shelter from the radiation. In reference to equation (A-1), (see Appendix A-1)

$E_f = 45{,}000 \text{ BTU/hr-ft}^2$

$Q = 1{,}500 \text{ BTU/hr-ft}^2$

Rearranging equation(A-1) and substituting the values of Q and E_f:

$$F_\tau \varepsilon_f = .033 \qquad (4)$$

1/ D.E. Loudon, API Proceeding, Vol. 43 (1963), p. 418.

A trial and error calculation was carried out to determine the distance, X, (measured from the center of the fire) at which the radiation level dropped to 1,500 BTU/hr-ft^2. This value was found to be approximately 7.3 times the radius of the fire (X/R = 7.3).

At this point, it should be noted that in determining the view factor, F, the curve for a flame tilt of 15^o was used. This was done because of the lack of data on view factors for upright cylinders. However, this adds some conservatism to the calculations, in that the view factors at a flame tilt of 15^o are approximately 20 percent higher than those of an upright flame. The flame height to radius ratio, L/R, (see Appendix A-1) was found to vary from 5.4 to 6.3, so the curve for L/R = 6 was used for all view factor calculations.

To determine the number of fatalities from a pool fire, it is necessary to calculate the distance at which heat radiation intensity drops below 5,300 Btu/hr-ft^2. According to Loudon 1/, this intensity will cause blistering in 5 seconds. In this study, exposure for 10 seconds is considered fatal.

Using the methods presented in Appendix A-1 for various spill sizes, the X/R value ranged from 2.95 to approximately 3.2 for a radiation intensity of 5,300 Btu/hr-ft^2. Using the methods presented in Appendix A-1, the maximum distance to the fatal radiation intensity level was calculated for spill sizes ranging from 25,000 m^3 to 165,000 m^3. The fire radius used was that which occurs 10 seconds before the fire is extinguished (due to depletion of the LNG). The values of the fire radius, R, and the distance to the fatal radiation intensity level, X, (measured from the center of the spill) are given in Table 1 for each spill size.

1/ D.E. Loudon, API Proceedings, Vol. 43 (1963), p. 418.

Comments on the Vapor Fire Radiation Hazard

The environmental staff has addressed itself to the problem of heat radiation from a burning LNG vapor cloud. Because of limited information on this subject, however, no quantitative results are available at this time. Only two series of experiments have been conducted thus far to study the ignitability of the vapor, and data from them are very limited. From the available information, it was decided that most significant radiation hazard was presented by the pool fire, rather than the vapor fire, because the pool fire emits dangerous heat radiation for a much longer period of time.

When a vapor cloud is ignited, a flame front followed by a burning zone of finite width propagates through the cloud back to the source at a particular velocity. This flame velocity is strongly affected by wind.

The maximum radiant heat emission occurs at the maximum temperature attained by the burning vapor. The maximum temperature occurs at the moment of combustion, after which it decreases with time, as shown in Figure 1. 1/ Since heat radiation is primarily dependent upon temperature, 2/ this graph also shows that radiative heat emission also decreases with time. The result is that the surroundings are exposed to dangerous heat radiation for only a very short period. The maximum heat emission is given by equation (5):

$$E = \sigma T^4 \qquad (5)$$

$\sigma = .1714 \times 10^{-8}$ Btu/hr-ft^2-$^\circ$R^4

(the Stefan-Boltzmann constant)

Since E is the emission rate of a "perfect radiator," the actual emission rate is lower. Figure 1 indicates that after only one second, the temperature of the burned gases is about 1500°F. From equation (5), E = 8,677 Btu/hr-ft^2. The actual heat emission would be less. Within seconds, this value would decrease even further, according to Figure 1. This number compares with a value of 45,000 Btu/hr-ft^2 from a pool fire, which is on the order of 4 to 5 minutes in duration. This is over 50 times the exposure time from a burning cloud.

1/ Science Applications, Inc. "LNG Terminal Risk Assessment Study for Oxnard, California," SAI-75-615-LJ, (Jan. 26, 1976).

2/ W.H. McAdams, Heat Transmission (New York, 1954).

FIGURE 1. TEMPERATURE PROFILES FOR METHANE-AIR MIXTURES

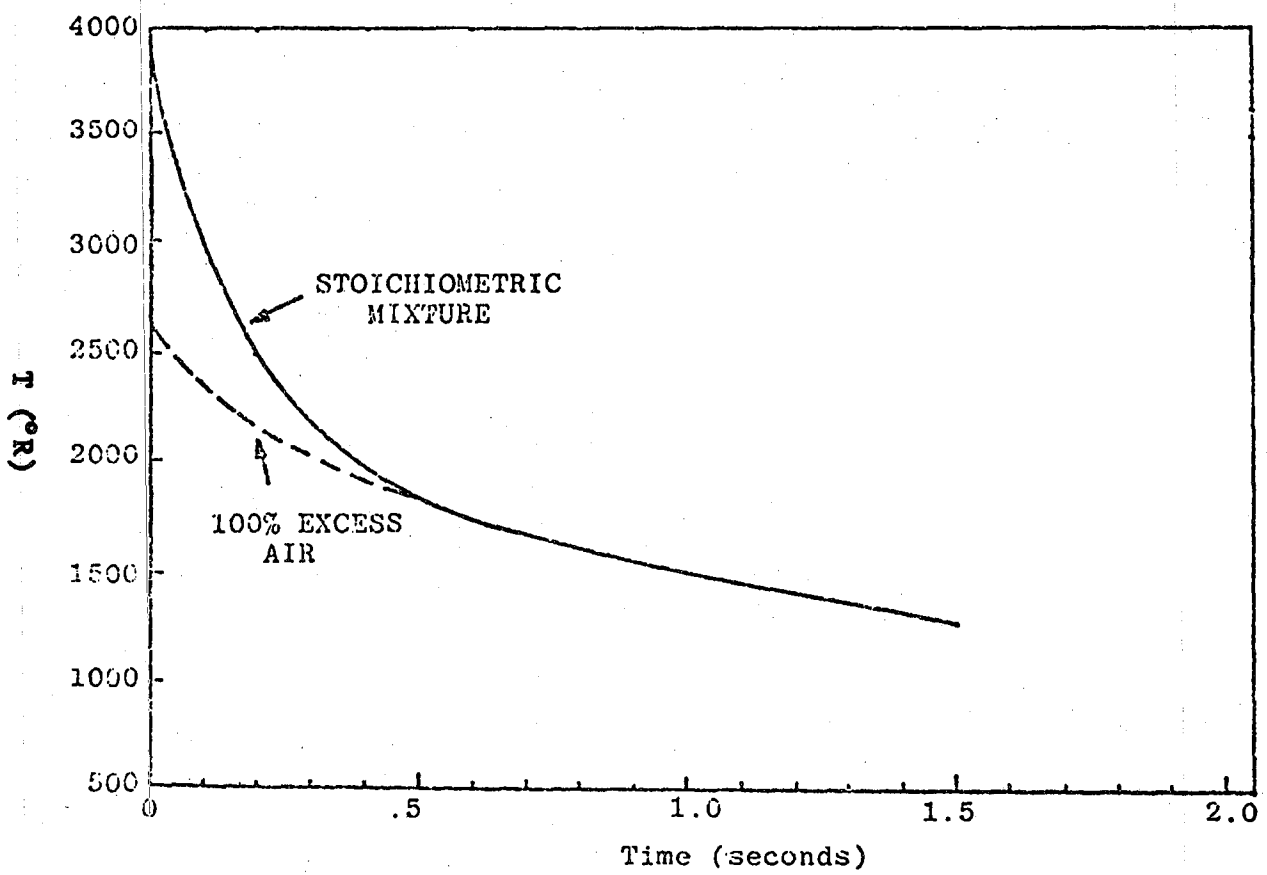


TABLE 1: Fire Radius and Distance to 5,300-Btu/hr-ft^2 Level

V (m^3)	X (ft)	R (ft)
25,000	3,595	1,134
37,500	4,188	1,351
50,000	4,552	1,478
75,000	5,344	1,752
125,000	6,312	2,123
165,000	6,862	2,326

The amount of heat radiated by an LNG fire that is intercepted by an object away from the fire is given by the following equation:

$$Q = F \cdot \tau \cdot \varepsilon_f \cdot E_f \qquad \text{(A-1)}$$

Q = intercepted heat, Btu/hr-ft^2
τ = transmissivity of the intervening air
ε = flame emissivity
E_f = total emissive power of the flame, Btu/hr-ft^2
F = view factor

The view factor, F, is the fraction of energy radiated by the fire that is incident on the object in question.

$$F_{dA_1 \longrightarrow A_2} = \int_{A_2} \frac{\cos \beta_1 . \cos \beta_2 \, dA_2}{\pi r^2} \qquad \text{(A-2)}$$

(See Figure A-1 for the definitions of A_1, A_2, dA_2, β_1, β_2, and r.)

When the flame height, diameter, angle of tilt, and the distance between the flame and object are known, equation (A-2) may be used to calculate F. This must be done by computer. 1/ The results are presented in graphical form in Figure A-2.

The angle of tilt, ϕ , is given by equation (A-3).

$$\cos \phi = \frac{1}{\sqrt{u^*}} \quad \text{for } u^* \geq 1$$
$$= 1 \quad \text{for } u^* < 1 \qquad \text{(A-3)}$$

1/ R.G. Rein, Jr., C.M. Sliepcevich, and J.R. Welker, "Radiation View Factors for Tilted Cylinders," J. Fire and Flammability, (April 1970), p. 140.

where $u^* = u/u_c$

u = wind velocity, ft/sec

u_c = characteristic velocity = $\left[\frac{\dot{m}''gD}{\rho_v}\right]^{1/3}$

ρ_v = density of the gas at its boiling point, lb/ft^3

$\dot{m}''$ = burning rate, $lb/hr\text{-}ft^2$

D = flame diameter

g = 32.2 ft/sec^2

After the angle of tilt is calculated, it is necessary to determine the ratio of flame height to flame radius, L/R. This may be done using equation (A-4). 1/

$$L/D = \left[\frac{\dot{m}''}{\rho_a\sqrt{gD}}\right]^{-0.19} u^{*.06} \quad \text{if } u^* \geq 1$$

$$= \left[\frac{\dot{m}''}{\rho_a\sqrt{gD}}\right]^{-0.19} \quad \text{if } u^* < 1 \qquad \text{(A-4)}$$

ρ = density of ambient air

D = 2R

Figure A-2 may then be used to find F for any distance up to 50 diameters from the fire.

The transmissivity, τ, is a measure of the ability of the intervening air to transmit radiant heat. For a clear, humid day, water vapor will be the primary component of attenuation. Figure A-3 shows how transmissivity varies with distance at several relative humidities. A relative humidity of 50 percent was used in this study.

1/ American Gas Association, "LNG Safety Program, Phase II," Sections F and G (July 1, 1974).

The flame emissivity, ε_f , accounts for attenuation of flame radiation by components of the flame itself. This attenuation can be attributed to the nonluminous contributions of CO_2 and H_2O, as well as the presence of soot. The emissivity may be expressed as equation 5.

$$\varepsilon_f = 1 - e^{-kD} \qquad \text{(A-5)}$$

k = attenuation coefficient
D = flame diameter

The diameter of the flame being considered in this case, however, is so large that the flame may be considered as being "optically thick." In other words, $\varepsilon_f = 1$.

The total emissive power, E_f, is the maximum radiant heat flux at the flame surface that a fuel can release upon combustion. This quantity must be measured experimentally. For an LNG pool fire, a value of 45,000 Btu/hr-ft^2 has been measured.

The burning rate of LNG, m", is controlled by heat received from the water on which the pool is floating and from flame radiation. It has been noted that the regression rate of LNG on water is 1 inch per minute. This corresponds to an evaporation rate of 141.5 lb/hr-ft^2. 1/ The regression rate due to radiation is estimated by Raj and Atallah 2/ as .369 in/min. This corresponds to a burning rate of 52.2 lb/hr-ft^2. The total rate is the sum of the two, or 193.7 lb/hr-ft^2.

1/ D.S. Burgess, J.N. Murphy, M.G. Zabetakis, "Hazards Associated with the Spillage of Liquefied Natural Gas on Water," Bureau of Mines Report No. 7448 (1970).

2/ See footnote 1 on 3rd preceding page.

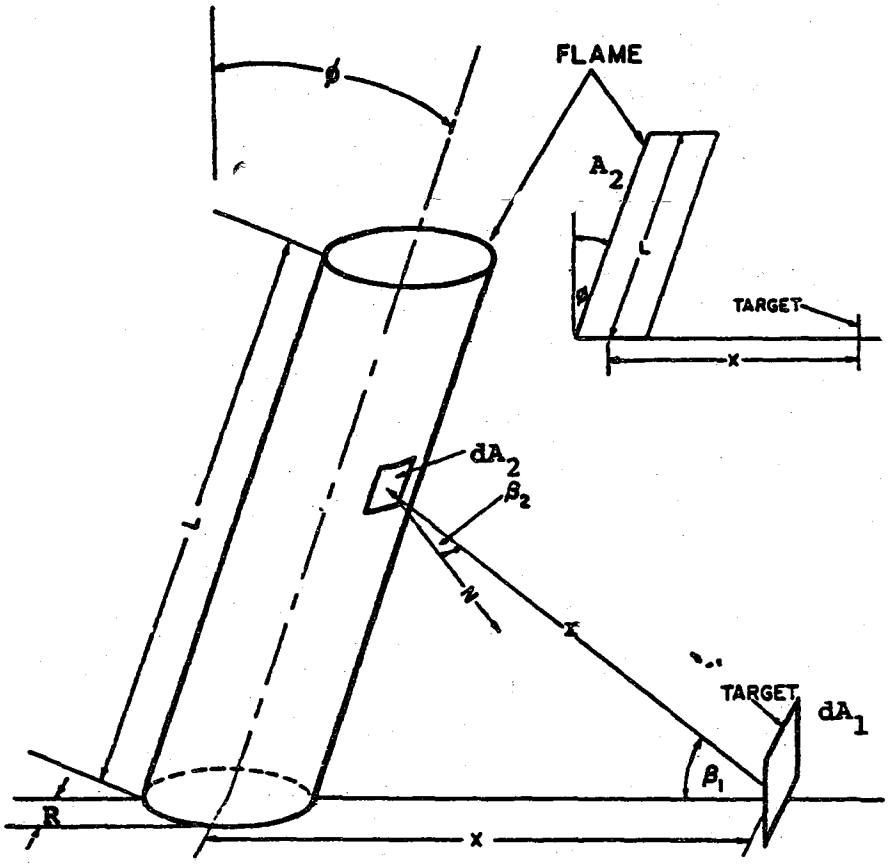


Figure A-1: Geometry Used For Calculation of View Factors

FIGURE A-2. VIEW FACTORS FOR TILTED CYLINDERS, ϕ =15 degrees

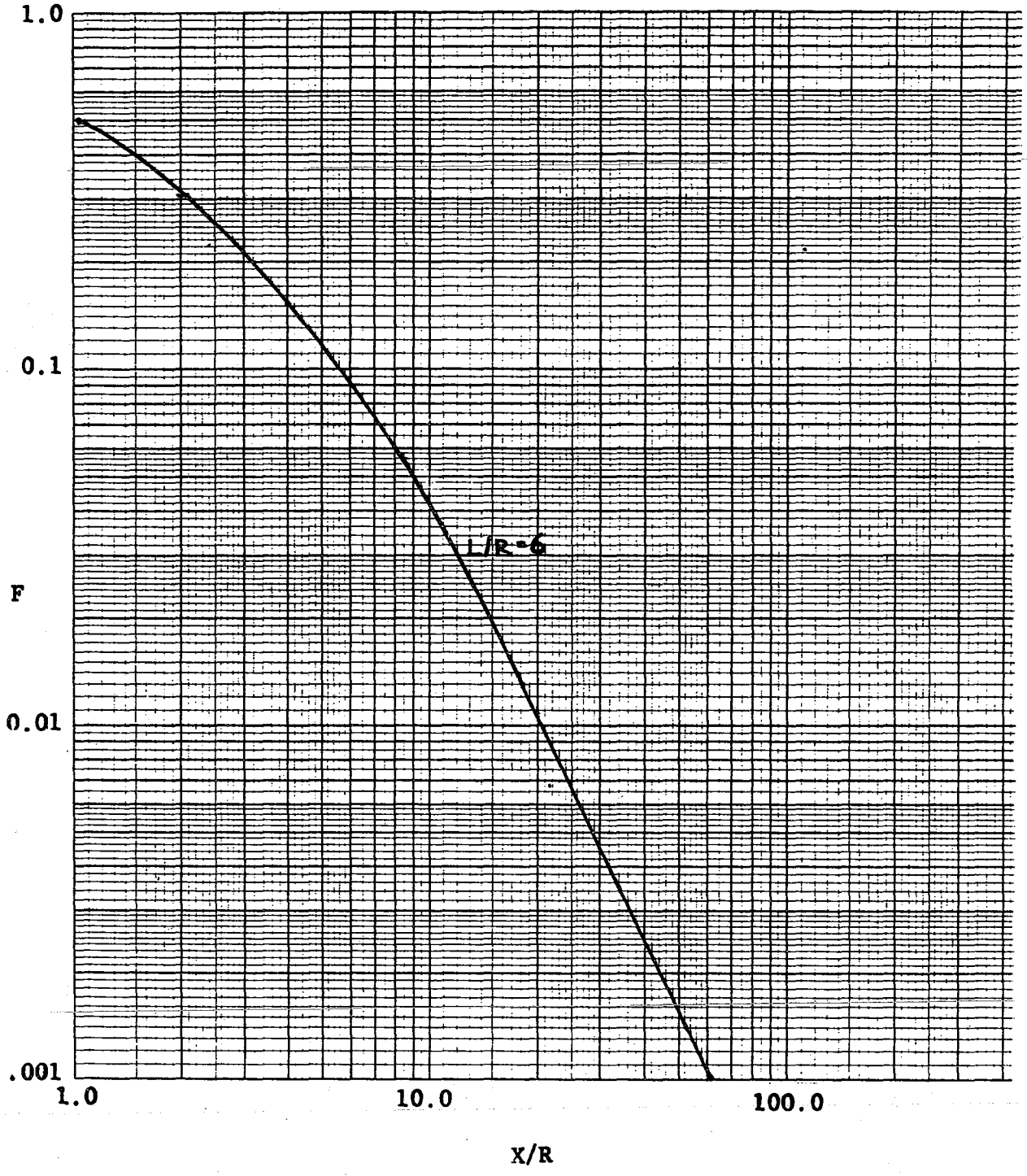
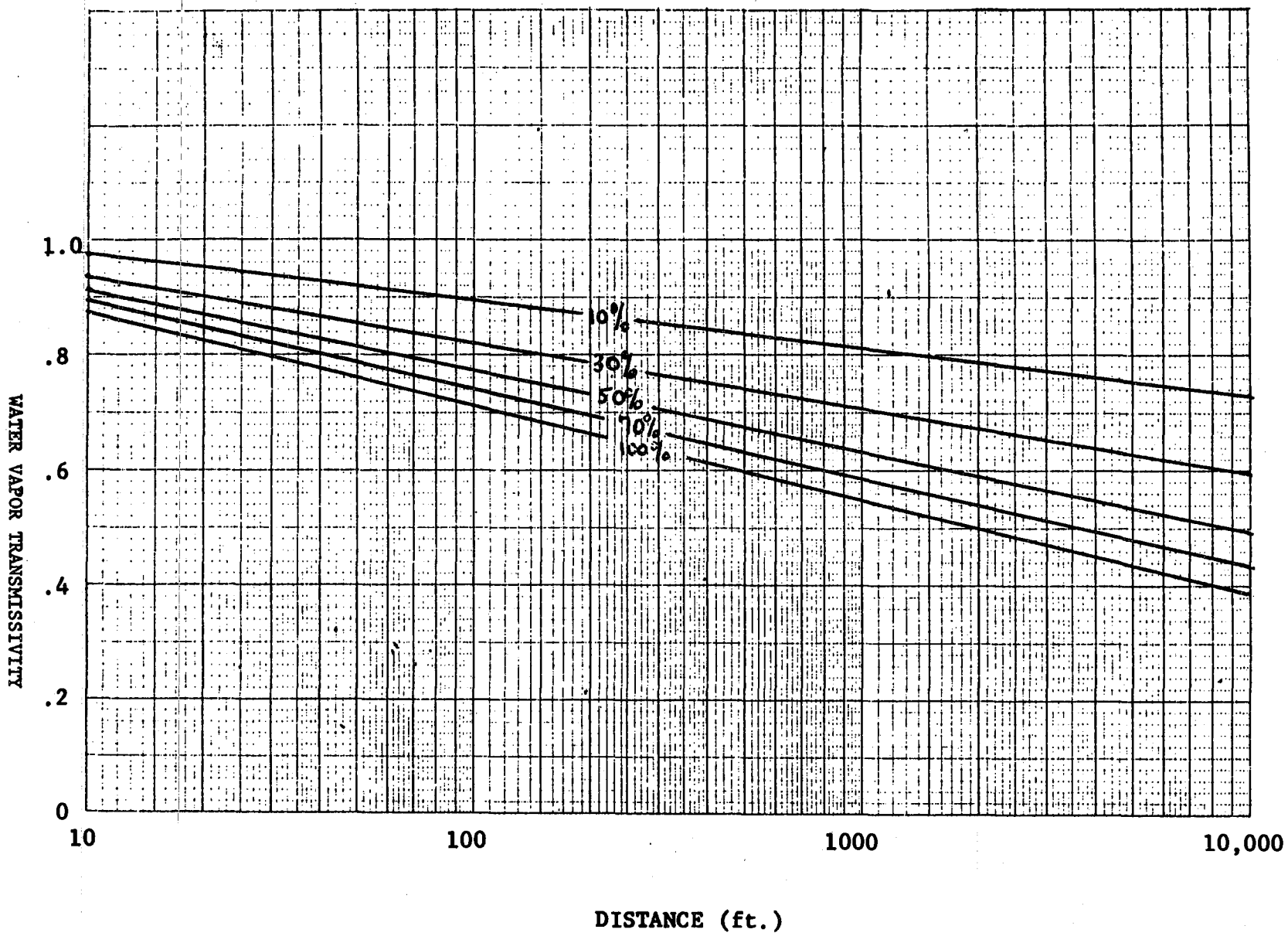


FIGURE A-3. VARIATION OF TRANSMISSIVITY WITH DISTANCE AND HUMIDITY



ATTACHMENT 3

EXPECTED FATALITIES FOR POPULATED AREAS

As a flammable vapor cloud advances over a populated area, an increasing segment of the public would be exposed to a hazard. At the same time, the cloud encounters an increasing number of ignition sources with the result that the probability of the plume remaining unignited approaches zero.

For a flammable vapor cloud encountering independent sources of ignition (N), the probability of no plume ignition ($\overline{P}$) is the product of the individual probabilities of no ignition ($\overline{P}_s$) for each of the N sources:

$$(1)\quad \overline{P} = (\overline{P}_{s1})\ (\overline{P}_{s2})\ \ldots\ (\overline{P}_{sN})$$

When it is assumed that the probability of ignition is the same for all of the sources, the probability of no plume ignition in N sources becomes:

$$(2)\quad \overline{P} = (\overline{P}_s)^N$$

The probability that the plume will have been ignited (P) within N sources is:

$$P = 1 - \overline{P}$$

$$(3)\quad = 1 - (\overline{P}_s)^N$$

The probability of no plume ignition versus the range of the plume has been plotted in Figure 1 for three values of $\overline{P}_s$: .50, .95, and .99, assuming an ignition source density of 500 sources per square kilometer. The figure illustrates that the probability of plume ignition is very sensitive to the value assumed for the probability of ignition for each source. However, for even the most conservative value, $\overline{P}_s = .99$ (each source has only a 1 percent probability of igniting the plume), the probability of no plume ignition after extending over area of one square kilometer is about .007. After covering three square kilometers, the probability of no plume ignition is less than 10^{-6}. The probability of ignition per source of one percent is considered to be very conservative. This value has been selected for the study since it permits a flammable vapor cloud to affect a larger area before ignition becomes a certainty.

The expected number of fatalities, E(F), for a flammable vapor cloud drifting over populated areas may be defined probabilistically for the general case where an infinite number of ignition sources are encountered:

$$(4) \qquad E(F) = \sum_{n=1}^{\infty} F_n \times P(F_n)$$

Where F_n is the number of fatalities which could occur at ignition source n, and $P(F_n)$ is the probability associated with F_n. $P(F_n)$ is the probability of no plume ignition in $n-1$ sources. From equation 2:

$$(5) \qquad P(F_n) = (\bar{P}_s)^{n-1}$$

The fatalities at point n can be determined by relating fatalities to ignition sources. When it can be assumed that both population and ignition sources are uniformly distributed within a specific area, the fatalities at point n can be determined from the density of population (Dp) and the density of ignition sources (Ds):

$$(6) \qquad F_n = \frac{Dp}{Ds}\left[n - (n-1)\right]$$

$$= \frac{Dp}{Ds}$$

Substituting in equation 4:

$$(7) \qquad E(F) = \sum_{n=1}^{\infty} \frac{Dp}{Ds} (\bar{P}_s)^{n-1}$$

A flammable vapor cloud drifting over a land area could not encounter an infinite number of ignition sources, since its range would be limited by the maximum distance to the lower flammable limit. As a result, the summation in equation 7 is evaluated to a finite number of ignition sources, N_{max}:

$$(8) \qquad E(F) = \sum_{n=1}^{N_{max}} \frac{Dp}{Ds} (\bar{P}_s)^{N-1}$$

Equation 8, the summation of a geometric progression, reduces to: 1/

$$(9) \qquad E(F) = \frac{Dp}{Ds} \qquad \frac{(1 - \bar{P}_s{}^N)}{(1 - \bar{P}_s)}$$

The density of population within a study area can be estimated from 1970 census tract information from the U.S. Department of Commerce Census Bureau. Population growth projections are frequently made by local governments and these figures should be used when the information is available.

Very little information currently exists on the density of ignition sources on land areas. It was assumed for this study that one ignition source existed per exposed dwelling.

Nomenclature:

P_s = Probability of ignition for an individual source

$\bar{P}_s$ = Probability of no ignition for an individual source
= $1 - P_s$

N = Number of individual ignition sources

P = Probability of plume ignition

$\bar{P}$ = Probability of no plume ignition
= $1 - P$

F = Number of fatalities

D_s = Density of ignition sources

D_p = Density of population

1/ CRC Standard Mathematical Tables, Twentieth Edition, 1972.

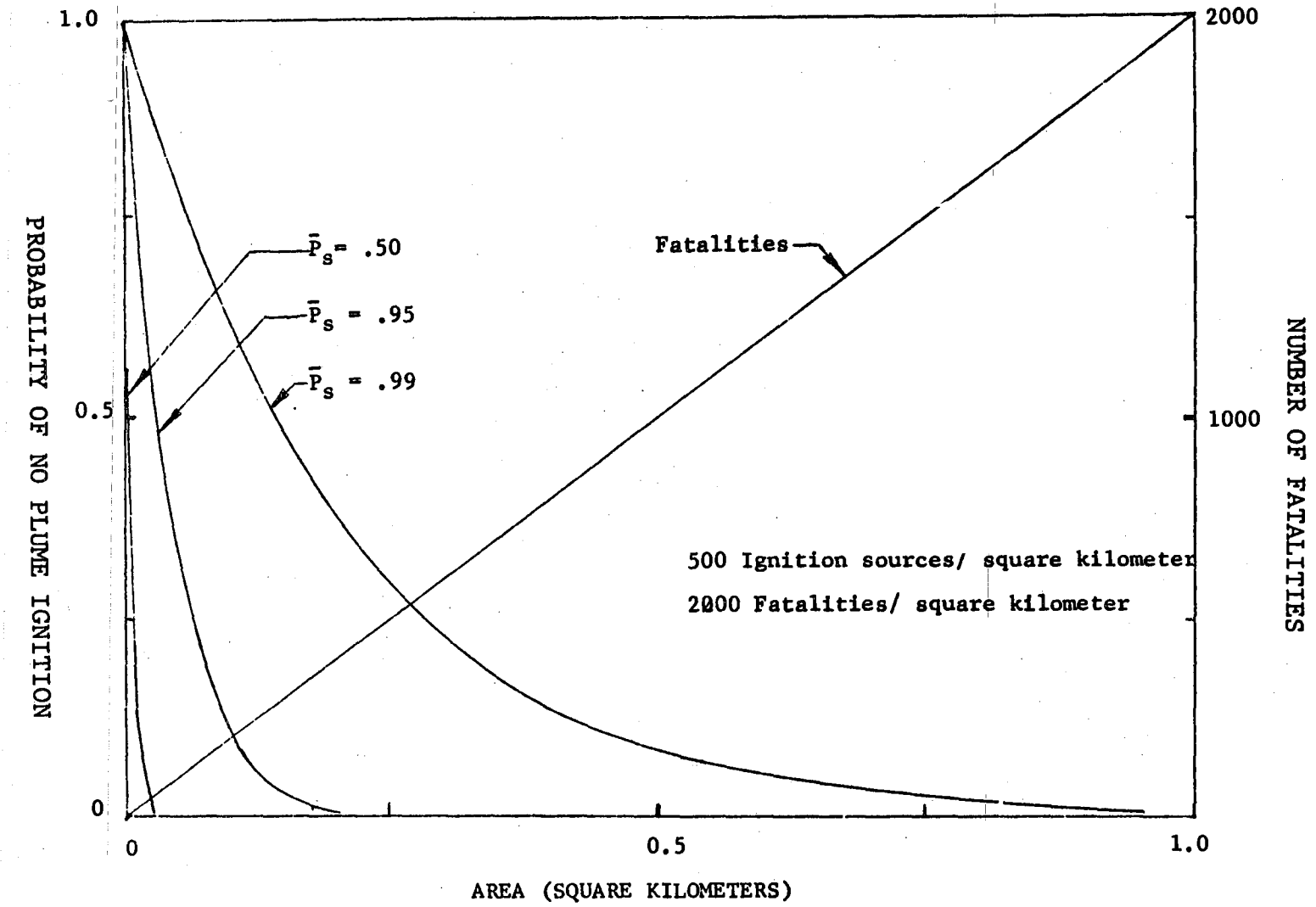
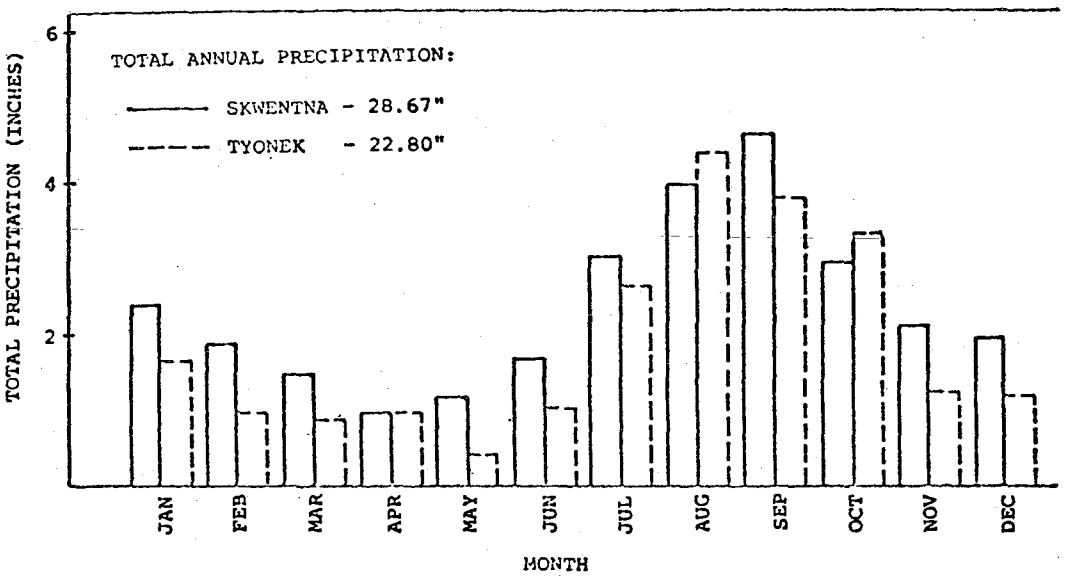


Figure 1

PROBABILITY OF NO IGNITION VERSUS AREA

APPENDIX A
CLIMATOLOGICAL AND SEISMIC DATA



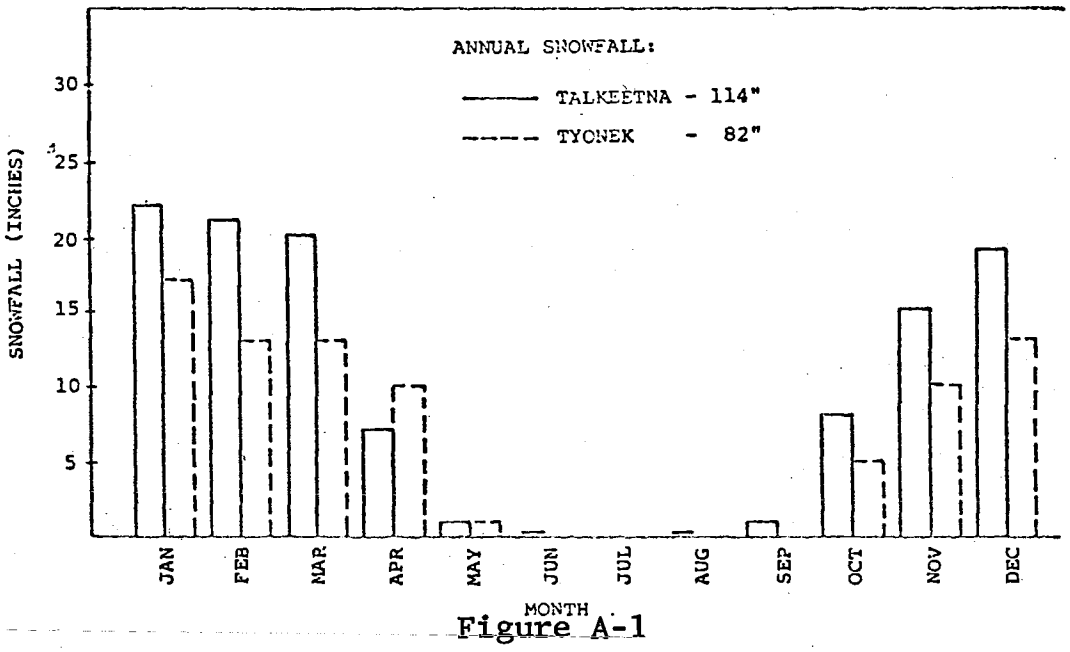


Figure A-1

SUMMARY OF TOTAL PRECIPITATION AND SNOWFALL DATA FOR SKWENTNA, TALKEETNA AND TYONEK

SKWENTNA: FROM 1939 TO 1958 (U.S. DEPT. COMM., 1965)
TALKEETNA: FROM 1926 TO 1960 (U.S. DEPT. COMM., 1965)
TYONEK: FROM 1899 TO 1907 (E.D.S., 1970)

DAMES & MOORE

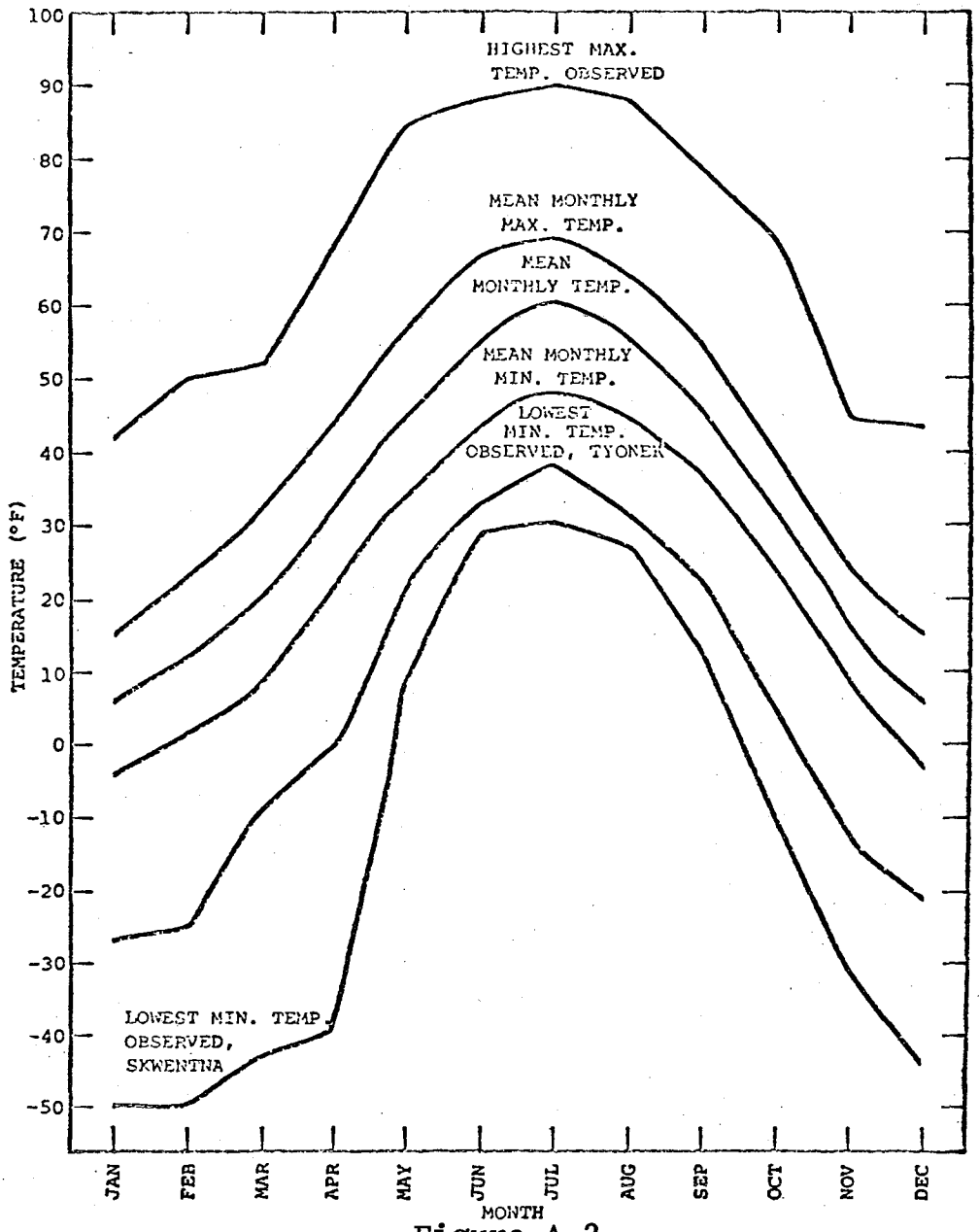


Figure A-2

SUMMARY OF TEMPERATURE DATA
FOR SKWENTNA AND TYONEK

SKWENTNA: FROM 1939 TO 1958 (U.S. DEPT. COMM., 1965)
TYONEK: (LOWEST MIN. TEMP. OBSERVED) FROM 1899 TO 1907 (E.D.S., 1970)

DAMES & MOORE

TABLE A-1

METEOROLOGICAL DATA - KENAI MUNICIPAL AIRPORT, ALASKA

	Temperature (°F) 1/				Wind (Knots) 1/			Precipitation(inches) 1/			Fog 2/
	Average Daily Maximum	Average Daily Minimum	Extreme Maximum	Extreme Minimum	Prevailing Direction	Mean Speed	Extreme Hourly Speed	Mean Total	Maximum Total	Mean Snowfall	Percent Frequency
January	21	3	47	-42	NNE	7	47	1.1	2.8	13	0.5
February	26	5	47	-44	N	7	40	1.1	2.8	12	0.3
March	32	10	52	-38	N	7	40	1.1	3.2	10	0.2
April	41	25	63	- 6	N	7	47	1.0	2.7	7	0.3
May	52	34	74	14	N	7	27	1.0	2.8	1	0.1
June	57	42	87	29	SSW	7	40	1.4	2.9	0	0.2
July	61	46	84	32	SSW	7	33	2.3	5.0	0	0.4
August	61	45	81	29	SSW	6	33	2.8	5.4	0	0.4
September	55	39	70	17	N	6	33	3.6	7.1	*	0.2
October	42	27	62	-11	N	7	33	2.3	4.4	3	0.1
November	29	13	53	-21	NNE	7	40	1.3	4.2	9	0.1
December	20	3	44	-40	NNE	6	40	1.3	3.7	14	0.3
Annual	41	24	87	-44	N	7	47	20.3	7.1	69	0.2

* Trace

1/ Source: Air Weather Service Climatic Brief, Prepared by ETAC, Air Weather Service, Feb. 1971, Asheville, N. C.

2/ Visibility less than ½ mile and/or ceiling less than 100 feet, based on hourly observations: Source - Ceiling - Visibility Climatological Study and Systems Enhancement Factors, National Climatic Center, Page 6, June 1975.

TABLE A-2

Annual Percentage Frequency of Wind
Direction and Speed 1/2/
Kenai Municipal Airport, Alaska

Direction	Speed (Knots) 1-3	4-6	7-10	11-16	17-21	22-27	28-33	≥34	Total
N	1.8	5.8	5.0	4.2	1.1	.4	.1	.0	18.2
NNE	1.3	5.1	4.7	3.8	.8	.2	.0	.0	16.0
NE	1.8	3.4	2.0	.7	.0	.0	.0	-	7.9
ENE	.6	1.2	.6	.2	.0	.0	-	.0	2.6
E	.9	1.5	.4	.1	.0	-	-	-	2.9
ESE	.5	1.2	.3	.0	.0	-	-	-	2.0
SE	.8	1.9	.6	.1	.1	.0	-	-	3.4
SSE	.4	1.3	1.0	.4	.2	.0	-	-	3.2
S	.6	2.0	2.7	1.7	.2	.1	.0	.0	7.3
SSW	.4	1.5	2.9	1.8	.0	.0	.0	.0	6.8
SW	.3	1.4	2.2	.6	.0	.0	.0	-	4.6
WSW	.1	.5	.9	.2	.0	.0	-	-	1.7
W	.2	.5	.5	.1	.0	.0	-	-	1.3
WNW	.1	.5	.4	.0	.0	.0	-	-	1.0
NW	.4	.9	.5	.1	.0	.0	.0	-	2.0
NNW	.5	1.4	1.2	.6	.2	.1	.0	.0	3.9
CALM	-	-	-	-	-	-	-	-	15.0
TOTAL	10.7	30.1	26.0	14.5	2.7	.8	.1	.0	100.0

Note: .0 Less than .05 percent
- None observed

1/ Based on hourly observations from Aug 1949 to Jun 1967.

2/ Source: Revised Uniform Summary of Surface Weather Observations, ETAC, Air Weather Service, Asheville, N.C.

TABLE A-3

EARTHQUAKES LOCATED BETWEEN LATITUDES 59° AND 62° NORTH AND LONGITUDES 150° AND 153° WEST, 1786-1975 1/

Year	Mo.	Da.	Lat.	Long.	Depth(km)	Mag.	MMI
1899	07	11*	61.0	151.0	?	?	V
1900	10	07*	61.0	151.0	?	?	V
1912	06	07*	59.0	153.0	25	6.4	V
1912	06	10*	59.0	153.0	25	7.0	III
1925	12	23*	62.0	152.0	?	?	IV
1927	03	30	62.0	150.0	?	?	III
1928	01	25	60.0	150.0	?	?	VI
1931	12	24*	60.0	152.0	100	6.2	IV
1932	10	06*	59.5	151.5	?	?	V
1933	04	27*	59.5	151.5	?	?	V
1933	04	27*	61.0	150.0	?	?	V
1933	04	27*	61.3	150.8	25	7.0	VII
1933	06	12*	61.5	150.5	?	5.6	III
1933	06	13*	61.0	151.0	25	6.2	III
1933	06	19*	61.3	[illegible]	25	6.0	V
1934	04	19*	61.0	150.0	?	?	V
1934	06	18*	60.5	151.0	80	5.8	V
1935	08	24*	61.0	150.0	?	?	V
1936	05	08*	61.0	153.0	170	5.8	III
1937	10	24*	62.0	150.0	?	?	V
1940	07	19*	61.0	150.0	?	?	VI
1940	10	11*	59.5	152.0	25	6.0	IV
1941	07	30*	61.0	151.0	?	6.2	VI
1942	12	05*	59.5	152.0	100	6.5	IV?
1943	11	03*	61.8	151.0	25	7.3	V
1949	06	19*	61.0	150.0	?	?	IV
1949	08	31	62.0	150.0	?	?	III
1950	01	30	61.5	150.0	?	?	III
1950	03	09*	61.0	151.0	150	?	IV
1951	06	25*	61.0	150.1	128	6.2	V
1952	02	22*	61.8	150.9	?	?	IV
1954	10	03*	60.5	151.0	100	6.7	VIII
1955	05	14	59.5	151.5	100	?	III
1956	03	26*	61.5	151.0	?	?	IV
1957	06	01	59.5	150.5	?	?	III
1958	01	20	59.6	151.7	?	?	III
1958	01	24*	60.0	152.0	60	6.5	IV
1958	07	31	61.5	151.0	?	?	III
1958	11	19*	60.5	150.5	60	?	V
1959	02	03	60.0	151.0	?	?	III
1959	06	04*	59.5	153.0	100	5.5	III
1959	11	02	59.0	152.0	?	?	III
1959	11	30	59.5	152.0	?	?	III
1959	12	03	59.5	152.0	?	?	III
1959	12	26*	59.5	151.5	?	6.3	III
1960	01	03*	61.0	152.0	?	?	V
1960	02	19*	60.5	151.0	?	?	VI
1960	06	30	60.0	151.0	?	?	III
1960	12	21*	61.5	152.9	125	5.7	III
1961	09	05*	60.0	150.6	43	6.3	VI
1961	09	25*	60.5	153.0	125	6.0	III
1962	02	27	63.0	150.0	100	?	III
1962	04	14	59.6	152.1	78	?	III
1962	05	10*	62.0	150.1	72	6.0	V
1962	07	06	60.3	152.1	67	?	III
1962	09	23	60.1	151.2	86	?	III
1963	06	24*	59.5	151.7	52	6.7	VII
1964	01	06*	59.5	151.5	?	?	V
1964	04	12*	61.2	151.1	28	5.0	IV
1964	04	14*	61.4	150.8	52	5.1	III
1964	09	23	61.9	150.0	33	4.1	III
1964	10	18	60.3	152.3	96	4.1	III
1965	01	03*	60.2	151.2	76	5.6	III
1965	01	06*	60.1	151.8	93	5.6	III
1965	09	23	59.8	152.3	57	3.9	III
1966	01	18	61.4	150.8	61	4.0	III
1966	02	06*	60.4	152.3	91	5.3	III
1966	03	03	61.4	150.7	51	4.0	III
1966	10	07*	61.7	150.1	57	5.6	IV
1966	10	08	61.3	150.7	33	3.7	III
1967	01	18	60.4	152.5	?	4.4	III
1967	02	06	60.1	152.8	?	4.9	III
1967	08	17*	59.4	151.4	55	5.0	III
1967	08	18	61.5	151.0	19	4.5	III
1967	09	03	60.5	151.6	79	4.7	III
1967	10	11	63.0	151.1	115	4.6	III
1967	10	25	60.8	150.4	33	?	III
1968	08	14	60.2	153.0	103	4.6	III
1968	10	07*	61.4	150.3	55	4.2	IV
1968	11	11	61.6	150.1	33	?	III
1968	12	17*	60.2	152.8	86	6.5	VI
1968	12	29	61.7	152.2	77	4.5	III
1969	01	03	61.0	151.0	33	?	III
1969	03	04	60.0	152.7	121	?	III
1969	03	21	59.9	152.7	105	4.5	III
1969	08	06*	61.4	150.7	53	4.8	IV
1969	08	27	60.1	153.0	107	4.5	III
1969	09	26	60.1	153.0	97	4.7	III
1969	11	07*	62.0	150.3	61	3.8	IV
1970	01	16*	60.3	152.7	91	6.0	V
1970	04	05*	61.4	152.3	82	3.9	IV
1970	04	07	61.8	150.0	50	?	III
1970	04	18*	59.9	152.8	94	5.7	V
1970	05	10*	61.7	150.0	55	3.7	IV
1970	06	02*	61.6	151.7	95	5.5	IV
1970	06	19	60.3	151.5	62	3.8	III
1970	07	13	60.4	152.0	104	4.8	III
1970	09	19	60.9	151.5	66	4.6	III
1970	11	03*	62.0	151.2	70	5.6	V
1970	11	03	62.0	150.7	57	3.7	III
1970	11	30	59.7	150.6	50	4.0	III
1971	02	24	59.0	152.4	49	3.4	?
1971	02	28	59.1	151.9	52	3.[illegible]	?
1971	03	20	60.2	150.6	41	3.9	?
1971	04	01	60.3	153.0	111	4.4	[illegible]
1971	04	02	61.4	150.1	47	3.7	III
1971	04	12	60.1	152.8	89	4.0	?
1971	04	13	60.3	150.8	44	3.9	?
1971	04	17	59.7	152.6	75	4.0	?
1971	04	22*	60.1	153.0	110	5.1	?
1971	05	03	60.5	151.9	71	3.8	?
1971	05	05	61.7	151.5	75	4.1	?
1971	05	18	60.0	151.9	74	3.9	III
1971	05	31	60.1	152.5	78	[illegible].0	?
1971	06	02*	61.0	151.3	29	5.5	IV
1971	06	25	61.5	150.0	48	2.9	?
1971	07	14	60.0	152.7	82	4.0	?
1971	08	03	60.1	152.8	82	3.8	?
1971	08	08	61.8	150.5	30	3.0	?

1/ Earthquakes of MM Intensity greater than II or with reported magnitudes.

2/ Highest reported MM intensity.

* Events plotted on Figure .

TABLE A-3 ,(cont.)

Year	Mo.	Da.	Lat.	Long.	Depth(km)	Mag.	MMI
1971	08	10	61.8	150.0	34	3.0	?
1971	08	24	59.9	152.6	73	3.8	?
1971	09	01	59.8	152.7	81	3.9	?
1971	09	17	60.9	151.5	93	4.1	?
1971	10	19	61.6	150.2	50	3.9	?
1971	10	26	59.8	152.3	116	3.6	?
1971	11	01	59.7	152.1	57	4.2	?
1971	11	09	61.0	150.8	33	3.2	?
1971	11	24	60.2	151.8	60	4.0	?
1971	11	25	61.7	150.0	45	2.7	?
1971	12	23	60.7	151.6	67	3.7	III
1971	12	26	59.8	153.0	95	4.7	?
1971	12	30*	61.1	150.4	41	3.7	IV
1972	01	10	62.0	151.0	18	3.0	?
1972	01	24	59.6	151.4	83	4.0	?
1972	02	27	59.2	151.6	50	4.0	?
1972	03	01	59.6	152.8	101	4.6	?
1972	03	24	59.5	150.1	34	3.0	?
1972	04	07*	60.1	152.8	98	5.1	V
1972	04	11	62.0	150.4	18	4.2	?
1972	04	13	61.3	151.1	33	3.0	?
1972	04	20*	60.2	152.1	85	4.7	V
1972	05	04	60.1	152.8	84	4.5	?
1972	05	07	61.6	151.2	33	3.0	?
1972	05	14	61.9	150.3	57	3.8	?
1972	05	30	60.4	152.2	73	3.2	?
1972	06	10	59.9	152.6	114	4.5	?
1972	06	11	60.2	152.6	104	3.4	?
1972	06	30	59.6	151.7	91	3.4	?
1972	07	01	59.8	151.9	99	3.4	?
1972	07	09	60.0	152.7	90	3.5	?
1972	07	10	60.2	151.1	77	3.2	?
1972	07	24	60.0	152.8	88	3.5	?
1972	08	03	61.8	150.8	62	3.4	?
1972	08	13	62.0	150.5	66	3.3	?
1972	08	17	59.4	152.6	64	3.7	?
1972	08	18	60.7	151.8	53	3.4	?
1972	08	22	59.9	152.2	71	4.4	?
1972	09	08	61.1	152.1	104	3.7	?
1972	09	16	60.7	150.4	23	3.2	?
1972	09	19	61.5	151.6	79	3.5	?
1972	10	25	61.3	150.5	30	3.2	III
1972	10	27	61.5	150.4	54	3.7	III
1972	11	11	60.5	150.4	50	3.3	?
1972	11	22	59.7	152.3	78	3.7	?
1972	11	30	61.7	150.0	54	3.3	?
1972	12	29	61.7	151.3	69	3.7	?
1972	12	29	61.5	151.2	74	3.4	?
1973	01	05	60.1	153.0	105	3.7	?
1973	01	07	60.8	150.1	31	3.5	?
1973	02	02	60.1	152.9	103	3.5	?
1973	02	08	61.8	150.2	54	3	III
1973	02	23	61.5	150.8	64	3.1	?
1973	03	15	60.6	150.8	37	3.0	?
1973	04	14	60.6	150.6	57	3.5	?
1973	04	16	60.8	150.7	33	3.2	?
1973	04	18	60.9	152.9	146	3.8	?
1973	04	30	61.0	151.1	33	3.4	III
1973	05	06	59.5	152.1	70	3.9	?
1973	05	25	60.4	152.6	98	3.4	?
1973	06	25	61.7	150.1	15	3.0	III
1973	07	02	60.9	151.0	33	3.0	?
1973	07	15	59.4	152.4	79	4.1	?
1973	07	19	60.2	151.8	95	4.7	?
1973	07	21	60.1	151.0	33	3.1	?
1973	09	05	59.9	152.8	124	4.3	?
1973	09	28	61.4	151.5	82	3.6	?
1973	10	13	60.1	152.9	147	4.0	?
1973	10	21	60.7	152.2	87	3.5	?
1973	10	27	59.8	152.8	118	4.4	?
1973	11	01*	62.0	150.6	69	3.9	IV
1973	11	06	61.6	150.0	52	?	III
1973	12	04	60.9	150.9	8	3.0	?
1974	01	22	60.85	150.02	50	3.4	?
1974	01	22	61.94	152.14	115	3.8	?
1974	02	04	60.02	152.91	111	3.7	?
1974	02	10	61.36	150.23	33	2.8	?
1974	02	10	59.13	152.50	61	4.6	?
1974	03	04	59.51	152.77	122	4.0	?
1974	03	14	60.77	151.16	39	4.0	?
1974	03	19	60.61	152.74	120	3.7	?
1974	03	21	61.69	150.92	71	3.7	?
1974	03	30	61.69	150.99	83	3.5	?
1974	04	26	61.84	150.66	78	3.3	?
1974	05	11	61.66	150.58	67	3.8	II
1974	05	26	61.57	150.24	3	3.1	II
1974	05	31	60.54	151.36	65	3.4	?
1974	06	11	61.47	152.45	122	3.2	?
1974	07	03	61.97	150.12	36	2.9	?
1974	07	29*	59.70	152.72	84	4.5	V
1974	07	31*	60.52	150.04	44	4.3	IV
1974	08	18	60.36	150.64	51	3.5	?
1974	09	10*	59.89	151.71	86	3.7	V
1974	09	11*	60.27	151.03	33	4.1	V
1974	09	14	59.98	151.34	100	4.6	?
1974	09	23	61.84	150.14	61	3.4	?
1974	10	06	60.26	152.65	98	4.0	?
1974	10	26	59.45	150.41	52	3.5	?
1974	11	12	60.18	150.97	94	4.0	?
1974	12	29*	61.60	150.51	67	5.6	V
1975	01	01	61.41	150.06	63	3.8	III
1975	01	09	61.69	151.75	126	3.9	?
1975	01	13*	61.43	150.49	66	4.8	IV
1975	01	17	61.66	150.90	70	3.8	?
1975	02	05	60.06	152.73	128	4.2	?
1975	02	18	59.89	152.92	97	4.0	?
1975	02	27	61.64	150.65	35	2.9	?
1975	03	12	61.91	150.31	10	4.0	II
1975	03	20	59.70	153.00	118	4.0	?
1975	04	06	61.93	150.92	33	3.0	?
1975	04	07	61.56	150.57	11	3.0	?
1975	04	17	61.91	151.94	33	3.2	?
1975	04	18	61.81	150.56	41	3.0	III
1975	05	18	60.14	152.55	129	3.7	?
1975	05	21	60.43	152.03	92	3.4	?
1975	06	17	60.72	151.78	115	3.5	?
1975	06	17	59.97	152.13	96	3.8	?
1975	08	01	61.92	150.76	79	4.6	?
1975	08	21*	60.36	151.19	67	4.9	V
1975	10	08	59.65	151.19	78	3.7	?
1975	10	23	61.73	150.12	33	3.2	III
1975	10	28	61.42	152.42	132	4.5	III

TABLE A-4

MODIFIED MERCALLI INTENSITY SCALE OF 1931
(Abridged)

I. Not felt except by a very few under especially favorable circumstances.

II. Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.

III. Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motorcars may rock slightly. Vibration like a passing truck. Duration estimated.

IV. During the day felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make creaking sound. Sensation like heavy truck striking building. Standing motorcars rocked noticeably.

V. Felt by nearly everyone, many awakened. Some dishes, windows, etc., broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop.

VI. Felt by all; many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight.

VII. Everybody runs outdoors. Damage *negligible* in buildings of good design and construction; *slight* to *moderate* in well-built ordinary structures; *considerable* in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motorcars.

VIII. Damage *slight* in specially designed structures; *considerable* in ordinary substantial buildings, with partial collapse; *great* in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motorcars disturbed.

IX. Damage *considerable* in specially designed structures; well-designed frame structures thrown out of plumb; *great* in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.

X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with their foundations; ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.

XI. Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.

XII. Damage *total*. Waves seen on ground surfaces. Lines of sight and level distorted. Objects thrown upward into air.

APPENDIX B

DRAINAGE BASIN AND PIPELINE CORRIDOR MAPS OF COOK INLET

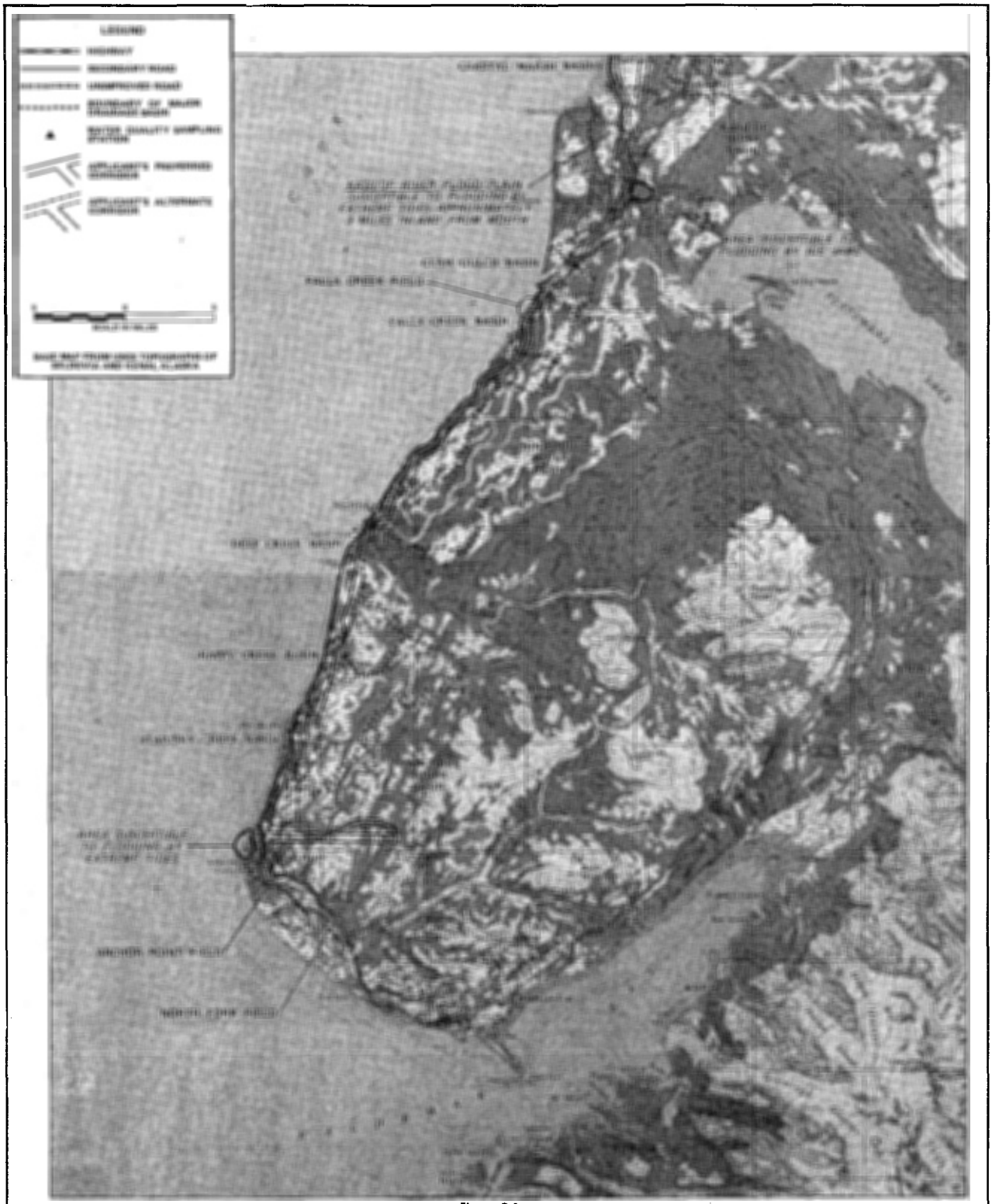


Figure B-1

DRAINAGE BASINS AND PIPELINE CORRIDORS LOWER KENAI PENINSULA

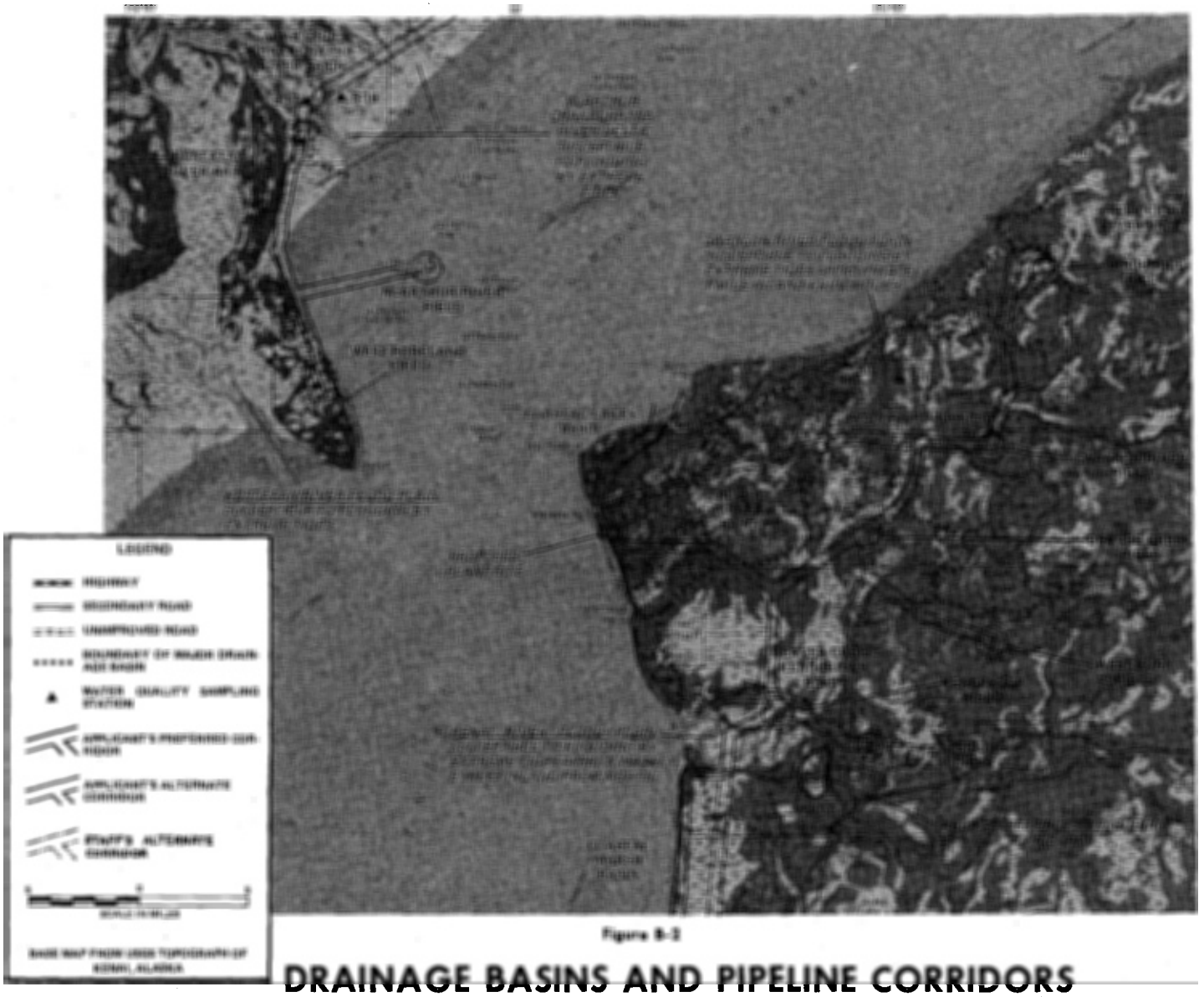


Figure B-2

DRAINAGE BASINS AND PIPELINE CORRIDORS
UPPER KENAI PENINSULA AND WEST FORELAND AREA

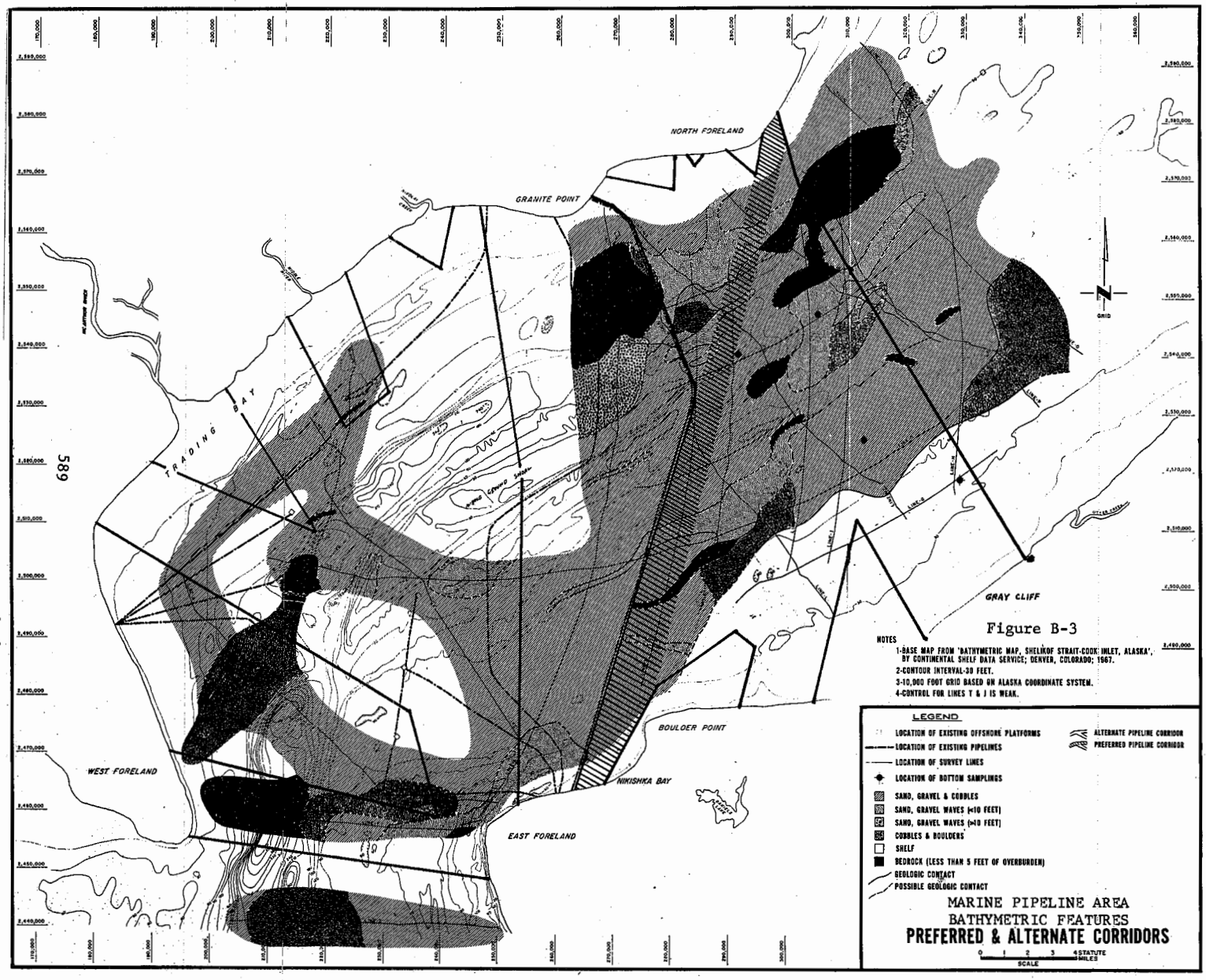

NORTH FORELAND
GRANITE POINT
TRADING BAY
WEST FORELAND
EAST FORELAND
BOULDER POINT
NIKISHKA BAY
GRAY CLIFF
GRID
LINE A
LINE B
LINE C
LINE D
LINE E
LINE F
LINE G
LINE H
LINE I
LINE J
NOTES
1-BASE MAP FROM 'BATHYMETRIC MAP, SHELIKOF STRAIT-COOK INLET, ALASKA', BY CONTINENTAL SHELF DATA SERVICE; DENVER, COLORADO; 1967.
2-CONTOUR INTERVAL-30 FEET.
3-10,000 FOOT GRID BASED ON ALASKA COORDINATE SYSTEM.
4-CONTROL FOR LINES T & J IS WEAK.
LEGEND
LOCATION OF EXISTING OFFSHORE PLATFORMS
LOCATION OF EXISTING PIPELINES
LOCATION OF SURVEY LINES
LOCATION OF BOTTOM SAMPLINGS
SAND, GRAVEL & COBBLES
SAND, GRAVEL WAVES (<10 FEET)
SAND, GRAVEL WAVES (>10 FEET)
COBBLES & BOULDERS
SHELF
BEDROCK (LESS THAN 5 FEET OF OVERBURDEN)
GEOLOGIC CONTACT
POSSIBLE GEOLOGIC CONTACT
ALTERNATE PIPELINE CORRIDOR
PREFERRED PIPELINE CORRIDOR
MARINE PIPELINE AREA
BATHYMETRIC FEATURES
PREFERRED & ALTERNATE CORRIDORS
0 1 2 3 4 STATUTE MILES
SCALE

Figure B-3

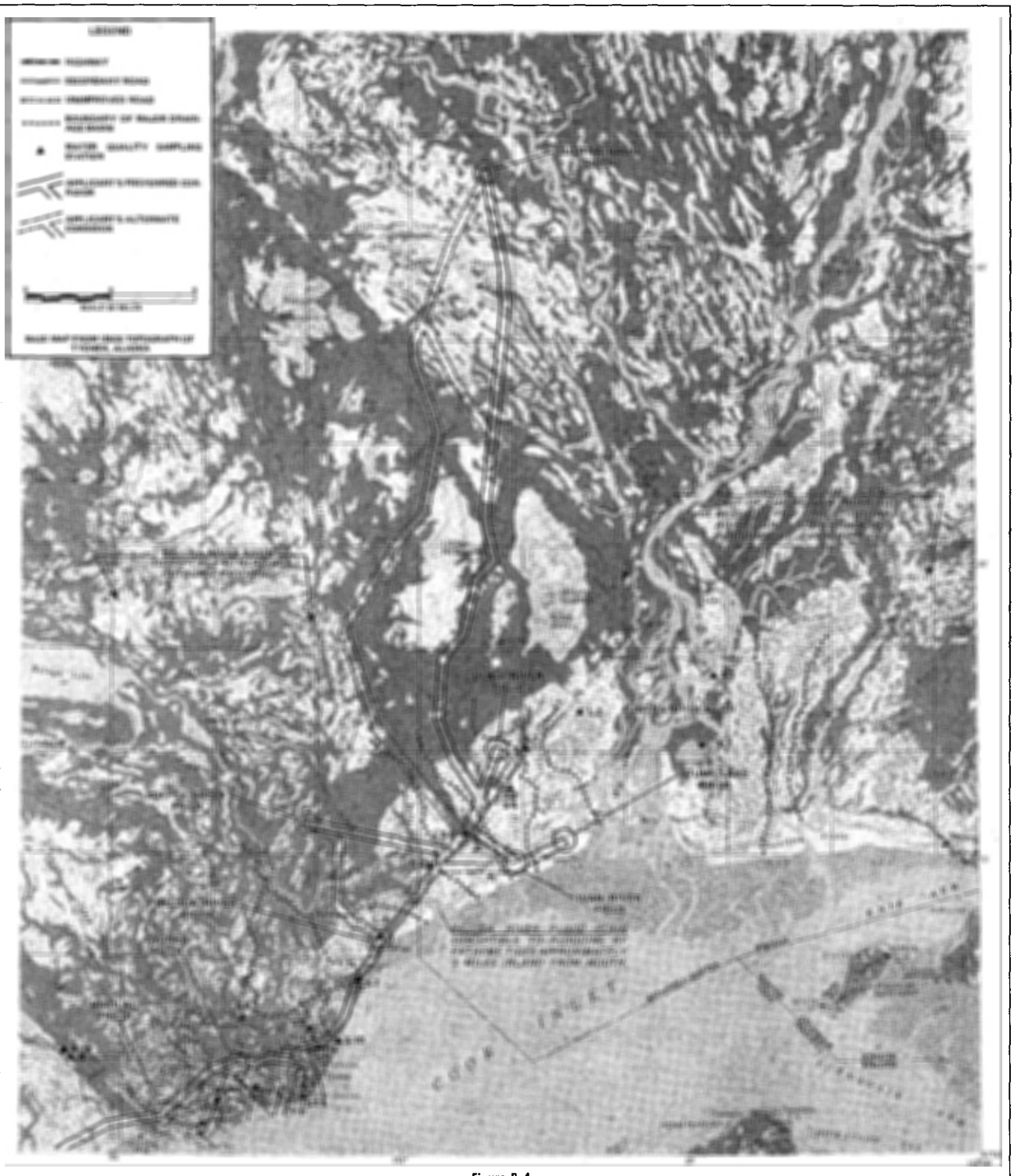


Figure B-4

DRAINAGE BASINS AND PIPELINE CORRIDORS NORTH FORELAND AND SUSITNA BASIN AREAS

TABLE B-1

SURFACE RUNOFF INTO COOK INLET

	Approximate Length 1/ (mi.)	Gauge Location (at or near)	Drainage Area Above Gauge (sq. mi.)	Years of Record	Average Discharge (cfs)	Maximum Discharge (cfs)	Point of Discharge
Douglas River	24		214 2/				LCI 8/
Kamishak River	39		320 2/				LCI
Little Kamishak River	23		170 2/				LCI
McNeil River	15		100 2/		248 2/		LCI
Paint River	20		196 2/		511 2/		LCI
Johnson River	13		100 2/				LCI
Tuxedni River	35		259 2/				LCI
Crescent River	12		250 2/				LCI
Drift River	35		250 2/				LCI
Big River	20		350 2/				LCI
McArthur River	33		350 2/				LCI
Chakachatna River 4/	36	Tyonek	1120	8	3647		McArthur R.
Beluga River 10/	35		760				UCI 9/
Susitna River 10/	293		19400				UCI
		Denali	950	14 3/	2654	38200	
		Gold Creek	6160	24	9770	90700	
Skwenta River		Skwenta	2250	14	6227	50000	Susitna R.
Maclaren River	50	Paxson	280	15	981	9260	Susitna R.
Tyone River	30		1400 2/				Susitna R.
Talkeetna River	85	Talkeetna	2006	9	4143	67400	Susitna R.
Chulitna River 4/	90	Talkeetna	2570	9	9079		Susitna R.
Little Susitna River	110	Palmer	62	25	203	7840	UCI
Knik River	25	Palmer	1180	14	6794	359000 5/	Knik Arm
Caribou Creek		Sutton	289	18	303	8720	Matenuska R.
Matenuska River	75	Palmer	2070	24	3857	82100	Knik Arm
Eagle River	40	Eagle River	192	8	504	6240	Knik Arm
Eklutna River 4/		Palmer	119	8	345.3		Knik Arm
Chester Creek		Anchorage	20	15	19.3	95	Knik Arm
		Anchorage	27	7	16.8	95	
Ship Creek		Anchorage	91	27	160	1860	Knik Arm
		Elmendorf AFB	115	3	118 6/	1600	
Cottonwood Creek 4/		Wasilla	29	5	16.6		Knik Arm
Campbell Creek		Spenard	70	7	59.3	421	Turnagain Arm
Glacier Creek		Gridwood	62	8	266	7710	Turnagain Arm
Resurrection Creek		Hope	149	6	260	2700	Turnagain Arm
Swanson River			260 11/				UCI
Beaver Creek 10/		Kenai	52	6	26.2	598	Kenai R.
Kenai River		Cooper Landing	634	26	2689	21500	LCI
		Soldotna	2010	8	5429	30000	
Kasilof River		Kasilof	738	18	2400		LCI
Ninilchik River		Ninilchuk	131	10	102	1000	LCI
Anchor River		Anchor Pt.	133	8	185	2240	LCI
Bradley River		Homer	54	16	404	7690	LCI
Twitter Creek		Homer	16	2	20.9 6/	536	LCI
Fritz Creek		Homer	10	7/		349	LCI
Barbara Creek		Seldovia	21	1	74.1 6/	335	LCI

Source: U.S. Geological Survey, 1974, Water Resources Data for Alaska WY 1973, Part I and II, U.S. Geological Survey, Alaska District Annual Publications, except where noted.

1/ Alaska, State of, 1974, Alaska Regional Profiles - Southcentral Region, Office of the Governor and the University of Alaska.
2/ Approximate, no gauging stations. From footnote 1.
3/ May 1957 - Sept. 1966, July 1968 - Sept. 1973
4/ Peterson, D.L., & Associates, 1971, Water Resources Management for the Cook Inlet Basin/Kenai Peninsula Region, Vol. I and II, Prepared for the State of Alaska, Department of Natural Resources, May 1971. Mean annual flow used for average discharge.
5/ Recorded July 1958 (outside record period).
6/ Data for Water Year 1973.
7/ Data taken Nov. 1970.
8/ Lower Cook Inlet
9/ Upper Cook Inlet
10/ Crossed by proposed ROW.
11/ Approximate

TABLE B-2

STREAMS PROPOSED TO BE CROSSED BY THE PREFERRED RIGHT-OF-WAY CORRIDORS

SUSITNA BASIN TO NORTH FORELAND

(34 crossings of 20 streams) 1/

Stream Name	Number of Crossings
Kutna Creek	1
Unnamed Creek (Kutna Cr. Tributary)	1
Unnamed Creek	1
Alexander Creek	1
Lower Sucker Creek	1
Unnamed Creek (Snag Cr. Tributary)	1
Snag Creek	1
Unnamed Creek (Wolverine Cr. Tributary)	1
Unnamed Creek (Wolverine Cr. Tributary)	1
Unnamed Creek (Wolverine Cr. Tributary)	1
Unnamed Creek (Wolverine Cr. Tributary)	1
Wolverine Creek	1
Unnamed Creek (Lewis R. Tributary)	1
Unnamed Creek (Lewis R. Tributary)	1
Unnamed Creek (Lewis R. Tributary)	1
Unnamed Creek (Lewis R. Tributary)	1
Unnamed Creek (Theodore R. Tributary)	1
Unnamed Creek	1
Unnamed Creek	1
Ivan River	1
Unnamed Creek (Lewis R. Tributary)	1
Lewis River	2
Unnamed Creek	1
Theodore River	2
Unnamed Creek	1
Pretty Creek (Beluga R. Tributary)	1
Olsen Creek (Beluga R. Tributary)	1
Beluga River	1
Unnamed Creek	1
Threemile Creek	1
Shorty Creek	1
Chuitna River	1

NORTH FORELAND TO WEST FORELAND

(29 crossings of 17 streams) 1/

Stream Name	Number of Crossings
Tyonek Creek	1
Unnamed Creek (Old Tyonek Cr. Tributary)	1
Old Tyonek Creek	2
Unnamed Creek (Old Tyonek Cr. Tributary)	1
Unnamed Creek (Old Tyonek Cr. Tributary)	1
Unnamed Creek (Old Tyonek Cr. Tributary)	1
Unnamed Creek (Old Tyonek Cr. Tributary)	2
Nikolai Creek	1
Unnamed Creek	1
Chuitkilnachna Creek	1
Unnamed Creek	1
Unnamed Creek	1
Middle River	1
Unnamed Creek (Middle R. Tributary)	1
Unnamed Creek (Middle R. Tributary)	1
Unnamed Creek (Middle R. Tributary)	1
Cottonwood Slough	1
Seal Slough	1
Chakachatna River	1
McArthur River	1
Unnamed Creek (McArthur R. Tributary)	1
Unnamed Creek (McArthur R. Tributary)	1
Unnamed Creek	1
Unnamed Creek	1
Unnamed Creek	1
Unnamed Creek	1
Unnamed Creek	1

KENAI PENINSULA

(31 crossings of 28 streams) 1/

Stream Name	Number of Crossings
Unnamed Creek (Bernice Lake Tributary)	1
Unnamed Creek (Scaup Lake Tributary)	1
Swanson River	1
Beaver Creek	3
Unnamed Creek	1
Unnamed Creek	1
Unnamed Creek	1
Unnamed Creek	1
Kenai River	1
Unnamed Creek	1
Coal Creek	1
Kasilof River	1
Crooked Creek	1
Unnamed Creek (Crooked Cr. Tributary)	1
Unnamed Creek	1
Unnamed Creek	1
Clam Gulch Creek	1
Unnamed Creek	1
Falls Creek	1
Corea Creek	1
Unnamed Creek	1
Ninilchik River	1
Deep Creek	1
Unnamed Creek	1
Happy Creek	1
Unnamed Creek	1
Stariski Creek	1
Unnamed Creek	1
North Fork (Anchor River)	1

1/ Unnamed tributaries are counted as multiple crossings of the named stream.

TABLE B-3

SUMMARY OF STREAMFLOW RECORDS FOR THE KENAI RIVER AT SOLDOTNA

Mean Discharge (cfs)

Period	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	Minimum	Maximum	Average
Jan.		1,200	1,235	1,674	2,842	2,331	1,755	1,245	1,197	1,068	1,319	823	823	2,842	1,517
Feb.		1,000	1,100	1,616	2,417	1,752	1,250	969	954	913	1,146	822	822	2,417	1,267
Mar.		850	1,100	1,781	1,597	1,763	1,148	848	842	869	1,045	800	800	1,781	1,149
Apr.		859	1,100	1,512	1,486	1,708	1,150	812	998	1,335	1,087	1,002	812	1,708	1,186
May		1,995	2,134	3,361	2,223	2,754	1,962	2,375	1,950	2,238	3,751	2,096	1,950	3,751	2,440
June		6,777	8,524	8,457	10,220	7,983	6,760	4,940	5,458	6,804	7,351	6,850	4,940	10,220	7,284
July		10,920	13,520	11,910	13,290	11,620	15,240	11,440	9,696	11,140	13,830	12,560	9,696	15,240	12,288
Aug.		18,970	18,970	13,110	8,706	13,560	17,950	14,310	10,530	11,390	12,150	13,650	8,706	18,970	13,936
Sept.		17,140	20,840	6,273	5,873	9,739	13,100	11,470	7,546	16,570	8,075	13,820	5,873	20,840	11,859
Oct.	6,305	8,538	7,322	2,861	14,370	4,110	4,807	4,536	3,504	8,590	5,579		3,504	14,370	6,411
Nov.	2,133	2,778	2,922	1,641	4,507	4,432	2,322	2,458	1,631	3,375	1,813		1,631	4,507	2,728
Dec.	1,500	1,548	2,161	1,413	2,828	2,234	1,629	1,574	1,190	1,640	1,132		1,132	2,828	1,714
11-Year													800	20,840	5,315

Drainage Area : 1,010 square miles
Period of Record : May 1965 to current year
Maximum on Record: 30,000 cfs (October 15, 1969)
Minimum on Record: 770 cfs (April 1-4, 1966)

Source: U.S. Geological Survey, Water Resources Data for Alaska, Parts I and II (1970-1976 only), Alaska District Annual Publications, 1966-1976.

TABLE B-4

SUMMARY OF STREAMFLOW RECORDS FOR THE KASILOF RIVER NEAR KASILOF

Mean Discharge (cfs)

Period	1965	1966	1967	1968	1969	1970	Minimum	Maximum	Average
Jan.		673	666	1,156	350	866	350	1,156	742
Feb.		436	491	868	371	939	371	939	621
Mar.		332	399	700	492	919	332	919	568
Apr.		309	456	597	488	676	309	676	505
May		656	981	649	581	760	581	760	725
June		1,281	1,668	1,434	1,704	1,218	1,218	1,704	1,461
July		4,102	4,565	4,024	4,725	2,531	2,531	4,725	3,989
Aug.		7,638	10,030	7,594	5,329	4,575	4,575	10,030	7,033
Sept.		7,388	9,594	5,506	3,982	4,284	3,982	9,594	6,151
Oct.	4,954	4,981	5,368	2,584	5,323		2,584	5,368	4,642
Nov.	1,757	2,082	2,494	1,262	3,430		1,262	3,430	2,205
Dec.	975	1,048	1,597	635	1,880		635	1,880	1,227
5-Year							309	10,030	2,489

Drainage Area : 738 square miles
Period of Record : July 1949 to September 1970
Maximum on Record: 12,300 cfs (September 14, 1957)
Minimum on Record: 19 cfs (April 2, 1964)

Source: U.S. Geological Survey, Water Resources Data for Alaska, Parts I and II (1970 only), Alaska District Annual Publications, 1966-1970.

TABLE B-5

SUMMARY OF STREAMFLOW RECORDS FOR THE NINILCHIK RIVER AT NINILCHIK

Mean Discharge (cfs)

Period	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	Minimum	Maximum	Average
Jan.		44.0	55.8	50.2	39.1	55.0	46.8	62.0	67.4	36.8	54.0	51.0	36.8	67.4	51.1
Feb.		60.0	55.0	49.9	43.5	66.6	50.8	62.0	66.0	36.0	51.4	51.1	43.5	66.6	53.8
Mar.		60.0	50.0	61.3	49.1	108.0	55.5	61.0	66.8	36.9	56.0	52.7	36.9	108.0	59.8
Apr.		134.0	61.5	155.0	52.2	151.0	66.2	61.0	101.0	548.0	81.0	152.0	52.2	548.0	142.1
May		310.0	111.0	283.0	81.7	193.0	227.0	324.0	147.0	151.0	390.0	255.0	81.7	390.0	224.8
June		170.0	118.0	112.0	62.2	80.6	131.0	117.0	92.3	76.5	173.0	78.4	62.2	173.0	110.1
July		109.0	85.6	67.1	59.8	75.5	90.0	69.0	69.4	68.2	77.5	70.0	59.8	109.0	76.5
Aug.		144.0	94.4	54.5	47.8	68.1	126.0	88.0	100.0	76.5	66.4	71.3	47.8	144.0	85.2
Sept.		198.0	144.0	61.2	54.6	93.6	95.2	155.0	94.2	113.0	129.0	138.0	54.6	198.0	116.0
Oct.	144.0	203.0	103.0	78.2	83.5	98.0	108.0	178.0	91.2	139.0	135.0		78.2	203.0	123.7
Nov.	46.0	96.2	248.0	51.6	73.8	165.0	61.3	78.5	55.4	79.5	57.6		46.0	248.0	92.1
Dec.	42.0	68.1	70.1	44.2	69.8	52.9	62.0	69.9	42.6	59.2	53.2		42.0	70.1	57.6
11-Year													36.8	548.0	99.4

Drainage Area : 131 square miles
Period of Record : April 1963 to September 1976
Maximum on Record: 1,240 cfs (April 24, 1974)
Minimum on Record: 30 cfs (July 20, 1966)

Source: U.S. Geological Survey, Water Resources Data for Alaska, Parts I and II (1970-1976 only), Alaska District Annual Publications, 1966-1976.

TABLE B-6

SUMMARY OF STREAMFLOW RECORDS

Mean Discharge (cfs)

Stream	Period of Record	Drainage Area (square miles)	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
Chuitna River near Tyonek	Oct. 1975 to Sept. 1976	131	332.	116.	92.9	85.8	75.5	60.0	72.0	803.	1,117.	137.	126	453
Anchor River near Anchor Point	Oct. 1965 to Sept. 1973 (discontinued)	133	241.3	143.9	84.3	69.6	69.1	74.9	175.3	582.8	305.4	124.3	139.3	196.4
Anchor River at Anchor Point	Oct. 1965 to Sept. 1966 (discontinued)	226	314.	89.2	49.8	56.3	78.0	56.8	265.	992.	486.	257.	382.	488.

Source: U.S. Geological Survey, Water Resources Data for Alaska, Parts I and II (1970-1976 only), Alaska District Annual Publications, 1966-1976.

TABLE B-7

SUMMARY OF STREAMFLOW RECORDS FOR BEAVER CREEK

Mean Discharge (cfs)

Period	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	Minimum	Maximum	Average
Jan.		26.5	13.0	13.0	13.5	15.0	15.7	12.6	15.9	11.2	11.2	26.5	15.2
Feb.		26.0	15.6	13.5	10.5	13.1	14.1	12.0	14.3	11.0	10.5	26.0	14.5
Mar.		29.5	17.9	22.3	10.0	13.0	13.4	19.8	11.6	11.8	10.0	29.5	16.6
Apr.		38.0	30.1	32.8	12.0	13.5	44.8	84.6	20.4	41.8	12.0	84.6	35.3
May		58.5	25.6	30.6	79.0	111.0	27.8	36.5	126.	37.1	25.6	126.	59.1
June		38.9	21.4	22.6	26.9	35.7	23.6	20.0	29.8	20.8	20.0	38.9	26.6
July		25.5	18.7	21.6	25.1	19.6	15.3	18.5	17.1	15.1	15.1	25.5	19.6
Aug.		20.5	16.4	23.1	44.9	18.9	23.4	16.4	13.7	14.1	13.7	44.9	21.3
Sept.		19.2	17.4	25.8	32.4	31.1	22.5	20.5	26.8	22.7	17.4	32.4	24.3
Oct.	35.4	25.5	20.1	26.7	37.1	72.4	32.0	35.6	24.3		20.1	72.4	34.3
Nov.	49.7	18.2	16.8	26.3	22.5	26.3	17.0	25.1	17.1		16.8	49.7	24.3
Dec.	33.3	14.0	14.0	17.2	17.4	18.6	14.5	19.7	14.2		14.0	33.3	18.1
9-Year											10.0	126.	25.8

Drainage Area : 51 square miles (approximate)
Period of Record : October 1967 to September 1976
Maximum on Record : 598 cfs (May 8, 1972)
Minimum on Record : 8.2 cfs (October 23, 1969, caused by temporary ice storage upstream)

Source: U.S. Geological Survey, Water Resources Data for Alaska, Parts I and II, Alaska District Annual Publications, 1968-1976.

TABLE B-8

SUMMARY OF STREAMFLOW RECORDS FOR THE CHAKACHATNA RIVER NEAR TYONEK

Mean Discharge (cfs)

Period	1965	1966	1967	1968	1969	1970	1971	1972	Minimum	Maximum	Average
Jan.		480	600	626	639	705	532	585	480	705	595
Feb.		400	500	535	550	568	467	484	400	568	501
Mar.		350	430	490	500	550	467	446	350	550	462
Apr.		350	380	511	533	625	692	481	350	692	510
May		756	935	1,695	1,003	1,285	2,381	906	756	2,381	1,280
June		6,000	6,616	6,190	6,548	4,893	10,930	4,294	4,294	10,930	6,496
July		10,040	14,380	12,580	13,100	9,960	14,470	12,860	9,960	14,470	12,484
Aug.		10,310	16,610	12,170	8,416	8,884	16,710	12,750	8,416	16,710	12,264
Sept.		7,145	7,333	4,369	3,347	3,587	4,513	6,995	3,347	7,333	5,327
Oct.	4,070	3,790	2,939	1,552	3,098	2,201	1,351		1,351	4,070	2,714
Nov.	1,180	1,100	1,565	939	1,822	1,247	902		902	1,822	1,251
Dec.	650	820	947	723	1,006	829	726		650	1,006	814
7-Year									350	16,710	3,725

Drainage Area : 1,120 square miles (approximate; includes drainage from Barrier Glacier)
Period of Record : June 1959 to September 1972 (discontinued)
Maximum on Record: 470,000 cfs (August 11, 1971; determined by field estimate)
Minimum on Record: Not determined

Source: U.S. Geological Survey, Water Resources Data for Alaska, Parts I and II (1970-1972 only), Alaska District Annual Publications, 1966-1972.

TABLE 8-9

TYPICAL ANALYSIS OF SURFACE WATER FROM NIKISHKA LOWLAND

Date of collection	Mean discharge (cfs)	Temperature (°C)	Silica (SiO_2) (mg/l)	Iron (Fe) (mg/l)	Calcium (Ca) (mg/l)	Magnesium (Mg) (mg/l)	Sodium (Na) (mg/l)	Potassium (K) (mg/l)	Bicarbonate (HCO_3) (mg/l)	Sulfate (SO_4) (mg/l)	Chloride (Cl) (mg/l)	Fluoride (F) (mg/l)	Nitrate (NO_3) (mg/l)	Dissolved solids (residue on evaporation at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
															Calcium, magnesium	Noncarbonate			
15-2663. KENAI RIVER AT SOLDOTNA (Lat 60°28'39", long 151°04'41")																			
May 21, 1952	--	--	6.3	0.20	9.7	2.0		2.7	35	7.1	1.2	0.1	0.4	46	32	4	72	7.1	10
June 20	--	--	4.7	.21	8.6	1.0		1.7	28	5.3	0.0	.1	.7	36	26	3	59	6.7	8
July 25	--	--	3.6	.80	8.7	1.1		1.7	26	5.8	1.2	.1	.8	37	26	5	58	6.5	10
Jan. 30, 1953	--	--	3.6	.03	9.6	1.0	2.5	1.1	27	7.9	3.8	.0	.7	44	28	6	68	7.1	8
Sept. 9, 1955	--	--	5.9	.00	9.1	0.7	1.2	0.8	30	4.5	1.0	.0	.6	39	26	1	64	6.8	--
May 2, 1956	--	--	6.5	.27	8.3	1.2	2.2	2.3	34	3.4	0.8	.0	.4	42	26	0	64	7.0	25
July 4	--	--	6.2	.00	9.9	0.2	2.6	1.1	30	6.0	.8	.0	.6	42	26	1	68	6.4	3
Oct. 3, 1957	--	--	4.2	.05	8.7	2.2	1.3	1.1	32	6.0	.5	.0	.2	40	30	4	68	6.8	10
Nov. 6	--	--	7.4	.41	9.1	1.0	1.4	1.0	31	4.0	1.0	.0	.7	41	26	1	65	7.2	20
Dec. 11	--	--	4.7	.10	8.7	1.2	1.6	1.3	32	5.0	0.5	.0	.7	40	26	0	66	6.8	10
Jan. 23, 1958	--	--	4.9	.09	10	1.1	1.4	1.2	34	6.0	.5	.0	.8	43	30	2	70	7.1	15
Feb. 19	--	--	6.1	.16	9.9	2.4	2.3	1.0	39	6.0	1.5	.0	.8	49	34	2	81	6.1	0
May 20	--	--	5.2	.05	9.1	1.4	1.9	0.9	15	5.0	2.0	.0	.2	41	28	3	68	6.5	0
July 15	--	--	4.0	.14	8.3	2.4	1.2	1.3	28	7.0	2.5	.1	.5	41	30	8	63	6.7	20
Aug. 21	--	--	3.8	.04	9.5	0.8	0.8	1.0	80	6.0	1.0	.0	.6	35	80	4	68	8.8	h
Dec. 2	--	--	5.8	.18	9.9	1.2	1.3	1.0	34	4.0	0.5	.0	.4	41	30	2	67	7.2	20
Mar. 29, 1967	1,080	1.0	7.0	.30	11	2.3	1.7	1.1	38	6.0	2.5	.4	.0	51	37	6	90	7.2	5
June 14	7,350	9.0	3.9	.70	7.7	0.9	0.8	0.6	26	1.5	0.4	.0	1.3	31	22	1	63	6.7	10
July 28	16,000	--	3.7	.13	11	.9	1.3	.6	28	7.0	.4	.2	0.5	40	31	8	65	6.7	5
Sept. 2	21,900	12	3.3	.38	9.6	1.4	1.2	.3	30	4.0	3.5	.0	.5	39	30	5	65	7.0	10
Oct. 22	4,570	4.0	4.4	.04	10	1.0	0.9	1.3	30	6.0	1.1	.1	1.8	29	30	5	69	7.3	5
Nov. 2	3,300	4.0	5.5	.34	7.0	1.0	1.6	0.9	31	4.0	0.4	.0	0.0	36	22	0	59	6.8	20
Mar. 11, 1968	1,020	1.0	5.9	.88	11	1.5	1.4	.9	34	4.8	.7	.0	.8	45	34	6	78	7.6	5
Apr. 2	1,440	1.0	6.4	.62	12	1.8	1.8	.7	36	5.0	2.8	.1	1.1	51	36	8	83	7.0	5
June 19	9,150	10	3.8	1.04	9.9	0.9	1.3	.8	28	5.7	0.6	.0	0.6	39	28	5	65	7.5	10
Aug. 21	13,600	11	3.4	1.10	9.8	.8	1.1	.8	28	6.7	.4	.0	.8	39	28	6	65	7.7	5
Oct. 23	2,090	2.0	4.0	*0.53	10	1.2	1.8	1.1	32	5.4	.8	.4	.5	42	30	4	70	7.7	10
Nov. 21	1,570	0.0	--	* .08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jan. 15, 1969	1,190	.0	6.1	* .82	11	1.4	2.3	1.0	36	8.7	1.4	.1	.7	52	34	4	85	7.5	5
Jan. 24	4,340	.0	3.3	* .04	9.7	0.9	1.3	1.0	29	6.0	0.6	.2	.9	38	28	4	69	7.5	9
Mar. 19	1,530	.0	6.2	* .04	13	1.4	2.5	2.2	41	7.0	1.4	.3	.2	54	38	4	86	7.4	--
May 5	1,480	5.0	6.8	* .17	9.3	1.4	2.4	1.0	34	4.6	0.0	.0	.0	43	29	1	78	7.5	--
June 25	14,200	8.0	3.6	* .04	9.0	0.9	1.2	1.3	26	5.7	.0	.3	.6	36	26	4	62	7.5	5
July 31	11,000	13	3.4	* .34	9.6	.7	1.3	1.9	28	6.6	.0	.1	.4	38	27	4	66	7.6	10
Sept. 9	5,450	9.0	3.4	* .33	10	1.0	1.7	1.1	30	5.9	.0	.1	2.9	41	30	5	67	7.7	20
Oct. 14	24,000	5.0	8.1	* .81	6.6	1.1	1.1	0.3	22	6.7	.0	.2	0.0	36	21	3	57	7.6	10
Nov. 7	5,980	2.0	3.5	* .03	9.8	1.0	1.6	1.0	29	6.3	.0	.1	1.2	39	29	5	69	7.0	0
Jan. 7, 1970	2,060	0.0	5.5	* .48	10	1.6	3.2	1.3	34	6.3	3.9	.0	0.9	50	32	4	86	7.8	10
Mar. 5	1,860	.0	4.5	* .10	11	1.4	1.9	1.3	36	6.3	1.4	.0	.3	46	34	4	80	7.6	5
May 6	1,830	6.5	3.2	* .77	11	2.0	3.9	1.3	26	5.7	3.6	.0	.0	52	36	1	98	8.6	10
June 24	9,050	9.0	3.6	* .11	9.8	0.9	1.5	0.9	28	7.3	0.7	.1	.8	40	28	5	68	7.5	5
Aug. 9	14,000	10	3.7	* .18	10	.7	1.4	.9	28	7.2	.7	.1	.7	40	24	6	69	7.5	5

* Filtered

TABLE B-9 (continued)

TYPICAL ANALYSIS OF SURFACE WATER FROM NIKISHKA LOWLAND

Date of collection	Mean discharge (cfs)	Temperature (°C)	Silica (SiO_2) (mg/l)	Iron (Fe) (mg/l)	Calcium (Ca) (mg/l)	Magnesium (Mg) (mg/l)	Sodium (Na) (mg/l)	Potassium (K) (mg/l)	Bicarbonate (HCO_3) (mg/l)	Sulfate (SO_4) (mg/l)	Chloride (Cl) (mg/l)	Fluoride (F) (mg/l)	Nitrate (NO_3) (mg/l)	Dissolved solids (residue on evaporation at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Non-carbonate	Specific conductance (micromhos at 25°C)	pH	Color
15-2665. BEAVER CREEK NEAR KENAI (Lat 60°33'50", long 151°07'05")																			
July 1951	--	10	30	--	12	2.9	6.7		58	2.6	3.5	--	2.5	88	42	0	104	7.3	30
Mar. 8, 1952	15.5	--	33	0.75	16	4.6	8.2		79	5.4	3.8	0.1	0.8	112	59	0	133	7.0	45
May 2, 1956	--	--	7.3	.22	44	0.9	2.0	4.0	22	0.2	1.5	.0	.6	42	15	0	43	6.7	45
Oct. 31, 1967	41.0	1.0	23	1.40	11	2.5	4.8	1.4	61	.0	1.8	.0	1.8	78	38	0	105	7.0	35
Nov. 20	58.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-	141	--	--
Mar. 14, 1968	31.9	0.0	26	1.60	17	4.3	5.1	2.1	85	.0	2.8	.1	0.8	102	60	0	141	7.6	30
Apr. 2	23.7	.0	28	2.40	18	4.4	5.0	2.2	90	.0	1.8	.1	.6	107	63	0	149	7.3	20
Aug. 2	17.9	8.0	26	2.00	18	4.5	5.4	1.7	90	.2	1.4	.1	.1	103	64	0	148	7.9	30
Jan. 15, 1969	13.2	0.0	28	2.22	18	4.5	6.2	2.3	95	.0	1.9	.1	.4	110	64	0	158	7.6	30
Feb. 26	16.9	.0	29	0.81	18	4.5	6.2	3.4	99	.0	2.5	.0	.1	113	64	0	158	7.4	15
Apr. 9	31.5	.5	20	.83	12	3.1	4.2	2.5	65	.0	2.1	.0	.6	77	42	0	106	7.3	25
May 5	27.0	5.0	22	2.74	17	3.6	4.8	2.3	80	7.1	0.4	.2	.6	100	58	0	137	7.8	5
Aug. 20	14.6	6.0	30	1.50	20	4.3	5.9	2.2	77	0.4	1.8	.1	.2	112	67	0	153	7.8	10
Sept. 9	19.0	5.0	26	1.38	17	4.3	6.0	0.3	86	2.3	3.2	.1	.9	102	59	0	141	7.9	20
Oct. 14	22.5	5.0	27	*1.28	14	4.2	5.2	1.3	74	0.5	0.4	.3	.0	90	52	0	128	8.1	25
Jan. 6, 1970	13.0	0.0	29	*2.00	18	5.0	6.6	2.9	98	.0	2.1	.0	.1	114	66	0	165	7.3	35
Mar. 5	14.5	.0	23	*0.64	21	4.4	6.1	2.8	98	.0	2.1	.2	.0	109	70	0	165	7.3	20
Mar. 18	29.0	.0	15	* .54	14	2.9	3.7	5.8	68	.0	5.7	.0	.8	82	45	0	121	7.6	45
Apr. 23	42.2	3.0	16	*1.60	12	3.2	3.7	2.9	62	.0	2.8	.1	.4	74	43	0	109	6.8	20
June 24	20.9	10	22	*0.61	17	3.9	5.4	2.1	83	.0	1.1	.2	.5	93	59	0	139	8.0	20
Aug. 9	20.5	9.0	25	* .91	18	3.9	5.5	1.9	84	.2	1.8	.2	.6	99	61	0	140	7.5	40
Oct. 1	19.9	4.4	28	*1.20	18	3.9	5.1	2.1	79	3.0	3.5	.2	.1	106	61	0	137	8.0	20
15-2669. BERNICE CREEK NEAR KENAI (Lat 60°41'30", long 151°05'45")																			
Apr. 3, 1968	1.33	2.0	20	0.51	7.8	2.4	3.9	1.8	38	1.0	5.3	0.1	0.3	62	30	0	85	7.0	5
15-2670. BISHOP CREEK NEAR KENAI (Lat 60°46'35", long 151°05'45")																			
Oct. 31, 1967	29.5	1.0	16	0.84	9.6	2.4	3....	1.2	4...	0.0	2.5	0.1	1.2	58	34	0	86	7.5	25
Apr. 1, 1968	11.9	0.0	20	1.24	13	3.0	4.3	2.0	62	1.0	2.8	.1	0.4	88	45	0	113	7.2	25
Aug. 20, 1969	4.18	15	12	*0.38	14	3.2	4.5	1.0	64	0.0	2.8	.0	.1	70	48	0	113	7.9	10
Sept. 30, 1970	15.1	6.0	14	* .70	12	2.9	4.2	1.6	51	3.0	3.2	.2	.3	66	42	0	100	7.4	10
15-2670.5. SWANSON RIVER NEAR STERLING (Lat 60°42'57", long 150°59'23")																			
Oct. 4, 1967	--	--	16	0.02	18	3.7	5.5	1.1	77	1.5	2.0	0.2	0.0	84	55	0	130	7.5	--
Nov. 1	--	--	16	.23	15	4.8	6.0	1.4	77	3.0	2.5	.3	.6	88	57	0	130	7.5	--
Feb. 20, 1968	--	--	21	1.00	27	6.2	5.8	2.6	128	3.3	4.0	.2	.5	137	93	0	223	7.3	--
Dec. 2	--	0.0	15	1.10	21	5.5	6.5	1.8	103	1.0	3.5	.1	.3	107	75	0	171	7.0	45
Nov. 1, 1967	98.1	.6	16	0.40	20	5.0	6.9	2.5	99	1.0	2.8	.0	1.0	106	71	0	158	7.6	15
Aug. 20, 1969	22.0	12	13	* .30	28	6.5	13	2.5	140	0.2	4.3	.2	0.0	140	96	0	234	8.2	15
15-2671.6. SWANSON RIVER NEAR KENAI (Lat 60°47'15", long 151°00'30")																			
Aug. 20, 1969	--	13	16	*0.48	29	6.4	10	2.5	140	0.4	3.5	0.1	0.0	129	99	0	229	8.3	--

* Filtered

APPENDIX C

AGENCIES AND STANDARDS AFFECTING THE PACIFIC ALASKA PROJECT

Part I - Agencies and Their Jurisdiction

Part II - Standards Applicable to the Construction and Operation of the Proposed Facilities

PART I

AGENCIES AND THEIR JURISDICTIONS

Agency	Jurisdiction, Statutes, Codes
Federal	
American Bureau of Shipping	-Classifies all U.S. flag merchant vessels as to hull integrity, seaworthiness, cargo capability, etc.; Rules for Building and Classing Steel Vessels.
Environmental Protection Agency	-Issues permits for wastewater discharges; Federal Water Pollution Control Act.
	-Reviews air, water, and noise impacts on environment; NEPA 1969, Clean Air Act, Noise Control Act.
Federal Aviation Administration, U.S. Department of Transportation	-Determines possible hazards to air navigation from facilities.
Federal Communications Commission	-Certifies all communication equipment.
	-Requires vessel bridge-to-bridge radiotelephone on all large vessels; 47 CFR, Parts 81 & 83.
Federal Maritime Commission	-Certifies financial responsibility; Federal Water Pollution Control Act, 46 CFR, Part 452.
Federal Energy Regulatory Commission	-Approves construction or operation of any pipeline or related facility for the transport of natural gas in interstate commerce; Section 7(c), Natural Gas Act, 46 CFR, Part 452.
Maritime Administration, U.S. Department of Commerce	-Reviews and approves conceptual engineering design specifications and drawings; Merchant Marine Act, Title XI.

Agency	Jurisdiction, Statutes, Codes
Occupational Safety and Health Administration, U.S. Department of Labor	-Approves the construction and operation of facilities according to regulations governing the general safety of workers.
Office of Pipeline Safety	-Determines compliance with Federal safety standards for transportation by pipeline of natural or other gas.
U.S. Army Corps of Engineers	-Approves permits, as required, authorize work in both navigable waters of the United States and navigable waters. Navigable waters of the United States are defined in Section 209.260 of Title 33 CFR. The primary legislation requiring permits for work and structures in navigable waters of the United States and for deposits of dredge or fill material in navigable waters is Section 10 of the River and Harbor Act of March 3, 1899 (30 Stat 1151; 33 USC 403) and Section 404 of the Federal Water Pollution Control Act Amendments of 1972 (86 Stat 816; 33 USC 1344).
U.S. Coast Guard	-Approves design and operation of dock facilities; approves vessel design and operations; regulates safe shipping practices; Dangerous Cargo Act and Ports and Waterways Safety Act. -Establishes special rules for U.S. flag gas carriers and rules for foreign flag vessels entering U.S. ports; Title 46 CFR Sections 38 and 154. Note: All new vessels, U.S. and foreign, are required to meet the IMCO Gas Carriers Code.

Agency	Jurisdiction, Statutes, Codes
U.S. Coast Guard (cont.)	-Requires hull markings which indicate maximum load depths on large merchant vessels; Title 46 CFR, Section 2.85-1 and Part 42.
	-Issues Certificates for Cargo Ship Safety Construction; 46 CFR, Section 31.40-5.
	-Issues Certificates for Cargo Ship Safety Equipment; 46 CFR, Section 31.40-10.
	-Regulates citizenry of seamen and officers, competence and physical condition of crew, and ability of crew to handle LNG; Title 46 CFR, Parts 10-16, and 46 USC, Sections 541-713.
	-Regulates the design, construction, and certification procedures for marine sanitation devices; 33 CFR 159.
	-Documents ownership of vessel registration, and place of construction for vessels which operate between points in the U.S.; 46 USC, Sections 11-63, 251-355, and Title 46 CFR.
	-Issues permits for pipeline crossing of navigable waters; 33 CFR 115.
	-Approves design and operation of private aids to navigation; 33 CFR 66.
	-Regulates oil transfer operations between vessels and shoreside facilities; 33 CFR 154-156.
	-Issues permits for bridge crossings of navigable waters; 33 CFR 2.05.25

PART II

STANDARDS APPLICABLE TO THE CONSTRUCTION AND OPERATION OF THE PROPOSED FACILITIES

Federal Regulations

1. Title 49 CFR, Part 192-- Amendment 192-10, Liquefied Natural Gas Systems, and Part 192, Safety Standards for Transport of Natural Gas by Pipeline.
2. Occupational Safety and Health Act, 29 CFR, Parts 1910, 1910.23, and 1926.
3. Clean Air Act-- Amended (Public Law 91-6041).
4. National Environmental Policy Act of 1969 (Public Law 91-190).
5. Federal Water Pollution Control Act, as amended (Public Law 92-500).
6. Natural Gas Act.
7. Federal Water Pollution Control Act 1973, 40 CFR, Part 125.
8. Noise Control Act, 29 CFR, Parts 1910.95 and 1926.52.
9. Federal Aviation Act of 1958, 49 USC, Part 1350.
10. The Fish and Wildlife Coordination Act, 15 USC, Part 661.
11. The Rivers and Harbors Act 1899, 33 USC, Part 401, Transportation Act of 1966, 49 USC, Part 1665.
12. USCG Regulation-- 33 CFR 126, Security of Vessels and Waterfront Facilities.
13. USCG Regulation-- 33 CFR 154-156, Pollution Prevention Vessels and Oil Transfer Facilities.

Alaska Regulations and Codes

1. As 18.70.050 Regulations of the Department of Public Safety.
2. Alaska Administrative Code 19.000.

Other Industry and Underwriter Health and Safety Codes

Pipeline

1. American National Standards Institute (ANSI) B31.8 Gas Transmission and Distribution Piping.
2. American Petroleum Institute (API).
3. American Society for Testing Materials.
4. Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).
5. American Waterworks Association.

LNG Terminal

1. American Association of State Highway Officials (AASHO).
2. American Society of Mechanical Engineers-- Pressure Vessels.
3. American Society of Civil Engineers-- Wind Forces.
4. American National Standards Institute; various standards in the areas of Civil Engineering, Lighting, Instrumentation, Mechanical Engineering, Noise, Sanitation, Materials Handling.
5. American Concrete Institute (ACI) Specifications for Structural and Reinforced Concrete Construction.
6. American Institute of Timber Construction Manual.
7. American Institute of Steel Construction (AISC).
8. American Petroleum Institute (API); API std. 620 1973 and others.
9. American Waterworks Association.
10. American Society for Testing and Materials ASTM: Concrete and Structural Steel Standards.
11. Diesel Engine Manufacturers Association.

LNG Terminal (continued)

12. Hydraulic Institute Standards (HIS); Pump Standards 1969.
13. American Gas Association; AGA Gas Engineers Handbook-- Purging.
14. American Welding Society-- Structural Welding Code.
15. National Board of Firefighting Underwriters.
16. National Fire Protection Association (NFPA); NFPA No. 10 (1972), Installation of Portable Fire Extinguishers.
17. NFPA No. 17-- Dry Chemical Extinguishing Systems.
18. NFPA No. 30-- Flammable and Combustible Liquids Code.
19. NFPA No. 59A-1972; Storage and Handling of LNG.
20. NFPA No. 68-- Explosion Prevention Systems.
21. NFPA No. 70-1971; National Electrical Code.
22. NFPA No. 72A-- Local Protective Signaling Systems.
23. NFPA No. 77-1972; Static Electricity.
24. NFPA No. 78-- Lightning Protection Code.
25. NFPA No. 87-1971; Piers and Wharves
26. NFPA No. 90A-1972; Air Conditioning and Ventilating Systems.
27. NFPA No. 194-1968; Screw Threads for Fire Hose Couplings.
28. NFPA No. 196-1972; Fire Hose.
29. Uniform Building Code-- Zone 3.

APPENDIX D

EXCERPT - OCEANOGRAPHIC INSTITUTE OF WASHINGTON

1.4.2 Process of Elimination, Location and Evaluation of Impacts

There are a number of environmental factors that influence the accessibility, the effective placement, and the operations of an LNG facility. There is the impact of the facility and its subordinate operations on the environment and conversely the effects of the environment on the facility operations. Table 1-3 indicates the major parameters and their relationship to the operational modes of an LNG facility.

These major parameters and the extensive list of sub-parametric relationships were used in both the elimination and location iterative processes for determining viable plant sites. Appendix 4.1 provides both a detailed description of the parameters considered and the methodology used in the study. Fig. 1-6 is a schematic of the site selection and ranking process.

The initial phase was a gross elimination process based on facility site and marine terminal requirements. The Cook Inlet region was subdivided into 11 sub-regions (see Figure 1-7 and Table 1-4). Unfavorable land uses and status, excessively long distances to main pipelines, close proximity of volcanos and other detrimental geological features, unsafe approaches for maneuvering and docking of transport vessels, and adverse meteorological and marine conditions were all considered factors important in eliminating areas as unsuited for LNG terminal placement. This broad screen elimination rejected sub-regions 1,5,6 (see Table 1-5). Sub-region 9 was eliminated in the second iteration of the process on the basis of biotic community impacts.

TABLE 1-3 SITE CHARACTERISTICS VS. OPERATIONAL MODES OF LNG FACILITY

SITE CHARACTERISTICS \ OPERATIONAL MODES	(ROUTES)	(FACILITY SITE)		(MARINE TERMINAL)	(NAVIGATIONAL ROUTES)
	PIPELINE	LIQUEFACTION	STORAGE	TRANSFER	TRANSPORT
SAFETY OF APPROACH				▬	▬
TOPOGRAPHY	▬	▬	▬	┅	┅ (APPROACH)
SOILS ANALYSIS	▬	▬	▬		
GEOLOGY	▬	▬	▬		
METEOROLOGY				▬	▬
PHYSICAL OCEANOGRAPHY				▬	▬
BIOLOGICAL IMPACTS	▬	▬	┅	▬	▬
POPULATION CHARACTERISTICS	▬	▬	▬	▬	┅
PRESENT LAND USES	▬	▬	▬	┅	

This table shows major site characteristics and the operational modes within which each is a factor of consideration. Solid and hatched lines indicate whether a particular characteristic is a major or minor factor of consideration in each mode.

▬ -- major factor of consideration

┅ -- minor factor of consideration

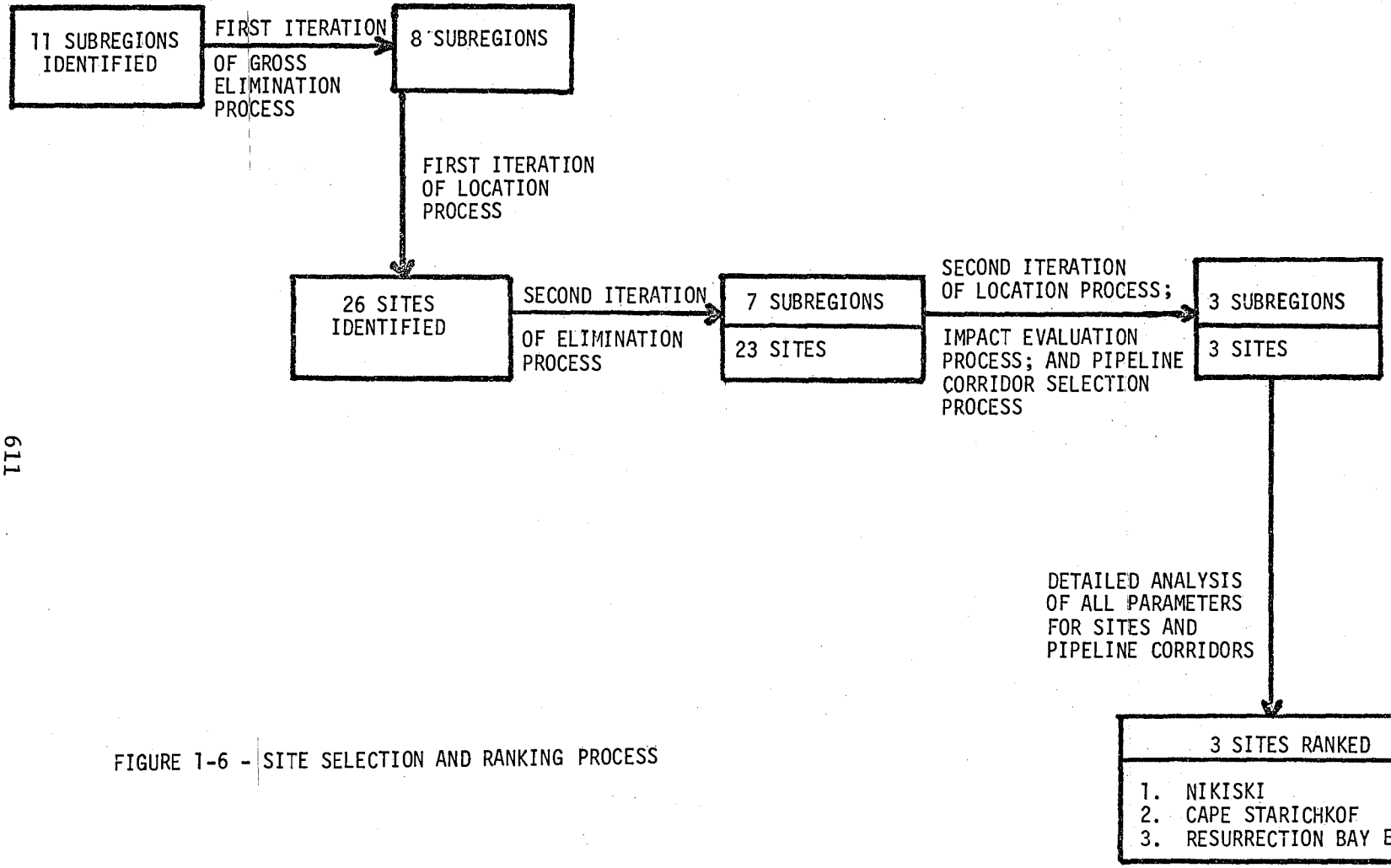


FIGURE 1-6 - SITE SELECTION AND RANKING PROCESS

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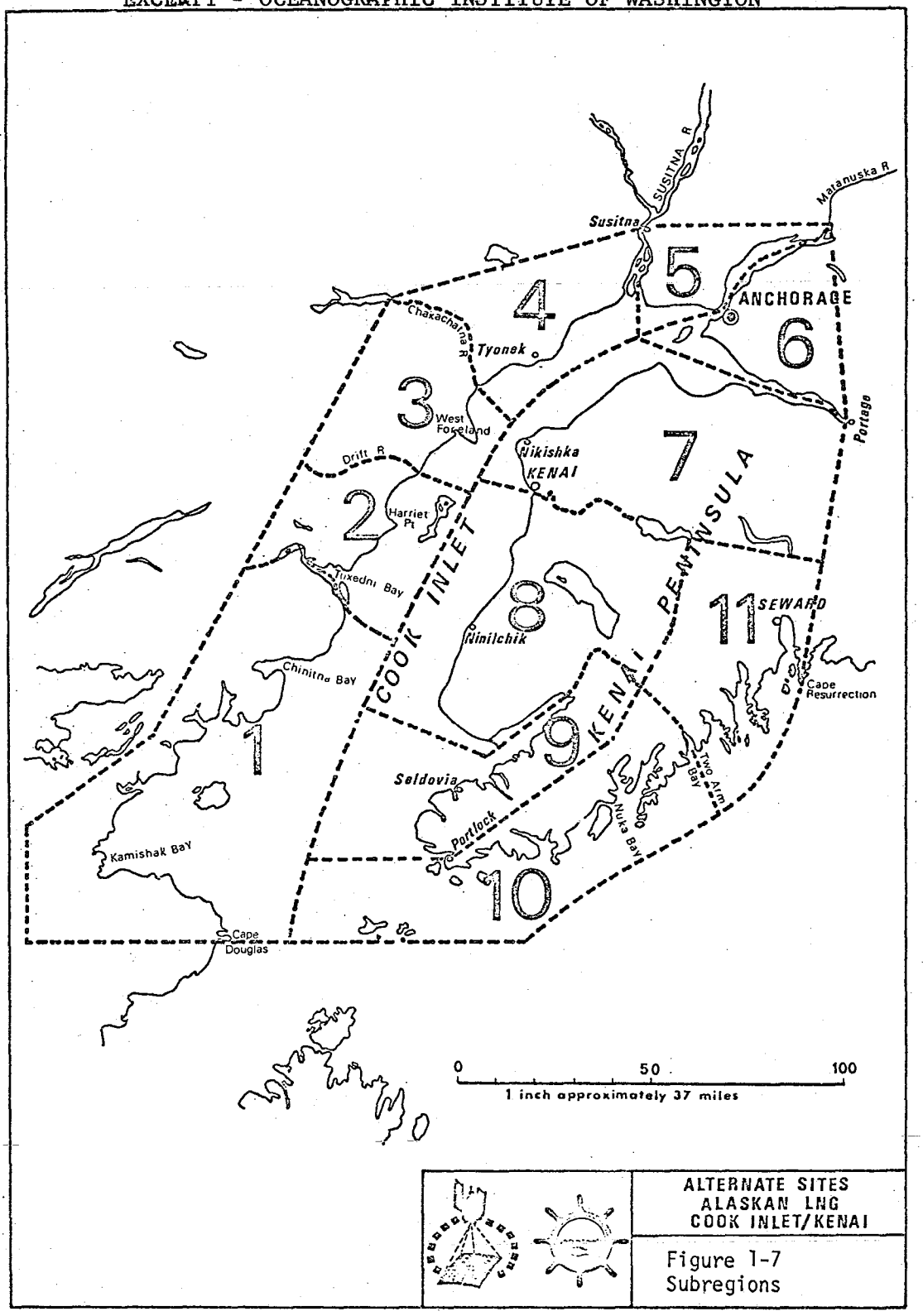

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TABLE 1-4

SUB-REGION DESCRIPTIONS

Number	Name Used in this Report	Boundary
		Cape Douglas
1.	Chinitna-Kamishak	
		Tuxedni Bay
2.	Harriet Point	
		Drift River
3.	West Foreland	
		Chakachatna
4.	Tyonek-Beluga	
		Susitna River
5.	Susitna Delta	
		Knik Arm
6.	Anchorage Plain	
		Turnagain Arm
7.	East Foreland	
		Kenai River
8.	Starichkof-Homer	
		Fox River
9.	Seldovia	
		Port Chatham
10.	Nuka Bay - West Arm	
		Aialik Bay
11.	Seward	
		Cape Resurrection

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TABLE 1-5

Land Subregions Eliminated and Accepted by the Broadscreen Elimination Process.

Eliminated from Consideration	Accepted for Further Study
Subregion 1: Chinitna-Kamishak	Subregion 2: Harriet Point
Subregion 5: Susitna Delta	Subregion 3: West Foreland
Subregion 6: Anchorage Plain	Subregion 4: Tyonek-Beluga
Subregion 9: Seldovia	Subregion 7: East Foreland
	Subregion 8: Starichkof-Homer
	Subregion 10: Nuka Bay-West Arm
	Subregion 11: Seward

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Land areas not eliminated by this initial screening were subject to closer examination for particular locations which met facility and pipeline site requirements (location process). Analysis of sites to determine their suitability for accommodating an LNG terminal facility or the pipeline leading to it, included additional information on topography and physiography, soil analysis and subsurface conditions, geology and seismic history and the meteorological and marine conditions of the area. Only those sites which compared favorably with these aspects of the site requirements for the facility and the pipeline were chosen for further consideration.

A number of prospective sites were further eliminated on the basis of possible local adverse impact on ecosystems and biotic communities, human populations and present land status. The criteria for the evaluation of impacts were established and applied by the respective disciplines (impact process). From this type of study approach a number of alternate sites were chosen which possessed suitable physical requirements. These sites would cause minimal environmental damage in accommodating the LNG facility and the pipeline leading to it with its accompanying structures. Thus, the process of selection followed a logical sequence which enabled identification of specific sets of rationale for accepting certain locations over others.

Twenty-six sites or areas were chosen by the location process and investigated for their adverse impacts and further elimination. Figure 1-8 illustrates their location in Cook Inlet and Resurrection Bay.

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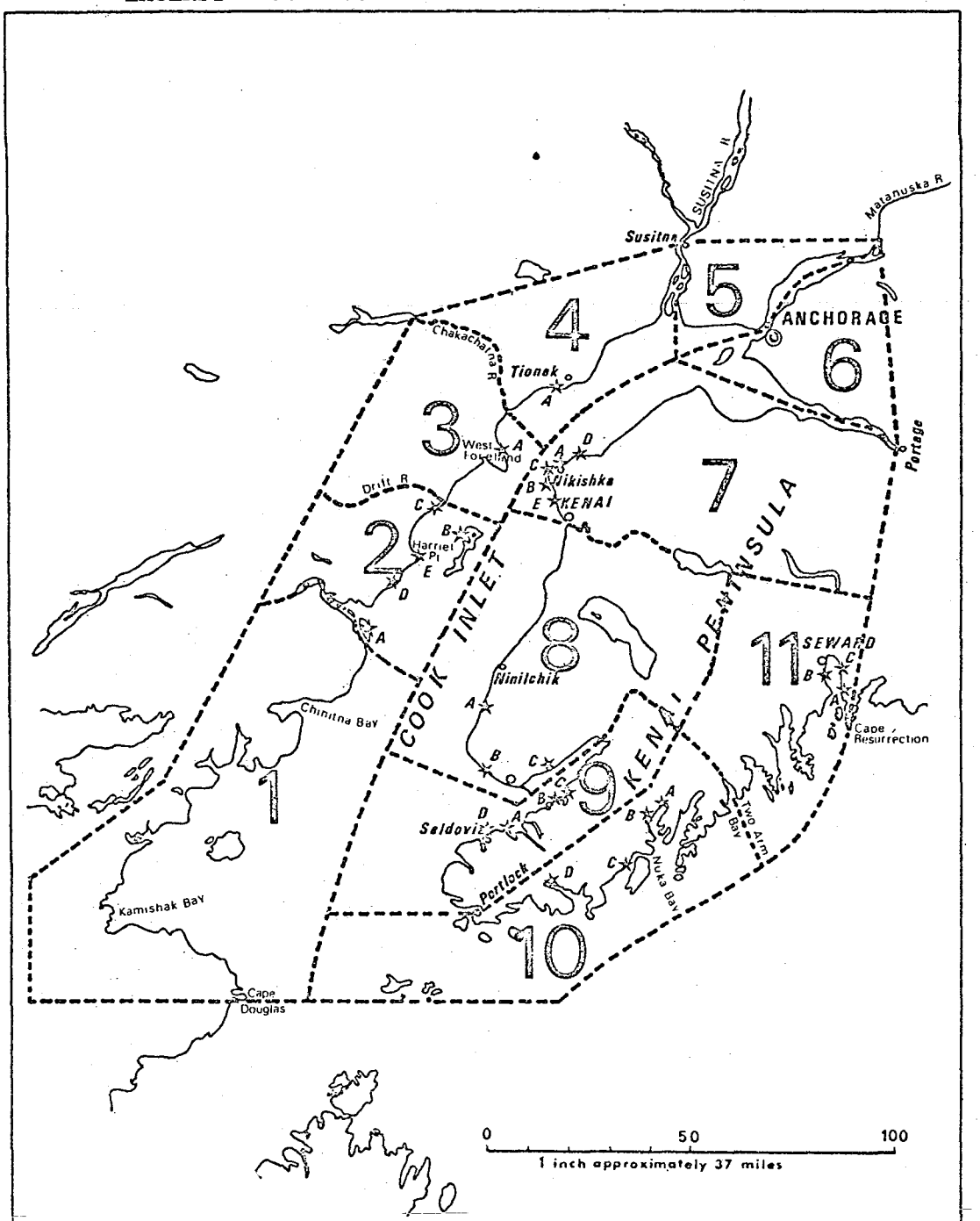

ALTERNATE SITES
ALASKAN LNG
COOK INLET/KENAI

Figure 1-8
Location of Sites
in Subregions

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A list of the parameters used for evaluation and location of plant sites, marine terminals, and navigable water ways is shown in Table 1-6.

The twenty-six sites were evaluated using both quantitative and qualitative analyses.

In Cook Inlet a synthesis of seven parameters was done by considering tradeoffs and establishing a zone of indifference shown in Figure 1-9.

The major parameters used for assessing the sites or areas, the measures of discrimination used in the evaluation process, and the results of the analysis are summarized in Table 1-7.

Three sites were selected by this process; Nikiski, Cape Starichkof, and Resurrection Bay East (see Figure 1-10, 1-11, & 1-12).

The final impact perturbations to the environment by the placement of the LNG plant and marine terminal at the 3 sites were evaluated. The principal concerns were the impact on the human population, the physical conditions of the surrounding area, the adverse effects on the biotic communities, and the marine conditions that prevailed.

The impacts were projected on two sets of scales:

1) time scale of impact: measuring short range and long range changes; and

2) geographic scales of impact measuring the changes in the immediate vicinity of the site and that on the regional surroundings.

Finally, the analyses resulted in a ranking of the three sites;

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TABLE 1-6

PARAMETERS	CONSTRAINTS
Land Area Available	Gradable 400 acres, perimeter 100 acres, greenbelt 700 acres, totaling 1200 acres.
Topography	Graded area, should be < 10% slope, perimeter should not be > 40% slope, greenbelt should be free of slides.
Distance from Plant to Terminal	Maximum distance of 2.5 miles.
Soil Characteristics	Bedrock is desirable, however, dense glacial sill is good for foundation support, well drained gravelly material has low potential against soil liguefaction and frost action.
Distance from Terminal to Shore	Maximum distance of 4100 feet.
Proximity of Faults	No active faults should be near the site.
Proximity of Nearest Community	Preferably, beyond self-ignited worst-case plume from a 4 tank spill (i.e. two million gallons), proximity of not less than 5.7 miles. Preferably, beyond self-ignited plume from vessel spill at marine terminal (i.e. 165,000 cu. meters), proximity of not less than 4.2 miles.
Pipeline Accessibility	Grades <40°, stable well drained soils, outside of human settlements, the utility corridors where existant.
Water Depth at Berth	Minimum depth of 50-60 feet at MLLW.
Marine Terminal Exposure	Minimal occurrence of winds over 30 MPH, Minimal occurrence of waves over 6 feet. Minimal occurrence of tidal currents over 4 knots.
Maneuvering Area Required	Minimal channel width of 450 feet, Minimum turning diameter of 2000 feet is required.
Size & Depth of Channel	Minimum water depth of 50-60 feet at MLLW, Minimum channel width of 450 feet.

TABLE 1-6 (Cont.)

PARAMETERS	CONSTRAINTS
Hydrological & Geological Hazards	Possible flood plains due to glacier or volcanic activities should be avoided for the sites.
Channel contours and Constraints	No sharp turns in channel, no large boulders or other obstructions to navigation.
Vessel Traffic Patterns	Minimal traffic moving in well defined patterns is desirable, but not a critical factor in locating potential sites.
Aids to Navigation	Sufficient aids to navigation should be present in Cook Inlet and Resurrection Bay site areas to handle projected vessel traffic increases.
Anchorage Areas	Maximum anchoring depth of 200 feet.
Ice Conditions	Minimal occurrence of adverse floe and pack ice thickness: unresolved. See discussion of ice conditions in Appendix 4.3.
Environmental Impact Comment	Outside of wildlife and fish concentration, outside of aquifer recharge areas for human settlements, not visible in major scenic views.

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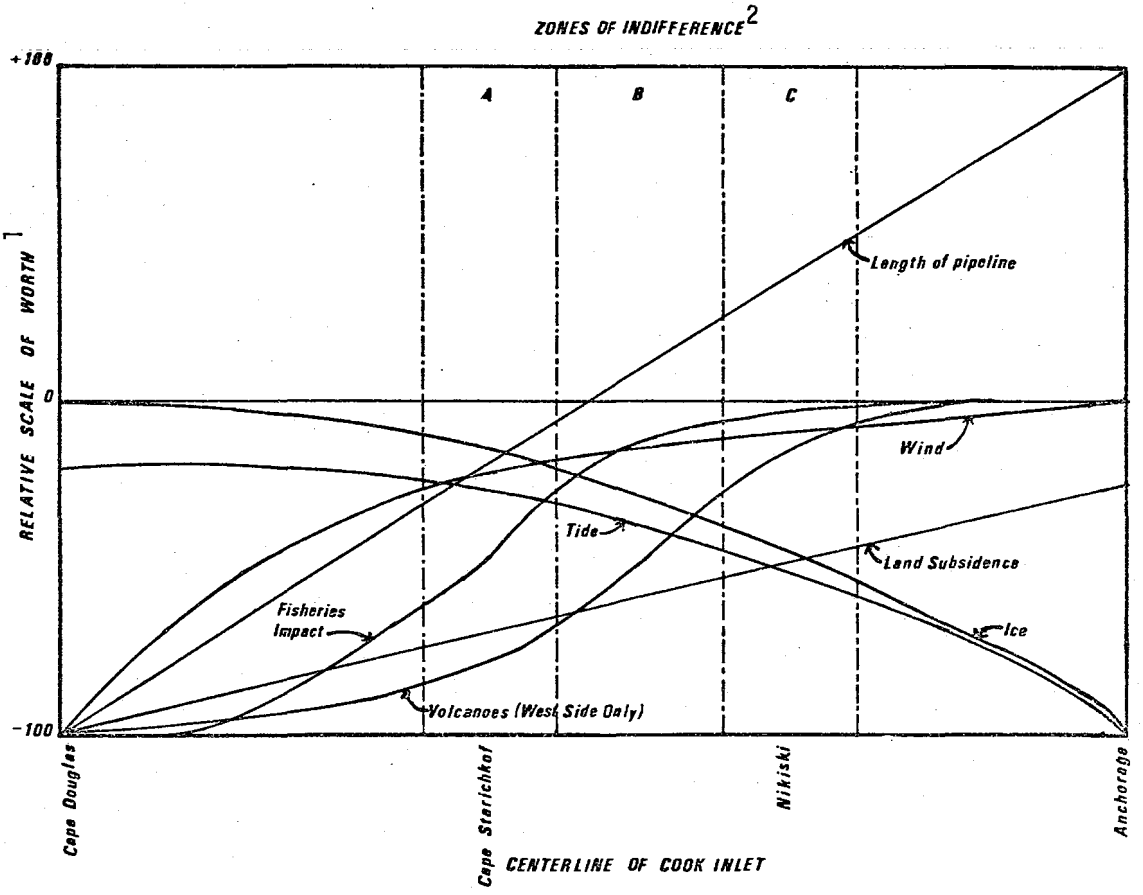

Notes: 1. Relative Scale of Worth-for all parameters the highest positive value is +100 and the lowest negative value is -100. Neutrality is 0 on the scale.

2. Zones of Indifference-A,B and C are the three zones in which the investigators could accept sites with an attitude of indifference. In these zones the negative worth or impact was not considered to be a basis for elimination.

ALTERNATE SITES
ALASKAN LNG
COOK INLET/KENAI

Figure 1-9
Parametric Tradeoffs

EXCERPT - OCEANOGRAPHIC INSTITUTE OF WASHINGTON

Table 1-7 Location for LNG Plant and Marine Terminal Using Parametric Analysis

Sub-region	Location	Description	Parameters [1]						
			Biotic Communities [2]	Navigation [3]	Pipeline [4]	Land Status [5]	Land Use & Population [6]	Topography [7]	Geology [8]
2	A	Chisik Island	No	Q	No	No	Refuge	Ok	No
2	B	Kalgin Island-West S.	No	Q	No	No	Recre-ation	Ok	Ok
2	C	Drift River	No	No	No	Ok	Oil	Ok	No
2	D	Redoubt Point	Q	No	No	Ok	Forest	Ok	Ok
2	E	Harriet Point	Q	No	No	Ok	Forest	Ok	Ok
3	A	West Foreland	Ok	No	No	Ok	Forest	Ok	Ok
4	A	North Foreland-Tyonek	Ok	No	No	No	Village	Ok	No
7	A	Nikishka	Ok	No	Ok	Ok	Industry	Ok	Ok
7	B	Nikiski	Ok	Ok	Ok	Ok	Industry	Ok	Ok
7	C	East Foreland	Ok	Q	Ok	No	Light	Ok	Ok
7	D	Boulder Point	Ok	No	Ok	Ok	Industry	Ok	Ok
7	E	Salamatof	Ok	No	Ok	Ok	Village	Ok	Ok
8	A	Cape Starichkof	Q	Ok	Ok	Ok	Radio	Ok	Ok
8	B	Bluff Point	Q	No	Ok	Ok	Rural	Ok	Ok
8	C	Kachemak	No	No	Ok	Ok	Rural	Ok	Ok
9	A	Kasitna Bay	No	Q	Ok	Ok	Village	No	Ok
9	B	Peterson Bay	No	Q	Ok	Ok	Village	Ok	Ok
9	C	Halibut Cove	No	Q	Ok	Ok	Village	Ok	No

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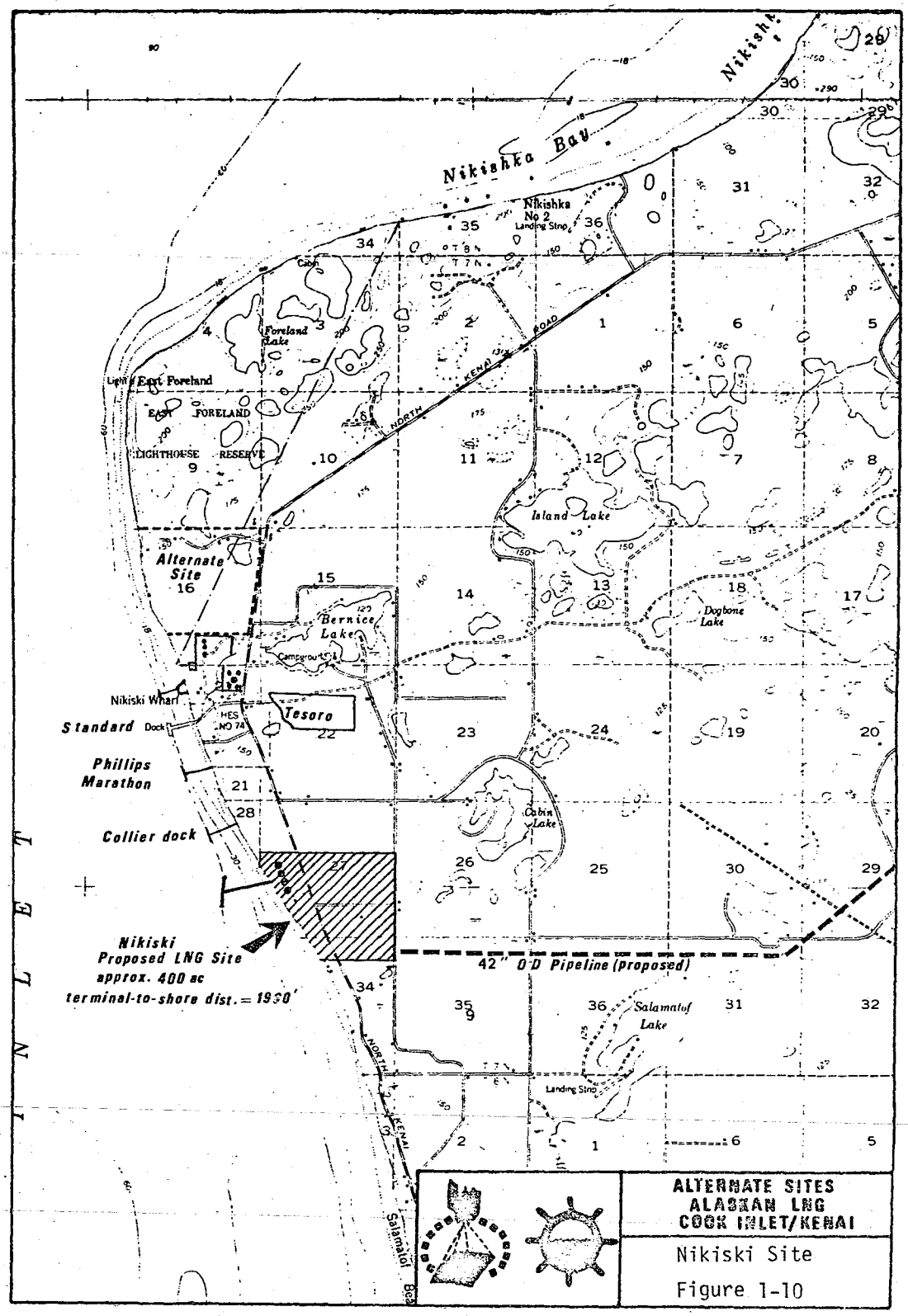
Table 1-7 (cont'd)

Sub-region	Location	Description	Parameters[1] Biotic Communities[2]	Navigation[3]	Pipeline[4]	Land Status[5]	Land Use & Population[6]	Topography[7]	Geology[8]
9	D	Barabara Point	No	No	Ok	Ok	Forest	Ok	Ok
10	A	Nuka Bay-North Arm	Q	Q	No	Ok	Forest	No	No
10	B	Nuka Bay-Beauty Bay	Q	Q	No	Ok	Forest	Ok	No
10	C	Nuka Passage	Q	Q	No	Ok	Forest	Ok	Ok
10	D	Port Dick-West Arm	No	No	Ok	Ok	Forest	No	No
11	A	Thumb Cove	Ok	Ok	Ok	Ok	Forest	No	Ok
11	B	Lowell Point	Ok	Q	Ok	Ok	Forest	No	No
11	C	Resurrection Bay East	Q	Q	Ok	Ok	Forest	Ok	Ok

Notes:

1. OK = Acceptable; NO = Eliminated.
2. Severe impact was judged to be the case for all "No" answers
3. Bathymetry and anchoring criteria were used.
4. Pipeline was answered "No" if the route was hazardous or difficult.
5. Land status was marked "No" if the land was in a specific claim for wildlife refuge, village core township, recreation patents, or similar dedication.
6. Land Use and Population is descriptive by words used.
7. Topography that did not provide a gradable site of 400 acres was marked "No".
8. Geological hazards were judged to exist for all "No" answers.

EXCERPT - OCEANOGRAPHIC INSTITUTE OF WASHINGTON



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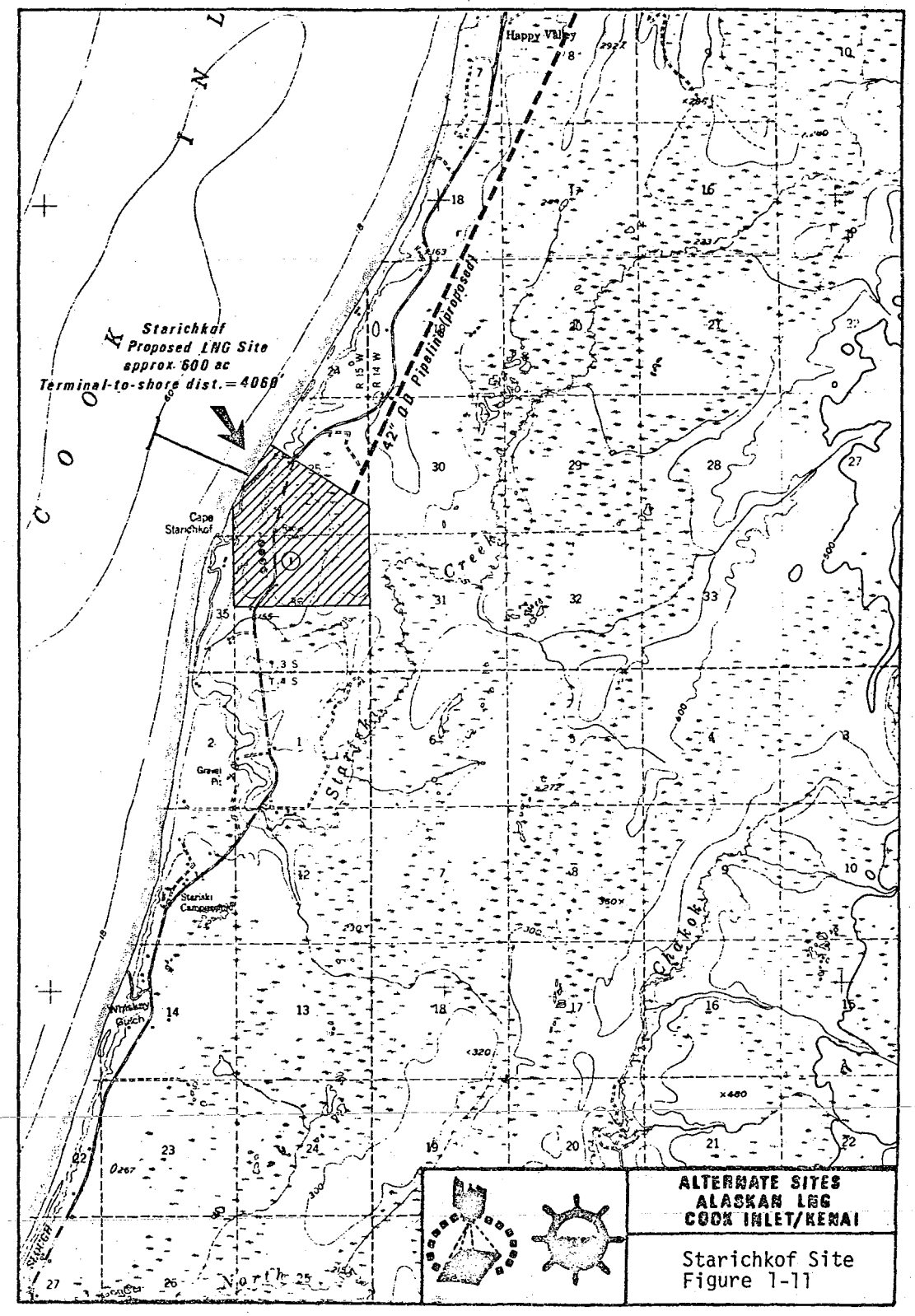

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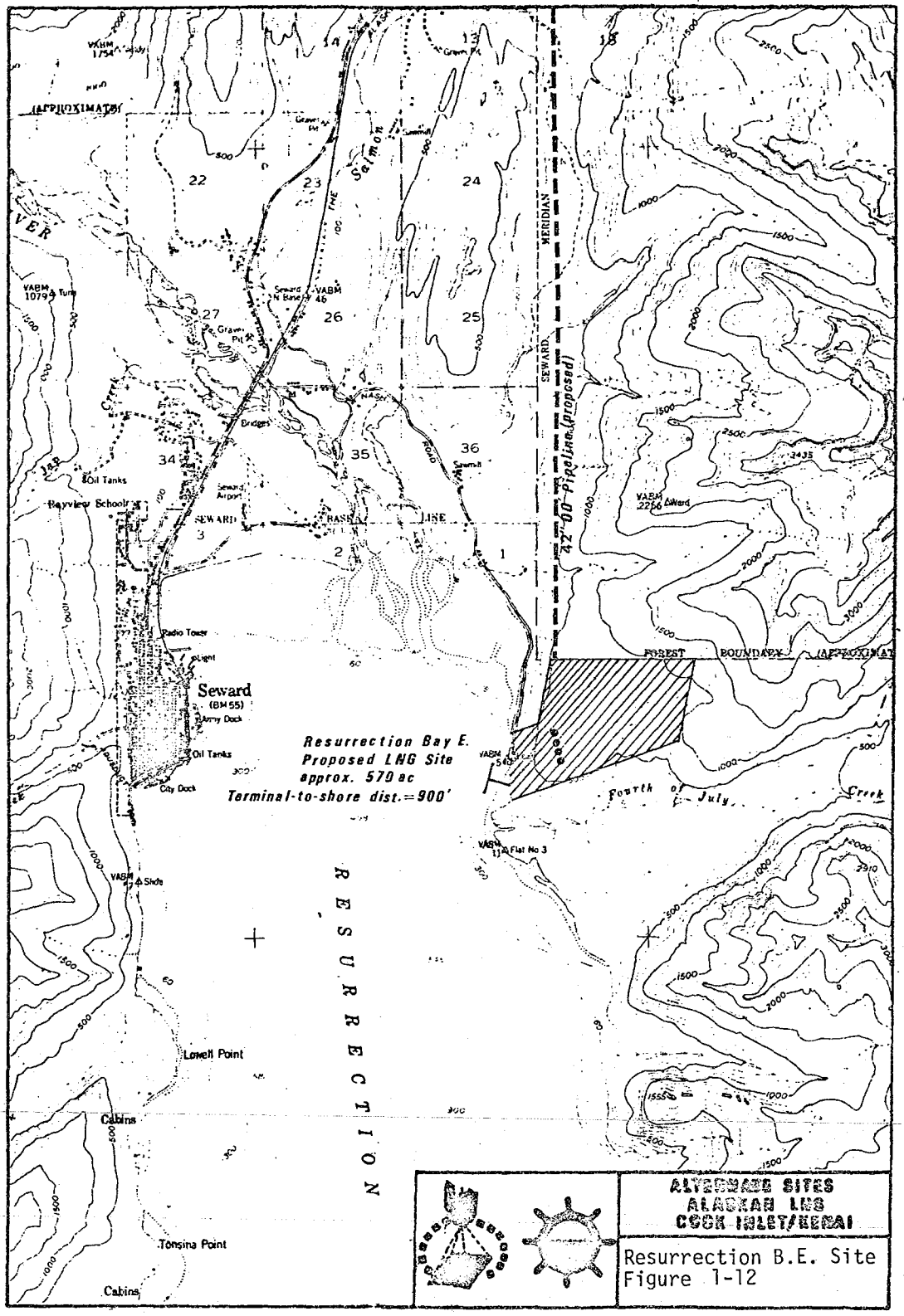


and an ordinate scale was used.

Site	Rank*
Nikiski	1st
Cape Starichkof	2nd
Resurrection Bay East	3rd

APPENDIX E

EXCERPT - OCEANOGRAPHIC INSTITUTE OF WASHINGTON

POTENTIAL OCEANOGRAPHIC CONSTRAINTS ON MARINE LNG OPERATIONS

The following material is excerpted from a study conducted by OIW in response to an FPC contract and concerns the potential oceanographic and meteorological constraints on marine LNG operations in the Cook Inlet environment, specifically marine ice conditions. 1/

> The ice problem is most severe in Upper Cook Inlet (North of the Forelands). The port at Nikiski is somewhat protected from ice drifting down from the Upper Inlet by the constriction formed by East Foreland and by the winds which tend to blow the ice to the Drift River side of the Inlet. Nevertheless, Nikiski occasionally has ice problems which can be considered serious with regard to approaches, berthing, and loading operations.

The OIW Study further states: 2/

> In spite of the obvious hazards and difficulties caused by the ice, the ports in Cook Inlet have been open year round for the past 10 years. It is reported that large vessels have no problem navigating in the ice, but this does not appear to be true for all the vessels. All reported accidents shown in Table 4-13 and Figure 4-6 occurred with older vessels which were not designed to withstand the ice conditions. No damage to date has been reported to newer vessels such as the LNG ships operating at Nikiski.

1/ Oceanographic Institute of Washington and the University of Washington, Department of Urban Planning, Remote Sensing Application Laboratory, Alternative Sites for LNG Facilities in the Cook Inlet/Kenai Peninsula, Alaska Area (1975), p. 4-56.

2/ Ibid., pp. 4-61, 4-64, and 4-65.

EXCERPT - OCEANOGRAPHIC INSTITUTE OF WASHINGTON

The most serious ice problem for both petroleum and LNG vessels appears to occur during loading operations. It is worth noting that the location of 1/2 of the reported ice accidents reported from 1971-1974 were at docks. This is due to the fact that the ice tends to jam between the ship and the dock with the possibility of rupturing the loading arms. Mitigating measures for this problem have been incorporated at the present Phillips-Marathon facility at Nikiski. Fast release unloading arms are utilized, and the ship's engines are kept running under adverse conditions. If ice appears to be a problem, loading is interrupted. If the situation worsens, the loading arms are disconnected, and if necessary the ship gets underway. On one occasion during the winter of 1971-1972, five dockings during the course of a week were required to fill an LNG ship at the Phillips-Marathon dock at Nikiski. During normal operations, these ships require 15 hours to be filled. Such severe conditions are not the normal situation, and are dependent on the rare occurrence of an onshore wind. An abnormal situation such as this could result in a temporary queueing problem.

The ice problem decreases considerably in the southern part of the Inlet. Generally speaking, there is no ice, or very little ice, south of Anchor Point. This indicates that the Cape Starichkof site is relatively hazard free from ice conditions. It is stated

EXCERPT - OCEANOGRAPHIC INSTITUTE OF WASHINGTON

(F,13) that the Cape Starichkof site is ice free year-round. This statement is probably true for a normal winter, but some sea ice has appeared as far south as Anchor Point during severe winters.

There are conflicting opinions as to the relative seriousness of the ice conditions in Cook Inlet. There is little question that the ice is a hazard to navigational and loading operations. The problem resolves itself into the question of whether or not the risk level is acceptable. It is clear that in the Nikiski area companies such as Standard Oil Co., Tesoro Oil Co., Collier Carbon & Chemical Co., Phillip's-Marathon and Pacific-Alaska LNG Co. do not feel that the hazards are insurmountable. In addition, a petroleum facility with a sea island is in operation at Drift River, where the ice conditions are more hazardous than at Nikiski. Further, the more severe ice conditions north of the Forelands have not prevented year round marine traffic to Anchorage by other companies, including freight carriers such as Sea-Land and TOTE. Finally, permanent offshore wells are operating in areas where severe icing occurs.

In summary, although we have not attempted to define an acceptable level of risk in quantified terms for future LNG tanker operations in Cook Inlet, it is obvious that shipping companies, oil and gas companies, insurance companies, ports, governmental agencies (which issue permits), and others have accepted the present level of risk and are operating in this environment daily.

APPENDIX F

CORRESPONDENCE WITH THE U.S. COAST GUARD

1. Letter from Federal Power Commission to Rear Adm. J. B. Hayes, Commander, 17th District, U.S. Coast Guard, October 10, 1975.

2. Letter from Rear Adm. J. B. Hayes to the Federal Power Commission, November 14, 1975.

3. Letter from Federal Power Commission to Rear Adm. J. B. Hayes, January 20, 1975.

4. Letter from Rear Adm. J. B. Hayes to the Federal Power Commission, February 4, 1976.

5. Letter from Federal Power Commission to Rear Adm. J. B. Hayes, June 11, 1976.

6. Letter from Captain P. A. Yost to the Federal Power Commission, July 12, 1976.

7. Letter from Rear Adm. J. B. Hayes to the Federal Power Commission, August 4, 1976.

8. Letter from Rear Adm. J. B. Hayes to Pacific Alaska LNG Company, July 8, 1976.

9. U.S. Coast Guard letter of comment dated November 2, 1976, on September 3, 1976, DEIS.

10. U.S. Coast Guard letter of comment dated November 24, 1976, on September 3, 1976, DEIS.

11. Letter from Federal Power Commission to Rear Adm. A. F. Fugaro, February 4, 1977.

12. Letter from Rear Adm. J. B. Hayes to the Federal Power Commission, March 9, 1977.

13. Letter from Rear Adm. A. F. Fugaro to the Federal Power Commission, March 23, 1977.

OCT 10 1975

FEDERAL POWER COMMISSION
WASHINGTON, D.C. 20426

IN REPLY REFER TO:

BNG-SOD/EES
El Paso Alaska Company
Docket No. CP75-96 et al.

Admiral John B. Hayes
Commander, 17th Coast Guard District
Box 3-5000
Juneau, Alaska 99802

Dear Admiral hayes,

The staff of the Federal Power Commission is presently involved in the preparation of a draft environmental impact statement (DEIS) concerning the proposal by El Paso Alaska Company to transport Alaskan North Slope natural gas by pipeline to an LNG liquefaction terminal at Gravina Point in Prince William Sound, Alaska. In the staff's analysis of alternate pipeline routes and LNG liquefaction terminal sites, Cook Inlet was given serious consideration as a potential location for the proposed LNG liquefaction terminal. In order to more fully evaluate potential site ratings as provided to the staff by its site selection contractors, and to substantiate the staff's own site analysis, it is necessary to obtain certain official information and opinions on navigational safety from the United States Coast Guard. It is therefore requested that the Coast Guard provide answers to the following questions:

1) What is the Coast Guard's assessment of shipping safety as it presently exists at Nikiski in the area of the Phillips-Marathon, Standard Oil, and Collier piers?

2) Would ice conditions at Nikiski (below the Forelands, immediately south of the Collier plant - see attachment) pose a significant hazard to the navigation, docking, or loading of LNG tankers? It is requested that any available background information on 1) the severity and magnitude of the ice conditions, 2) the frequency of occurrence of

severe ice conditions, and 3) the extent of the hazard which would be created by the ice conditions on the safety of tanker operations, which was used to make that determination, be provided.

3) As an LNG tanker would maneuver into position for docking procedures at the proposed berth site at Nikiski, identify the frequency and extent of time delays that could reasonably be expected due to ice conditions?

4) With automatic shutdown systems on the LNG loading arms capable of stopping flows in a maximum time of 48 seconds and quick release mooring lines to the tanker, is it possible that the ice conditions or a combination of the ice, tide and current conditions could change quickly enough to create a significant hazard of a break or rupture of the LNG loading arms?

5) Would operations of an LNG terminal immediately south (see attachment) of the existing industries at Nikiski pose a significant hazard to the safety of those existing facilities?

6) What would be the Coast Guard's official position regarding the development <u>at Nikiski</u> of:

(A) The LNG terminal proposed by Pacific Alaska LNG Company requiring approximately 60 LNG tanker arrivals per year?

(B) A combined terminal which would be capable of processing the volumes of gas from both the Pacific Alaska and the El Paso Alaska Company proposals requiring up to 350 LNG tanker arrivals per year?

In particular, would it be the Coast Guard's official position that either (A) or (B) above would pose a significant navigational or loading hazard in the waters of Cook Inlet?

7) It is requested that the Coast Guard also respond to questions 2 through 6 above, as they relate to the potential alternate LNG terminal site north of the existing piers at Nikiski, as shown on the attachment. Would the Coast Guard's assessment of navigational safety regarding LNG operations at the northerly site differ from their position on the southerly site?

8) In reference to any navigational or loading safety hazards which you may have identified in the answers to the above questions, what effect would the establishment of a formal vessel traffic system in Cook Inlet have on reducing or eliminating those hazards? Would a vessel traffic system be implemented in Cook Inlet in the event of increased tanker arrivals per year into Cook Inlet due to LNG tanker operations?

Responses to these questions will be used to assist the staff in its alternate LNG terminal site selection analysis. The staff has been in contact with the Coast Guard Marine Safety Office in Anchorage through Commanders Nichols and Gordon and Lieutenant Commander Thompson to discuss the writing of this letter, and will remain in close contact with them in the future. If any questions arise concerning this letter, please direct inquiries to Mr. Richard Hoffmann, Federal Power Commission at (202) 275-4564.

The proposed distribution date of the staff's DEIS on the El Paso Alaska Company (El Paso) proposal is November 15, 1975. The Coast Guard will have the opportunity at that time to review El Paso's preliminary design plans and comment on the staff's analysis of the project.

Your cooperation in this matter will be greatly appreciated.

Very truly yours,

Secretary

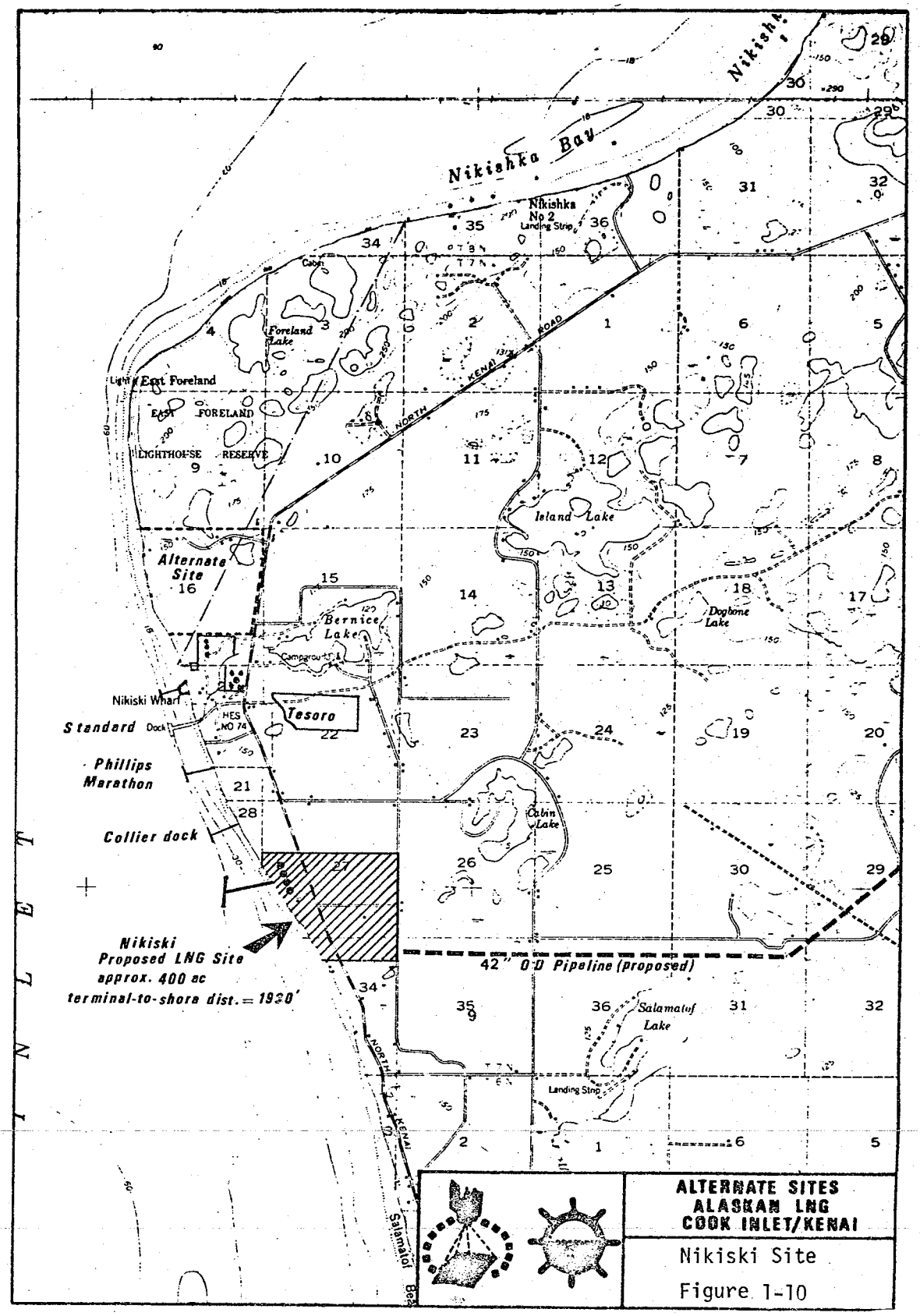
Attachment 1: Map of the Nikiski Site

cc: Commander R.C. Nichols
Commanding Officer
MSO Anchorage
Post Office Box 1286
Anchorage, Alaska 99510

Commander L.D. Gordon
Executive Officer
MSO Anchorage
Post Office Box 1286
Anchorage, Alaska 99510

Lt. Commander Thompson
District Representative
17th Coast Guard District
Post Office Box 3-5000
Juneau, Alaska 99802

Attachment 1



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
COMMANDER (m)
17TH COAST GUARD DISTRICT
FPO SEATTLE 98771

OFFICIAL FILE COPY

5900
14 NOV 1975

Mr. Kenneth F. Plumb
Federal Power Commission
Washington, D.C. 20426

Dear Mr. Plumb:

This is in reply to your letter of October 10, 1975 (reference BNG-SOD/EES, El Paso Alaska Company, Docket No. CP75-96 et al) requesting Coast Guard comments regarding siting of an LNG terminal in the Nikiski area of Cook Inlet. I will attempt to answer your detailed questions as thoroughly as possible, however, in some cases, data is simply not available to formulate specific answers.

In preparing this response, I have relied heavily on the experienced observations of the Commanding Officer of our Marine Safety Office in Anchorage, Commander R. C. NICHOLS, with whom members of your staff have been in contact regarding this matter. CDR NICHOLS and other personnel of his command have observed operations at Nikiski under severe winter ice conditions.

As you are perhaps aware, the tides and tidal currents in Cook Inlet are extreme. Extreme tidal range approaches forty feet in some areas. Average tidal currents are in excess of seven knots during large tides. When a wind-driven current reinforces the tidal current, the velocity is considerably increased. This occurs with some frequency during flood tides in the winter months when the wind is southwest. A recent survey in Cook Inlet by the NOAA Ship MACARTHUR reveals that under such conditions, currents in excess of eight knots are not unusual and velocities near eleven knots have been reported. Obviously, currents of this magnitude complicate the navigation and docking of a vessel. Further, the mooring lines and any ground tackle employed in securing a vessel to a pier in these currents are under considerable strain.

In conjunction with these tides and currents, winter ice presents the major problem to operations at Nikiski. Ice forms between November and April in the Upper Inlet and the strong currents keep much of the ice in nearly constant motion. Huge cakes of ice, some a half mile wide, move up and down the inlet at or near surface current velocities. Surface currents in the Inlet are such that the northerly flow (flood tide)

tends to be along the east shore and southerly flow along the west shore. Thus, the most dangerous situation at Nikiski occurs during flood tides; a strong southwest wind aggravates the situation. The piers at Nikiski are completely exposed to these conditions. The ultimate danger is that of a large cake of ice or a buildup of smaller cakes and brash striking a moored vessel and causing it to break away from its mooring.

Turning now to your specific questions, I shall attempt to answer them as thoroughly as possible in the order posed in your letter.

Question #1: The close proximity of the piers and the nature of the cargoes handled, coupled with the maneuvering and mooring hazards created by the tidal range, swift currents and winter ice conditions, at times create an extremly hazardous situation. The primary hazard is the inability of vessels torn away from their loading berth or executing emergency break away procedures, to maneuver in heavy ice so as to prevent collision with other pier facilities or vessels in the area. The cargo lines to the loading berths at the existing Colliers Terminal (anhydrous ammonia), Phillips-Marathon Terminal (LNG) and the Standard Oil Terminal (petroleum products) are normally charged at all times. Therefore any collision with the cargo pipe trestles could spell disaster in terms of personnel injury, property loss and environmental damage. It is the mere existance and minimal physical separation of the facilities in this area - not the actual cargo transfer operations - which pose the greatest hazards.

Of the four existing facilities at Nikiski, vessels at the Colliers Terminal (southern-most facility) present the greatest hazard due to that terminal's exposure to the onslought of ice during flood tides, the inadequacy of the mooring, and vessel manning procedures. Any vessel breaking away from the Colliers Terminal on a flood tide, and not under control, could be swept down on other facilities and/or vessels to the north. The following are examples of previously unreported mishaps which have occurred in recent years:

1971: A Mexican tanker had to clear the terminal under emergency conditions due to ice build-up. As she let go, she lost power due to icing of sea suctions.

1972: Barge PAC 312 broke away due to ice conditions and the assisting tug lost power due to icing of sea suctions.

1973: (1) An ammonia tanker had to clear her berth due to ice conditions and failing mooring lines. She lost power as she cleared the berth. This vessel had refused to keep her engine room manned and ready.

(2) The vessel COPAA parted her mooring lines and heavily damaged the pier.

Colliers management personnel have proposed corrective action to reduce the possibility of accidental breakaways at their pier. CDR NICHOLS will be meeting with Colliers representatives on November 24 to discuss this and other matters.

Only with the most cautious and prudent safety measures such as, but not limited to, quick disconnect capabilities, fully trained vessel and dockside personnel, maintaining ship's engines in an on-line or immediate standby status, and retention of a pilot on board, should cargo operations be conducted during ice conditions. If vessels and facilities at Nikiski do not observe these precautions voluntarily, the Coast Guard Captain of the Port can make such operating conditions mandatory. A limitation on the number of vessels allowed in the port area might be imposed under severe conditions.

Enclosure (1) is a copy of a letter written by a master of the LNG tanker SS POLAR ALASKA regarding his concern over an incident at Nikiski on January 8, 1975. This is another example of a "near miss" which might have become a catastrophe.

Questions 2 & 3: As should be clear from the answer to Question #1, ice conditions definitely pose a hazard to the navigation, docking and loading of LNG tankers and delays due to ice conditions can certainly be expected. Evidence of this fact is set forth in enclosure (2) which contains various vessel Boarding Reports prepared by Phillips-Marathon. It will be noted that during one period in March of 1972, the SS POLAR ALASKA was delayed in loading for six days by severe ice conditions.

The extent of the potential hazards created by severe ice conditions is obvious to anyone who has observed the situation firsthand. Only extremely cautious and prudent vessel and cargo handling procedures can provide acceptable levels of safety during the ice season. In the absence of such procedures, there exists an unacceptable risk to the safety of the port, the vessels therein and the surrounding community.

Question #4: This is not likely if the proper precautions mentioned above are observed aboard the vessel. During severe ice conditions a duly qualified and licensed pilot should be posted on the bridge of LNG tankers. Using both visual procedures and radar, he should be able to detect the larger floes capable of tearing the ship from her mooring in sufficient time to initiate emergency breakaway procedures. Presently, Marathon can secure cargo transfer operations and purge the cargo arms in approximately two minutes and can clear the arms in twelve minutes. Obviously, the creation of additional facilities would compound the problem as more than one vessel might be required to execute breakaway procedures simultaneously or in coordinated sequence.

Question #5: Yes. As mentioned, the ice on a flood tide sweeps down on the piers from a southwesterly direction, a situation which is compounded when accompanied by a westerly wind which tends to force the ice further inshore. Under such conditions the proposed southern facility would receive the full force of the moving ice. Under severe conditions, it would be virtually impossible for a vessel to make an approach or remain at the pier. Any vessel leaving the pier, accidently or purposefully, could be set down on existing facilities or vessels to the north.

Question #6.A: The addition of any other LNG facility in this location will substantially increase the risk to life, property and the environment. The establishment of a second LNG facility would likely give rise to mandatory procedures during ice conditions. Possible examples of such procedures are a live bridge watch, engines on immediate standby, pilot aboard, quick release devices on cargo and mooring lines, and permitting only one LNG vessel in port at any given time. Imposition of these or other procedures would depend on the severity of current and ice conditions, traffic density, loading times and other matters.

Question #6.B: The answer is basically the same as that to 6.A, except to note that a sixfold increase in traffic suggests a sixfold increase in risk. Control measures and mandatory procedures would likely be increased accordingly. Certainly the number of facilities is a matter of concern, but just as important is the number of on-going operations, regardless at which or how many facilities they are conducted. Simply stated, additional facilities and/or additional operations complicate an already marginal situation.

Question #7: If proper mooring facilities were developed, the northern site might be somewhat less hazardous than the

southern site, but not significantly so. Although time delays due to ice might be somewhat less frequent at this northern site, the time delay situation at the existing sites to the south would be virtually unchanged. Further, as the existing facilities would provide some protection during flood tides, the possibilities of vessel breakaways at a northern site may be somewhat lessened. However, the overall danger in the port area is not reduced, for the existing facilities to the south remain unprotected and vessel breakaways from them would pose a distinct threat to a northern site. Generally then, while the northern location is better for the particular facility located there, the overall hazard to the entire port area is essentially the same.

Question #8: The establishment of a formal VTS in Cook Inlet would have little real effect on the problem as it currently exists. Current federal regulations allow a Coast Guard District Commander or Captain of the Port to control vessel movement in hazardous circumstances irregardless of whether or not a VTS is in effect in a particular waterway. The establishment of a VTS might simplify and streamline the procedures for vessel movement control, but in any event, if additional facilities are constructed at Nikiski, vessel movement control will undoubtedly be required either within or without a formal VTS.

The requirement for a VTS in Cook Inlet depends upon many factors besides the Nikiski situation, but certainly the significant increase in traffic which would be generated by the proposed additional facilities at Nikiski would be an argument in favor of a VTS. The need for a VTS in Cook Inlet would be determined by future analysis of traffic patterns and densities as this and other developments materialize.

In summary, the siting of any additional LNG terminal in the Nikiski area poses a significant hazard to the safety of life, property and the environment. From the standpoint of safety as compared with the proposed Gravina location in Prince William Sound or numerous other possible locations in South-central Alaska, Nikiski is quite frankly, a poor choice. I strongly recommend that cognizant officials of your agency visit Nikiski during winter conditions before any decision is made in this matter.

As a final item, I am in receipt of a copy of a letter to you from the Alaska District Corps of Engineers regarding this matter. I must disagree with statements therein to the effect that ice conditions in Cook Inlet neither impede navigation nor prevent use of commercial docks in Cook Inlet. Our information, such as that provided in the enclosures, suggests otherwise.

Sincerely,

J. B. HAYES
Rear Admiral, U. S. Coast Guard
Commander Seventeenth Coast Guard District

Encl:
(1) Ltr from Master, SS POLAR ALASKA dtd 10 Feb 1975
(2) Miscellaneous Boarding Reports prepared by Phillips-Marathon for their Nikiski facility, 1971 - 1975
(3) Phillips' Petroleum Company descriptive brochure

Copy to:
COMDT (G-W) (less enclosure 3)
MSO Anchorage (less enclosures)
Alaska District, Corps of Engineers (less enclosure 3)

Enclosure (1)

POLAR LNG SHIPPING CORPORATION

February 10,1975.

Mr.
R.D.Yuill
Alaska Transportatio Service Co.
Shapp Building
7 Nihon Odori,Naka-Ku
Yokohama,Japan

Danger of two or more ships moored at Nikiski dock.-

FROM THE BELL BOOK: Voy.86-B Draft; F. 25' 00" A 28' 00"
Date: Jan. 8,1975
Port: Nikiski Berth: Phillips 66 Pier
At 0400 S.B.E.
At 0520 Pilot onboard : Mr.G.Robinson
At 1105 Let go Stbd.Anchor At 1140 Start mooring
At 1325 F.W.E. At 1330 All Fast

FROM PORT NIKISKI DOCK TIDE TABLES. ** Standard Time used :
Wed,Jan.8,1975 Time 0105 Ft.17.2/ Time 0644 Ft.5.8/ Time 1236 Ft.20.1/Time 1950 Ft.0.5

Dear Mr.Yuill,
as you are aware the port of Nikiski,Alaska,consists of three Piers which accomodate oceangoing ships.

The Northern one is "Standard Oil Pier",the middle one is "Phillips 66 Pier" and the Southern one is "Collier Pier".

The LNG Carriers SS "Polar Alaska" & "Arctic Tokyo" dock at "Phillips 66 Pier".

At 1330 hours,January 8,1975 the SS "Polar Alaska" was moored - port side - at "Phillips 66 Pier" and after the normal operations of loading arms connection,Coast Guard inspection etc.,loading was in progress.

Around 1300,January 8,1975 the Tanker SS "Hillier Brown" moored - port side - at "Standard Oil Pier" for loading operations.

Few minutes before 1600 the SS "Hillier Brown" gave a warning by mean of a serie of blasts indicating that there was a danger.In fact almost immediately she broke loose from "Standard Oil Pier"and started drifting suothward.

The entire crew of the SS "Polar Alaska" was immediately alerted for an emer - gency cast off and at 1600 loading was stopped.

The SS "Hillier Brown" was under engine and steering controls and managed to steer a course clear of "Phillips 66 Pier",nevertheless she passed dangerously close to the SS "Polar Alaska" and proceeded to the port of Homer.

At 1620 on January 8,1975 loading was reasumed onboard the SS "Polar Alaska" and the crew dimissed.

By this letter I point to the fact that,expeccially in winter time,there is a constant danger when two or more ships are moored at Nikiski Piers and I beg you to take all the steps to avoid a situation which jeopardize the ships and their crews.

Yours very truly

S. Szalay

Capt.S.Szalay,Master SS "Polar Alaska"

JAN 1971

ENCLOSURE (2)

Boarding Report #16/17-R-1.

Vessel: SS Arctic Tokyo Voyage: 16A Port: Nikiski

Vessel's Movements	Hrs.	Date
Homer Pilot boarded	0715	1/12/71
FWE Nikiski	1520	1/12/71
Cast off Nikiski	0155	1/14/71

Remarks:

Bunker	Heavy F.O.	Diesel F.O.
Arrival dock	1040 LT	153 m^3
Received	1105 LT	m^3
On hand departure	2125 LT	153 m^3

Water

Arrived dock	350 mt
Departure dock	280 mt

Nitrogen

Arrival dock	38 m^3
Departure dock	34 m^3

Draft	FWD.	AFT
Arrival	27'00"	28'02"
Departure	32'00"	33'00"

Weather conditions last voyage:

Rough sea first day out of Yokohama. Later smooth.

Cargo Operations	Time	Date	Hours
Chicksan connected	1540	1/12/71	
Cool-down commenced	1545	1/12/71	
Cool-down completed	0030	1/13/71	9.75
Loading commenced	0030	1/13/71	
Loading completed	0045	1/14/71	24.25
Chicksan disconnected	0115	1/14/71	
LNG shipped, bbls.	438,940		

DELAYS:

From	To	Hours	Reason
0030, 1/12/71	2130, 1/13	1.2	Loading with one LNG Chicksan - Ice
0410, 1/13/71	0520, 1/13	1.2	Stopped loading - Ice
1610, 1/13/71	2000, 1/13	3.8	Chicksans disconnected - Ice
	TOTAL HOURS	5.0	

Attending:

Owners Personnel: G. Timlin, C. Kuehl

Others: IAP, 1 man for survey of Ansul equipment.

Boarded At:

Nikiski

Material Received:
250 GCR Log Forms
KMV Advise Notes: 79599, 78738, 79148, 79163, 79547, 79602
Spares per P. O. 2339A (Molecular Sieve, PH-1480, 1/8" Pellets, 4 Angstrom)

Material Unloaded:
Spares per P. O. 2305A
1 TS Element
Vacuum equipment, vacuum adaptors

Crew Joined:

Crew Repatriated:
2nd Officer Gerin

1. Operations

Severe ice conditions were expected and as a precautionary measure, loading through one liquid arm, permitting faster disconnect, was decided upon. Loading was stopped between 0410 and 0520 January 13. Loading was stopped and Chicksans were disconnected between 1610 and 2000 hours of same day. Loading was resumed 2000 hours, utilizing both liquid arms.

Though ice was not as heavy as expected and did not form solid between ship and shore, a total of 22 lines were employed to tie vessel up.

Engine and bow thruster were kept ready and employed during last hours of tide to maintain vessel's position.

Generally under ice conditions, most favorable times for docking are first 90 minutes of flood tide. Period of severest ice drift are last two hours of flood and first two hours of ebb tide. It should be expected that pilots decide to have loading arms disconnected during this period if ice conditions get worse.

2. Shore Facilities - Quick Disconnect of Chicksans

Quick release device as per original installation had been removed when camlock flange connections were installed about June 1970. Up to this docking, no tests had been run and no data were available as to time factor involved for quick disconnect or loading with one liquid arm.

Loading with one LNG arm takes about 20 hours. Time assessed by extrapolating. Estimate had been 15 to 16 hours.

Quick disconnect takes at least 15 minutes and requires a minimum of two men. It is believed that the present arrangement of loading arms in view of a break-away device is inadequate and needs modification. Following features should be incorporated as a safeguard against tearing of Chicksans or a spillage of LNG:

a. A full flow valve at the tip of the liquid loading arms, automatically, mechanically, and independently from other systems actuated. Should also have manual feature.

b. A quick release connection at flanges of all loading arms. Automatic and manual, automatic function to be interlocked with valve as per point a.

c. A weak link in Chicksan to protect shore installation. (This might exist.)

3. Mooring Arrangements

Presently shore facilities incorporate two quick-release hooks which do not permit release of lines under load. These should be exchanged for a type that permits tripping under load. For all mooring wires, polypropylene forerunners should also be contemplated. These would permit cutting in case of emergency and would also provide elasticity.

4. TransSonics

Temperature sensor point 222 -

Reference bridge cord as returned from manufacturer was tested and operated satisfactorily.

5. Quick Closing Valves

Were opened manually during loading. Method of installation of pneumatic valve position indicator and/or alarmer was investigated.

6. Ballast Tank Level Transmitter

Ballast tank level transmitters were spot-checked and transmitters for Nos. 1 and 2 tanks calibrated.

7. Gas Sampling Lines

Sample point starboard pipe tunnel is plugged due to accumulated moisture being frozen. Exposed sampling line should be relocated into pipe tunnel.

8. Salt Water Service Pumps - Strainers

Strainers repeatedly plugged up with ice. Means for clearing of strainers (steam heating) are required.

9. Salt Water Service Pumps - Motors

Motors of pumps were grounded due to introduction of salt water while cleaning strainers. Crew disassembled, cleaned, and dried motors.

10. Sea-Chest Clearing

Sea chests were continuously cleared by steam. Water consumption 75 tons daily.

11. Ballast Tank Heating Coils

Water hammer was heard throughout all of the heated ballast spaces. Recent cracks found and nature as follows: #1 port DB 1 crack in axial direction, length 6"; #5 port DB 1 tee slipped sweat joint, 1 nipple slipped sweat joint; #2 trunk tank radial crack close to tee. Leaks are known to exist in #1 port tank, nature not known, tank not accessible.

12. Air Drier

Dew point was reported to be -34°C and found to be -29°C. Purge air was found to be approximately 5 m^3/hr. After installation of 1/4" needle valve last voyage, CE had been instructed to keep purge flow at a minimum of 17 m^3/hr. These instructions were repeated. 300 lbs. of molecular sieve supplied to vessel and CE instructed to replace charge as soon as possible.

Dust filters of sufficient capacity should be incorporated in dry air line down stream of drier.

13. Cargo Valves

During loading bonnet gasket of #1 cargo tank filling valve started leaking. As this gasket cannot be replaced in a loaded condition, temporary

have to be taken to prevent spillage during discharging. Respective measures were suggested to CO.

This valve leaks in a closed position, which indicates that the seals of the seat are leaking through and should be replaced during repair period.

14. No. 1 Ballast Tank

CO reported that a mud accumulation of approximately one foot height had been found in this tank.

15. Vibrations

Chief Engineer reported that casing of starboard F. D. fan showed cracks and had to be welded. Cracks are believed to be caused by vibrations in aft body of vessel. Previously reported panelling effect and cracks found in fresh water tanks also indicate vibrations in aft body of vessel.

CO expressed opinion that vibrations did not increase and are stronger only with current and wind going with vessel or in shallow water.

16. Vent Masts - Drains

Drains of vent masts were spot-checked and ice found in drains of Nos. 2 and 5 mast. CO was advised to open drains to remove water in warmer climate.

17. Bow - Searchlight

Master recommended installation of a searchlight at the bow which would assist in detecting ice build-up.

18. Mooring Wire

During docking one breast line broke.

cc: ATSCO
G. Timlin
17-R-1
W. B. Emery II

Boarding Report #17/17-R-1 JAN 1971

Vessel: .SS Arctic Tokyo Voyage: 17A Port: Nikiski

Vessel's Movements	Hrs.	Date
Homer Pilot boarded	10.40	1-31-71
FWE Nikiski	21.45	2-4-71
Cast off Nikiski	21.00	2-5-71

Remarks:

Bunker	Heavy F.O.	Diesel F.O.
Arrival dock	1089 m^3	153 m^3
Received	1121 m^3	m^3
On hand departure	2167 m^3	153 m^3

Water	
Arrived dock	385 mt
Departure dock	320 mt

Nitrogen	
Arrival dock	34.5 m^3
Departure dock	m^3

Draft	FWD.	AFT
Arrival	26'03"	28'06"
Departure	32'00"	34'00"

Weather conditions last voyage:

Cargo Operations	Time	Date	Hours
Chicksan connected	21.30	2-4-71	
Cool-down commenced	21.45	2-4-71	
Cool-down completed	06.00	2-5-71	8.25
Loading commenced	06.00	2-5-71	
Loading completed	18.38	2-5-71	12.60
Chicksan disconnected			
LNG shipped, bbls.	439,152		

DELAYS:

From	To	Hours	Reason
1-31-71, 10.40	2-2-71, 21.05		Waiting for cargo, LNG plant down.
2-2-71, 21.05	2-3-71, 07.37		Attempted reach Nikiski; returned due to heavy ice.
2-3-71, 07.37	2-4-71, 11.38		Waiting for ice to clear.
	TOTAL HOURS		

Attending:

Owners Personnel: G. Timlin
C. Kuehl
Others: Steiner
Commander Bernhard, USCG

Boarded At:

Homer
Homer
Homer
Nikiski

Material Received:
5 Cyl. O2
Spares for governor valve Std. by generator: 2 pistons, 2 oil seals, 2 O-rings

Material Unloaded:
2 Safety Valves
Clevite Brush Recorder

Crew Joined:
Andreani
Pumpman Barilari

Crew Repatriated:
Antonelli
Pumpman Furlan
Oiler (name unknown) sick

1. Vessel's Movements

1.1 Arrived Katchemak Bay 1-31-71, 10.40, and dropped anchor thereat, waiting for LNG plant to get full cargo. Plant operated on reduced capacity due to leakage in an Ethylene compressor.

1.2 Vessel left Katchemak Bay and proceeded to Nikiski 2-2-71, 21.05. Up to 40 miles south of Nikiski, pushed through soft ice, then hit heavier hard ice which was pushed through at full speed. Approximately 25 miles south of Nikiski, abeam of Kasilof, vacuum of main condenser rose due to ice-pluggage and speed had to be reduced to about 32 RPM. This speed being insufficient to push through the ice, Master decided to abandon attempt to reach Nikiski. Vessel returned to Katchemak Bay and anchored thereat 2-3-71, 07.37 hours.

1.3 On 2-4-71, 11.38, pilot boarded and vessel proceeded to Nikiski at 12.55, where she was docked at 21.54.

2. Personnel Movements

Undersigned arrived Anchorage Airport 2-4-71, 06.35 and was awaited there by Mr. G. Timlin and Mr. B. Steiner (Phillips), who had arranged for a charter plane. After a brief stop at Kenai to pick up a steel plate per undersigned's request, Homer was reached at about 08.30. At about 10.00 hours, pilot boat was boarded and vessel was boarded by above party at about 10.45.

Undersigned left vessel 2-6-71, about 02.45 at Homer, outbound.

3. Measures Taken to Prevent Ice-Pluggage

Two problems had been encountered:

a. Ice plugging strainers for salt water service pump, which supplies CW for L. O. coolers of generators. C/E feared a black-out due to too high an L. O. temperature.

b. Ice plugging main condenser, thus restricting CW flow resulting in loss of vacuum and maneuverability of vessel.

(Though ice was not found in main condenser, due to it not being inspected, ice was found in the strainers as per a. Intake for salt water service system being at approximately the same level as main condenser scoop injection, it is felt safe to assume that the cause for reduced CW flow to main condenser was ice.)

3.1 Chief Engineer was advised to use either General Service Pump or Bilge Pump to take suction from Flume Tank via Bilge System and supply to salt water service system. Flow estimated to be approximately 30 m^3/hr. Maximum capacity of Flume Tank: 1000 m^3. Water carried normally: 450 m^3 or supply for 15 hours. Operation was successfully tested.

3.2 Main Condenser

Several modes of (emergency) operation were successfully tested. (Refer drawing 814-17/1028)

3.2.1 From all Ballast tanks gravitating through one Main Ballast line V24 or V23 and V36 plus V35 into Main Condenser, back-

valve open. Simultaneously employing Ballast pump in forward pump room to replenish Ballast Tanks. If Ballast pump plugs, water supply in tanks is sufficient for at least five hours operation, gravitating. Head: about 1.5 kg/cm^2; Revolution obtained: 95 RPM; Vacuum: 95%; Differential temperature over condenser, CW: 20°C.

(NOTE: In switching operation from normal to back-flushing, engine output has to be reduced to about 40 to 60 RPM for a period of up to five minutes. Since this might be critical in heavy ice, it is recommended that vessels employ above described reverse flow method in winter time continuously while maneuvering in Cook Inlet.)

Main L. O. cooler served by water leaving condenser on intake side. L. O. temperature obtained: +42°C.

3.2.2 One tank crossover gravitating reverse flow pattern to condenser: Satisfactory for 30 minutes.

Vacuum: 95%
ME output: 95 RPM
At CW Condenser: 23°C

3.2.3 One or two tanks crossover being pumped by ER Ballast pump through V23 or V24 and recently installed 8" connecting line via V36 and V35 into condenser, reverse flow pattern:

Vacuum: 95%
ME output: 95 RPM
At CW Condenser: 22°C

(NOTE: This method would provide CW for about seven hours upon loaded departure.)

3.2.4 Ballast pump forward takes suction from sea and pumps through one Ballast Main line and valves V23/V24, V36, V35 reverse flow pattern into condenser. Should pump plug up, other Ballast line opens tanks to condenser per 3.2.3. This mode should be employed continuously when negotiating Cook Inlet upon loaded departure during winter months. Installation of a 16" gate valve in X-over line of forward pump room of Arctic Tokyo is required.

4. Main Generator - L. O. Cooler

C/E reported that he had opened L. O. cooler of Main Generator at Homer. He had found pitted areas, caused by corrosion or erosion. Four tubes were plugged. Cooler will be surveyed next time vessel comes into port. C/E reported that these pittings developed within the last two months, which is questionable.

5. Maintenance

Following equipment had been opened for maintenance and survey and was found in good condition: Main L. O. coolers; Generator L. O. coolers

FEB 1971

Boarding Report #17B/17-R-1

Vessel: SS Arctic Tokyo Voyage: 17B Port: Nikiski

Vessel's Movements		Hrs.	Date
Homer Pilot boarded		15.45	2-22-71
FWE Nikiski		22.35	2-22-71
Cast off Nikiski	about	02.00	2-24-71

Remarks:

Bunker	Heavy F.O.	Diesel F.O.
Arrival dock	1150 LT	153 m^3
Received	958 LT	m^3
On hand departure	2078 LT	153 m^3

Water	
Arrived dock	400 mt
Departure dock	290 mt

Nitrogen	
Arrival dock	35.8 m^3
Departure dock	31.1 m^3

Draft	FWD.	AFT
Arrival	27'6"	28'6"
Departure	33'3"	33'6"

Weather conditions last voyage:

Very good. Smooth throughout.

Cargo Operations	Time	Date	Hours
Chicksan connected	23.40	2-22	
Cool-down commenced	23.50	2-22	
Cool-down completed	08.00	2-23	9.1
Loading commenced	08.00	2-23	
Loading completed	00.10	2-24	16.1
Chicksan disconnected	01.10	2-24	
LNG shipped, bbls.	439,042		

DELAYS:

From	To	Hours	Reason
2-23, 18.30	21.30, 2-23	3	Waiting Tide. Low tide - 2'.

TOTAL HOURS 3

Attending: Boarded At:

Owners Personnel: G. Timlin, C. Kuehl Nikiski

Others:

Material Received:

P. O. 2336A, Compressor Spares
P. O. 2342A, Feed Control Valve, Cage, and Plugs, 1-ported

Material Unloaded:

Crew Joined:

Chief Officer Dicasagrande
One 3rd Engineer

Crew Repatriated:

Chief Officer Fienger

1 Operations, Draught

Vessel had to delay loading for about three hours in order to overcome low tide of -2 feet. It is suggested that Messrs. Phillips Petroleum remove several existing shallow spots close to berth. Though these spots probably will not harm vessel (refer Polar Alaska first loading), prudence requires that Masters hold loading to assure a sufficient depth of water below keel.

2. Ice Condition Cook Inlet

When vessel docked, Inlet was free of ice. Approximately 24 hours later, water ways were covered with a thin layer of ice, which, though not harmful, packed tightly between shore and vessel and exerted a certain amount of pressure. Salt water system plugged by ice repeatedly.

3. Custody Transfer Equipment

Trans-Sonics gave erroneous print out, erroneous calibration readings on Channel 03, automatic resetting did not work. Print out was corrected by calibrating 60 Hertz frequency converter, calibration Channel 03 was adjusted. Fault in resetting function was traced to defective relay K5 in data control panel, which was exchanged.

4. Gas Analyzer Sequencer

Sequencer for gas analyzers had been reported malfunctioning. However, it appeared to be in good working order and no faults were found.

5. ASEA - Bridge Control

Vessel docked with bridge control in operation. Unit did not fail while ship was in port. Ammeter readings recorded did not indicate an excessive load. Phases R, S, T were equally loaded with approximately 1 amp. It is believed that a short exists in one of the components or either heat influences the load. This will be checked out with Mr. Timlin riding the vessel.

6. LN_2 - Vaporizer

Drain lines of LN_2 vaporizer froze due to low ambient temperatures. It is suggested to incorporate an alarm in the system that would warn if temperatures of drain get close to zero.

7. Boiler Water Consumption

Consumption of boiler water was stated to be about 37 tons per day. C/E suspects leaking heating coils and will check on it during loaded passage.

8. Nitrogen Samples

Samples of nitrogen were obtained from service system and analyzed. Results of analysis:

CO_2:	No Trace
Water Vapor:	5 to 7 ppm
Oxygen:	200 ppm

MAR 1971

...ron Oil Company
Anchorage, Alaska

Yokohama

Voyage and Boarding Report # 18/17-R-1

Vessel: SS ARCTIC TOKYO Voyage: 18B Port: Nikinki

Vessel's Movements	Hrs.	Date
Homer Pilot boarded	14.15	3-13-71
FWE Nikiski	14.30	3-14-71
Cast off Nikiski	05.25	3-16-71
Remarks:		

Bunker	Heavy F.O.	Diesel F.O.
Arrival dock	1060 LT	155 m3
Received	984 LT	- m3
On hand departure	2100 LT	155 m3

Water	
Arrived dock	400 mt
Departure dock	350 mt

Nitrogen	
Arrival dock	32.9 m3
Departure dock	31.0 m3

Draft	FWD.	AFT.	
Arrival	25'06"	25'06"	Homer
	22'00"	24'06"	Dock
Departure	33'00"	33'00"	

Weather conditions last voyage:

Cargo Operations	Time	Date	Hours
Chicksan connected	15.30	3-14-71	
Cool-down commenced	16.00	"	
Cool-Down completed	20.30	3-15-71	
Loading commenced	00.30	3-15-71	———
Loading completed	03.55	3-16-71	
Chicksan disconnected	04.25	3-16-71	———
LNG shipped, bbls.	438 844		

DELAYS:

From	To	Hours	Reason
3-13,17.20	20.30	3.1	Waiting Tide at Homer
3-14,04.10	11.20	7.2	At Anchor off Kenai, waiting Tide
3-15,04.45	17.30	12.4	Chicksans disconn. vessel off dock due ice
3-15,17.30	18.50	1.3	Chicksan re-connected, resumed loading

TOTAL HOURS 24.0

Attending: Boarded At:

Owners personnel: G. Timlin, C. Kuehl Nikiski

Others: V. Thom, Marine Service

Material Received:

P.O. 2085

Shipment of ybrcalbro material, dropped for P.A.

Material Unloaded:

Instruction manual on ACC, order reproduce it and make up copies.

One copy left on board.

Crew Joined:

Electrician Linden

Pumpman Calipari

Crew Repatriated:

Electrician Mr. Castelli

Pumpman Bommarco

Messboy Scala, Sick

1) Vessel's Movements

Severe ice conditions in Cook Inlet were prevailing. Vessel anchored at Katchemak Bay to wait for tide. Upon docking, ice wedged between shore and ship and broke two lines, whereupon Pilot decided to abandon docking and anchor off Kinai to wait for next flood tide.

Vessel was safely moored 3-14-71, 14.30 and cargo operations started 15.30.

On 3-15-71 at 04.45 ice pressure was critical and loading had to be stopped and Chicksans disconnected. Vessel was moved off berth by about 50 feet and could not resume its original position for continuation of loading until next flood tide, 17.30 Hrs., whence ice was shored. CLEARED

2) Vessel's Operation

Ballast water had been used for cooling of critical machinery components.

3) Terminal Operation

Quick disconnect was done inside of 15 minutes. However, it is believed that Chicksan arrangement needs improvement with regards to quick-disconnect features.

4) Terminal Gangway

Problems were encountered in removing gangway upon quick-disconnect. Present pivot-arrangement is not suitable and should be changed. Pivot aboard ship was damaged, also a part of adjacent rail.

5) Gas-Analysers

Gas-Analyser QIT 191 was calibrated in accordance with original calibration curve, found aboard. Additional calibration curve, sent to vessel by undersigned and allegededly not received, were held by Chief Officer. Chief officer was instructed how to calibrate gas Analysers, using these curves.

6) Cargo X- Over Quick Closing Valves

These valves were opened manually due to their allegded unreliability when opened by air.

7) Visitors

Mr. V. Thom of Marine Service visited the ship as advised by Mr. W.B. Emery

S/S POLAR ALASKA

VESSEL MOVEMENTS VOYAGE 39-B 3-14 thru 3-20 1972

3-14-72

Arrive Kachimak Bay	06:30
Pilot Aboard vessel	07:20
First line at Nikiski Dock	14:15
Cast off Nikiski Dock	16:00
Anchored in Kachimack Bay	22:18

Vessel was unable to get close enough to dock to secure vessel because of heavy ice concentrations of strong currents due to 26.4' tides.

3-15-72

Vessel underway from Kachimack Bay to Nikiski	03:50
First line at Nikiski Dock	11:25
All Fast at Nikiski Dock	13:00
Chicksans Connected	13:05
Commenced Cool Down	13:15
Stopped Cool Down due to tide flood ice conditions	16:10
Resumed Cool Down	17:00
Commenced Loading	23:20

After 16:00 during extreme ice condition one aft spring line synthetic end broke due to pressure on vessel and problem with winch, was repaired immediately by crew, and resecured. Tide was 27.8' with in excess of 100 percent ice coverage.

3-16-72

Loading stopped due to ice conditions	03:20
Chicksans Disconnected	03:30
Chicksans Reconnected	06:45
Loading Resumed	07:18
Loading Stopped	08:55
Chicksan Disconnected	09:10
Chicksans Reconnected	14:00
Loading Stopped	15:10
Emergency Disconnect of Chicksans	15:15
Emergency unmooring of vessel commenced	15:25
Vessel All Clear of Dock	15;40
Anchored at Kachimack Bay	21:46
LNG Loaded	235,185 Bbls

At L5:20 it was appearent that vessel could not hold position at dock due to strong current and heavy ice flows. One of the additional synthethic

was 29.9' with over 100 percent ice coverage.

3-17-72

Undersigned boarded vessel in Kachimack Bay	13:30
Pilot Boarded Vessel	17:05
Vessel Underway	17:10

3-18-72

First line	01:15
Chicksans Connected	02:10
Commenced Loading	03:40
All Fast	03:00
Stopped Loading	03:40
Chicksans Disconnected	03:50
Emergency Unmooring	05:20
All Clear from Dock	05:40
Anchored at Kachimack Bay	12:00
LNG Loaded	35,000 Bbls

At 03:50 Extreme ice conditions were again encountered with a tide change of 27.3' experienced.

3-20-72

First Line	16:25
All Fast	17:40
Chicksans Connected	17:50
Loading Commenced	18:05
Loading Complete	23:25
Chicksans Disconnected	23:55
Cast Off	03:20 3-21-72

Total Cargo aboard on departure 439,722 Bbls
Vessel Received 108 LT Fresh Water
7937 Bbls Bunker

Ice conditions CONSIDERED by pilot worst ever seen Nikiski area was componded by strong tide currents.

DECK

4 TANK ELECTRICAL LINE TO PUMPS DECK PENETRATION

Above listed deck pentration was found to be leaking on deck. The leakage was around several of the lines and out of the penetrations clamp devise. Epoxy type compounds were supplied to the C.E. for temporary patch of leakage. It is possible there may be some increase of Methane in #4 tank barrier but none above normal was noted before vessel departure.

AFT SPRING LINE WINCH

A problem was reported with the operation of this winch both in unspooling and self tensioning operation.

RADAR AND BRIDGE V.H.F. RADIO

The large radar was reported to be blowing fuses. Problem was found to be the modulator tube (C1166). Due to there not being a spare aboard vessel Sun-Shine Radar of Homer was requested to board vessel to replace tube, check over radar units, and tune up bridge V.H.F. transmitter as its range has been limited. Captain has requested the cathode ray tube of the large radar be changed soon as it has many burned spots on the face.

ICE CONDITION ASSOCIATE PROBLEMS

It is the opinion of the undersigned that the crew of this vessel are to be commended for their effots, both without rest and at great risk to personal safety in endearouring to maintain this vessel at the loading dock under what were impossible circumstances. It is further felt that during future similar conditions no attempt be made to dock either vessel. Similar conditions being large tide footage change which cause strong current flows WITH heavy ice coverage. There are approximatley 7 days in both February and March when this condition is possible.

ENGINE

BULKHEAD BETWEEN STBD. FLUME, BUNKER TANK

Chief Engineer reported finding water in bunker tank and found cracking areas between stbd Bunker, Flune and Diesel tank bulkheads. C.E. has requested arrival at ship yard for dry docking with no diesel or bunker in stbd. tanks to allow repair and reinforcement.

L.P. Evaporator

C.E. Feels unit not functioning properly due to possible leakage in unit. He stated there was too much pressure drops in main steam exhaust system and feels we should check O2 contrmpt of feed water to determine leakage.

L.P. STEAM SYSTEM

A problem was reported in this system which is causing insufficient steam flow but didn't have a change to discuss futher with C.E.

AUX. CIRCULATION PUMP FROM BALLAST TANKS

This unit was reported to be not functioning properly but later determined problem was caused by insufficient water head on pump.

GENERATOR OVERLOADS

C.E. Reported both main, forward, and aft generator overload during first two attempts to dock vessel. This to be explained further in his information letter.

BRIDGE CONTROL UNIT

This unit tripped the main engine once during manuvering due to failure of idling cycle. This failure only occured once and did not repeat.

MAIN ENGINE TRIPS

The main engine tripped three times due once to above mentioned problem and twice due to flame out on stbd boiler. This flameout was caused by problem with function of stbd damper control with high speed forced draft fan on. Plan to renew damper actuator in ship yard.

BOW THRUSTER

This unit overload a number of times due to ice flowing through unit.

Gary Timlin

Gary M. Timlin

GT:jmw
CC: R. D. Yuill
W. B. Emery II

VESSEL DELAY 16 DAY 5 HOURS 55 MIN. REASON: Main Generator Failure

DEPARTURE

Cast-Off Nikiski 06:25 3/9/73

CREW JOINED

Illiano, U. - Bos'n
Giovammi, S.G. Oiler
Podda, A. 2nd Pumpman
Zelatore, M. Oiler
Trullu, G. Oiler
D'Alessandro, A. 1st Eng.
Ranieri, C. 3rd Mate

PASSENGERS

Steiner, H.
Steiner, J.
Steiner, K.
Jones, C.
Johnson, T.

CREW REPATRIATED

Calaminici, S. Oiler
Forlan, B. 2nd Pumpman
Quondamatteo, E. Sailor
Giovani, V. Bos'n
DeFiore, L. Oiler
Staracle, S. 2nd Mate
Steccanella, R. 1st Eng.

MATERIAL ON BOARD

P.O. 2534AD - 2 ea. Spring Guides - Hydro-Pneumatic
P.O 2651AD - Seals & Vent Plugs, 6 ea. - Eng. Equip.
P.O. 2581AD - 6 Wiper Blades & 4 Block Assy. - Vynstruments
P.O. 2657AD - Recorder Charts-partial - Graphic Control
P.O. 2677AD - 2 Maytag Washers, Model A18CA - Harolds
P.O. 2678AD - 2 cases Potting compound-RTV-60 - Gen. Elect.
1 Case Dry Milk for - Mr. Yuill
P.O. 2580AE - Module - 2 gate valves - Galbraith
P.O. 2627AE - 2 Timer Motors - Rimer-Birlec
P.O. 2672AE - Coalescer Elements - Marine Moisture Control
P.O. 2645AE - Sol.Valve - Automatic Switch
1 Ctn. Swagelok Fittings
1 Set Stern Tube Seals - from Polar Alaska
13 Pair Coveralls

INITIAL EXPECTED VESSEL DELAY

Around 09:00 hours on 2/19/73 the undersigned received a call from Ed Brown of Phillips Kenai Plant stating Captain W. L. Johnson of Homer Pilots had called and stated it was his opinion the S/S Arctic Tokyo should not immediately proceed to Nikiski Dock because of a vessel presently being at Kenai Pipeline Dock and one underway to the Collier Carbon & Chemical Dock, which during its last attempted loading had broken away. He further had stated he felt the existing ice conditions caused this in his opinion, to create an unsafe condition for the S/S Arctic Tokyo to be moored at Phillips Marathon Dock. I was further informed that Mr. H.N. Olsen had told Captain Johnson the vessel was not to be delayed and to bring the vessel in to Nikiski Dock.

I immediately called Captain Johnson to get information directly from him and to again advise him that any decisions effecting the safety of the vessels are to be made by the Masters of the respective vessels and that he is to advise the Masters of his opinions with no outside influence from Phillips Kenai Plant personnel as they do not operate the vessels, and this was not their responsibility nor do they have any authority to issue directives to either he or the Masters of the vessels. It was agreed the S/S Arctic Tokyo would proceed to Nikiski on either the next flood tide or the one following as the Master of the vessel due at Collier Dock had agreed to be moored only during the ebb tide as they could not dock port side to.

MAIN GENERATOR

On 2/19/73 around 14:00 hours, while vessel was anchored at Kachemak Bay, the Chief Engineer decided to shut down the main generator, main feed water pump turbine to allow repair of a leak in the feed water recirculation line. After repair was completed they reportedly attempted to put the main generator back on line but could not get 440 VAC on the unit. Several hours were spent by the crew attempting to determine why the voltage would not come up.

At around 21:00 hours on 2/19/73, the undersigned received a call from the Homer Pilot Station stating the Master had requested the undersigned presence on the vessel to determine what the problem was with the generator.

At around 22:10 hours 2/19/73, the undersigned departed Kenai via chartered air craft for Homer, arriving at vessel around 23:00 hours and proceeded to assist in checking out generator. First indications were a possible shorted armature or rotor windings or faulty exciter unit as stator windings did not show any faults by meggar readings. It was determined there was not any excitation voltage present so the exciter was disconnected and the generator turned over to rated R.P.M. and the excitation voltage from the standby generator was inpressed on the main generator. The voltage started to come up but an arcing was observed at the aft end of the generator and the excitation voltage was immediately removed. This was around 03:00 to 04:00 hours, 2/20/73. On return to Kenai and at around 09:00 hours, 2/20/73 Westinghouse Repair Plant in Anchorage was contacted and requested they attend the vessel and confirm findings and initiate repair if possible.

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48
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S/S POLAR ALASKA — March 19th 1972

TIME SHEET - VOY 39 B & 40 A

MARCH 14th 1972

	06 30	S.B.E. - Arrival at Homer Bay
	07 20	Pilot on Board (Mr. Sweet) - Proceeding to loading Pier - Nikiski
18	14 15	First line ashore - Start mooring at Phillips Pier - Nikiski
	16 00	Let go lines from Pier - Strong current and bad ice conditions
	22 00	Let go Stbd. Anchor (4 sh.)
	22 18	F.W.E. - Anchored in Homer bay.

MARCH 15th 1972

	03 30	S.B.E. - Departure from Homer Anchorage
	03 35	Start heaving up anchor
	03 50	Anchor up - Proceeding to loading Pier - Nikiski
	11 25	First line ashore - Start mooring at Phillips Pier
	13 00	Moored at Phillips Pier - Eagle on S.B.
20	13 05	Chicksans connected
	13 15	Start cooling down
	16 10	Stopped cooling down for bad ice conditions
	17 00	Resumed cooling down
	20 00	Crew on watch ~~every 2 hours~~ for safety on lines
	23 20	Start loading

MARCH 16th 1972

-	03 20	Stopped loading for ice
	03 30	Chicksans disconnected
	06 45	Chicksans reconnected
	07 18	Resumed loading
	09 10	Chicksans disconnected & stop loading for ice
	14 00	Chicksans reconnected
18	14 15	Resumed loading
	15 15	Stopped loading & chicksans disconnected for emergency
	15 25	Start unmooring
	15 40	All clear from the Pier - Proceeding to Homer anchorage
	21 30	Let go Stbd. Anchor
-	21 46	F.W.E. - At anchor in Homer Bay

MARCH 17th 1972

	-16 45	S.B.E.
2	16 45	Start heaving up anchor
	17 05	Pilot on board (Mr. Tingley)
	-17 10	Anchor up - Proceeding to Loading Pier - Nikiski

MARCH 18th 1972

20	01 15	First line ashore
	02 10	Chicksans connected
	02 46	Start Loading
	03 00	Moored at Phillips Pier - Engine on S.B.
	03 40	Stop loading
	03 50	Chicksans disconnected for ice
	05 20	Start unmooring from the Pier
	05 40	All clear from the Pier - Proceeding to Homer Anchorage
	46	Let go Stbd. anchor
		F.W.E. - Anchored in Homer Bay

Giuseppe FIENGA - MASTER

...N OIL COMPANY
KENAI, ALASKA

DATE: March 22, 1972

BOARDING REPORT #

Vessel: SS Arctic Tokyo Voyage: 37 A Port: Nikiski

Vessel's Movements	Hrs.	Date
Homer Pilot Boarded	11:30	3-21
FWE Nikiski	17:45	3-21
Cast Off Nikiski	16:40	3-22
Remarks:		

Bunker	Heavy F.O.	Diesel F.O.
Arrival Dock	365 LT	
Received	873 LT	
On Hand Departure	1238 LT	

Water

Arrived Dock	mt
Departure Dock	mt

Nitrogen

Arrival Dock	37.2 M^3
Departure Dock	34.5 M3

Draft	FWD.	AFT
Arrival	23'00"	28'04"
Departure	32'03"	32'11"

Weather Conditions Last Voyage:

Cargo Operations	Time	Date	Hours
Chicksan Connected	17:50	3/21	
Cool-Down Commenced	18:00	3/21	
Cool-Down Completed	02:45	3/22	
Loading Commenced	02:50	3/22	
Loading Completed	15:45	3/22	
Chicksan Disconnected	16:00	3/22	
LNG Shipped, Bbls.	386,555 BBLS		

DELAYS:

FROM	TO	HOURS	REASON
08:40 3/22	09:00 3/22		ICE
11:25 "	11:45 "		ICE
	TOTAL HOURS	:30	

ATTENDING: BOARDED AT:

OWNERS PERSONNEL: Timlin & Geiger

OTHERS:

MATERIAL RECEIVED: Exchange walkie talkie + 2 additional batteries
2353- Siemens (Replaced Labyrinth Rings)
2410A-Hibon 2456A- Hibon Pumps
2426A-Honeywell 2427A- Honeywell
2428A- Honeywell 2459A- Diamond Power
2460A- Diamond Power 2461A-Honeywell
2466A- AAA Products 2472A- Project Inst.
2475A- SAAB Scania 2477A-Marine Moisture Control
2483A-Dresser Pacific B & C Supply 220 V drill

MATERIAL UNLOADED:
Deffective walkie talkie and 1 battery.

CREW JOINED: Glardian Salvatore- Galleyboy
Gambi Fortunato - Sailor

CREW REPATRIATED: Cutrulia Pietro- Messboy
Pastorelli Aug.- Sailor

DECK

ATEW CARD 42

This card was reported to have again failed so replaced card with new one received from Kockums and removed bad card to repair.

BRIDGE WINDOW WASHERS

Supplied C.E. with sufficient copper tubing and fitting to complete fresh water window washer system on bridge.

ICE CONDITIONS

Loading was stopped twice for possible mooring problems due to ice flow but tide currents were not sufficient to move vessel from dock. Crew was on standby in event of problems.

ENGINE

A.C.C. CARD # 50

This card reportedly failed during last passage to Japan. Replaced MC 660 A.C.C. and requested C.E. to test card during passagae as impossible to test card without gas firing.

MAIN ENGINE LUBE OIL PRESSURE SWITCHES

It was not possible to check the settings on these switches due to engine being on standby for possible ice problems.

Gary Timlin

Gary M. Timlin

GT:jmw
CC: R. D. Yuill
W. B. Emery II

February 22, 1974
File 101 P/A R-10

MARATHON OIL COMPANY
S/S POLAR ALASKA VOY. 72A (LOADING)
FEBRUARY 20, 1974

ATTENDANCE REPORT

Port of Registry - Monrovia, Libera — Gross Tonnage 44088 L/T

This is to certify that the undersigned did, on behalf of the Owners of the S/S Polar Alaska, attend on board said vessel on February 20, 1974, and thereafter while she was loading at Nikiski Terminal of Phillips Petroleum Co. for the purpose of reviewing any deficiencies of an operational nature in the vessel's equipment.

VESSEL MOVEMENTS

Arrival Homer S.B.E.	05:15	2/20/74
Pilot on Board	06:20	2/20/74
Berthed Nikiski	12:30	2/20/74

CARGO OPERATIONS

Chiksans Connected	13:45	2/20/74
Custody Trans. of Slack	13:55	2/20/74
Amount of Slack	294	Barrels
Start Cool-down	14:00	2/20/74
Start Loading	14:45	2/20/74
Finished Loading	03:05	2/21/74
Chiksan Disconnected	03:20	2/21/74
Custody Trans. of Cargo Loaded	03:50	2/21/74
Cargo Loaded	437,806	Barrels
Cargo In Transit	438,100	Barrels

DRAFT	FORE	AFT
Arrival	26'	28' 06"
Departure	31' 06"	33'

[illegible] AND LN2

[illegible] on Board Arrival	1448 LT	
[illegible] Loaded	2622 BBLs	Note loading stopped due to severe ice conditions making it impossible to load minimum quantity
[illegible] Arrival	30.5 M3	

File 104/PA-R10

MARATHON OIL COMPANY
S/S Polar Alaska Voy. 91 A (Loading)
March 25, 1975

ATTENDANCE REPORT

Port of Registry - Monrovia, Libera Gross Tonnage 44080

This is to certify that the undersigned did, on behalf of the own of the S/S Polar Alaska, attend on board said vessel on March 25, 1975, and there after while she was loading at Nikiski Terminal of Phillips Petroleum for the purpose of reviewing any deficiencies of an operational nature in t vessels equipment.

VESSEL MOVEMENTS	TIME	DATE
Arrival Homer S.B.E.	04:30	3/25/75
Pilot on Board	06:10	3/25/75
Berthed Nikiski	12:45	3/25/75
CARGO OPERATIONS		
Chiksans Connected	12:55	3/25/75
Cust. Trans. of Slack	13:00	3/25/75
Amount of Slack	295	Barrels
Start Cool-Down	13:15	3/25/75
Start Loading	14:15	3/25/75
Finished Loading	03:10	3/26/75
Chiksn Disconnected	03:45	3/26/75
Cust. Trans. of Cargo Lded.	03:15	3/26/75
Cargo Loaded	438,745	Barrels
Cargo in Transit	439,040	Barrels
DRAFT	**FORE**	**AFT**
Arrival	20 Ft. 00 In.	30 Ft. 00 In.
Departure	33 Ft. 00 In.	35 Ft. 00 In.
FUEL AND LN2		
Fuel on Bd. Arr.	887	LT
Fuel Loaded	978	LT
Fuel on Bd. Dept.	1,840	LT
Port Cons.	25	LT
CARGO ON ARRIVAL		
Departure Negishi	9,682	Barrels
Arrival Nikiski	292	Barrels
Total Boil-Off	9,390	Barrels
DEPARTURE	**TIME**	**DATE**
Cast-Off Nikiski	04:00	3/26/75

CREW JOINED

Crescenti	2nd Mate
Cammalleri	Deckboy

CREW REPATRIATED

Ambrosino	2nd Mate
Lopparini	Deckboy

VISITORS IN ATTENDANCE

U. S. Coast Guard Inspectors: Capt. Binns, Lt. Mayberry, Comander Billingsly
Mr. R. D. Yuill, Marathon Oil Company.

MATERIAL ON BOARD

Engine:

P. O. 1012 P	Durmatallic
P. O. 1018 P	I.M.O.
P. O. 1025 P	I.V.A.

1 Box Hydrophore Pump Spares TRSF from A/T
1 Box Flux
1 Main Condensate Pump Stage Piece
1 Cylinder Acetylene

Gas Control Room

P. O. 911 P	Hibon
P. O. 1016 P	Lapp
P. O. 1015 P	M.S.A.

1 Box Gas Analyzer Filters
1 Box Gas Analyzer Carbon
2 Thermocouples
1 Scott Air Pac Cylinder

MATERIAL UNLOADED

2 ea. Ansul N^2 Cylinders for refill

U. S. COAST GUARD VESSEL SAFETY INSPECTION

The Emergency Shutdown System was tested for operation by equalizing the number two cargo tank barrier space low differential pressure transmitter and activating it's associated pressure switch.

QIT-101 was tested for proper operation and calibration and found in good order.

All pressure, temperature and methane percentage recordings were noted to be within normal limits.

ANSUL SK-3000 DRY CHEMICAL EXTINGUISHERS

Attending Fire Control System personnel completed the annual survey the SK-3000 extinguishers. Two each N^2 cylinders which were found with low pressure were removed for refill.

An official report of survey will be prepared and submitted to the undersigned by the firm of which a copy will be supplied to A.B.S., U.S.C.G. and the vessel.

TERMINAL HAZARDS

Note! I did not observe vessel maneuvers but this report was supplied by dock personnel.

During this loading a potentially hazardous situation developed. A Chevron Oil Tanker, M.V. Tuttle, began attempting to dock Port Side Too, at approximately 15:00, March 25, 1975, near the end of a flood tide. They were unable to secure the vessel and continued maneuvering until after 16:00 and the ebb tide had started. The S/S Polar Alaska's crew and the Phillips plant personnel were placed on standby in the event the "Tuttle" should lose control and be carried into the S/S Polar Alaska or the Phillips dock. Fortunately the "Tuttle" aborted their attempted berthing before the ebb tide current became to strong for the vessel to retain control.

This was the second time in the last year such a situation has developed.

MACHINERY SPARE PARTS INVENTORY

A corrected machinery spare parts count was secured from inventory binder number seven.

G. M. Timlin
Port Engineer

GMT/kt

XC/ Mr. W. B. Emery II
Mr. R. D. Yuill

BNG-SOD/EES
El Paso Alaska Company
Docket No. CP75-96, et al.

JAN 2 0 1976

Admiral John B. Hayes
Commander, 17th Coast Guard District
Box 3-5000
Juneau, Alaska 99802

Dear Admiral Hayes,

The staff of the Federal Power Commission (FPC) is presently involved in the preparation of a final environmental impact statement concerning the proposal by El Paso Alaska Company to transport Alaskan North Slope natural gas by pipeline to an LNG liquefaction terminal at Gravina Point in Prince William Sound, Alaska. In a letter from the FPC to the U.S. Coast Guard, dated October 10, 1975, the staff requested certain official information and opinions on navigational safety relative to an alternate site for the LNG terminal at Nikiski in Cook Inlet. In its response to the staff's inquiry of October 10, 1975, the Coast Guard indicated its opposition to the Nikiski alternate site. At this time, the FPC staff requests additional official information and opinions concerning an alternate LNG terminal site at Cape Starichkof in Cook Inlet. It is therefore requested that the Coast Guard provide answers to the following questions:

1) What is the Coast Guard's assessment of shipping safety as it presently exists at or near Cape Starichkof (see attached location map) or on the tanker approach route to the site from the Cook Inlet ship channel?

2) Do ice conditions occur at Cape Starichkof that would pose a significant hazard to the navigation, docking, or loading of LNG tankers? It is requested that any available background information on 1) the severity and

magnitude of the ice conditions, 2) the frequency of occurrence of severe ice conditions, and 3) the extent of the hazard which would be created by the ice conditions on the safety of tanker operations, which was used to make that determination, be provided.

3) As an LNG tanker would maneuver into position for docking procedures at the proposed berth site at Cape Starichkof, identify the frequency and extent of time delays that could reasonably be expected due to ice conditions?

4) Would operations of an LNG terminal at the Cape Starichkof site pose a significant hazard to the safety of existing facilities or tanker operations anywhere in Cook Inlet?

5) What would be the Coast Guard's official position regarding the development at Cape Starichkof of:

   (A) The LNG terminal proposed by Pacific Alaska LNG Company requiring approximately 60 LNG tanker arrivals per year?

   (B) A combined terminal which would be capable of processing the volumes of gas from both the Pacific Alaska and the El Paso Alaska Company proposals requiring up to 370 LNG tanker arrivals per year?

   In particular, would it be the Coast Guard's official position that either (A) or (B) above would pose a significant navigational or loading hazard in the waters of Cook Inlet?

6) In reference to any navigational or loading safety hazards which you may have identified in the answers to the above questions, what effect would the establishment of a formal vessel traffic system in Cook Inlet have on reducing or eliminating those hazards? Would a vessel traffic system be implemented in Cook Inlet in the event of increased tanker arrivals per year into Cook Inlet due to LNG tanker operations?

Responses to these questions will be used to assist the staff in its alternate LNG terminal site selection analysis. The staff will contact the Coast Guard Marine Safety Office in Anchorage through Commanders Nichols and Gordon and Lieutenant Commander Thompson to discuss this letter, and will remain in close contact with them in the future. If any questions arise concerning this letter, please direct inquiries to Mr. Richard Hoffmann, Federal Power Commission at (202) 275-4564.

More detailed information concerning the El Paso Alaska Company proposal and the FPC staff's site analysis can be found in the FPC staff's "Alaska Natural Gas Transportation Systems Draft Environmental Impact Statement (DEIS)" issued in November 1975, a copy of which has been sent to you. For your information the comment period on the staff's DEIS has been extended to January 30, 1976.

Your cooperation in this matter will be greatly appreciated.

Very truly yours,

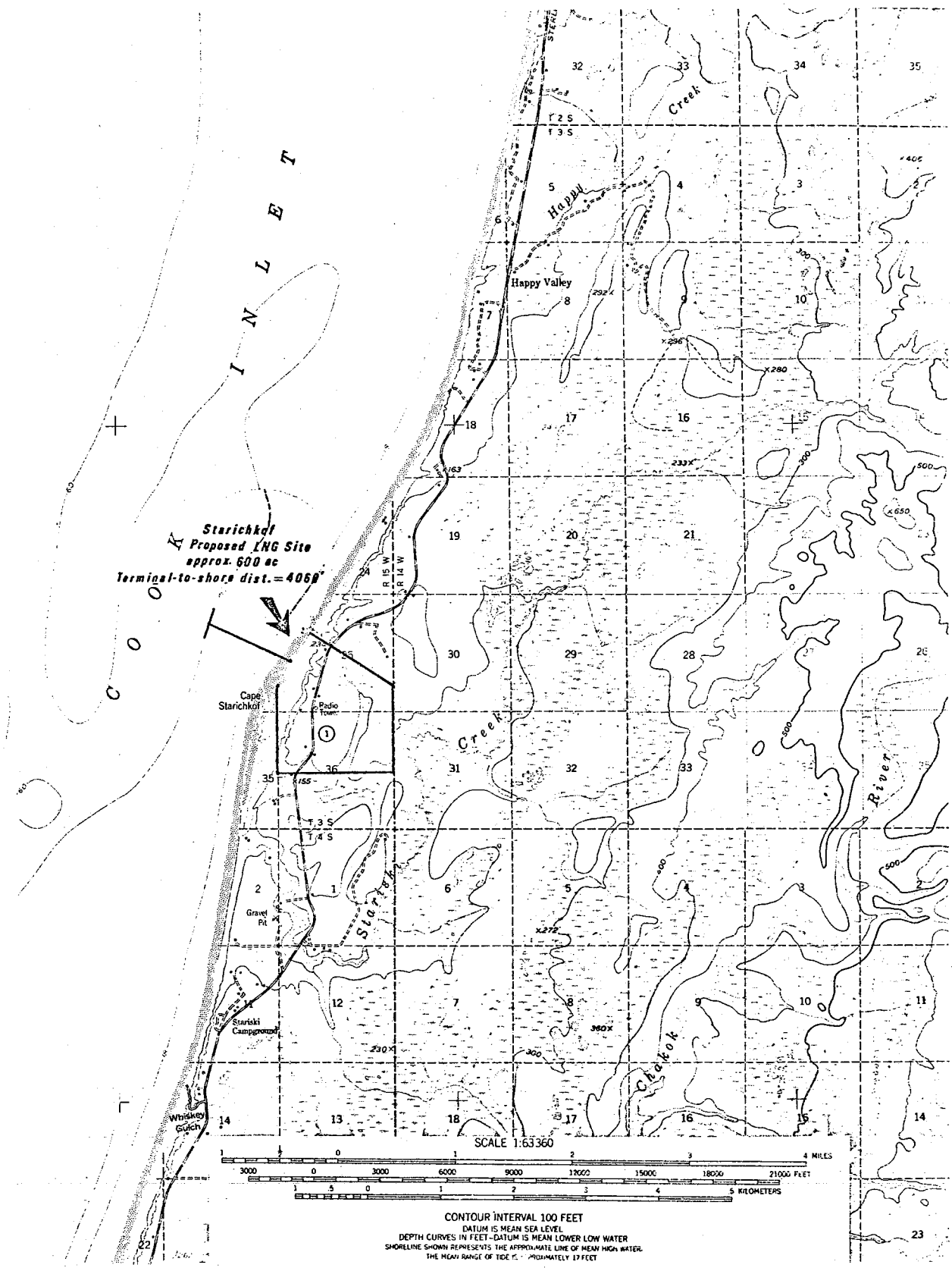
Secretary

Attachment 1: Map of the Cape Starichkof Site

cc: Commander R. C. Nichols
Commanding Officer
MSO Anchorage
Post Office Box 1286
Anchorage, Alaska 99510

Commander L. D. Gordon
Executive Officer
MSO Anchorage
Post Office Box 1286
Anchorage, Alaska 99510

Lt. Commander Thompson
17th Coast Guard District (mps)
Post Office Box 3-5000
Juneau, Alaska 99802


COOK INLET
Starichkof
Proposed LNG Site
approx. 600 ac
Terminal-to-shore dist.=4068'
Happy Valley
Happy Creek
Cape Starichkof
Radio Tower
Gravel Pit
Stariski Campground
Whiskey Gulch
Starichkof Creek
Chakok River
Chakok Creek
R 15 W
R 14 W
T 2 S
T 3 S
T 4 S
SCALE 1:63360
1 0 1 2 3 4 MILES
3000 0 3000 6000 9000 12000 15000 18000 21000 FEET
1 5 0 1 2 3 4 5 KILOMETERS
CONTOUR INTERVAL 100 FEET
DATUM IS MEAN SEA LEVEL
DEPTH CURVES IN FEET-DATUM IS MEAN LOWER LOW WATER
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE MEAN RANGE OF TIDE IS ± APPROXIMATELY 17 FEET

276-119

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
COMMANDER
17TH COAST GUARD DISTRICT
FPO SEATTLE 98771

4 FEB 1976

Mr. Kenneth F. Plumb
Federal Power Commission
Washington, D.C. 20426

Dear Mr. Plumb

This is in reply to your letter of January 20, 1976 (reference BNG-SOD/EES, El Paso Alaska Company, Docket No. CP75-96, et al) requesting Coast Guard comments regarding siting of an LNG terminal at Cape Starichkof in Cook Inlet. On 14 November 1975 I wrote you a letter in response to your request for Coast Guard comments on a proposed LNG site at Nikiski. Whereas my earlier letter regarding Nikiski was quite detailed, I am unable to answer your specific questions with regard to the Cape Starichkof site. There is simply no data available beyond some general information contained in the United States Coast Pilot, Tide Tables and Tidal Current Tables. I have located one additional reference concerning sea ice conditions in Cook Inlet. I have attached this National Weather Service Report as enclosure (1).

At Nikiski we had the benefit of a number of years of experience in operating vessels from existing facilities. There are no such facilities at Cape Starichkof and therefore no similar data base.

Generally, at Cape Starichkof, tidal range is slightly less than at Nikiski and tidal currents are slightly more than half as great (2.2 knots average flood current with a maximum of approximately 3.5; ebb currents are less strong). While ice conditions are probably less severe, both as regards the amount of ice and the duration of the ice season, there is, as I said, insufficient data from which to formulate answers to your questions regarding shipping safety, time delays, etc. Again I can only urge that members of your staff visit Cape Starichkof during the winter season before any decision is made.

With regard to your question concerning a formal vessel traffic service in Cook Inlet, my answer remains the same

as in my letter of 14 November.

Sincerely,

J. B. HAYES
Rear Admiral, U. S. Coast Guard
Commander Seventeenth Coast Guard District

Encl: NOAA Technical Memorandum AR7: Sea Ice Conditions in the Cook Inlet, Alaska during the 1970-71 winter

Copy to:
Comdt (G-W) (less enclosure)
MSO Anchorage (less enclosure)

FEDERAL POWER COMMISSION
WASHINGTON, D.C. 20426

IN REPLY REFER TO:

BNG-SOD/EES
Pacific Alaska LNG Company
Docket No. CP75-140 et al.

JUN 11 1976

Admiral John B. Hayes
Commander, 17th Coast Guard District
Box 3-5000
Juneau, Alaska 99802

Dear Admiral Hayes,

The staff of the Federal Power Commission (FPC) is presently preparing a draft environmental impact statement concerning the proposal by Pacific Alaska LNG Associates (Pacific Alaska) which includes planned construction of an LNG marine terminal at Nikiski. In a recent hearing on El Paso Alaska Company, Docket No. CP76-96 et al., several questions were asked with regard to the Cook Inlet area which the staff was unable to answer. It is anticipated that these questions may also be asked in the future hearing on the Pacific Alaska proposal. To assist the staff in answering these questions, it is requested that the Coast Guard provide answers to the following:

1. Have any major winter storms or windstorms ever delayed the docking of vessels in lower, central, and upper Cook Inlet? (See Attachment 1.) If so, what were the average delays which have resulted? What was the longest delay encountered?

2. Could a 130,000-cubic meter capacity LNG vessel with a design draft of 38.25 feet and an overall length of 989 feet be operated safely in the area off Cape Starichkof? Would the shoal off Cape Starichkof present any navigational problems? (See Attachment 2.)

3. The Coast Guard stated in a letter to the FPC dated November 14, 1975, that the addition of any LNG facility in this location (Nikiski) will substantially increase the risk to life, property, and the environment and that additional facilities and/or additional operations would complicate an already marginal situation. However, the Coast Guard further stated that this marginal situation exists only "at times" and that there were no formal

vessel movement procedures established for the Port of Nikiski. Recently it has come to our attention that a Nikiski Marine Terminal Safety Committee has been formed and that the members have adopted the guidelines described in Operations Guide Nikiski Marine Terminal Complex. The Coast Guard and Pacific Alaska are both members of this committee.

a) To what extent is it anticipated that the formation of this committee and the adoption of its operational guidelines will mitigate the anticipated impacts of locating an additional LNG marine terminal at Nikiski?

b) Pacific Alaska proposes about 52 tanker arrivals annually. Would Nikiski be an acceptable site for the proposed facilities with this amount of tanker traffic? If not, what is the Coast Guard's position with regard to the use of Nikiski as a site for the Pacific Alaska LNG terminal?

4. Can you identify additional voluntary operating measures and/or procedures which Pacific Alaska might implement that would further reduce the impact of the adverse weather and physiographic conditions at its proposed facility? If so, please describe them.

Responses to these questions will be used to assist the staff in its analysis of alternate LNG terminal sites. If any questions arise concerning this letter, please direct inquiries to Mr. Kenneth Frye, Federal Power Commission, telephone (202) 275-4541.

Your cooperation in this matter will be greatly appreciated.

Very truly yours,

Lois A. Cashell

for Kenneth F. Plumb
Secretary

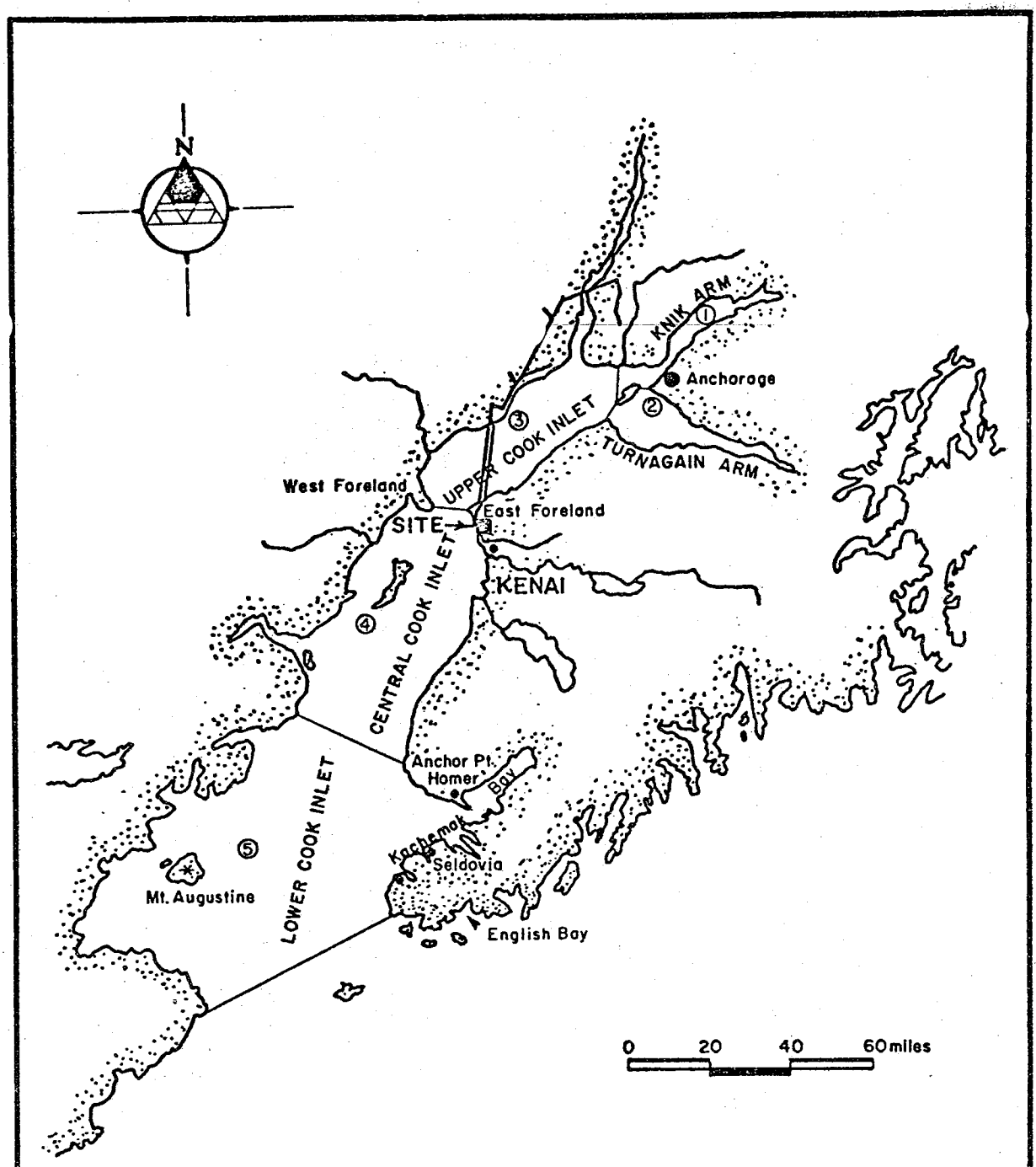
Attachment 1: Map of Cook Inlet
Attachment 2: Map of the Cape Starichkof Site

cc: Commander R. C. Nichols
Commanding Officer
MSO Anchorage
Post Office Box 1286
Anchorage, Alaska 99510

Commander L. D. Gordon
Executive Officer
MSO Anchorage
Post Office Box 1286
Anchorage, Alaska 99510

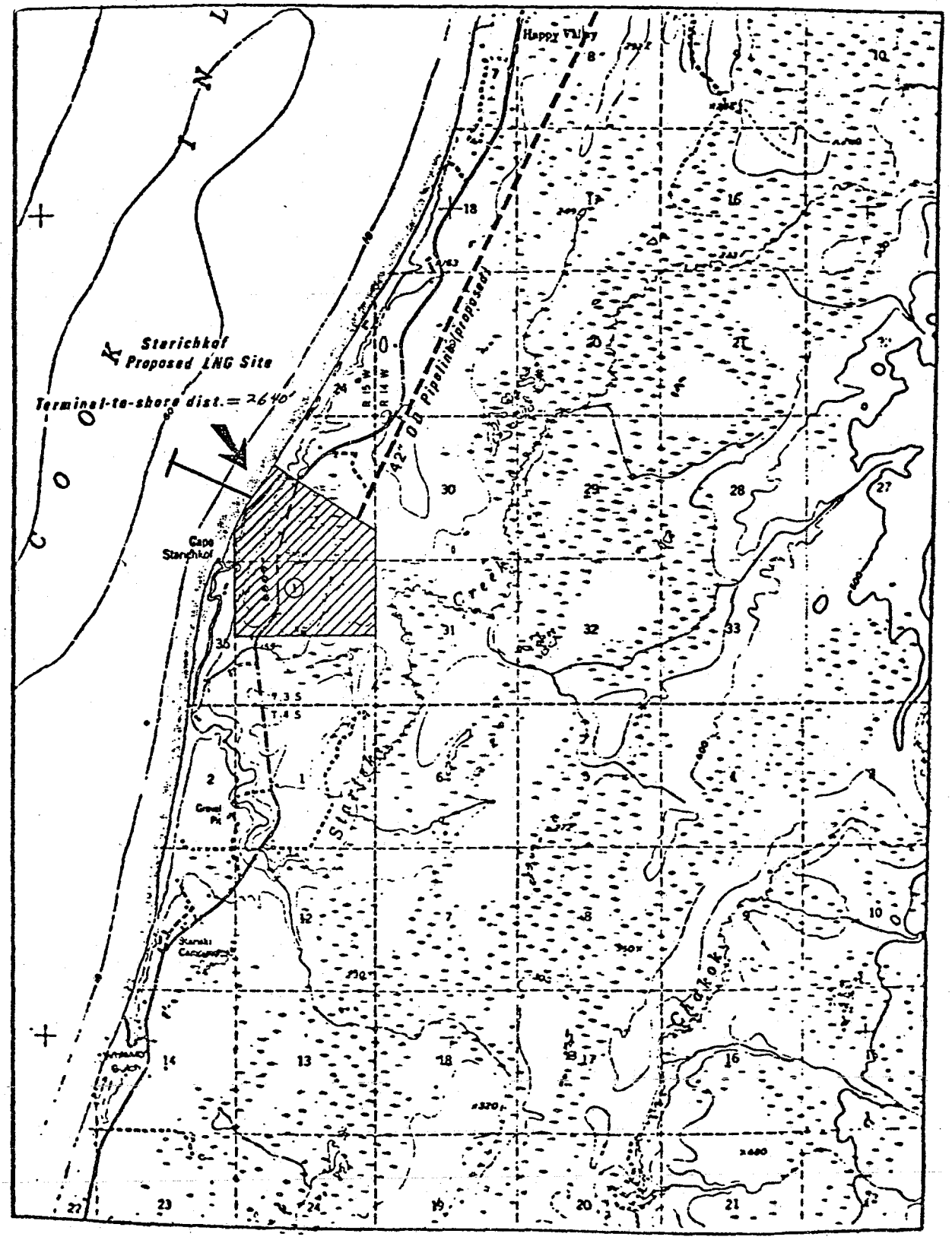
Lt. Commander Thompson
17th Coast Guard District (mps)
Post Office Box 3-5000
Juneau, Alaska 99802

ATTACHMENT 1



DIVISIONS OF COOK INLET

ATTACHMENT 2



Starichkof Site, Cook Inlet

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
COMMANDER (m)
17TH COAST GUARD DISTRICT
FPO SEATTLE 98771

•5900
12 JUL 1976

•Mr. Kenneth F. Plumb
Secretary
Federal Power Commission
Washington, D.C. 20426

Dear Mr. Plumb:

This is in response to your letter of June 11, 1976 (Re BNG-SOD/EES Pacific Alaska LNG Company Docket No. CP75-140 et al.) concerning the proposal by Pacific Alaska LNG to construct an LNG marine terminal at Nikiski. I will attempt to answer your detailed questions as thoroughly as possible, however, data is not available in all cases.

Question #1: I refer you to my letter of November 14, 1975 and the enclosures thereto. This is the best information we have regarding vessel delays. There have indeed been delays in docking, however the only cases we have documented were caused by ice and current, not winter storms or windstorms.

Question #2: There is little data available regarding Cape Starichkof. Generally speaking, both current and ice conditions are less severe than at Nikiski, as I mentioned in my letter to you of February 4, 1976. Safety is a relative thing. This is still a potentially hazardous area, but the cautious and prudent seaman could operate "safely" in this vicinity. I would not recommend navigating the vessel you describe in the vicinity of the seven fathom shoal northwest of Cape Starichkof. If you will refer to C&GS chart 16640 (old number 8554), you will note that while this shoal is 2½ miles in length, there are but two soundings over it. Additionally, I would refer you to the cautionary note in the upper left corner of the chart regarding the unreliability of all soundings in this area due to the 1964 earthquake.

Question #3.a: It is not possible to quantify in this regard. Operating guidelines and procedures do not, in most cases, eliminate the problem of ice and current. Rather they enhance the capability to respond in the event of an emergency and only to the degree to which diligence and foresight are exercised do such procedures reduce the risks associated with the environmental hazards. The risks cannot be totally eliminated, only reduced.

Question #3.b: I recently received a letter from Pacific Alaska regarding their Nikiski proposal. Enclosure (1) is my response, setting forth my position on this matter. For your information I will be meeting with representatives of Pacific Alaska later this week to further discuss their proposal.

Question #4: Again I would refer you to my letter of November 14, 1975 regarding operating procedures which might be implemented at Nikiski. Additionally, as pointed out in the enclosure, if the technology exists and can be employed to reduce the major problem of ice and current, the Coast Guard would reevaluate the hazards associated with operations at Nikiski.

P.A. YOST
CAPTAIN, U. S. COAST GUARD
CHIEF OF STAFF
SEVENTEENTH COAST GUARD DISTRICT

Encl:
(1) My ltr 5900 of 8 July 1976 to Pacific Alaska LNG

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
COMMANDER (M)
17TH COAST GUARD DISTRICT
FPO SEATTLE 98771

16600

4 AUG 1976

Mr. Kenneth F. Plumb
Secretary
Federal Power Commission
Washington, D.C. 20426

Dear Mr. Plumb:

This will supplement my letter of 12 July 1976 which was an interim response to your inquiry of June 11, 1976, regarding the proposal by Pacific Alaska LNG to construct an LNG marine terminal at Nikiski, Alaska.

Since my earlier letter, I and members of my staff have re-studied the problem in depth, twice meeting with representatives of Pacific Alaska and attending a meeting of the Nikiski Marine Terminal Safety Committee. These deliberations have produced some new information which leads me to this review of my previously stated position.

As you know, my primary concern has been with regard to the combination of winter ice and strong currents at Nikiski and the possibility of vessel breakaways from piers. The most dangerous situation occurs with maximum flood currents (northerly set) during winter months. A vessel breaking away from her mooring could pose a serious hazard to facilities and vessels to the north. Inasmuch as Pacific Alaska proposes to locate south of all existing facilities at Nikiski, I am particularly concerned about a Pacific LNG tanker breakaway.

During a meeting on 15 July, Pacific Alaska displayed the results of a preliminary current survey they conducted in the vicinity of their proposed site in 1972. Though not conclusive, the data suggests that the current closely parallels, rather than being slightly convergent with, the pier face as previously believed. Pacific Alaska intends to conduct further current studies this year and, as a result of our discussions, they now intend to expand the scope of those studies so that a more comprehensive current picture in the vicinity of the Nikiski complex will be available.

During that meeting we also discussed various operating procedures which might be employed at the various Nikiski facilities. It was suggested to Pacific Alaska that they undertake an analysis of the maneuvering characteristics of the vessels they plan to employ at Nikiski, as regards response to emergency breakaways. From this,

it was hoped that they could determine power and manning requirements at dockside that would permit a safe recovery from an uncontrolled breakaway under various current conditions. Pacific Alaska agreed to collect this data as soon as possible.

On 29 July Pacific Alaska presented the results of their analysis of vessel maneuvering characteristics. Assuming severe conditions of an eight-knot current and a 25-knot wind from the southwest, Pacific's data shows that their LNG tankers could theoretically safely recover from an emergency breakaway, providing certain conditions of machinery readiness and manning are adhered to.

On the same day, 29 July, two members of my staff travelled to Nikiski to attend a Marine Terminal Safety Committee meeting. During that meeting, it was divulged that one of the existing Nikiski plants is currently undergoing an expansion which will ultimately lead to a 60% increase in vessel callings at that particular facility. Two other facility operators suggested the probability of future expansion which would lead to additional vessel traffic in the Nikiski port complex as it now exists.

Additional vessel traffic, whether generated by an expansion of existing facilities, the siting of additional facilities or a combination thereof, similarly increases the dangers associated with vessel operations during severe ice and current conditions.

I have attempted to analyze the overall Nikiski port complex as it affects safety of ships, their personnel and equipment and the protection of the marine environment, bearing in mind that a need also exists for orderly flow of the port's output of cargo. From these standpoints, I continue to feel strongly that increased usage of existing facilities or siting of additional ones can only be accomplished safely by implementation of strict operating conditions and controls. As related in earlier correspondence, the Nikiski Marine Terminal Safety Committee has been developing and refining a set of Operating Guidelines during the past several months. They are currently undergoing final revision prior to implementation during the upcoming winter season. Those presently proposed appear adequate for current vessel traffic density, however experience gained during this next winter season may necessitate revisions now unforseen. The guidelines being established at Nikiski provide for an operations advisory system accuratly depicting terminal traffic forecast information; a workable berthing priority system; communications requirements for intership, ship to terminal, and interterminal use, all on a year round basis. Additional "winter rules" mandated by the

safety committee to take effect when free ice is present in Cook Inlet at or south of the Forelands include berthing to stem the worst ice conditions; ballast and trim requirements; increased numbers of mooring lines; pilot aboard with a manned bridge and engine room watch capable of immediate maneuvering response; anchors ready for immediate use; steam to the sea chests on steam drive vessels and starting air peaked on diesel propelled craft.

An increase in traffic density, generated either by expansion of existing facilities or the establishment of new facilities, will undoubtedly lead to a requirement for more stringent operating procedures, either voluntarily adopted or Coast Guard imposed. For instance, at some level of vessel traffic density, it will become necessary to limit the number of vessels simultaneously in the Nikiski port area under severe ice and current conditions. Obviously such measures would economically limit port expansion and this fact must be understood by all from the outset. Yet only by planning for such contingencies and implementing them when appropriate can we minimize the inherent dangers at Nikiski.

In summary, I remain convinced that, from all standpoints considered, there are numerous other locations in southcentral Alaska, both in Cook Inlet and Prince William Sound, which would be better suited to the type of operations currently conducted and planned for the future in Nikiski. Our detailed study of the problem leads me to conclude that highly restrictive operating guidelines will be required to minimize the increased dangers associated with projected future Nikiski operations.

Sincerely,

J. B. HAYES
Rear Admiral, U. S. Coast Guard
Commander, Seventeenth Coast Guard District

be totally eliminated, only reduced, and it is not possible to quantify in this regard.

I realize there are a number of factors which must be considered before the final decision can be made on this issue and I would not expect the FPC to act in a unilateral manner based only on the concerns which I have expressed. Certainly the need for energy resources, the potential drawbacks associated with possible alternative sites and the employment of as yet unexplored physical and operational procedures may combine to outweigh my concerns. Most certainly, if the technology exists and can be employed to reduce the major problem of ice and current, the Coast Guard would reevaluate the hazards associated with operations at Nikiski.

I am sure you realize that while the Coast Guard is not the final authority for site approval, we do have clear authority regarding certain aspects of vessel movement and terminal operations. Should the project be approved as you have proposed, the Coast Guard will institute whatever measures are deemed necessary and appropriate to insure the maximum possible level of safety. Be assured that we would work closely with you and the other Nikiski operators in this regard and in furtherance of our national objective, the facilitation of marine transportation.

I have recently received an inquiry from the FPC regarding your proposal. My general response will be as set forth in this letter.

Sincerely,

J. B. HAYES
Rear Admiral, U. S. Coast Guard
Commander, Seventeenth Coast Guard District

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
COMMANDER (m)
17TH COAST GUARD DISTRICT
FPO SEATTLE 98771

5900
8 JUL 1976

Mr. K.C. McKinney
Vice President and General Manager
Pacific Alaska LNG Company
P.O. Box 54288 Terminal Annex
Los Angeles, California 90054

Dear Mr. McKinney:

This is in response to your letter of June 10, 1976 regarding your Nikiski project. Considering the steps you have already taken in this project, I can readily understand your concern over my response to the FPC's inquiry regarding the El Paso proposal. I would hasten to add, however, that the FPC's letter of October 10, 1975 was the first formal request received by my office from any party regarding the siting of additional LNG facilities at the Nikiski port complex. Neither my office nor the COTP office in Anchorage has record of any earlier correspondence from Pacific Alaska LNG.

The basic statements in my letter of November 14, 1975 to the FPC remain operative. The detailed enclosures to that letter, which is reproduced as Appendix F to Volume II to the FPC's Final EIS on Alaska Natural Gas Transportation Systems, pointedly demonstrate the hazards associated with current Nikiski operations. Certainly the siting of an additional facility with the attendant increase in vessel traffic and transfer operations increases those hazards to some degree. Of course the FPC/El Paso proposal included plans for approximately 350 vessel callings per year at Nikiski whereas your proposal shows 52 vessel callings per year. Inasmuch as my primary concern is over vessel breakaways caused by a combination of ice and current, your proposal would not increase the overall danger to the port complex as much as would the FPC/El Paso operation.

Safety is of course a relative thing and certainly the benefits you derive from the experience of other Nikiski operators, as well as the institution of various operating procedures, can go far toward minimizing the various risks involved. However, the establishment of operating procedures does not, in most cases, eliminate the hazards of current and ice at Nikiski. Rather they enhance the capability to respond in the event of an emergency, and only to the degree to which diligence and foresight are exercised do such procedures reduce the risks associated with the environmental hazards. The risks cannot

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (G-WS/73)
WASHINGTON, D.C. 20590
PHONE: (202) 426-2262

CP75-140
CP75-83-2

Mr. Kenneth F. Plumb
Secretary
Federal Power Commission
Washington, D. C. 20426

Dear Mr. Plumb:

This is in response to your letter of 3 September 1976 concerning a draft environmental impact statement for the construction and operation of facilities to collect and liquefy natural gas, the transportation of liquified natural gas in interstate commerce, and the sale of liquified natural gas. The natural gas would be from the Cook Inlet region of Alaska and the receiving terminal at Los Angeles, California.

The concerned operating administrations and staff of the Department of Transportation have reviewed the material submitted. The Coast Guard commented as follows:

"Vol. I, p. xvii - Vol. II, p. viii: 'LORAN references: LORAN is an acronym for Long Range Aids to Navigation, not Long Range Navigation.'

"Volume I:

(a) Section D.3 - p. I-196. 'The volume of 12,000 gpd of sanitary waste appears erroneously high for a crew of 28. In addition, it is recommended that at least one of the terminals be equipped to pump ashore for treatment the sewage wastes from the LNG tankers in view of the adverse economics of diverting tankers from the direct Los Angeles to Nikiski route for pumping off sewage outside territorial waters.

(b) Appendix C: Part I - Under U. S. Coast Guard, add 'Regulates the design, construction and certification procedures for marine sanitation devices (33CFR159).' Part II -

(1) Item 5 should read 'Federal Water Pollution Control Act, as amended (PL 92-500).'

(2) Item 12 should read 'U. S. Coast Guard Regulations... 33 CFR 126, security of vessels and Waterfront Facilities.'

(3) Add item 13 which reads: U. S. Coast Guard Regulations...33 CFR 154-156, Pollution Prevention Vessels and Oil Transfer Facilities.

"Volume II - Appendix 3

Under U. S. Coast Guard, add: 'Regulated oil transfer operations to or from vessels and facilities (33 CFR 154-156). Regulates the handling of hazardous materials transferred to or from vessels or facilities (33 CFR 126).' "

The Department of Transportation strongly objects to this project if the LNG terminal is sited at Nikiski. We believe that there are numerous other locations in Southcentral Alaska both in Cook Inlet and Prince William Sound, which would be better suited to the type of operations currently conducted and planned for the future of Nikiski. Highly restrictive guidelines will be required to minimize the increased dangers associated with projected future Nikiski operations.

The opportunity to review this draft statement is appreciated.

Sincerely,

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (G-WS/73)
WASHINGTON, D.C. 20590
PHONE: (202) 426-2262

24 NOV 1976

Mr. Kenneth F. Plumb
Secretary
Federal Power Commission
Washington, D. C. 20426

Dear Mr. Plumb:

The Department of Transportation letter dated 2 November 1976 submitted in response to your letter of 3 September 1976 is in error and is cancelled by this response. Your letter of 3 September 1976 requested the review of a draft environmental impact statement for the construction and operation of facilities to collect and liquefy natural gas, the transportation of liquified natural gas in interstate commerce, and the sale of liquified natural gas. Natural gas would be purchased from gas fields in the Cook Inlet region of Alaska and transported through a proposed 6 through 24 inch diameter 116.9 mile pipeline network to a proposed LNG plant in the Nikiski industrial complex. Two 130,000 cubic meter LNG vessels would be constructed to carry LNG by sea from Nikiski to a proposed receiving terminal at Los Angeles Harbor, California.

The concerned operating administrations and staff of the Department of Transportation have reviewed the material submitted. The Coast Guard commented as follows:

"Vol. I, p. xvii - Vol. II, p. viii: 'LORAN references: LORAN is an acronym for Long Range Aids to Navigation, not Long Range Navigation.'

"Volume I:

(a) Section D. 3 - p. I-196. 'The volume of 12,000 gpd of sanitary waste appears erroneously high for a crew of 28. In addition, it is recommended that at least one of the terminals be equipped to pump ashore for treatment the sewage wastes from the LNG tankers in view of the adverse economics of diverting tankers from the direct Los Angeles to Nikiski route for pumping off sewage outside territorial waters.

"(b) Appendix C: Part I - Under U. S. Coast Guard add 'Regulates the design, construction and certification procedures for marine sanitation devices (33 CFR 159).' Part II -

"(1) Item 5 should read ' Federal Water Pollution Control Act, as amended (P. L. 92-500).'

"(2) Item 12 should read 'U. S. Coast Guard Regulations... 33 CFR 126, Security of Vessels and Waterfront Facilities.'

"(3) Add item 13 which reads: U. S. Coast Guard Regulations... 33 CFR 154-156, Pollution Prevention Vessels and Oil Transfer Facilities.

"Volume II - Appendix 3

Under U. S. Coast Guard, add: 'Regulated oil transfer operations to or from vessels and facilities (33 CFR 154-156). Regulates the handling of hazardous materials transferred to or from vessels or facilities (33 CFR 126).' "

The Office of Pipeline Safety Operations commented that all appropriate pipelines must be designed, constructed, and maintained in accordance with 49 CFR Part 192.

The Department of Transportation observes that there are numerous other locations in Southcentral Alaska, both in Cook Inlet and Prince William Sound, which would be better suited to the type of operations currently conducted and planned for the future of Nikiski. The Department of Transportation concludes that highly restrictive operating guidelines will be required to minimize the increased dangers associated with the projected future Nikiski operations, and further recommends that the above comments be considered in further reviews of the project.

The opportunity to review this draft statement is appreciated.

Sincerely,

A. F. FUGARO
Rear Admiral, U.S. Coast Guard
Chief, Office of Marine Environment
and Systems

FEDERAL POWER COMMISSION
WASHINGTON, D.C. 20426

IN REPLY REFER TO:

Pacific Alaska Company, et al
Docket No. CP75-140, et al.

Rear Admiral A.F. Fugaro
Department of Transportation
U.S. Coast Guard
Chief, Office of Marine
Environment and Systems
400 Seventh Street, S.W.
Washington, D.C. 20590

FEB 4 1977

Captain D.J. Riley
Department of Transportation
U.S. Coast Guard
Office of Marine Environment
and Systems
400 Seventh Street, S.W.
Washington, D.C. 20590

Dear Sirs:

The Commission Staff has reviewed the U.S. Coast Guard's shipping safety communications with regard to the LNG terminal which Pacific Alaska LNG Company proposes to build at Nikiski, Alaska. The communications which were reviewed are as follows:

1) November 14, 1975, letter from Rear Admiral John B. Hayes to Secretary Kenneth F. Plumb, FPC.

2) February 4, 1976, letter from Rear Admiral J.B. Hayes to Secretary Kenneth F. Plumb, FPC.

3) July 8, 1976, letter from Rear Admiral J.B. Hayes to Mr. K.C. McKinney of Pacific Alaska LNG Company.

4) July 12, 1976, letter from Captain P.A. Yost to Secretary Kenneth F. Plumb, FPC.

5) August 4, 1976, letter from Rear Admiral J.B. Hayes to Kenneth F. Plumb, FPC.

6) November 2, 1976, letter from Captain D.J. Riley to Secretary Kenneth F. Plumb, FPC.

7) November 24, 1976, letter from Rear Admiral A.F. Fugaro to Secretary Kenneth F. Plumb, FPC.

The first 5 letters collectively indicate that the construction of another LNG facility at Nikiski, in addition to the existing Phillips-Marathon facility, would significantly increase the risk to life, property, and the environment, that the hazards at Nikiski, i.e., tidal range, swift currents, and winter ice conditions, cannot be eliminated, and that there are numerous other locations in South-central Alaska, both in Cook Inlet and Prince William Sound, which would be better suited to the proposed LNG terminal operations. Staff notes that the Coast Guard's determination of a "significant increase of risk to life, ..." has always remained operative throughout all correspondences.

In its Cook Inlet-California Project, Draft Environmental Impact Statement (DEIS), Staff indicated that the proposed project could be implemented at an acceptable level of risk in terms of probability of fatality per exposed person per year. However, in view of the Coast Guard's experience with the Nikiski area and that agency's independent determination that any additional LNG terminals in the area would pose a significant hazard to the safety of life, property, and the environment, Staff found itself unable to recommend in the DEIS the construction of the proposed LNG terminal at Nikiski. In addition, Staff's DEIS invited the Coast Guard and others to comment on the DEIS.

Specifically, in the letter of November 2, 1976, Captain D.J. Riley commented to Commission Secretary Plumb that:

> The Department of Transportation [U.S. Coast Guard] strongly objects to this project if the LNG terminal is sited at Nikiski. We believe that there are numerous other locations in Southcentral Alaska, both in Cook Inlet and Prince William Sound, which would be better suited to the type of operations currently conducted and planned for the future at Nikiski. Highly restrictive guidelines will be required to minimize the increased dangers associated with projected future Nikiski operations.

However, in the letter of November 24, 1976, Rear Admiral A.F. Fugaro cancelled the November 2, 1976, comment stating that the letter was in error. Rear Admiral Fugaro therein stated that:

> The Department of Transportation [U.S. Coast Guard] observes that there are numerous other locations in Southcentral Alaska, both in Cook Inlet and Prince William Sound, which would be better suited to the type of operations currently conducted and planned for the future of Nikiski. The Department of Transportation concludes that highly restrictive operating guidelines will be required to minimize the increased dangers associated with the projected future Nikiski operations, and further recommends that the above comments be considered in further reviews of the project.

Staff notes that the latter reply did not contain the strong objection to the Nikiski site that was contained in the November 8, 1976, letter and that had evolved over the long series of Coast Guard communications. The Coast Guard's modification of views has therefore raised serious doubts with regard to what the Coast Guard's opinion is with respect to the Nikiski LNG site. Consequently, for the purpose of a Final Environmental Impact Statement, the Commission Staff finds it necessary to require the appearance of a witness from the Coast Guard to appear in order that Staff and the parties in the proceeding may ascertain the definitive Coast Guard views on the siting problem at Nikiski. Such witness or witnesses should be qualified to speak authoritatively on the determinative Coast Guard position on the Nikiski site, as well as on the potential operating guidelines which may be imposed on shipping operations. Please contact the undersigned with regard to procedural arrangements for the appearance of the Coast Guard witness(es), including scheduling.

Sincerely,

David G. Bortz

David G. Bortz
Commission Staff Counsel

cc: Rear Admiral John B. Hayes
Commander, 17th Coast Guard District
P.O. Box 3-5000
Juneau, Alaska 99802

Captain Paul A. Yost
Chief of Staff
17th Coast Guard District
P.O. Box 3-5000
Juneau, Alaska 99802

Lt. Commander Thompson
District Representative
17th Coast Guard District
P.O. Box 3-5000
Juneau, Alaska 99802

Commander R.C. Nichols
Commanding Officer
MSO Anchorage
P.O. Box 1286
Anchorage, Alaska 99510

Commander L.D. Gordon
Executive Officer
MSO Anchorage
P.O. Box 1286
Anchorage, Alaska 99510

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

Address reply to:
COMMANDER
Seventeenth Coast Guard District
P.O. Box 3-5000
Juneau, Alaska 99802

16610
19 MAR 1977

RECEIVED
MAR 25 3 19 PM '77
OFFICE OF THE
GENERAL COUNSEL

Mr. David G. Bortz
Commission Staff Counsel
Federal Power Commission
Washington, D.C. 20426

Dear Mr. Bortz;

Admiral Fugaro has asked me to respond to your letter to him of February 4, 1977 (Re: Pacific Alaska Company, et al. Docket No. CP75-140, et al.).

Reviewing previous correspondence, it is understandable that you are confused over the Coast Guard's apparent shift in positions on the matter of additional LNG sitings at Nikiski. Allow me to succinctly summarize the earlier correspondence originating from this office and attempt to clear the matter up once and for all.

A significant increase in marine traffic, particularly LNG ships, at Nikiski would certainly constitute an unacceptable risk if not accompanied by strict operating requirements either self-imposed by the industry or mandated by the Coast Guard. This was the major point of my original letter to FPC, dated 14 November 1975. This letter contained much historical data in response to specific FPC Staff questions.

Since November 1975 a number of significant changes have taken place. These include formation of the Nikiski Operators' Safety Committee, the adoption of voluntary operating procedures by the Committee, the upgrading of existing facilities at the port complex, and further studies by Pacific Alaska Company regarding currents and ship breakaways. As a result of these steps, and under existing Coast Guard regulatory authority, I am now convinced that present and future Nikiski operations can be conducted safely, though perhaps under conditions of considerable economic burden to the operators. These were the major points addressed in my most recent letter, dated 4 August 1976. It would appear unnecessary to comment on the intervening letters as they were basically repetitive of the first.

Safety, then, can be made essentially a moot point, and the economic impact of the measures necessary to make it so become primary. For instance, under severe winter icing conditions such as those which occurred in 1972 (as detailed in my letter of 14 November 1975), it is probable that the entire port complex might be shut down for significant periods of time.

Using that approach, or other less stringent measures which I have identified in earlier correspondence, I can and will continue to insure safe operations at Nikiski.

Sincerely,

J. B. HAYES
Rear Admiral, U. S. Coast Guard
Commander Seventeenth Coast Guard District

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS: (G-LCL/81)
U.S. COAST GUARD
WASHINGTON, D.C. 20590
PHONE: 202 426 2245

16610/5882

23 MAR 1977

Mr. David G. Bortz
Commission Staff Counsel
Federal Power Commission
Washington, D. C. 20426

Re: Pacific Alaska Company, et al.
(Docket No. CP 75-140, et al.)

Dear Mr. Bortz:

This is in response to your letter of February 4 concerning the Federal Power Commission Staff's analysis of various Coast Guard letters regarding the Pacific Alaska Company's proposal to locate a LNG terminal at Nikiski, Alaska. Your staff had noted an apparent change in the Coast Guard's position concerning the suitability of Nikiski as a potential LNG terminal site. Since the majority of the Coast Guard correspondence related to this matter had been initiated by the Commander, Seventeenth Coast Guard District, I requested that he respond to the substantive questions raised in your letter. His answer has been transmitted directly to you.

The Federal Power Commission Staff has correctly recognized that the Coast Guard has modified its view as to the siting of a LNG terminal at Nikiski. Unfortunately, our earlier correspondence did not adequately explain the reasons for this modification and led to your confusion as to our position. I have reviewed RADM J. B. Hayes' letter of March 9 concerning the matter and believe that it clarifies the Coast Guard's opinion as to the safety concerns of siting a LNG terminal at Nikiski and the reasons for his view. I am in complete concurrence with the opinion expressed by RADM Hayes and endorse his letter as the Coast Guard's position.

It is my opinion that the Coast Guard's view on the siting of a LNG terminal facility at Nikiski, Alaska is now clear and there is no necessity to provide oral testimony to the FPC Staff; however, if you feel that further specific questions need to be answered, please address them to me, in writing, and I will respond accordingly.

Sincerely,

A. F. FUGARO
Rear Admiral, U.S. Coast Guard
Chief, Office of Marine Environment
and Systems

Copy to:
CCGD17(d)

APPENDIX G

TOTAL ENERGY COST OF MAJOR ALTERNATIVES

The total energy cost of a natural gas transportation system consists of all the energy necessary to build and operate it. The energy required to construct a system's facilities is called the primary energy cost. The energy required to operate a transportation system includes all of the energy forms that are used to power or fuel the system.

The Energy Research and Development Administration (now part of the Department of Energy) developed a methodology to calculate the total primary energy cost for the construction of a proposed project. 1/ This methodology, called an input-output (I-O) analysis, can be used to determine the total direct and indirect energy required to manufacture, transport, and construct a facility. The I-O analysis was used by the staff to determine the primary energy cost for the different segments of the Pacific Alaska and Northwest Alaskan Tie-in alternatives. The results of the analysis can be found in Table G-1.

The total primary energy cost for construction of the proposed Pacific Alaska project, including the gathering pipeline system, liquefaction facilities, two LNG vessels, and incremental regasification facilities, would total approximately 41.4 trillion Btu. If the Pacific Indonesia project were not approved and Pacific Alaska constructs the California regasification facilities and Gosford pipeline, the total primary energy cost for the entire project would be about 66.2 trillion Btu. The Northwest Alaskan Tie-in Alternative would have a total primary energy cost of about 46.4 trillion Btu.

The total operating energy cost was obtained by identifying the amount of natural gas, Bunker-C fuel oil, and electricity that would be used to operate the transportation systems. The Northwest Alaskan Tie-in Alternative compressor stations would use natural gas taken directly from the pipeline as fuel to operate its facilities. Whereas Pacific Alaska would use natural gas to fuel its liquefaction process compressors and revaporization units, Bunker-C fuel oil and boil-off gas from the LNG cargo to power the LNG vessels, and electricity generated in California and Alaska to operate pumps and motors and to control the liquefaction and regasification facilities.

1/ C. W. Bullard, P. S. Penner, and D. A. Pilati, Energy Analysis: Handbook For Combining Process and Input-Output Analysis, Energy Research and Development Administration (1976).

TABLE G-1

COMPONENT PRIMARY ENERGY COSTS
FOR THE PACIFIC ALASKA AND NORTHWEST ALASKAN TIE-IN ALTERNATIVES

Major Components of Systems	Primary Energy Costs (Btu x 10^{12})	Pacific Alaska Proposal 1/ With Pacific Indonesia	Pacific Alaska Proposal Without Pacific Indonesia	Northwest Alaskan Tie-in Alternative 6/
Pacific Alaska LNG facility (400 million cfd)	20.6	20.6	20.6	-
Gathering pipeline system in Alaska	7.5	7.5	7.5	- 2/
Two LNG vessels for Alaskan gas (130,000 m^3)	12.5	12.5	12.5	-
Western LNG regasification facility (500 million cfd)	21.9	-	21.9 3/	-
Pacific Alaska incremental regasification facilities	0.8	0.8	-	-
Gosford pipeline in California	3.7	-	3.7	-
Northwest Alaskan tie-in facilities 4/	46.4	-	-	46.4
LNG vessels for Indonesia Gas 5/ (125,000 m^3)	6.0 each	-	-	-
	Total	41.4	66.2	46.4

1/ The primary energy cost associated with the LNG vessels and major California facilities used to transport the Pacific Indonesia gas is not included because this energy would be expended if the Pacific Indonesia Project were approved. Inclusion of this energy in the total figure would not allow a valid comparison of the alternatives.

2/ The primary energy cost for the gathering pipeline system in Alaska has been included in the figure for the Northwest Alaskan tie-in facilities.

3/ The primary energy cost of a 500 million cfd LNG regasification facility was used because there would probably be very little primary energy cost reduction for a 400 million cfd facility.

4/ No primary energy cost has been included for any modification to the existing natural gas system that might be needed south of Antioch, California.

5/ Assumes the new LNG vessels are constructed in the United States at costs comparable to the Pacific Alaska vessels. Six new LNG vessels and three existing foreign vessels may be used to transport the Pacific Indonesian gas.

6/ Pacific Gas and Electric Company and Southern California Gas Company, Pipeline Transportation Systems for Cook Inlet Gas, 1978.

The daily total operating energy costs of the Pacific Alaska project and the Northwest Alaskan Tie-in Alternative appear in Table G-2. Over a 20-year period the Pacific Alaska project's operating energy cost, including fuel gas for liquefaction, boil-off and fuel oil for LNG tanker engines, and fuel for electricity required in Alaska and California, would amount to 427.2 trillion Btu for an 87.4 percent delivery efficiency. The Northwest Alaskan Tie-in Alternative's 20-year operating energy cost in additional compressor fuel gas use would amount to 532.2 trillion Btu for an 83.3 percent delivery efficiency.

The Pacific Alaska LNG proposal is more efficient than the tie-in alternative on a total energy basis. Over a 20-year period, the Pacific Alaska LNG proposal would expend less energy to deliver gas to California regardless of whether or not the Pacific Indonesia project is constructed. See Table G-3. The LNG transportation system would deliver 299.8 trillion Btu's (295.7 million Mcf) more than the tie-in over this time period. The LNG transportation system has a total system efficiency that is better than that of the tie-in. Therefore, solely from a total energy cost standpoint, the Pacific Alaska proposal is a more efficient system for transporting Cook Inlet gas to California.

This analysis is based on a 48-inch diameter high pressure Northwest Alaskan pipeline system design carrying 2.4 billion cfd from Prudhoe Bay, Alaska, and 1.2 billion cfd of gas from Mackenzie Delta, Canada. 1/ The fuel penalty would be reduced if lower throughout volumes of gas are transported from Alaska and/or Canada. The Mackenzie Delta gas is not expected to flow until several years after Prudhoe Bay production and the fuel penalty associated with transporting the Cook Inlet volumes during this initial operating period would be reduced until the Mackenzie Delta gas comes on line.

1/ The Secretary of the Department of Energy has the authority to establish the final rated capacity of the U.S. portion of the Northwest Alaskan pipeline system. The Canadian National Energy Board has approved a 56-inch diameter, 1,080-psig pipeline system for its portion of the pipeline system. The applicant's study is based on a 1,440/1,680-psig 48-inch diameter pipeline with the 1,680-psig segment starting at Whitehorse, Yukon, the entry point for the Mackenzie Delta gas into the Northwest Alaskan pipeline system. The FERC staff has made its own independent study of the efficiency of the Tok Alternative and the results of that analysis are comparable to the information provided by the applicant.

TABLE G-2

OPERATING ENERGY COSTS FOR THE
PACIFIC ALASKA AND NORTHWEST ALASKAN TIE-IN ALTERNATIVES

	Pacific Alaska Proposal With Pacific Indonesia	Pacific Alaska Proposal Without Pacific Indonesia	Northwest Alaskan Tie-in Alternative
1. Total gas committed	449,000 million Btu/day (442,800 Mcfd) 1/	449,000 million Btu/day (442,800 Mcfd)	437,440 million Btu/day (431,400 Mcfd)
Operating Energy Costs 2/			
2. Fuel gas	43,400 million Btu/day	47,250 million Btu/day 5/	72,907 million Btu/day
3. Fuel oil 3/	4,180 million Btu/day	4,180 million Btu/day	-
4. Fuel for offsite electrical generation in Alaska 4/	6,400 million Btu/day	6,400 million Btu/day	-
5. Fuel for offsite electrical generation in California 4/	4,540 million Btu/day	-	-
6. Total (2 + 3 + 4 + 5)	58,520 million Btu/day	57,830 million Btu/day	72,907 million Btu/day
7. Gas delivered (1 - 2)	405,600 million Btu/day (400,000 Mcfd)	401,750 million Btu/day (396,200 Mcfd)	364,533 million Btu/day (359,500 Mcfd)
Delivery efficiency (percent) [7 ÷ (1 + 3 + 4 + 5)]	87.4	87.4	83.3

1/ This figure includes 431,400 Mcfd of interstate and 11,400 Mcfd of intrastate gas.

2/ Operating energy costs have been derived from information supplied by the applicant.

3/ LNG tanker Bunker-C fuel oil.

4/ Fuel used to generate electrical power requirements has been estimated from information contained in FERC Form 4 for Southern California Edison Company and the Chugach Electric Association, Inc.

5/ Includes natural gas used to fuel onsite electrical generation facilities in California.

TABLE G-3

TOTAL ENERGY COSTS OVER 20-YEAR PERIOD
FOR THE PACIFIC ALASKA AND NORTHWEST ALASKAN TIE-IN ALTERNATIVES

	Pacific Alaska Proposal With Pacific Indonesia (trillion Btu)	Pacific Alaska Proposal Without Pacific Indonesia (trillion Btu)	Northwest Alaskan Tie-in Alternative 1/ (trillion Btu)
1. Total primary energy cost	41.4	66.2	46.4
2. Total operating energy cost	427.2	422.2	532.2
3. Total energy expended by system (1 + 2)	468.6	488.4	578.8
4. Total energy delivered by system	2,960.9	2,932.8	2,661.1
5. Total energy (3 + 4)	3,429.5	3,421.2	3,239.9
6. Total system efficiency (4 ÷ 5)	86.3%	85.7%	82.1%

1/ This transportation system is compared on an incremental energy usage basis. All energy penalties have been totally assessed against the system, i.e., a rolled-in basis has not been used on the Northwest Alaskan pipeline and Western Leg.

APPENDIX H

CORRESPONDENCE WITH U.S. ARMY CORPS OF ENGINEERS, ALASKA DISTRICT

Page

OCT 14 1975

BNG/SOD-EES
Docket Nos. CP75-96 et al.
El Paso Alaska Company,
and CP75-140,
Pacific Alaska LNG
Company

Mr. Edward Curtis
U.S. Army Corps of Engineers
Planning Division
Post Office Box 7002
Anchorage, Alaska 99510

Dear Mr. Curtis:

This is to confirm your telephone conversation with Mr. Johnny French of the Environmental Evaluation Section (EES) on September 25, 1975. As Mr. French explained to you, this section of the Federal Power Commission (FPC) is interested in determining the feasibility of constructing LNG terminals in the Nikiski and Cape Starichkof areas of Cook Inlet, Alaska. This determination is necessary for the preparation of draft environmental impact statements (DEIS's) concerning the applications of El Paso Alaska Company (El Paso Alaska) in Docket No. CP75-96 and Pacific Alaska LNG Company (Pacific Alaska) in Docket No. CP75-140 for the construction of LNG facilities in south central Alaska.

Since it is vitally important that the EES be able to present to the Commission a professional evaluation of the navigation and dredging situations at Nikiski and Cape Starichkof, the staff would like to obtain a written summary of the information which you have already provided by telephone. This summary should include an evaluation of ice, currents, shoal areas, bottom characteristics, sediment movements, depths and widths of approach channels and anchorages, the location and suitability for dredging of any areas which would require dredging, and the biological sensitivity of these areas in relation to shipping and dredging activities. Most of the information would pertain to the safe, year-round operation of

LNG tankers. Vessel specifications given to the FPC by the applicants are as follows:

	Pacific Alaska	El Paso Alaska
Length:	989 feet	1002 feet
Beam:	136 feet	150 feet
Loaded Draft:	38 feet 3 inches	40 feet
LNG Capacity:	130,000 cubic meters	165,000 cubic meters
Propulsion:	100,000 horsepower	110,000 horsepower

Each ship would have twin screws, double steel hulls, and bow thrusters.

Due to the time limitations concerning the completion of the staff's DEIS's, it would be greatly appreciated if this information could be provided promptly.

If any difficulties arise in supplying this information, please contact Mr. Johnny French, Federal Power Commission, Environmental Evaluation Section, Room 6110; phone number (202) 275-4558.

Very truly yours,

Secretary

DEPARTMENT OF THE ARMY
ALASKA DISTRICT, CORPS OF ENGINEERS
P.O. BOX 7002
ANCHORAGE, ALASKA 99510

ATTENTION OF:
NPAEN-PR-R

20 October 1975

Mr. Kenneth F. Plumb
Federal Power Commission
Washington, D. C. 20426

Dear Mr. Plumb:

Reference: BNG/SOD-EES, Docket Nos. CP75-96 et al., El Paso Alaska Company, and CP75-140, Pacific Alaska LNG Company.

This is in reply to your 15 October letter to Mr. Edward Curtis of my staff requesting data on Cook Inlet, Alaska.

Under separate cover we are transmitting copies of our publications Final Environmental Impact Statement, Offshore Oil and Gas Development in Cook Inlet, and The Cook Inlet Environment, A Background Study of Available Knowledge.

The following summary is in response to specific questions enumerated in your letter:

a. Ice: Ice forms in Cook Inlet generally in late November, and has disappeared by early April. Ice found below the Forelands is carried there by wind and tide from upper Cook Inlet, or it comes from source areas on mudflats left exposed to freezing at low tide. Cook Inlet below the Forelands does not icelock, nor is ice generally any impediment to marine navigation (small craft the exception). Further, ice prevents no known use of commercial docks located along Cook Inlet in this area.

b. Currents: Because of prevailing southwesterly winds, shore currents induce a northward littoral drift along Cook Inlet in both terminal areas. Surface currents in the lower inlet reflect this movement, flowing north along the east inlet and returning southward to the west. Generally, with consistent winds for 48 or more hours, 3 to 4 knot currents can be expected.

c. Shoal Areas and Bottom Characteristics: Shoal areas are shown on C&GS Charts 8554 and 8553. In upper Cook Inlet above East Forelands, shoal areas contain glacial erratics of durable rock, sometimes to 20-foot diameter. In general, other than shoreline tidal flats, most shoals reflect durable cores of gravel or boulders, covered by a mantle of gravel, sand, or mud.

Bottom materials at both terminal sites are quite similar. Tide flats are exposed at low tides, showing a mantle of uniformly graded, fine silty sand. Little gravel is visible. Large boulder erratics lie just off the beaches. Nearshore areas may be tidal muds becoming more sandy at approximately 1,500 feet seaward. When excavated to 5 feet or more in depth, gravel and boulders are encountered.

d. Dredging: Materials in Cook Inlet have not been found resistant to dredging. Hopper/suction, cutter head, clamshell, and bucket dredges have been used successfully in the area. Rock outcroppings of the Kenai Formation (sandstone, coal, and siltstone) have been found soft to cut when encountered.

e. Sediments: Sediment movement in upper Cook Inlet is large, decreasing in volume to the south. Suspended sediments as large as 3,000 ppm are found north of East Foreland. Off the Nikiski site, they may be expected to range from 200 to 300 ppm. At Cape Stariski, the suspended sediment range may be as low as 30 ppm.

f. Approach and Anchorage: Data on approach channels and anchorages are as described in the current Coast Pilot.

g. Biological Sensitivity: See Final EIS, Offshore Oil and Gas Development, Cook Inlet.

h. Safe, Year-round Operation: We recommend you contact the Commander, 17th U.S. Coast Guard District, P.O. Box 3-5002, Juneau, Alaska 99802 (Telephone: 586-7297). We are, by copy of your letter and this correspondence, alerting the Coast Guard to your needs.

In the event you need further assistance, please do not hesitate to call me.

Sincerely yours,

2 Incl
As stated fwd sep

CHARLES A. DEBELIUS
Colonel, Corps of Engineers
District Engineer

BNG-SOD/EES
El Paso Alaska Company,
Docket No. CP75-96 et al.;
and Pacific Alaska LNG
Company,
Docket No. CP75-140

JAN 29 1976

Colonel Charles A. Debelius
District Engineer, Alaska District
U.S. Army Corps of Engineers
Post Office Box 7002
Anchorage, Alaska 99510

Dear Colonel Debelius,

The staff of the Federal Power Commission (FPC) is presently involved in the preparation of environmental impact statements concerning the construction of LNG liquefaction plants and marine terminals in south-central Alaska. In a letter from the FPC to the U.S. Army Corps of Engineers, dated October 15, 1975, the staff requested an evaluation of the navigation and dredging situations in the Nikiski and Cape Starichkof areas of Cook Inlet, Alaska. Subsequent to your response to that letter, the U.S. Coast Guard's opposition to the former site has led to an increased interest in the Cape Starichkof site. It is therefore requested that the Corps of Engineers provide, in as much detail as possible, the following information:

1) Provide any available background information on the frequency and magnitude of sea ice conditions at Cape Starichkof. Identify the frequency and duration of delays to LNG shipping activities which could reasonably be expected annually due to ice conditions.

2) Identify (preferably on a map more detailed than C&GS 8554) any existing channels which would enable 40-foot draft LNG vessels to use the terminal facilities identified on the attached map. If such channels

are not available, please identify potential channels and indicate specific areas which would require dredging and/or navigational marking. What volume of materials might have to be dredged initially? Quantify, to the extent possible, the volume, frequency, cost, and environmental impact of maintenance dredging in the terminal area.

3) Would the terminal facility and the 4,060-foot trestle shown on the attached map pose a navigational hazard to, or otherwise obstruct, existing shipping or other aquatic activities? In order to avoid the necessity of dredging, what length of trestle would be necessary? How much of an obstruction would such a trestle become?

4) Pacific Alaska LNG Company (Pacific Alaska) has proposed to build a portion of their LNG plant in modular form and to ship the modules by barge to Cook Inlet. In order to offload the modules and other cargo, Pacific Alaska has further proposed to construct a dock at Nikiski to accommodate 100 by 400-foot barges [1/] and to build a road up the bluff to the originally proposed Nikiski plant site. Would a similar construction dock and haul road be feasible at the Cape Starichkof site? How much dredging would be necessary to bring the barges within 125 feet of the high water mark on the beach at Cape Starichkof? Are there any existing docking facilities in the general area, such as at Homer or Kasilof, which might be used, with or without modification, to unload the barges? Are there any other locations in the general area which might be utilized to construct a new dock and haul road?

Responses to these questions will be used to assist the staff in its alternate LNG terminal site selection process. More detailed information concerning the El Paso Alaska Company proposal and the staff's site analysis can be found in the

---

1/ Pacific Alaska has not provided the staff with more specific information about the barges, such as the loaded draft of the barges, nor has the draft of tugs towing the barges been mentioned.

staff's "Alaska Natural Gas Transportation Systems Draft Environmental Impact Statement (DEIS)", issued in November 1975, a copy of which has already been sent to you for comment.

If any questions arise concerning this letter, please direct your inquiries to Mr. Johnny French, FPC, at (202) 275-4558. Your cooperation in this matter will be greatly appreciated.

Very truly yours,

Kenneth F. Plumb

Secretary

Attachment 1: Map of the Cape Starichkof Site

cc: Mr. Edward Curtis
U.S. Army Corps of Engineers
Planning Division
Post Office Box 7002
Anchorage, Alaska 99510

Mr. Robert Smith
U.S. Army Corps of Engineers
Planning Division
Post Office Box 7002
Anchorage, Alaska 99510

DEPARTMENT OF THE ARMY
ALASKA DISTRICT, CORPS OF ENGINEERS
P.O. BOX 7002
ANCHORAGE, ALASKA 99510

REPLY TO ATTENTION OF:
NPAEN-PR-R

24 February 1976

Mr. Kenneth F. Plumb
Federal Power Commission
Washington, D.C. 20426

Dear Mr. Plumb:

Reference: BNG-SOD/EES, Docket Nos. CP75-96 et al., El Paso Alaska Company; and CP75-140, Pacific Alaska LNG Company.

Your recent letter concerning the proposed Cape Starichkof terminal site addressed a broad spectrum of concerns, most of which could only be addressed subjectively with value judgments. As a result, rather than attempting to answer your questions in this letter, Mr. Robert G. Smith of my planning staff responded by telephone to Mr. French of your office on 4 February 1976.

Generally, the following high points were touched:

a. There is no known tabulation of statistical data on icing for Cook Inlet. The Navy Hydrographic Office is the best source of ice observation information known to us. Our subjective observations indicated that Cape Starichkof is near the southern limit of Cook Inlet floe ice, that surface coverage by ice should not exceed about 20 percent, and that no delays should occur to the size vessels under consideration.

b. There is no known hydrographic mapping of greater detail than US Coast and Geodetic Survey (USC&GS) Navigation Chart 8554. The boat sheets from which this chart was compiled should be at a larger scale and should be available through the USC&GS headquarters in the Washington, D.C. area. Because the terminal is found at the 10 fathom line and the general bottom to the seaward side and approaches is 9 to 10 fathoms, there should be no hindrance to 40-foot draft vessels at any tide stage. Simple two-light approach and departure would, of course, make navigation easier and safer. The terminal, as shown, should require no

dredging, either initially or for maintenance, as long as the approach structure is open and does not interrupt natural littoral transport (south to north) along the shore.

c. The terminal and approach would pose no hazard to deep draft navigation since the normal sea lane is several miles to the west. It would pose a constraint to masted fishing vessels, since they could not pass under the structure at higher tide stages and would thus have to detour to the seaward. This could be hazardous in foul weather. The trestle would interfere substantially with the drift net salmon fishery which is very active in this area.

d. The bluffs at the Cape Starichkof site are 100 to 200 feet high and of granular materials. There should be no technical difficulties in ramping a road to the beach. Because of the bluff heights, the cost should be considerably higher than for a similar road at Nikiski. A large dock should also pose little difficulty other than cost. Assuming a barge draft of no more than 20 feet, it would seem more practical to build the dock in water of that depth, with temporary earth ramp connection to the beach, than to attempt to dredge and maintain an approach channel to within 125 feet of the high water line. Minus 20 water depths should occur within 1000 to 1500 feet offshore. Similarly, loaded barges could be grounded at high tide and be within 100 to 200 yards of the high water mark when the tide receded, requiring only a small amount of bulldozer work to connect them with the road. It is assumed that the modules under discussion would be too large for normal highway transport and, thus, the use of a more remote landing would not be feasible.

e. The facility proposed is within a mile or two of the mouth of Stariski Creek which supports substantial runs of chinook and coho salmon and steelhead trout. This, in conjunction with the major interference with drift netting and some interference with beach set net sites, can be expected to result in considerable resistance from fishery agencies, fishermen, local land owners, and environmental interests.

The information and views presented in our 20 October 1975 letter to you on this subject remain valid. This matter is of considerable interest to the Corps of Engineers. I will be pleased to provide additional assistance wherever possible.

Sincerely yours,

CHARLES A. DEBELIUS
Colonel, Corps of Engineers
District Engineer

APPENDIX I

OPERATIONS GUIDE

NIKISKI MARINE TERMINAL COMPLEX

PREFACE

This booklet has been prepared by the NIKISKI MARINE TERMINAL SAFETY COMMITTEE to acquaint masters of vessels with the guide lines for operations at or near the Nikiski Marine Terminal Complex.

The information contained herein is believed to be accurate at the time of printing, but the COMMITTEE makes no warrantees nor assumes any responsibilities regarding it or any information which may appear in supplemental publications, additions, or corrections.

COMMITTEE MEMBERSHIP

FOR:
COLLIER CARBON & CHEMICAL COMPANY ..... Plant Manager
KENAI LNG CORPORATION (Phillips Dock) .. Plant Manager
KENAI PIPE LINE COMPANY ..... Terminal Manager
TESORO ALASKAN REFINERY ..... Plant Manager
PACIFIC ALASKA LNG ..... Manager of Public Relations
U.S. COAST GUARD, WESTERN ALASKA . Captain of the Port
SOUTHWEST ALASKA PILOTS ASSOCIATION ..... President of Association
ALASKA MARINE PILOTS ..... President

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OPERATIONS GUIDE - NIKISKI MARINE TERMINAL COMPLEX

OPERATIONS GUIDE

NIKISKI MARINE TERMINAL COMPLEX

I. SCOPE

This guide establishes volunteer procedures that are designed to optimize the safety of marine operations directly related to all marine terminals existing or currently planned for future installation in the Nikiski Area. The manual describes the function of the Operations Advisory System, Terminal Communications Systems, Procedures for Arrival, Mooring, Unmooring and Departure, emergency procedures and general safety requirements.

II. DESCRIPTION OF COMPLEX

The Nikiski Marine Terminal Complex includes the following:

A. Collier Carbon & Chemical Company Terminal is designed to load ships and barges with anhydrous ammonia and urea and to receive petroleum products for storage on shore.

B. Kenai LNG Corporation is designed specifically for loading LNG ships, but also is fitted for receipt or delivery of tanker cargo of petroleum products to or from the Tesoro Alaskan Refinery.

C. Kenai Pipe Line Company Terminal is designed to receive or deliver tanker cargoes of petroleum from or to the Kenai Pipe Line Terminal, Standard Oil Company of California Refinery, or the Tesoro Alaskan Refinery.

D. Rig Tenders Dock is a land-fill berth designed primarily to handle barges and small off-shore platform service vessels. It also serves as barge loading terminal for the Tesoro Alaskan Refinery.

E. In the near future, Pacific Alaskan LNG Company plans installation of an additional terminal to handle LNG tankers.

III. OPERATIONS ADVISORY SYSTEM

In order to provide accurate terminal traffic information that can be used by all parties having anything to do with ship movement to the terminal area, an operations advisory system is established.

A. Long Range

A printed forecast will be published each week showing anticipated vessel movement into the Nikiski Complex for the next two weeks. This forecast will show name of vessel, point of origin, destination terminal, and time anticipated at berth. It will be updated each Thursday and mailed to reach each recipient by the following Monday. The responsibility for preparing the schedule will be rotated between the Nikiski Terminal Operators.

The mailing list for this schedule is:

1. Collier Carbon & Chemical Company
2. Kenai LNG Corporation (Phillips Dock)
3. Tesoro Alaskan Refinery
4. Kenai Pipe Line Company
5. Pacific Alaska LNG
6. North Star Stevedore Company
7. U.S. Coast Guard, Anchorage
8. Pilots: Captain K. Collar, Sea Land Service Co.
   Captain W. L. Johnson, Alaska Marine Pilots
   Captain G. Robinson, Southwest Alaska Pilots Association
   Captain F. Buckler
9. Cook Inlet Pipe Line Company

B. Short Range

An oral advisory message center is established to provide immediate and current information on Terminal traffic. This information is available on a 24-hour basis on phone number (907) 776-8877. The message describes Terminal Traffic for the current day and the day following. The format of the message is shown on Appendix III.

To keep the message current, each terminal will call in before noon each day with new information for the following day. Also, corrections will be called in whenever they are received, so that the message has the best information available at all times.

IV. BERTHING PRIORITY

A. Priority of berthing at a specific wharf will be established by that Terminal Operator. This sequence will be established and conveyed to subject vessels well before they approach the Terminal area; e.g., before passing Anchor Point or before departing Drift River or Anchorage.

B. Priority for ships proceeding to different wharves will be established by mutual agreement between the masters and pilots of ships proceeding to the Terminal Area. This agreement will be reached by the time either of the vessels is within 10 miles of the Terminal.

C. Upon mutual consent the Marine Terminal Operators may impose an operational priority to over-ride the sequence established in B above. In this case, onshore plant operations would be dictating a sequence change that is necessary to prevent curtailment of operations. Instructions regarding such changes will be conveyed to vessels concerned prior to their approach to Anchor Point or departure from other Cook Inlet berths.

V. APPROACHING AND DEPARTING MARINE TERMINALS

A. All movement inside the priority area is governed by existing "Inland Rules of the Road".

B. Before arriving within 10 miles of the Terminal Complex, the incoming vessel will establish its intentions and determine the intentions of other vessels in the area by bridge-to-bridge communications.

C. An anchor may be used to assist with approach, but once moored the anchor should be weighed.

D. Summer rules shall apply during the ice-free periods. Each marine terminal will establish its own procedures that protect the safety of the vessel and other marine terminals.

E. Winter rules shall apply when there is free ice floating in the Inlet. The starting and ending date for winter rules will be established by the Nikiski Marine Terminal Safety Committee. Under these circumstances the following special rules shall apply.

1. Berth so as to stem the worst ice condition to be expected. Since the ice flow is heavier on the flood, this generally means the vessel should approach the wharf port-side to.

2. Where applicable, manipulate ballast and cargo to keep sea suction and propeller below the ice and keep trim to a minimum to prevent ice from sliding beneath the vessel.

3. No vessel will be permitted to proceed to berth that isn't equipped with sufficient mooring lines of good quality to provide a safe tie-up. In heavy ice conditions, it may be necessary to double or triple the normal mooring line requirements. It is the responsibility of each Terminal Operator to confirm this requirement in advance with shipping companies intending to use their facility. However, the Terminal

Operators are responsible to advise on ice conditions only and are not responsible for providing or causing to be provided adequate lines aboard ships.

F. Each Terminal is equipped (or soon will be) with VHF Channel 7A. The intent is that this channel be used for all communication with the individual terminals during arrival and departure maneuvers.

G. Each Terminal is also equipped with VHF Channel 10. The intent is that this channel be used for communications involving ship-to-shore loading/ discharge operations.

VI. AT BERTH

A. Ships, tugs and marine terminals will maintain a means of two-way voice communication between the person in charge of the transfer operation on the vessel/tug, barge and the marine terminal operator.

B. Under winter rules the ships must maintain the necessary watch in engine room and bridge to permit immediate maneuvering response and anchors will be ready for immediate use.

C. Under winter rules the Terminal will be prepared for immediate suspension of cargo operations and to cast off mooring lines. Under circumstances such as restricted visibility due to darkness or fog conditions, it may be necessary to proceed to a standby condition with cargo operations suspended and cargo systems disconnected in readiness for cast-off orders. The casting-off shall at all times be at the direction of the officer in charge of the vessel.

D. Under winter rules steam propulsion ships should take these special precautions:

1. Maintain sufficient ballast or cargo aboard so that sea suctions and propeller are below the level of any ice.

2. Provide an emergency supply of water or steam to the condensers so that any slush-ice taken in can be melted or flushed away immediately.

3. Establish precautions to insure that fuel does not freeze and that temperature is sufficient to provide immediate flow of fuel to all burners in the event of an emergency. This precaution includes the fuel supply for the emergency generators.

4. Keep steam flowing through steam drive equipment on deck.

E. Under winter rules vessels/tugs with internal combustion engines used as main propulsion units shall maintain such in immediate readiness for use:

1. Starting air to be peaked in all tanks.

2. Cooling water shall be heated and ready for circulation in main engine.

3. Lubricating oil for the main engine to be in readiness for service.

4. Fuel system on main engine to be purged and ready for instant use.

F. Except in an emergency, repairs that immobilize the ship shall not be undertaken while moored to the dock. When emergency repairs are needed they will be first authorized by the Manager of the shore facility and the Captain of the Port, USCG.

G. While a ship is at its wharf, each terminal will maintain a portable VHF unit equipped with Channel 7A at the wharf. This will be used to communicate emergency messages to other terminals as regards ship movements.

VII. DEPARTURE

A. Departure shall be timed so as to utilize the tide for maximum safety. Reasonable effort shall always be made to depart into the current.

B. When moored port side to and leaving during the ebb tide (or conversely when moored starboard side to and leaving during the flood tide) the current should be carefully considered so that the vessel is in good control and has adequate clearance when passing the berth immediately to the south (or north).

C. Approximately 30 minutes prior to its departure, and again at time of departure, the ship shall announce its intentions on VHF Channel 7A so that other ships and terminals in the area are alerted.

D. Care shall be taken in establishing estimated departure time (ETD). This is important as these times will be used by incoming or passing vessels in determining their best course to minimize hazard in their approach to the Terminal area.

PHONE NUMBERS AND RADIO FREQUENCIES

FACILITY	PHONE NUMBER	RADIO BAND	FREQ. KHz	CALL SIGN	MONITORED
PACIFIC ALASKA LNG CO.	278-9571	(future installation)			
COLLIER CARBON & CHEMICAL	776-8121	VHF Ch 7A			
		Ch 13			
		Ch 16	156.8	KM7551	working
KENAI LNG CORP (Phillips)	776-8166	VHF Ch 7A*			
		Ch 10	156.5		continuous
		Ch 16	156.8	KLT88	continuous
		SSB			
KENAI PIPE LINE COMPANY	776-8711	AM	2182	KBH-52	continuous
			2512		working
		SSB	4136.3	WSY22	continuous
			6210.4	")	
			8284.4	")	working
			12428.0	")	
		VHF Ch 7A*			
		Ch 10	156.5	WSY26	continuous
		Ch 16	156.8		continuous
NORTH STAR TERMINAL & STEVEDORE COMPANY	776-8222	VHF Ch 10	156.5	KTD75	continuous
TESORO ALASKAN REFINERY	776-8191	---	---	---	---
STANDARD OIL COMPANY OF CALIFORNIA - REFINERY	776-8161	---	---	---	---

*License applied for.

FACILITY	PHONE NUMBER	RADIO BAND	FREQ. KHz	CALL SIGN	MONITORED
ALASKA MARINE PILOTS Homer, Alaska	235-8526	VHF Ch 10	156.5	KTE21	continuously
		16	156.8	"	continuously
		AM	2182	"	continuously
			2152	"	
		SSB	4136.3	WKD34	continuously
			6210.4		
			8284.4		
			12428.0		
SOUTHWEST ALASKA PILOTS ASSOCIATION Homer, Alaska	235-8783	VHF Ch 10	156.5	WAB-917	continuously
		Ch 16	156.8	"	continuously
		SSB	8284.4mhz	"	0800-1200 M-F (AK)
			4136.3	"	1300-1700 M-F (AK)
			2182.0	"	
			2382.0	")	
			2512.0	")	
			2670.0	")	On request
			6210.4	")	
			8281.2	")	
		NOTE: Individual pilots have other VHF frequencies on their portable units.			
U.S. COAST GUARD Captain of the Port	265-5371	---	---	---	---
MARINE OPERATORS					
1. Nikishka Marine	Dial 100 & ask for Operator	VHF Ch 28		WSX-97	continuously
2. Diamond Ridge		VHF Ch 26		WAB-903	continuously

APPENDIX J

AIR POLLUTION EMISSION FACTORS AND STACK PARAMETERS

TABLE J-1

EMISSION FACTORS

Source	Operation	PM	SO_2	NO_x	HC	CO	Units	Reference
Construction--Nikiski	Diesel - 540 gal/day avg. 1,100 gal/day max.	13	27	370	37	225	lb/1000 gal	EPA Table 3.1.5-1 1/
	Gasoline - 175 gal/day avg. 350 gal/day max.	12	4.8	121.6	172	1,718	lb/1000 gal	EPA Tables 3.1.4-1, 3.1.4-13 (Assume 6 mi/gal)
Construction--Pt. Conception	Diesel - 1,700 gal/day avg. 3,400 gal/day max.	13	27	370	37	225	lb/1000 gal	EPA Table 3.1.5-1
	Gasoline - 225 gal/day avg. 450 gal/day max.	12	4.8	37	54	1,070	lb/1000 gal	EPA Table 3.1.4-1, 3.1.4-13 (Assume 6 mi/gal)
Gas Turbines--Nikiski	826 x 10^6 Btu/hr/train	.015	Neg 2/	.36-.77 3/	-	-	lb/10^6 Btu	Pacific Alaska response to staff's question No. 28 (9/78)
		-	-	99-210 3/	9	10	ppm	
Gas-Fired Vaporizers--Pt. Conception	233 x 10^6 Btu/hr (max)	-	-	0.10	-	-	lb/10^6 Btu	Western's response to staff's question No. 26 (1/6/78)
		5-15	Neg 2/	-	3	17	lb/10^6 cf	EPA Table 1.4-1 (Industrial)
Trim Heater--Pt. Conception	6.3 x 10^6 Btu/hr (max)	-	-	0.18	-	-	lb/10^6 Btu	Western's response to staff's question No. 26 (1/6/78)
		5-15	Neg 2/	-	3	17	lb/10^6 cf	EPA Table 1.4-1 (Industrial)
Standby Gas Turbines--Pt. Conception	35 mw (0.9 bcfd) 46 mw (1.3 bcfd)	0.02	Neg 2/	0.52-0.58	0.005	0.023	lb/10^6 Btu	Western's application to EPA (3/17/78)
LNG Tankers--Pt. Conception	Bunker Fuel:							
	Approach	2.8	22	10.6	0.8	0.1	lb/metric ton	Western's application to EPA (3/17/78)
	Berthing/Deberthing	3.3	22	12.0	0.6	0.3		
	Pumping	3.2	22	11.9	0.6	0.2		
	Hoteling	2.7	22	9.5	0.9	0		
	Departing	3.2	22	11.8	0.6	0.2		
	Boil-Off Gas (All Modes):	4.39	Neg	6.44	0.88	1.17	lb/metric ton	
LNG Tankers--Nikiski (Winter Operations)								Pacific Alaska's response to staff's question No. 28 (8/78)
	Bunker Fuel:							
	Approach	3.3	85.1	12.4	0.5	0.3		
	Berthing/Deberthing	4.0	81.5	13.6	0.3	0.6		
	Loading	4.4	85.1	14.2	0.2	0.7		
	Hoteling	3.7	85.1	13.2	0.4	0.5		
	Departing	11.5	85.1	16.4	0.3	1.7		
	Full (18 Knots)	15.11	85.1	17.0	0.5	1.9		
	Boil-Off Gas:							
	Full (18 Knots)	4.4	Neg	13.0	.9	1.2		
	Other Modes	4.4	Neg	6.6	.9	1.2		
Tug Assistance--Pt. Conception	Diesel (0.275% sulfur) 30 gal/hr	25	39	572	13	86	lb/1000 gal	FEIS, Sohio Project, Volume 4, Part 3 Revised Air Quality Appendix, April 1977
Transportation to Pt. Conception	50 round trips/day, 50 miles/round trip	0.3	0.1	1.9	1.1	16.8	grams/mile	South Coast Air Quality Management District, Air Quality Handbook For Environmental Impact Reports, Feb. 1977. Light-duty vehicles, 1980
Air Quality Benefits-California								
Gas (1,104 Btu/cf-avg.)		5-15	0.6	120-230	3	17	lb/10^6 cf	EPA Table 1.4-1 (Industrial)
Distillate Oil (0.25% S, 141,000 Btu/gal)		2	36	22	1	5	lb/10^3 gal	EPA (Supplement #7), Table 1.3-1 (Industrial)
Residual Oil (0.5% S, 150,000 Btu/gal)		8	79.5	60	1	5	lb/10^3 gal	Ibid.

1/ EPA, Compilation of Air Pollutant Emission Factors and Supplements 1-7, AP-42.

2/ Plant equipment would use unodorized plant gas with a negligible sulfur content.

3/ High NO_x emissions for liquefaction train 1 and low NO_x value reflect proposed NSPS on train 2.

TABLE J-2

EMISSIONS FROM ELECTRIC UTILITY REQUIREMENTS

Power Plant	Generation[1] (10^6 mwh)	Fuel[1] (10^6 bbl, 10^9 cf)	Emission Factors (lb/equivalent bbl)[2] PM	SO_2	NO_x	HC	CO	Emissions (lb/mwh)[3] PM	SO_2	NO_x	HC	CO
Southern California Edison Company												
Steam - Oil	35.23	56.95	0.300	2.80	1.37	0.110	0.12	0.486	4.536	2.219	0.178	0.194
Steam - Gas	8.64	82.56	0.015	0.005	0.79	0.053	0.09	0.026	0.009	1.367	0.092	0.156
Gas-Turbine - Oil	0.37	0.83	0.300	1.040	3.10	0.250	0.70	0.672	2.330	6.944	0.560	1.568
Gas-Turbine - Gas	0.59	6.63	0.084	0.005	2.48	0.250	0.70	0.171	0.010	5.034	0.508	1.421
Total	44.83	-	-	-	-	-	-	0.395	3.586	2.131	0.169	0.214
Chugach Electric Company - Bernice Lake Plant			Emission Factors ($lb/10^6$ cf)[4]					Emissions (lb/mwh)				
Gas-Turbine - Gas	0.076	1.73	14	5.2	413	42	115	0.318	0.118	9.395	0.995	2.616

1/ 1977 Annual Fuel Consumption and Power Generation Data submitted to the Energy Information Administration on Form 4, "Monthly Power Plant Report"

2/ Southern California Air Pollution Control District, Fuel Use and Emissions From Stationary Combustion Sources, July 1976.

3/ Emissions for gas usage based on 5,515 cf/bbl.

4/ EPA, Table 3.3.1-2.

TABLE J-3

STACK PARAMETERS

Source	Number of Stacks	Stack Height (ft)	Stack Diameter (ft)	Exhaust Temperature (°F)	Exhaust Velocity (ft/sec)	Exhaust Volume (ft^3/sec)	Reference
Liquefaction Train--Nikiski							Pacific Alaska's response to staff's question No. 28, 9/78
Turbine a	1	169	8.1 x 10.3	638	71.7	6,020	
Turbine b	1	165	8.1 x 10.3	660	87.8	7,372	
Turbine c	1	165	8.1 x 10.3	660	87.8	7,372	
Turbine d	1	169	5.0 x 8.1	648	77.9	3,191	
Gas-Fired Vaporizers--Pt. Conception	3	75	4.0	135	18.3	230	Western, New Source Review Application to EPA, March 1978
Trim Heater--Pt. Conception	1	50	1.5	400	19.6	34.7	Ibid.
LNG Tankers:							
Point Conception	2	125-150	4.0	330	see below	--	Ibid.
Nikiski	1	150	7	300	see below	--	Pacific Alaska response to staff's question No. 28, 8/78

Exhaust Velocity (ft/sec)	Point Conception	Nikiski (Winter)	Nikiski (Summer)
Approach	16.0	9.4	6.2
Berthing	26.5	13.2	11.0
Unloading	25.0	--	--
Loading	--	15.6	7.8
Hoteling	10.5	11.8	4.3
Deberthing	26.5	12.9	11.0
Departing	23.6	31.2	10.2
Service Speed	--	35.0	35.0

APPENDIX K

CULTURAL RESOURCES MITIGATION PROGRAM

To supplement the applicant's mitigation measures, the FERC staff proposes a phased program for identifying historic and prehistoric sites and for mitigating impact. So that the program is adequately coordinated to ensure reliable, comparable, and scientifically valid results, the staff recommends that the applicant employ a single entity or institution to direct the program and to manage the overall operations; options include having the entire sequence of work conducted under the direction of the Departmental Consulting Archaeologist within the U.S. Department of the Interior (DOI), the Office of the Alaska State Archaeologist, or the Alaska State Historic Preservation Officer. The staff believes that such direction could greatly reduce the paperwork and time involved in procedural compliance with state and Federal laws. The applicant should file copies of the proposed preservation and salvage program with the FERC, the Alaska State Historic Preservation Officer, the Interagency Archaeological Services Division of the National Park Service, and the Advisory Council on Historic Preservation prior to the commencement of the program.

The applicant should allocate sufficient funds for this program and allow a reasonable period of time for the execution of its components, including adequate surveys, excavations, analyses, and publication of results. The program would cover the terminal site, pipeline right-of-way, and all other areas affected by construction activities. It would employ the services of qualified archaeologists, historians, and other relevant specialists and would be made in full consultation with the Alaska State Historic Preservation Officer and State Archaeologist at all phases and the Interagency Archaeological Services Division of DOI and the Advisory Council on Historic Preservation, as appropriate. The program would also allow for archaeologists to accompany construction crews through areas of high site probability to identify resources that may have been overlooked previously.

For large projects such as the Pacific Alaska LNG proposal, phased investigations under the direction of a single project director offer several advantages over the older salvage procedures. A phased approach would identify the significant sites early and develop alternative mitigating solutions. The goals of the phased program are to preserve sites by avoiding them or by using some other mitigating measure short of expensive and time-consuming salvage excavations. Phased programs are also better integrated into construction schedules and can accomplish the goals of preservation more cheaply and without delays to the project. In some situations, the

phases may overlap or be combined. The following describes the type of program that should be implemented for the Pacific Alaska LNG project.

A preliminary assessment, the first phase, consists of gathering background information on local history and prehistory through a survey of published literature, archives, site files, and knowledgeable professionals and amateurs. The purpose of a preliminary assessment is to determine factors useful in predicting the locations of sites and to identify regional research problems for use in developing a research design. Information already compiled by the applicant may be sufficient to meet these purposes.

The development of an adequate research design is crucial, since this is the plan used to guide the subsequent surveys and mitigation efforts. Legitimate research problems expressed in the research design would provide a framework for evaluating the significance of discovered sites and determining appropriate mitigating measures. Sites that are significant are usually ones that meet the criteria of eligibility outlined in Title 36 CFR Part 800.10.

During Phase II, the reconnaissance survey, the preliminary model for locating sites and the efficacy of the research design would be tested through small-scale surveys of the proposed pipeline route. The areas to be surveyed would use some form of random sampling strategy to establish survey locations and could include sample areas outside the proposed right-of-way. The reconnaissance should produce a more accurate model for predicting the distribution and nature of sites along the route. The refined model could then be used to plan an alignment that would avoid areas of known site concentration or with high probabilities of sites, as well as bypass areas likely to contain significant sites. Based on this reconnaissance, some preliminary mitigation plans could also be developed. For example, where economic or engineering requirements prevented shifting the alignment, the reconnaissance would indicate the quantity and quality of sites expected at that location. Through the research design, the reconnaissance would develop information for assessing the scope of work and the level of effort and techniques of search appropriate to different localities. These measures would allow the applicant to accurately estimate the cost of mitigation in both time and money and to analyze feasible alternatives.

Once the final locations of all project facilities had been determined, Phase III, an intensive field survey of the impacted areas, would be conducted. Using the research design and the predictive model developed and refined in the first two phases, the intensive survey should locate sites within

the areas of impact, evaluate the significance of these sites, and develop detailed impact mitigation alternatives. The intensive survey should encompass an area wide enough to allow for late alterations to the alignment. It should also permit investigation of alternatives that would avoid sites found in the proposed right-of-way. Determinations of site significance and mitigating measures would be developed in consultation with the SHPO's. The results of the intensive survey should allow the program director to determine the eligibility of sites for inclusion in the National Register and to identify probable impact and feasible mitigation alternatives. Guidelines for the level of documentation to accompany requests for determinations of eligibility are in the Federal Register, Volume 42, Number 183, pp. 47666-47669, September 21, 1977.

Phase IV, evaluation and consultation, would be required where sites listed on or eligible for listing on the National Register of Historic Places would be impacted. This could entail additional testing and evaluation of sites of undetermined significance and would require consultation with the Advisory Council on Historic Preservation, the SHPO, and the Department of the Interior, pursuant to Section 106 of the National Historic Preservation Act and 36 CFR Part 800.4. However, to avoid delays in construction resulting from consultation with the above agencies, the program director could develop criteria that would limit full consultation to those cases involving outstanding sites. Impacted sites with the following characteristics should invoke the full review process of 36 CFR Part 800.4; others not possessing these characteristics would be handled locally by the program director and the SHPO:

1. The property has significant potential as an exhibit in place for public understanding and enjoyment.

2. Archaeological or architectural recording technology is not sufficiently developed to insure that the scientific or architectural data contained in the property can be adequately retrieved.

3. The applicant is unwilling to provide a reasonable amount of time and funds to insure that adequate data recovery can be accomplished.

4. The program director, after consultation with the SHPO, believes that substantial public controversy is likely to develop if data recovery is undertaken at the property.

Phase V would implement the mitigation alternatives developed during the earlier phases. Salvage excavations would take place at those sites where impact would be direct and where other mitigation alternatives--avoidance, for example--are not prudent or feasible. Optional mitigation methods short of salvage should be fully explored, in part because salvage is very expensive and time-consuming, but more importantly because other options might allow the site to remain intact. Mitigation decisions should be made in consultation with the SHPO's and, if necessary, the Advisory Council. (See Phase IV.) Salvage excavation would require that the data recovered be fully analyzed, that the results be published, and should satisfy the Department of the Interior's proposed 36 CFR 66, "Recovery of . . . Data . . ." (in the Federal Register, Vol. 42, No. 19, pp. 5374-5377, January 28, 1977).

The staff recommends that at the conclusion of the intensive survey, the program director issue a report on the results of the survey and the decisions reached on mitigation of possible impact. This report should be submitted for review to the Advisory Council on Historic Preservation, DOI and other appropriate agencies. At the conclusion of the preservation and salvage program, a final report should be published covering the entire program and its findings. Copies should be sent to the appropriate state and Federal agencies and to local universities and museums. Artifacts recovered from Federal lands and non-Federal lands should be disposed of only after a thorough analysis and as agreed upon by the program director and the land manager or landowner.

FACTORS FOR CONVERTING ENGLISH UNITS TO METRIC UNITS

Multiply English Units	By	To Obtain Metric Units
	Length	
inches (in)	25.4	millimeters (mm)
	.0254	meters (m)
feet (ft)	.3048	meters (m)
yards (yd)	.9144	meters (m)
rods	5.0292	meters (m)
miles (mi)	1.609	kilometers (km)
	Area	
acres	4047	square meters (m^2)
	.4047	hectares (ha)
	.004047	square kilometers (km^2)
square miles	2.590	square kilometers (km^2)
	Volume	
fluid ounces	29.6	milliliters (ml)
gallons (gal)	3.785	liters (l)
	3.785×10^{-3}	cubic meters (m^3)
million gallons (10^6 gal)	3785	cubic meters (m^3)
barrels (bbls)	.159	cubic meters (m^3)
cubic feet (ft^3)	.02832	cubic meters (m^3)
cfs-day (ft^3/s-day)	2447	cubic meters (m^3)
acre-feet (acre-ft)	1233	cubic meters (m^3)
	1.233×10^{-6}	cubic kilometers (km^3)
	Flow	
cubic feet per second (ft^3/s)	28.32	liters per second (l/s)
	.02832	cubic meters per second (m^3/s)
gallons per minute (gpm)	.06309	liters per second (l/s)
	6.309×10^{-5}	cubic meters per second (m^3/s)
	Weight	
grains	64.8	milligrams (mg)
ounces (oz)	28.35	grams (gr)
pounds (lb)	.4536	kilograms (kg)
tons (short)	.9072	tons (metric)

PROPERTIES OF METHANE

Property	Value
Molecular Weight	16.04
Gas Gravity (air=1.000)	0.555
Critical Temperature, °F	-116.5
°C	- 82.5
Critical Pressure, psia	673.1
atmospheres	45.8
Liquid Gravity (water = 1.00)	0.44
Atmospheric Boiling Point,	
°F	-258.7
°C	-161.5
Liquid Density @BP, lb/cf	26.5
lb/gal.	3.53
gm/l	415
Gas Density @BP, lb/cf	0.11
gm/l	1.8
Gas Density @0°C, lb/cf	0.045
gm/l	0.72
Gas Density @STP, lb/cf	0.042
gm/l	0.68
Density = Air @STP, °F	-155
°C	-104
SCF gas/cf liquid @BP	630
/lb	24
/gal.	85
Heat of Vaporization,	
Btu/lb	220-248
cal/gm	122-138
Sensible Heat to 70°F, Btu/lb	166
cal/gm	93
Heat Content, Btu/lb	24,000
K-cal/gm	13.27
Spontaneous Ignition, °F	999
°C	537
Laminar Burning Vel. ft/sec	1.28
cm/sec	39
Minimum Ignition Energy,	
milli - joules	0.3
Fraction Combustion	
Heat Radiated	0.23
Flammable Range w/Air, %	5-15

THREATENED OR ENDANGERED PLANT SPECIES OCCURRING IN THE PROJECT VICINITY

SPECIES	WHERE FOUND IN PROJECT AREA 1/	HABITAT	PLANT COMMUNITY	STATUS STATE 2/	STATUS FEDERAL 3/	COMMENTS
Atriplex vallicola	K, SLO: Painted Rock	flats, dried rainpools	valley grassland	E_2	T	probably common Carrizo Plain s. of Soda Lake
Atriplex tularensis	K	alkaline plains, sinks	valley grassland	PE	E	Bakersfield area, Last reported 1921
Chorizanthe Blakeyi	SB	Sierra Madre Mts.	probably Foothill woodland	R_1	T	
Chorizanthe Breweri	SLO, SB: Lompoc	serpentine outcrops	chaparral, Foothill woodland	R_2		
Chorizanthe insignis	SLO	open sand	Foothill woodland	E_2		La Panza Mts. to Carrizo Plain
Cirsium loncholepis	SLO, SB: Sisquoc	sandy places, Moisthollows among dunes	coastal strand	E_2	E	
Cirsium crsssicaule	K: Tupman	sloughs, canal banks wet places in fields	valley grassland	E_2	T	near Buena Vista Lake
Cirsium rhotohopilum	SLO, SB: Point Conception	shifting dunes	coastal strand	E_2	E	
Cordylanthus mollis var. hispidus	K	alkaline places	valley grassland	E_2	T	
Dicentra ochroleuca	SLO,SB	Santa Ynez Mts.	chaparral	E_2	E	below 3,000 feet
Eriodictyon capitatum	SB: Point Conception	brushy slopes, ridges; W. Santa Ynez Mts.	chaparral	E_2	E	up to 1,000 feet found 1.5 miles N of site
Eriogonum gossypinum	SLO, K: Mouth-of-Kern, Taft Fellows, Panorama Hills	dry gravelly slopes, sandy places below 3,000 ft.	valley grassland	E_2	T	Temblor foothills; Panorama Hills near Crocker grade
Perideridia Pringlei	SLO, SB, K	open slopes, canyons 1,000 to 3,000 ft.	coastal sage, chaparral	E_2		abundant near summits of Caliente Mts.
Pholisma arenarium	SLO, SB	sandy places on shrub roots	coastal strand	E_2		parasitic herb
Sanicula Hoffmanii	SLO, SB	shady places, serpentine	coastal sage	E_2		
Scrophularia atrata	SB: Sacate, Lompoc Hills	dry, rocky places on coast, sandy woodland	coastal sage, chaparral	E_2	T	found on terminal site, mainly west half.
Thermopsis macrophylla var. agnina	SB	open places, Santa Ynez Mts.	Foothill woodland	E_2	T	

References: (a) California Native Plant Society (1974)
(b) Munz and Keck (1968)
(c) Hoover (1970)
(f) Smith (1974)

1/ K - Kern County
SLO - San Luis Obispo County
SB - Santa Barbara County
other names refer to U.S.G.S. 7 1/2-minute topographic quadrangles in project area where plant has been reported.

2/ California Native Plant Society (1974)
R_1 - Rare; potential for extinction presently low due to relatively wide distribution
R_2 - Rare; found in several populations or one extended population
E_2 - Endangered in part
PE - Possibly extinct
all species listed are endemic to California

3/ U.S. Fish and Wildlife Service (1975 and 1976)
E - Endangered
T - Threatened
Proposed classifications; status not officially designated for any of these plants.

APPENDIX O

BEFORE THE NATIVE AMERICAN HERITAGE COMMISSION

STATE OF CALIFORNIA

Investigation on the Commission's Own Motion Into the Matter of the Adoption of Regulations Governing the Safety and Construction of a Liquefied Natural Gas Terminal in the State of California	O.I.I. No. 1
In the Matter of the Application of Western LNG Terminal Associates, a General Partnership, and of a Joint Application of Western LNG Terminal Associates, Pacific Gas and Electric Company and Pacific Lighting Service Company, California Corporations, for a Permit Authorizing the Construction and Operation of an LNG Terminal Pursuant to Sections 550 et seq. of the Public Utilities Code.	Application No. 57626 FINDINGS OF THE NATIVE AMERICAN HERITAGE COMMISSION

WHEREAS, Native American organizations, tribes, groups, and individuals have advised the Commission that proposed actions by the California Public Utilites Commission (CPUC) in connection with the above entitled matters may cause severe and irreparable damage to Native American religious, spiritual, cultural, and social resources at Point Conception and the Little Cojo Bay; and

WHEREAS, since being advised of these potentially damaging actions, the Native American Heritage Commission (NAHC) has and will continue to carry out its mandate to protect and preserve Native American religious and cultural places, Public Resources Code 5097.9 et seq., in particular by having engaged in the following activities:

1. Summer of 1977: On site visit to Point Conception by Commissioner Ed Castillo and staff, in company with local Indian community representatives, CPUC staff, and Santa Barbara County environmental staff;

2. January 27, 1978: Suggestion by Commission to CPUC that specific site references in Final EIR be deleted to protect religious and cultural sites from disturbance;

3. February, 1978: NAHC staff met with CPUC environmental analyst Susan Landon to critique Cultural Resources Technical Report No. 8;

4. March, 1978: NAHC staff met with CPUC archaeological consultant Chester King to critique Cultural Resources Technical Report No. 8;

5. March, 1978: NAHC made responsive comments to Point Conception strategy outline submitted by Lee Dixon from Santa Barbara Indian Center;

6. April 11, 1978: NAHC staff informed CPUC that Cultural Resources Technical Report No. 8 was inadequate because there was insufficient consultation with knowledgeable California Indians concerning religiously significant areas and that Report No. 8 failed to include sufficient ethnographic research and reports;

7. May 12, 1978: After being apprised of trenching activities at the site, the NAHC interceded with the CPUC to achieve the following results:

a. CPUC ordered an immediate stop to all trenching

b. CPUC Legal Counsel and staff immediately went to the site to participate in negotiations;

8. May 18, 1978: NAHC staff testified at Coastal Commission hearing in Los Angeles that further consultation with the local Indian community was necessary, pertaining to religious and spiritual use of the site;

9. June-July, 1978: Intermittent on-site advising and monitoring of the spiritual encampment by NAHC staff with local Native American groups and individuals;

10. July 8, 1978: The full Native American Heritage Commission visited the site and spiritual encampment; and

WHEREAS, although the preferred treatment of cultural and artifactual resources is preservation, that under circumstances of necessity cultural values can be mitigated to some extent by proper techniques. However, since religious and spiritual values are tied directly to the physical characteristics of a site in its natural state, these religious and spiritual values cannot be mitigated when a site is disturbed or its character altered; and

WHEREAS, this matter came for hearing before the Native American Heritage Commission of the State of California (the Commission) on July 8, 1978, at Santa Barbara, California. Oral and documentary evidence was introduced and the hearing was closed.

NOW THEREFORE, pursuant to the authority vested in it under Public Resources Code Section 5097.9 et seq. the Commission hereby finds and declares that:

1. The area immediately surrounding Point Conception has had religious and spiritual significance since time immemorial; it is revered by the Chumash people as the WESTERN DOOR through which the souls of their people must pass to the afterworld, and through which

their souls must return to renew life again on this Earth; the sacred quality of this site is supported by anthropological reports and data, and by both Indian and academic communities.

2. The area surrounding Little Cojo Bay, approximately two miles southeast of Point Conception, is archaeologically and socially significant as manifested by exceptionally intact prehistoric cultural remains, burial sites, and related features.

3. The religion and culture of the Chumash people were adversely affected during the Spanish, Mexican, and American occupation of California, and have suffered further harm since statehood.

4. There has been a religious, spiritual, and cultural renaissance occurring at Point Conception and Little Cojo Bay, accompanied by a strong desire by local Chumash people and other Native Americans to renew religious, spiritual, and cultural activities at the Point Conception site.

5. Exceptionally intact cultural and archaeological resources at Little Cojo Bay contain a unique portion of the only surviving, undisturbed record of Native American people that lived in the area prior to European contact; these resources have the potential of yielding information significant to understanding the history of these people.

6. The CPUC's Draft EIR for the Point Conception LNG project, January, 1978 (Cultural Resources Technical Report No. 8) fails to adequately address the potential impact of the project on Native American historic, religious, cultural, and social resources at Point Conception and Little Cojo Bay in that the Draft EIR does not include ethnographic research and reports and/or consultation with knowledgeable members of the local Indian

community. Any Final EIR must include a thorough ethnographic research effort and report.

7. The Commission staff and the Office of the Attorney General are authorized to take all action necessary to safeguard the religious, social, cultural, and historic resources at Point Conception and Little Cojo Bay, including but not limited to litigation.

AGENCIES AND THEIR JURISDICTIONS
LNG TERMINAL AND SHIPPING

Agency	Jurisdiction, Statutes, Codes
Federal	
Army Corps of Engineers	-Approves construction of dock facilities, dredging, and pipeline crossings of navigable waters--River and Harbor Act of 1899, Section 10. -Receives required certification from states to insure compliance with state plans for land and water use programs for coastal waters and shorelines--33 CFR, Section 209.120.
Department of Agriculture (Mineral Lands Leasing Act)	-Issues permits for right-of-way through National Forest and for road construction. Controls construction practices.
Department of the Interior	-Approves temporary use of right-of-way on federally owned land. -Reviews impact on environment.
Department of Transportation Office of Pipeline Safety	-Approves design and operations of gas pipelines.
U.S. Coast Guard	-Approves design and operations of dock facilities; approves vessel operations, regulates safe shipping practices - Dangerous Cargo Act; Ports and Waterways Safety Act. Issues permits for pipeline crossings of navigable waters (33 CFR 115); Approves the design and operations of private aids to navigation (33 CFR 66); Regulates oil transfer operations (33 CFR 154-156); Regulates safe shipping practices (33 CFR 126).

Agency	Jurisdiction, Statutes, Codes
Environmental Protection Agency	-Issues permits for wastewater discharges--Federal Water Pollution Control Act.
	-Reviews air, water, and noise impact on environment--NEPA 1969, Clean Air Act, Noise Control Act.
Federal Communications Commission	-Certifies all communication equipment. Issues permits for radio towers.
Federal Aviation Administration	-Reviews terminal designs to determine if hazard to aviation would be created.
Federal Energy Regulatory Commission	-Approves construction or operation of any pipeline or related facility for the transport of natural gas in interstate commerce--Section 7(c), Natural Gas Act, Title 18 CFR.
Occupational Safety and Health Administration Department of Labor	-Approves facility if in compliance with OSHA regulations.
U.S. Public Health Service	-Issues certificates after reviewing design plans which relate to sanitation features and construction, prevention of communicable diseases, and deratization of the ship.
State	
California Coastal Commission	-Issues permits for soil test borings, plant siting, and construction.
California Public Utilities Commission	-Issues permit to construct and operate an LNG terminal.
California Regional Water Quality Control Board	-Issues discharge permit for hydrostatic test water, treatment plant effluent, and cooled seawater discharge.

Agency	Jurisdiction, Statutes, Codes
Department of Fish and Wildlife	-Issues permits for changing, obstructing, or diverting any river or stream.
Division of Highways-State of California	-Issues permits for road access, road arrangement, and entrance.
Division of Industrial Safety-State of California	-Issues Industrial Safety Permits (for excavation and buildings) and State of California OSHA compliance permits.
The Resources Agency	-Issues permits and easements for electric, gas, water, sewer, telephone, and utility lines on state land.
State Lands Commission	-Issues permits for geological and geophysical surveys.
State Land Division	-Approves purchase/lease of state lands.
Local	
Santa Barbara County Air Pollution Control District	-Issues permits to construct and operate.
Santa Barbara County Building and Safety Department	-Issues permit to construct.
Santa Barbara County Fire Department	-Approves fire protection systems.
Santa Barbara County Fire Prevention Association	-Issues burning permits.
Santa Barbara County Planning Department	-Holds public hearing, issues zoning changes and special land use permits for facilities.
Santa Barbara County Public Works Department	-Issues permits for location of telephone or electric power lines.
San Luis Obispo, Kern, Los Angeles, and San Bernardino Counties	-Issues pipeline construction clearances.

Agency	Jurisdiction, Statutes, Code
U.S. Department of the Interior	- Approves temporary use of right-of-way on federally owned land.
	- Reviews impacts on environment.
U.S Public Health Service	- Issues certificates after reviewing design plans which relate to sanitation features, construction prevention of communicable diseases, and deratization of the ship.
State of Alaska	
Alaska Pipeline Commission	- Issues certificates of public convenience and necessity to the extent not preempted by the Federal Power Commission.
Department of Environmental Conservation	- Issues permits to apply surface oil for dust control or road compacting.
	- Issues permits for archaeological approval of construction area.
	- Issues permits for waste disposal discharges into state waters.
	- Issues permits for construction or operation of sewage treatment facilities.
	- Issues permits for open burning.
	- Issues permits for operation in areas involving potential ice fog.
	- Issues permits for solid waste management.
	- Certifies reasonable assurance of compliance with Federal Water Pollution Act.
	- Issues permits for subsurface wastewater discharge.

Agency	Jurisdiction, Statutes, Codes
Department of Environmental Conservation (cont.)	- Issues permits for sludge disposal.
	- Issues permits for use of certain pesticides.
	- Issues operations permits for industrial process involving certain types of air quality emissions.
Department of Fish and Game	- Issues permits for use of explosives.
	- Approves construction in resource management area.
	- Approves crossing, use, obstruction, or diversion of any river, stream, or lake.
	- Issues permits for interference with salmon spawning streams or areas.
Department of Health and Social Services	- Approves installation or operation of public water systems; 7AAC 14.00.
Department of Highways	- Issues permits or easements for secondary roads, ditches.
Department of Natural Resources, Division of Lands	- Issues right-of-way easements or permits for secondary roads, ditches, pipelines, and other uses; 11 AAC 58.200.
	- Issues permits for special material use.
	- Issues permits for special land use; 11 AAC 58.210.
	- Issues permits for appropriation of groundwater; 11 AAC 72.050.
Department of Public Safety	- Administers regulations which relate to fire prevention and control during construction; AS 18.70.050.

Agency	Jurisdiction, Statutes, Codes
Division of Marine and Coastal Zone Management	- Requires a certificate of compliance with the Coastal Zone Management Act.
Other Alaska Administrative Code Requirements	- Issues permits to use explosives; 11 AAC 12.190.
	- Issues tidelands right-of-way easement permits; 11 AAC 62.810.
Local	
Kenai Peninsula Borough	- Approves site for a liquefaction facility.
	- Issues various building permits.
Matanuska-Susitna Borough	- Approves gas pipeline ROW easements.
Moquawkie Indian Reservation	- Issues ROW easements or permits for secondary roads, ditches, pipelines, and other uses.

APPENDIX Q

STANDARDS APPLICABLE TO THE CONSTRUCTION AND OPERATION OF THE PROPOSED LNG PLANT AND MARINE TERMINAL

LNG Terminal

1) American Association of State Highway Officials.

2) American Concrete Institute--Specifications for structural and reinforced concrete construction.

3) American Gas Association, AGA Gas Engineers Handbook--Purging.

4) American Institute of Steel Construction.

5) American National Standards Institute--Various standards in Civil Engineering, Lighting, Instrumentation, Mechanical Engineering, Noise, Sanitation, Materials Handling.

6) American Petroleum Institute (API)--API std. 620, Appendix Q, 1973 and others.

7) American Society for Testing and Materials--Concrete and structural steel standards.

8) American Society of Civil Engineers--Wind Forces.

9) American Society of Mechanical Engineers--Pressure Vessels.

10) American Waterworks Association.

11) American Welding Society--Structural Welding Code.

12) Diesel Engine Manufacturers Association.

13) Hydraulic Institute Standards--Pump Standards 1969.

14) National Board of Firefighting Underwriters.

15) National Electrical Code 1978.

16) National Fire Protection Association (NFPA)--NFPA No. 10 (1972), Installation of Portable Fire Extinguishers.

17) NFPA No. 30--Flammable and Combustible Liquids Code.

18) NFPA No. 59A-1975--Storage and Handling of LNG.

19) NFPA No. 70-1971--National Electrical Code.

20) NFPA No. 77-1972--Static Electricity.

21) NFPA No. 78--Lightning Protection Code.

22) NFPA No. 87-1971--Piers and Wharves.

23) NFPA No. 90A-1972--Air Conditioning and Ventilating Systems.

24) NFPA No. 194-1968--Screw Threads for Fire Hose Couplings.

25) NFPA No. 196-1972--Fire Hose.

26) Occupational Safety and Health Act--Title 29 CFR, Parts 1910, 1910.23, and 1926.

27) Title 49 CFR--Part 192, Amendment 192-10, Liquefied Natural Gas Systems, and Part 192, Safety Standards for Transport of Natural Gas by Pipeline.

28) Uniform Building Code--Zone 3, 1976.

29) USCG Regulation--CFR Title 33, Security of Vessels and Waterfront Facilities.

APPENDIX R

CATEGORIES OF FACILITY COMPONENTS FOR SEISMIC DESIGN

Category 1: All structures necessary to ensure public safety and/or necessary for safe shutdown or fire protection of the facilities. Category 1 structures, components, and systems shall maintain their safety function during and following the Contingency Level Earthquake 1/ and will also meet the Reliability Level Earthquake 2/ and Uniform Building Code design loads.

Category 1 Facilities:

1. Fire protection systems
2. Fire and leak detection systems
3. Shutdown system
4. Vent and relief system
5. Uninterruptible power system
6. Diesel driven power generator (dock and plant)
7. Emergency lighting
8. Radio communications system
9. LNG storage tank containment dikes

Category 2: All non-Category 1 structures which are essential to continued operation of the facilities. Category 2 structures, components, and systems shall maintain their operational function following the Reliability Level Earthquake and will also meet the Uniform Building Code design loads.

1/ Contingency Level Earthquake - Largest earthquake that appears reasonably capable of occurring in the site area. Defined on the basis of a mean recurrence rate of one event per 10,000 years.

2/ Reliability Level Earthquake - Arbitrarily chosen as being the earthquake producing a design ground motion acceleration of one-half of that for the contingency level earthquake. The mean recurrence rate is approximately 100 years.

Category 2 Facilities:

1. LNG storage tanks
2. LNG storage tank foundations
3. Marine trestle and dock
4. LNG unloading and transfer system
5. Control building
6. Fire station/warehouse
7. Power generation system
8. Substation buildings
9. Electrical distribution systems
10. Standby plant lighting
11. Vapor compression system
12. LNG sendout system
13. Instrument and utility air system
14. Main control panel and components
15. Seawater supply and return system
16. Nitrogen systems

Category 3: All structures which are not included in Categories 1 or 2. Category 3 structures, components, and systems shall be designed in accordance with the provisions of the Uniform Building Code (UBC), Volume I, 1976 Edition, Section 2312.

Category 3 Facilities:

1. Incoming electrical power systems including switchyard
2. Normal plant lighting system
3. Dock service equipment
4. Bunker fuel system

5. Diesel fuel system
6. Administration building
7. Waste treatment building

APPENDIX S

ENERGY CONSERVATION

When alternatives to a proposed energy supply project are considered, attention is focused primarily on different sites for the same project, substitute sources of energy supply, and the consequences of doing nothing. The alternative of reducing energy demand through conservation has not always been adequately considered. However, if conservation efforts could reduce gas demand in California by the 900 million cfd proposed in the project, conservation would be a feasible alternative to the proposed importation of LNG.

Between 1975 and 1978, the State of California adopted standards to promote energy efficiency in commercial and residential building construction and in appliances. These standards regulate the amount of insulation, heat retention, and fuel efficiency required before a building or appliance can be sold. In addition, a set of voluntary measures to improve the energy efficiency of existing buildings and appliances was approved. These measures included wall and ceiling insulation, retrofitting existing water and space heating systems in residences and auditing energy use in the commercial and industrial sectors.

Recent studies by the California Public Utilities Commission (CPUC), the California Energy Resources Conservation and Development Commission (CERCDC), and Resource Planning Associates, Inc. (RPA) have estimated the potential gas savings attributable to these mandatory and voluntary conservation standards for the years 1978-1990. 1/ It should be noted that wide variations exist among their estimates of conservable gas. The projected reductions in gas demand from conservation are summarized in Figure S-1. It can be seen that in 1985, estimates of conservable gas range from approximately 410 million cfd to 760 million cfd. These figures represent approximately 46

1/ The three studies are:

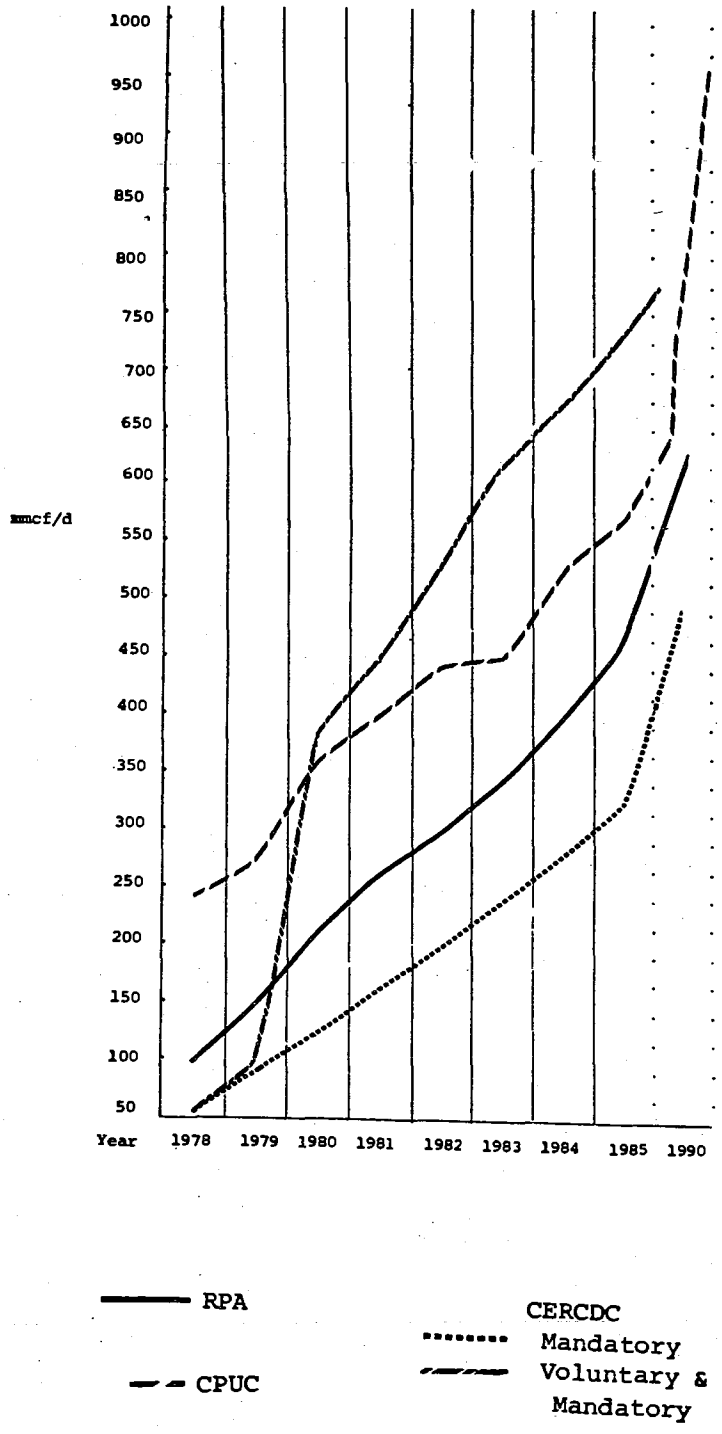
1) CPUC, Staff Report on the Decline in Natural Gas Available to the California Distribution Utilities from Traditional Supply Sources and the Need for and Timing of Supplemental Supply Sources, 1978.

2) RPA, California Natural Gas Supply and Demand 1977-1990, 1978.

3) CERCDC, Natural Gas Supply and Demand for California 1978-1995, 1978.

Figure S-1

Expected Demand Reduction from Conservation for Residential, Commercial, and Industrial Uses (Priority Categories P_1 Through P_4)



percent and 85 percent of the proposed 900 million cfd to be supplied by the Point Conception terminal. Similar comparisons can be made for other years.

While expected gas savings attributable to conservation are significant, the quantities expected to be conserved are insufficient to replace the 900 million cfd from the proposed project.

CORRESPONDENCE WITH THE U.S. NAVY

1) Letter from Captain Paul D. Olson, U.S. Navy, to Mr. Joseph E. Bodovitz, California Coastal Commission, undated.

2) Telegram from General C. W. Hoffman, U.S. Marine Corps, to Mr. Bradford Lundborg, California Coastal Commission, January 18, 1978.

3) Letter from U.S. Navy to California Public Utilities Commission, undated, with attached letter from Captain Paul D. Olson, U.S. Navy, to Mr. Joseph E. Bodovitz, California Coastal Commission, January 26, 1978.

4) Letter from Captain A. W. Collins, U.S. Navy, to Mr. Robert Arvedlund, FERC, March 29, 1978, with (a) attached letter from General Louis H. Wilson, U.S. Marine Corps, to Mr. Joseph E. Bodovitz, California Coastal Commission, March 16, 1978; (b) attached letter from Captain Paul D. Olson, U.S. Navy, to California State Clearinghouse, March 29, 1978, and (c) attached photocopy pages from a book dealing with the history of Camp Pendleton.

5) Letter of comment to staff DEIS from Captain Paul D. Olson, U.S. Navy, to FERC, June 2, 1978, with varying attachments.

DEPARTMENT OF THE NAVY
WESTERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
P.O. BOX 727
SAN BRUNO, CALIFORNIA 94066

IN REPLY REFER TO
09P:AWC:ims

JAN 21 1978

Mr. Joseph E. Bodovitz, Executive Director
California Coastal Commission
1540 Market Street, 2nd Floor
San Francisco, California 94102

Dear Mr. Bodovitz:

Your public announcement of 11 January 1978 listing four coastal sites for further LNG terminal consideration and calling for a public hearing on this subject on 18 January was received at this Command on 16 January. The announcement called for written comments to be provided by 24 January.

This letter is an interim reply, meeting the 24 January submission date, which vigorously objects to consideration of any Camp Pendleton property for use as an LNG terminal and is seriously concerned with other Southern California proposed locations which would impact adversely upon offshore fleet and Missile Test Center, Point Mugu, operations. The lack of any on-site Navy or Marine Corps coordination of the study efforts to date which apparently have concluded that the Camp Pendleton site should be further studied, coupled with the public notation that the Coastal Commission has recommended transfer of further Camp Pendleton property for state park use are inappropriate. Camp Pendleton property is not available for LNG terminal use or further state park use.

Lack of advance notification of any staff coordination on this subject makes a thorough reply to your 16 January announcement impossible by 24 January. This letter will serve as an interim reply pending a more complete Navy position which will be provided by 15 February 1978.

Sincerely,

Paul D. Olson

PAUL D. OLSON
[illegible], USN
Commanding Officer

western union

Telegram

1978 JAN 18 AM 5:35
RECEIVED
JAN 19 1978
CALIFORNIA
COASTAL COMMISSION

SFB 102(0647)(1-00150200818)PD 01/18/78 0644
TLX NCS STO
ZCZC 022 B NL GOVT DOD STOCKTON CA 18 JAN 78
PMS MR BRADFORD LUNDBORG CHAIRMAN
CALIFORNIA COASTAL COMMISSION
1540 MARKET STREET SAN FRANCISCO CA
P 1721432 JAN 78
REFERENCE YOUR REQUEST FOR COMMENTS CONCERNING PROPOSALS FOR SITING LIQUID NATURAL GAS (LNG) TERMINAL AT CAMP PENDLETON CALIFORNIA RECEIVED 16 JANUARY 1978 YOU ARE ADVISED THAT THIS IS A MATTER WHICH MUST BE ADDRESSED TO THE SECRETARY OF THE NAVY NO LOCAL OFFICER HAS ANY AUTHORITY WITH RESPECT TO THE DESPOSAL OF GOVERNMENT OWNED REAL PROPERTY. C W HOFFMAN MAJOR GENERAL U S MARINE CORPS COMMANDING GENERAL MARINE CORPS BASE CAMP PENDLETON CALIFORNIA

CG MCB CAMP PENDLETON CA

TELEPHONE
AREA CODE 415 871-6600
AUTOVON No. 859-

DEPARTMENT OF THE NAVY
WESTERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
SAN BRUNO, CALIFORNIA 94066

REPLY REFER TO:
2022.1:RRT:hs
Ser P2-63

California Public Utilities Commission
California State Building
San Francisco, California 94102

Gentlemen:

I am referring to your O.I.I. No. 1, Liquefied Natural Gas (LNG) Safety Investigation and Application No. 57626, Western LNG Associates, et al. On 31 January 1978, the California Coastal Commission voted to submit a list of site nominations for LNG terminal facilities which included Marine Corps Base, Camp Pendleton among the nominations. This action was taken despite previous requests from this Command to withdraw Camp Pendleton from further consideration as an LNG site. Most recently I sent a letter, dated 26 January 1978, to the California Coastal Commission which details the reasons Camp Pendleton should not be considered a viable site.

I invite your attention to this letter, copy enclosed, and ask that your Commission delete Camp Pendleton from further consideration.

Sincerely,

Enclosure

Copy to:
Federal Energy Regulatory Commission
Washington, DC 20426 (w/cy encl)

California Coastal Commission
631 Howard Street
San Francisco, California 94105 (w/o encl)

2022.1:RRT:hs
Ser P2-36

26 JAN 19

Mr. Joseph E. Bodovitz, Executive Director
California Coastal Commission
1540 Market Street, 2nd Floor
San Francisco, California 94102

Subject: Proposed Sites for Liquefied Natural Gas (LNG) Facilities

Dear Mr. Bodovitz:

This is in response to your staff recommendation to the Coastal Commission of 11 January 1978 on LNG tanker sites to be retained for future study. Included in your recommendations is a site at Camp Pendleton on Navy-owned land and a site at Deer Canyon near the Navy Missile Test Center.

Of most immediate concern is your public announcement that a site within Camp Pendleton's boundaries is being seriously considered, prior to any discussion with Navy spokesmen at this Command or the Marine Command at Camp Pendleton. The Navy regrettably must consider this announcement presumptive. The citation, that the site has been proposed by the State Coastal Commission for transfer from military to State park use, is misleading in its implication that the Coastal Commission has jurisdiction in the matter. It is interesting to note that your public announcement makes no mention of Navy's previous clear objections to publicly issued State recommendations for civilian uses of non-excess Navy property. You are well aware that these lands are excluded from the coastal zone and would require Navy agreement to be provided for such use. Neither this Command nor that at Camp Pendleton had more than preliminary contact with consultants understood to be engaged by your staff. These consultants were repeatedly informed that the Camp Pendleton site was not available for LNG facilities. Other than this preliminary contact, there was no dialogue on this matter.

There are many reasons why the Camp Pendleton Horno Canyon site cannot be made available; chief among them being the following:

a. Beach areas fronting Horno Canyon are a portion of the only remaining beach in southern California suitable for major Marine Corps and Navy Amphibious Assault Training Exercises. LNG facilities in this area would create maritime hazards for ships and landing craft on maneuvers, as well as for LNG tanker ships and shore installations.

b. Pipelines radiating from the terminal create the potential for damage and associated hazards from troops on maneuvers with mechanized

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BS.

equipment. The ever present hazard of unexploded ordnance in training areas both in and out of known impact areas could present a constant danger.

c. Troop maneuvers creating a high density of personnel in the vicinity of an LNG installation would constitute an unacceptable exposure to the still to be determined hazards of the LNG operation.

d. Outside of the conflicts with military operations, the LNG development would impact adversely on an ecology which the Marine Corps has diligently worked to preserve over many years.

In summary, any location within Camp Pendleton's borders is not compatible with military utilization of the property. It is therefore requested that the Horno Canyon site be withdrawn from further consideration.

The site proposed at Deer Canyon is also a matter of concern and to a lesser degree the other five sites along the southern California coast. While no encroachment on military properties is involved, the offshore uses by the Navy in these coastal areas must be considered. The coastal waters offshore of Deer Canyon and in the vicinity of the Channel Islands contain a major sea transport area and, of most concern, the missile test ranges of the Pacific Missile Test Center, Point Mugu. The sea transport lanes and missile test areas are shown on the enclosed charts. The offshore range areas under authority of the Missile Test Center at Point Mugu are shown in blue outline; critical range areas (shown in red) are those most heavily scheduled for live missile launch operations and are the most sensitive to tanker transit densities.

In order to minimize conflicts from LNG transits, the following considerations must be included in the determination of any final selection:

a. In the vicinity of Pitas and Seacliff areas, Eastbound/Westbound tanker traffic should enter and depart the Santa Barbara Channel north of 34°-08'N.

b. Tanker interference with missile range operations off the coast of Oceanside could be minimized by a stipulation that all arriving or departing tanker traffic be held clear of critical range areas (an arrival and departure route approximately 050°-30'N-121°-00'W, with an appropriate detour around Santa Catalina Island), and use of the coast-wise shipping lanes.

c. Selection of any LNG offloading site due east of Santa Cruz Island would create a serious source of interference to the Navy's Point Mugu operations. This interference would develop from tanker and boat activity

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Ser P2-36
26 JAN 1978

at an offloading site in the area and from the tanker routes which would be required through "critical range areas".

Selection of the proposed LNG offloading site at Point Conception would present no interference to the Navy's Point Mugu operations, except that resulting from LNG tanker transits. Geographical considerations determine that interference from such tankers would be minimal in this location. In this regard, it should be noted that all marine traffic transiting the critical areas shown on the enclosure be in voice radio contact with Pacific Missile Test Center, Point Mugu range control, and be responsive to requests to hold position, or alter course or speed.

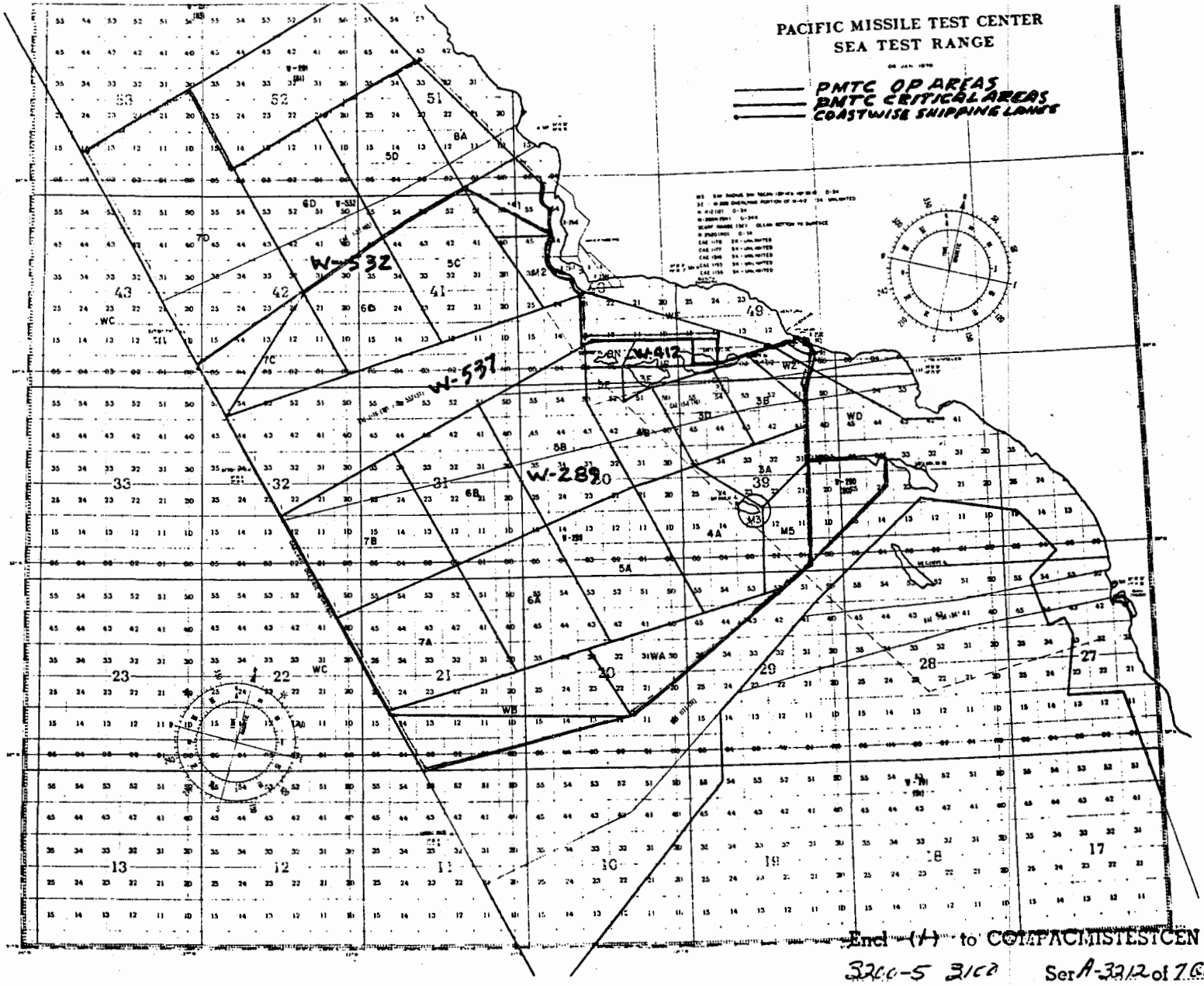
In summary, it is requested that the State's LNG alternatives record clearly show the Navy's serious concerns with siting of an LNG facility anywhere in the Southern California coastal area which may affect fleet operations or Missile Test Center, Point Mugu, operational areas as indicated in the enclosure. Further the Commission is advised that no portion of the Camp Pendleton property is available for use as an LNG terminal facility and Coastal Commission recommendations for transfer of non-excess military property for this or other uses are misleading and should be withdrawn.

Members of my staff are available to further discuss these and related California Coastal Zone issues with you at your convenience.

Sincerely,

PAUL D. OLSON
Captain, CEC, USN
Commanding Officer

Enclosure:
(1) Proposed sites for LNG Facilities



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Encl (1) to COMPACMISTESTCEN ltr
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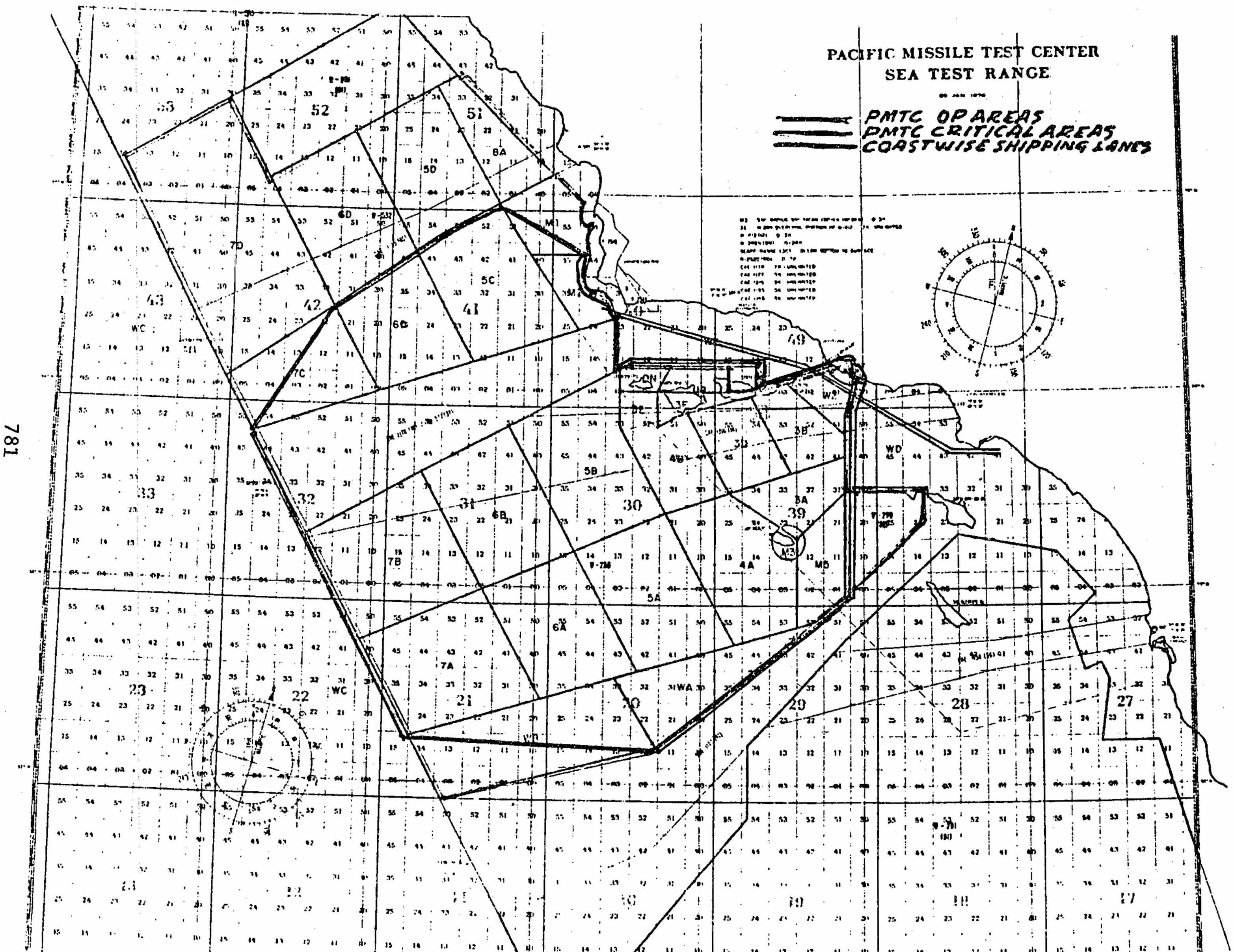

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Encl. (1) to COMPACMISTESTCEN ltr
3200-5 3102 Ser H-3312 of 7 OCT 7

DEPARTMENT OF THE NAVY
WESTERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
P.O. BOX 727
SAN BRUNO, CALIFORNIA 94066

IN REPLY REFER TO:
09P:AWC:sh
29 Mar 78

RECEIVED BY
APR - 3 1978
L. W. M.

Mr. Robert Arvedlund
Federal Energy Regulatory Commission
825 N. Capitol Street, Room 6112
Washington, DC 20426

Dear Mr. Arvedlund:

I have enclosed a couple of things that will be of interest to you in reviewing the State of California's proposal to consider the Marine Corps Base, Camp Pendleton for a LNG Terminal site. First of all, I have enclosed a copy of the letter from the Commandant of the Marine Corps, General Wilson, reiterating the non-availability of the site. His letter also represents the view of the Secretary of the Navy.

Secondly, I have provided you with a copy of recent comments we have sent to the State regarding the inadequacies of the DEIS. The basic problem is that no operational interferences to the Marine Corps/Navy were discussed at all in the DEIS. The operational impact of this undertaking is much more severe nationally than the more traditional environmental considerations. This letter should give you some idea of what we consider are real and major incompatibilities with the proposal.

Third, I have extracted a few pages from a book dealing with the history of Camp Pendleton, which seems to summarize the in-fighting which went into the final approval to site a nuclear power plant at Camp Pendleton. Basically this proposal was shoved down the throats of the Marine Corps and Navy, as was the loss of several miles of beaches to the State Parks as the result of President Nixon's "Legacy of Park's" program. So far as I can see, the only precedent set in these actions was that the Commander-in-Chief and the Congress can override the Commandant of the Marine Corps and the Base Commander. There is nothing new about that.

We will send you copies, as available, of other papers we have under preparation for use in an upcoming public hearing and would appreciate being given the opportunity to comment on your DEIS nearing publication. If I were to summarize my views of the problems of siting a LNG terminal at Camp Pendleton, they are these:

a. There are several sites at which a LNG terminal would appear to work. In view of the indefinite knowledge as to the real hazard potential of this facility, it would look to me that public safety would be the overriding consideration, and that Point Conception would be an overwhelming choice. There do not appear to be any serious operational or environmental

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29 Mar 78

difficulties with the Point Conception site from any of the briefings I have heard.

b. Camp Pendleton is the only place in the Pacific Area available to the Marine Corps and Navy "blue water" forces to train in a full-scale manner the rather complex and involved procedures involved in the full range of amphibious operations, from the off-shore preparations, landing on the beach, and continuing inland with close air support. The proposed LNG site sits right in the middle of the operating coast and would be regularly overflown by high performance aircraft at low altitude carrying live ordnance. The two missions are clearly incompatible.

c. I personally think it is a mistake to site such a facility immediately next to such a heavily used Interstate Freeway. I don't think there is any greater chance of one of our high explosive magazines detonating than there is of this facility actually igniting, but there is no way we could site explosive magazines alongside I-5. I think if the civilian community accepts that kind of risk they are making a mistake, particularly when the Point Conception site does not require that risk.

d. Since there are other possible sites for a LNG facility, and Camp Pendleton represents an extremely unique free world defense asset, it does not make sense to severely constrain the defense facility in order to greatly increase the risk to the public from LNG terminal exposure.

I have rambled on at greater length than what I intended. I guess all that I can add is that I am convinced from my discussions at all levels from the Base all the way up to the staff of ASN(MRA&L) that the Department of Defense will vigorously protest any proposal for use of Camp Pendleton for a LNG site. Your interest and discussion on this subject is greatly appreciated.

Sincerely,

A. W. COLLINS
Captain, CEC, USN
Head, Facilities Planning and
Real Estate Department

Enclosures

DEPARTMENT OF THE NAVY
HEADQUARTERS UNITED STATES MARINE CORPS
WASHINGTON, D.C. 20380

IN REPLY REFER TO
CS-LFF-1:rpt
16 MAR 78

RECEIVED
MAR 21 1978
CALIFORNIA
COASTAL COMMISSION

Mr. Joseph E. Bodovitz
Executive Director
California Coastal Commission
1540 Market Street, Second Floor
San Francisco, California 94102

Dear Mr. Bodovitz:

This is in response to your letters of 17 February 1978 to the Secretary of the Navy and me soliciting the views of the Department of the Navy and the Marine Corps on the possible use of a portion of Marine Corps Base, Camp Pendleton as a liquefied natural gas (LNG) terminal site. The Secretary of the Navy has requested that I respond in his behalf.

In his letter of 26 January 1978, the Commanding Officer, Western Division, Naval Facilities Engineering Command provided valid reasons why the Horno Canyon site at Camp Pendleton cannot be made available for LNG facilities. The reasons are restated for emphasis:

a. Beach areas fronting Horno Canyon are a portion of the only remaining beach in southern California suitable for major Marine Corps and Naval Amphibious Assault Training Exercises. Liquefied natural gas facilities in this area would create maritime hazards for ships and landing craft on maneuvers, as well as for LNG tanker ships and shore installations.

b. Pipelines radiating from the terminal create the potential for damage and associated hazards from troops on maneuvers with mechanized equipment. The ever present hazard of unexploded ordnance in training areas both in and out of known impact areas could present a constant danger.

c. Troop maneuvers creating a high density of personnel in the vicinity of an LNG installation would constitute an unacceptable exposure to the still to be determined hazards of the LNG operation.

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d. Outside of the conflicts with military operations, the LNG development would impact adversely on an ecology which the Marine Corps has diligently worked to preserve over many years.

In summary, I find it unacceptable to consider exposing the Marines, their dependents, and the civilian employees at Camp Pendleton to the risks associated with a LNG terminal. Accordingly, the Horno Canyon or any other site at Camp Pendleton should not be considered for use as a LNG terminal.

I hope the above is satisfactory for your purposes.

Sincerely,

LOUIS H. WILSON
General, U. S. Marine Corps
Commandant of the Marine Corps

Blind copy to:
COMNAVFACENGCOM
CG MCB Camp Pendleton
CO WESTNAVFACENGCOM

2022.1:RRT:hs
Ser P2-164

29 MAR 1978

California State Clearinghouse
Office of Planning and Research
Office of the Governor
1400 Tenth Street
Sacramento, California 95814

Gentlemen:

Thank you for the opportunity to review the Draft Environmental Impact Report (DEIR) for Proposed Point Conception Liquefied Natural Gas (LNG) Project, Public Utilities Commission Application Number 57626. The Navy is specifically concerned with the nomination of Marine Corps Base (MCB) Camp Pendleton, as an alternate LNG terminal site and the effects an LNG facility, as proposed, would have on the mission and operational capability of the base and related offshore areas. Upon analysis of the proposal, the Navy has determined that location of an LNG facility at Camp Pendleton would have an adverse impact on the base. This Command, therefore, notified the California Coastal Commission on 26 January 1978, and the California Public Utilities Commission on 13 February 1978, that Camp Pendleton is not available for use as an LNG terminal and should not be considered as a viable site. This position is solidified by the Commandant of the Marine Corps in his response to the State, for himself and the Secretary of the Navy, copy enclosed.

For the Marine Corps and Naval forces to continue to perform their assigned missions and tasks of maintaining military readiness, Camp Pendleton must be retained in its present land use. Any encroachment would diminish the capability of these military forces to engage in effective training activities.

With respect to the findings reported in the Arthur D. Little, Incorporated DEIR Technical Report No. 23 "Alternative Site Analysis" dated December 1977, the Navy concludes that while the data in the Arthur D. Little report appears accurate as far as it goes, it does not go far enough. It fails to address the adverse impact an LNG terminal would have on the military training operations conducted in the area, and the adverse impact on the LNG operations that this military training would impose. Detailed comments on the DEIR which support this position are enclosed. When these are considered, the

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Ser P2-164

LNG proposal is revealed as an untenable encroachment incompatible with national security needs. MCB Camp Pendleton should, therefore, be withdrawn from further consideration as an LNG terminal site.

Sincerely,

PAUL D. OLSON
Captain, CEC, USN
Commanding Officer

Enclosures

Copy to: (w/cy encl)
Mr. Steven Miller
California Public Utilities Commission
350 McAllister Street, Room 5151
San Francisco, California 94102

Mr. Robert Arvedlund
Federal Energy Regulatory Commission
825 N. Capitol Street, Room 6112
Washington, DC 20426

COMMENTS ON DRAFT ENVIRONMENTAL IMPACT REPORT (DEIR)
FOR PROPOSED POINT CONCEPTION
LIQUEFIED NATURAL GAS (LNG) PROJECT
PUBLIC UTILITIES COMMISSION APPLICATION NUMBER 57626

The proposed LNG site is within the operations area for land, sea, and air combat exercises entailing hazardous maneuvers. An LNG terminal in the vicinity of the military operations would immeasurably compound the risk of accident because of the additional inherent hazard involved in the handling of LNG.

Consequently, the location of an LNG terminal at Camp Pendleton is considered incompatible with, and detrimental to, Camp Pendleton's capability to perform its vital mission. Camp Pendleton provides the Pacific Fleet with the only existing amphibious landing site where all aspects of amphibious training, support, and follow-through capabilities can take place for evaluation and testing concurrently. These operations include:

a. Mine sweeping by both helicopters and sea vessels;

b. Troop and equipment movements by air (helicopters and airdrops) other than ship-to-shore;

c. High speed reconnaissance by both air and water craft;

d. Offshore combatants simulating shore bombardment;

e. Ship-to-shore movement of troops and equipment during all periods of the day and/or night, and conditions of visibility via boat, amphibious vehicle, tanker landing ship, and helicopter; and

f. High performance fixed-wing aircraft flying low level bombardment approaches to the ordnance impact areas.

The Little report also evaluated the Camp Pendleton site based on the criteria of the State of California Legislature's requirements (SB1081) for siting LNG terminals. Their findings identified the areas falling within the one-mile and the four-mile SB1081 population criteria. Records show, however, that during 1977, within one mile of the proposed LNG site, the 27-man density figure established by SB1081 was exceeded two-thirds of the year.

Investigation of the site at Camp Pendleton locates the proposed site approximately 2.3 miles north of Red Beach, the base's primary amphibious landing zone, and directly in the path of air and sea support operations conducted at Camp Pendleton. Current utilization of the areas adjacent to the proposed site (and within the one-mile distance delineated in SB1081 LNG siting criteria) are Beach Section B and areas--Uniform, Romeo II, and Papa II. Because Camp Pendleton is both remote (for a purpose) and

the only remaining location with full amphibious capabilities available to the military, the training areas are consistently used by all services which have amphibious units (Army, Navy, and National Guard, as well as Marine Corps). During 1977, records show that the training areas within one mile of the proposed site area were occupied an average of 200 days out of the year. (See chart.)

Listed Areas Impacted by LNG Up to 4 Miles

Beach Area		West of I5		East of I5	
Zone	Days	Zone	Days	Zone	Days
B*	204	Uniform	235	Romeo I	119
C	209	Victor	236	Romeo II*	135
D	212			Romeo III	100
E	219			Papa I	255
CP AVA	203			Papa II*	257
CP AAA	200+			Oscar II	259

*Within one mile of site.

In addition to the land operations at Camp Pendleton, essential sea and air operations are conducted. The construction of a 9,000-foot trestle (associated with the LNG terminal) extending seaward would be in the direct path frequently used by naval vessels. The trestle would also present a major navigation hazard to transient vessels moving in shallow water parallel to the coast. This hazard would also apply to commercial and private vessels when the area is unrestricted. The Navy is also concerned about the potential of hazards and restrictions that could develop due to LNG tanker traffic in "blue water" operating areas. The Navy is involved in the testing and the training of personnel in the evaluation and handling of explosive ordnance in these areas. Accidents do occur, and the compounded hazard of LNG tankers would severely restrict naval operations.

Furthermore, the siting of an LNG terminal encroaches into military restricted air space controlled by Camp Pendleton, Zone R2533 (low altitude) and R2503 (high altitude). Within these two controlled air zones, Camp Pendleton controls two aircraft bombing and strafing impact areas (Zulu and Whiskey impact areas).

The siting of an LNG terminal at Camp Pendleton's beach would present a severe hazardous condition in conjunction with flight operations. The flight operations conducted at Camp Pendleton are of two basic types. The first type is the use of helicopters to transport personnel and equipment to beach areas during amphibious operations. (Also, helicopters are in constant flight operation in the vicinity of the proposed LNG site practicing touch-and-go landings and general flight proficiency.) The second type of flight operations involves the use of high performance fixed wing aircraft conducting air strikes to the bombing and strafing impact areas located in Zone R2503. During 1977, Camp Pendleton recorded 99 days during which ordnance strikes were made into the bombing impact areas. The low altitude approach pattern into the impact area is located directly over the proposed LNG site and through the Horno Canyon.

Current Marine Corps and Navy-owned lands and restricted operating areas are considered vital to maintain military readiness. Any encroachment severely restricting fleet operation is a serious adverse impact on fleet capabilities to carry out its assigned mission and tasks. The ultimate effect of adverse encroachment in the Southern California operating areas seriously jeopardizes the fleet readiness, increases operating costs, affects homeporting, and incurs potential community impacts.

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16 March 197

Mr. Joseph E. Bodovitz
Executive Director
California Coastal Commission
1540 Market Street, Second Floor
San Francisco, California 94102

Dear Mr. Bodovitz:

This is in response to your letters of 17 February 1978 to the Secretary of the Navy and the Commandant of the Marine Corps soliciting the views of the Department of the Navy and the Marine Corps on the possible use of a portion of Marine Corps Base, Camp Pendleton as a liquefied natural gas (LNG) terminal site. The Secretary of the Navy has requested that I respond in his behalf.

In his letter of 26 January 1978, the Commanding Officer, Western Division, Naval Facilities Engineering Command provided valid reasons why the Horno Canyon site at Camp Pendleton cannot be made available for LNG facilities. The reasons are restated for emphasis: .. ..

a. Beach areas fronting Horno Canyon are a portion of the only remaining beach in southern California suitable for major Marine Corps and Navy Amphibious Assault Training Exercises. Liquefied natural gas facilities in this area would create maritime hazards for ships and landing craft on maneuvers, as well as for LNG tanker ships and shore installations. .....

b. Pipelines radiating from the terminal create the potential for damage and associated hazards from troops on maneuvers with mechanized equipment. The ever present hazard of unexploded ordnance in training areas both in and out of known impact areas could present a constant danger.

c. Troop maneuvers creating a high density of personnel in the vicinity of an LNG installation would constitute an unacceptable exposure to the still to be determined hazards of the LNG operation.

d. Outside of the conflicts with military operations, the LNG development would impact adversely on an ecology which the Marine Corps has diligently worked to preserve over many years.

In summary, the Commandant of the Marine Corps finds it unacceptable to consider exposing the Marines, their dependents, and the civilian employees at Camp Pendleton to the risks associated with a LNG terminal.

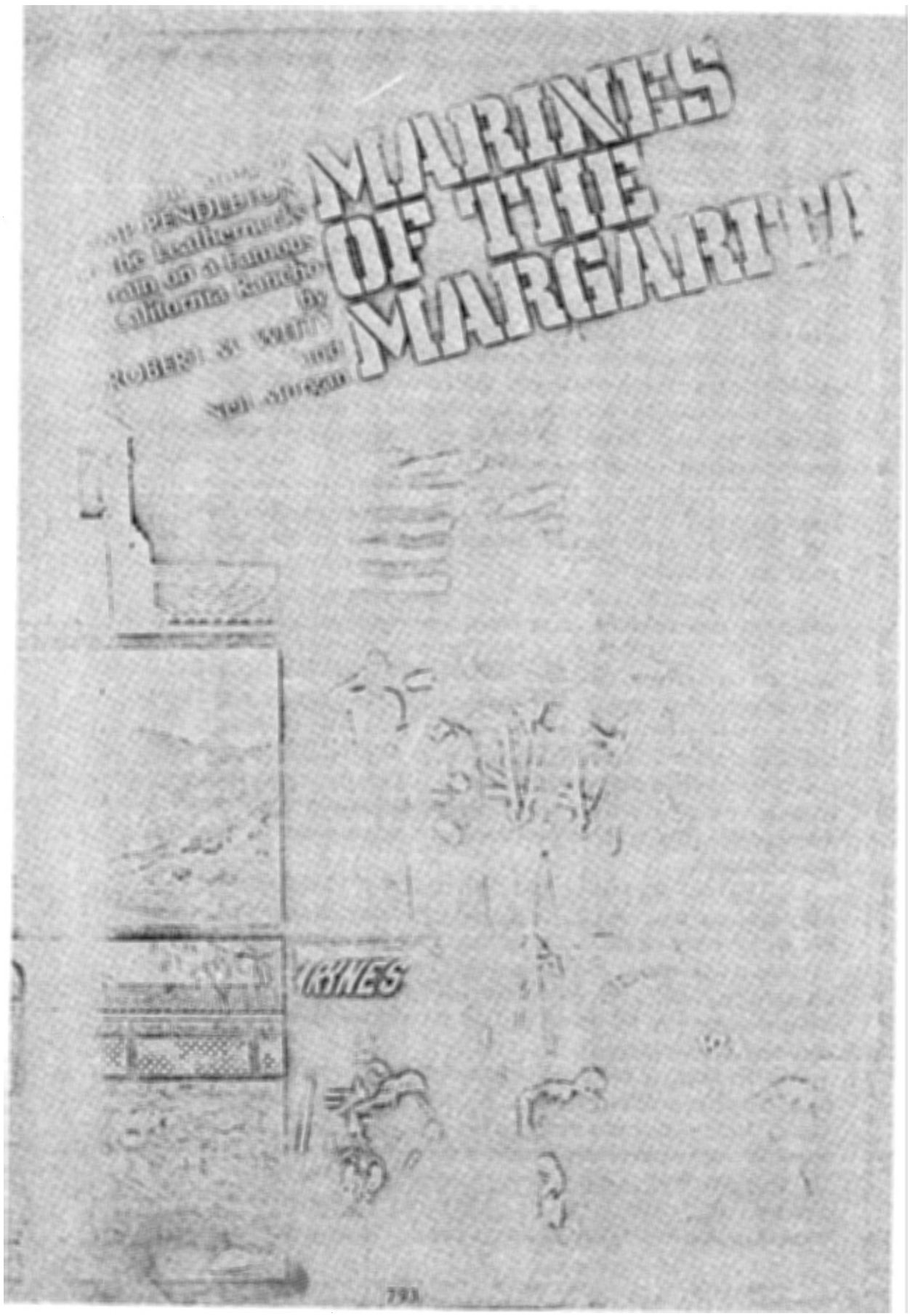
For reasons stated above, it is the position of the Department of the Navy and the Marine Corps that the Horno Canyon or any other site at Camp Pendleton is not available for use as a LNG terminal.

I hope the above is satisfactory for your purposes.

Sincerely,

/s/ Louis H. Wilson
General, U.S. Marine Corps
Commandant of the Marine Corps

Blind copy to:
COMNAVFACENGCOM
CO MCB Camp Pendleton
CO WESTNAVFACENGCOM


MARINES
OF THE
MARGARET

Committee and a devout champion of the Navy and Marine Corps, attempted to speed settlement of the lawsuit. He felt that California's political delegation might be persuaded to help by deliberately withholding expenditures for new construction at Pendleton.

For almost seven years the base got practically nothing in the way of new construction. It developed that the California delegation wasn't going to be cowed, and ultimately Vinson's effort was dissipated.

General Murray theorized, too, that the Southern California climate was a factor. Temporary buildings in Southern California's gentle climate were more realistic than they would have been in other areas like the Great Lakes.

Moreover, Camp Pendleton, even though the largest amphibious base in the world, was still a new breed. It had not existed long enough to gain any deep affection on the part of the Marine Corps establishment. Quantico had long been the grand old post of the Corps, dating back to World War I.

And Camp Lejeune was looked after by a famous Marine Corps general, W.P.T. Hill, who was quartermaster general of the corps for twelve years. He had laid out the North Carolina camp and it was his "baby."

Even after 1959, when the water rights case seemed near settlement, appropriations came slowly. General Munn's major goals in 1963 and 1964 were a new post exchange and an adequate commissary: "Just two mundane things like that—and the PX was to be built from profits from the old PX and did not cost the taxpayers a cent. The commissary also was a self-supporting institution, but it took me twelve months to get permission to build the PX, and I never did get permission to convert the commissary. It was done two years after I left. Things move slowly in Washington!" After spending five years in Washington, he was qualified to speak of such matters.

The boat basin which had been built in 1942 was finally redredged and improved in 1959. It was then used to ship the first replacement draft overseas for duty with the 3rd Marine Division on Okinawa. Two troop ships, the Talladega and Cavalier, lay 1,000 yards off the beaches, as the ships' "Mike" boats were led into the harbor to load out 750 Marines in only one hour and five minutes.

The future of Pendleton, meanwhile, was being threatened by the exigencies of its neighbors. A utility consortium of San Diego Gas & Electric Company and Southern California Edison Company asked for a ninety-acre site to build a nuclear power plant. Oceanside wanted a portion of the base for its new harbor development. Private promotors asked to use an airstrip; recreation leaders wanted part of the beach. Housing developers,

though not asking directly, coveted the base for new home sites.

Murray argued against relinquishing even a square inch of the base. "You have to have a buffer zone around maneuver areas," he said. "You can't use right up to the boundary line. It has to be as big as it is to be the kind of base it is. There are undoubtedly little areas that we could do without. But if we give up here, it's harder not to give up there, and even harder the next time, until finally you're whittled away until you can't operate anymore."

His boss at the time, General Ridgely, was more relenting. He felt that the portion Oceanside wanted would not cripple the base and he agreed to declare a small portion surplus.

Murray fought, too, under his next boss, General Shapley, the proposal for the atomic energy plant. He felt strongly that there were equally good sites elsewhere, and that the pressure exerted on Pendleton was primarily because its property was easier, politically and economically, to acquire.

Not even the commandant could prevent the nuclear power project. The utilities argued that Pendleton was "the most practical and best site. If we can't build it there we may have to reconsider the entire project." Commandant Shoup replied that "our position has not changed. The Marine Corps still requires all the land in the camp for training purposes and erection of an atomic plant would interfere with training."

But by late 1962, General Masters, then commanding Pendleton, was forced to say that the Marine Corps had no objections.

The matter had been decided by the politicians, in the name of industrial progress. Sen. Clair Engle introduced a bill in the Senate on June 29, 1963, and President Johnson signed it in 1964, authorizing the Navy Department to lease a site to the utilities. Rep. Craig Hosmer of Long Beach even asked for a series of national nuclear reservations.

Columnist Drew Pearson caused a mild ruckus by calling the Pendleton lease part of a $13 million subsidy to private power companies.

To appease the Marines, the utilities agreed to shift the site a little further to the north. The details, worked out in 1964, gave the power companies a sixty-year lease on 84 acres in the northwest corner of the base at San Onofre. The easement use charge was set at $91,291 a year.

At the dedication of the $87 million plant in 1967, President Lyndon Johnson sent his congratulations to the two companies for their "scientific forethought and peaceful use of the atom." Maj. Gen. Robert E. Cushman, the new Pendleton commander, was a rostrum guest, and a Marine bugler and color guard participated in the ceremony.

Shortly before the dedication, however, Gen. Wallace M. Greene Jr., the new commandant, had said:

"All of us, both the military and civilians, are going to have to make up our minds...Do you want amphibious forces trained on the West Coast of this country or not? If you do, the Camp Pendleton area is going to have to be maintained in its present location. This has to be measured against individual as well as local interests. This complex of Camp Pendleton and El Toro is absolutely essential to the maintenance of an efficient Marine Corps."

Giving up the San Onofre area, he said, was "really an effort on our part for we had to give up a section of the beach almost in the center of our landing area. We were able to adjust the location so that we were able to do this with the least amount of dislocation to our training.

"Of course, we've had to move the Camp Matthews facility up here, too. And we have tremendous pressures all the time. We have real estate interests who would like to get the beach areas, of course, for real estate development."

There were also suggestions to move the Recruit Depot from San Diego to Camp Pendleton, which the Marine Corps admitted would be practical but not advisable. The Corps traditionally has strived to keep boots separate from Marines, on the theory they're not Marines until they've finished boot camp.

In 1970, Camp Pendleton was asked to give up one-and-a-half miles of shoreline south of the atomic energy plant—the part that it had fought so hard to save—to the State of California for a public beach. That, too, had been requested higher up. The suggested arrangement, worked out by the White House, was to block public use of a one-mile stretch, known as Trestle Beach, near the Western White House at San Clemente. The Marines had already agreed to part with that. But the Secret Service said opening of Trestle Beach would threaten the security of the new White House.

The stage was set for further conflict. Although no change had been consummated, William Penn Mott, California's parks director, hailed the proposed acquisition as "a foot in the door to obtain as much of Pendleton's eighteen-mile beachfront as possible."

MOUNTED GUARD: The Camp Pendleton Mounted Color Guard, the only one in the Marine Corps.

DEPARTMENT OF THE NAVY
WESTERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
P.O. BOX 727
SAN BRUNO, CALIFORNIA 94066

IN REPLY REFER TO:
2022.1:RRT:cv
Ser P2-321
2 JUN 1978

Federal Energy Regulatory Commission
825 N. Capitol Street, Room 6112
Washington, DC 20426

Attention: Kenneth Plumb, Secretary

Subj: OPPR-PCCD/EEB Western LNG Terminal Company, Docket No. CP75-
(LNG Receiving Terminal at Point Conception, California)

Dear Sir:

This letter constitutes the Navy's official comments on the Draft Environmental Impact Statement (DEIS) for the subject project. Our comments relate to the consideration in the DEIS of Marine Corps Base (MCB), Camp Pendleton as an alternate site. The DEIS indicates that your staff has rejected Camp Pendleton as a site on the basis of operational incompatibility and for other reasons as stated on page 284 of the report. The Navy and the Marine Corps wholeheartedly support this position and request that your Commission take whatever action is necessary to remove Camp Pendleton from further consideration as a site for LNG facilities either onshore or offshore.

The California Coastal Commission, however, at its May 24th meeting, voted to recommend to the California Public Utilities Comission that Camp Pendleton be approved as the first-ranked LNG site for this state. This action was taken despite repeated efforts by the Department of the Navy to have Camp Pendleton deleted from consideration. Enclosed are copies of statements made at public hearings by Navy and Marine Corps representatives and of related correspondence. Included among these documents is a telegram dated 12 May 1978, from the Chairman of the House Armed Services Committee to the Chairman of the Coastal Commission. It strongly supports retention of the Base as a prime amphibious training area.

Thank you for the opportunity to comment on the Point Conception LNG Receiving Terminal DEIS.

Sincerely,

Paul D. Olson

PAUL D. OLSON
Captain, CEC, USN
Commanding Officer

Enclosures

2022.1:RRT:cv
Ser P2-321

2 JUN 1978

Copy to:
Public Utilities Commission (w/encls)
State of California
State Building
350 McAllister Street
San Francisco, California 94102

Comprehensive Planning Organization (w/o encls)
San Diego Region
Suite 524
Security Pacific Plaza
1200 Third Avenue
San Diego, California 92101

Office of Planning & Research (w/o encls)
State Clearinghouse
1400 - 10th Street
Sacramento, California 95814

Santa Barbara County (w/o encls)
City Area Planning Agency
1306 Santa Barbara Street
Santa Barbara, California 93101

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d the following message, subject to the Telegraph Company's conditions, rules and regulations, which are on file with regulatory authorities.

Yolo Torres

May 12, 1978

THE HONORABLE ~~MICHAEL FISCHER~~ BRADFORD W. LUNDBORG
CALIFORNIA COASTAL COMMISSION
~~1540 MARKET STREET~~ - 2nd ~~FLOOR~~ 631 HOWARD ST. - 4th FLOOR
SAN FRANCISCO, CALIFORNIA 94102

IT HAS COME TO THE ATTENTION OF THE HOUSE ARMED SERVICES COMMITTEE THAT THE CALIFORNIA COASTAL COMMISSION WILL SOON BE ISSUING ITS RANKING AND EVALUATION OF POTENTIAL LIQUEFIED NATURAL GAS TERMINAL SITES ON THE CALIFORNIA COAST. WE UNDERSTAND FURTHER THAT THE FIRST CHOICE OF THE COASTAL COMMISSION STAFF IS AN AREA WITHIN THE GEOGRAPHICAL BOUNDARIES OF THE CAMP PENDLETON MARINE RESERVATION.

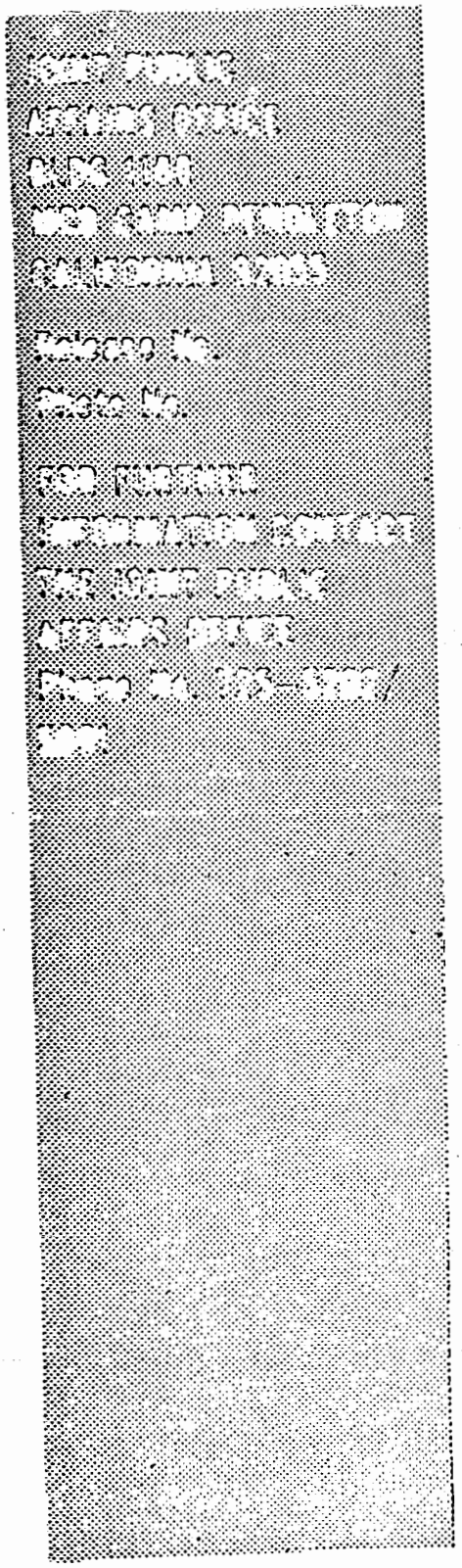
IT IS OUR POSITION THAT CONSTRUCTION OF SUCH A FACILITY IN THE AREA CONTEMPLATED, A PRIME TRAINING AREA FOR AMPHIBIOUS LANDINGS AND ASSAULTS, WOULD BE DETRIMENTAL TO THE TRAINING PROGRAM OF THE MARINE CORPS AND THUS UNACCEPTABLE TO THE UNITED STATES CONGRESS.

THE CAMP PENDLETON MARINE RESERVATION SHOULD BE REMOVED FROM YOUR LIST OF POSSIBLE CHOICES FOR CONSTRUCTION OF THE LNG FACILITY.

REP. MELVIN PRICE, CHAIRMAN
HOUSE ARMED SERVICES COMMITTEE

REP. BOB WILSON, RANKING MINORITY MEMBE
HOUSE ARMED SERVICES COMMITTEE

cc: CPUC Pres., Robert Batinovich
Governor Edmund G. Brown, Jr.



OFFICIAL PRESS RELEASE

LNG POLICY STATEMENT

CAMP PENDLETON, Calif., May 15 — The following statement was made at a California Coastal Commission public hearing today at Los Angeles.

- -

I am Major General Carl W. Hoffman, U.S. Marine Corps, commanding general of the Marine Corps Base at Camp Pendleton, Calif. I am here representing the Commandant of the Marine Corps, and I will present his position and the position of the Secretary of the Navy on the proposed establishment of a liquified natural gas terminal at Camp Pendleton.

As you know, the Secretary of the Navy and the Commandant of the Marine Corps have stated that no site at Camp Pendleton is available for use as an LNG terminal. I will reiterate their reasons and urge you to reject the staff recommendation that the terminal be sited at Camp Pendleton.

LNG POLICY STATEMENT
AUD 1-1-1-1

Camp Pendleton houses the major ground combat elements and a few of the air combat elements of the I Marine Amphibious Force or I MAF. This force consists of the 1st Marine Division, the 3d Marine Aircraft Wing and a number of associated combat and logistical commands — all maintained in a high state of combat readiness for immediate use anywhere in the world.

The camp itself is a prime training area for all these air and ground combat commands. It contains 38,000 acres of ranges on which all the air and ground weapons of the force — including supersonic jet aircraft — are regularly exercised. It also has the only beach areas in the Western United States on which I MAF can hone the amphibious assault responsibilities assigned to U. S. Marines by federal law.

Construction of an LNG terminal at Camp Pendleton would have such a severe impact on these facilities that the combat readiness of I MAF and associated elements of the U. S. Navy would be seriously — perhaps irreparably — degraded.

For example, we would have to terminate the training of large landing forces. The 9,000-foot pier and LNG tanker activity would prevent the deployment and maneuver of the naval forces necessary for large landing exercises. Even small unit training could not receive the aircraft support vital to the success of landing forces. The LNG terminals and LNG tankers are hazardous areas, and high performance aircraft cannot fly over them at low altitude without violating peacetime safety rules.

We would also lose the use of our aircraft bombing range. The only air corridor to this range passes right over the terminal site. This corridor was designed by the Federal Aviation Administration and the U. S. Navy, to meet specific requirements. It keeps aircraft away from the San Onofre Nuclear Power Plant, military and civilian housing areas and Camp Pendleton's ammunition storage areas. It is used by fully armed aircraft — that is, aircraft carrying clusters of 500-lb. bombs — which fly over the terminal site at low altitude and at speeds in excess of 400 knots.

Construction of the terminal would also seriously inhibit training with ground combat weapons. The terminal plans we have seen call for routing natural gas pipelines through the range impact areas. And, rather obviously, we would be unable to fire high explosive ammunition in any area which contained gas pipelines.

The routing of pipelines through training areas would also seriously inhibit training with tanks and other mechanized equipment.

It is also pertinent to note that the population density requirements associated with LNG terminals would force us to relocate a number of billeting areas assigned to troops of I MAF. The costs of these relocations have not been refined, but they would be no less than $40 million — and they could be as high as $75 million. This, as I understand it, is a cost which would have to be met by the company building the terminal — one which would be passed on to the purchasers of natural gas.

I also must point out that the Secretary of Defense recently directed the Department of the Navy to study the possible relocation and/or consolidation of a number of training activities. One of the proposals under study calls for moving the Marine Corps Recruit Depot at San Diego — and, possibly, the Marine Corps Recruit Depot at Parris Island, S. C. — to Camp Pendleton. If this is done, the most logical Camp Pendleton site for the depot or depots is an area south of the LNG terminal site and adjacent to existing recruit training areas. Doing this might put the areas far above the population density requirements.

Because of all the things I have just told you, I must urge the commission to reject the staff recommendation and omit Camp Pendleton from further consideration as a site for an LNG terminal.

There is one final point to make.

This nation can import natural gas — and many other needed commodities — because the seas are free. American sea power guarantees that.

U. S. Marines are a vital element of sea power.

Establishing an LNG terminal at Camp Pendleton would jeopardize the Marine Corps' ability to contribute to American sea power. We think that would be a foolish risk.

Thank you.

STATEMENT FOR PUBLIC UTILITIES COMMISSION
PUBLIC HEARING
12 MAY 1978
CONCERNING
ALTERNATIVE SITING OF ONSHORE LNG TERMINAL
HORNO CANYON

MY NAME IS COLONEL W. C. FRANK AND, FOR THE PURPOSES OF TODAY'S HEARING, I REPRESENT SEVERAL INTERESTED COMMANDS - PRIMARILY, HOWEVER, THE MARINE CORPS BASE, CAMP PENDLETON, CALIFORNIA. AS YOU ARE PROBABLY WELL AWARE, THE UNITED STATES NAVY AND THE MARINE CORPS HAVE ALREADY VOICED THEIR OPPOSITION TO THE SITING OF AN LNG FACILITY ANYWHERE WITHIN THE CONFINES OF CAMP PENDLETON. THE VIEWPOINTS OF THE SECRETARY OF THE NAVY; THE COMMANDANT OF THE MARINE CORPS; COMMANDING GENERAL, MARINE CORPS BASE, CAMP PENDLETON; COMMANDER, WESTERN DIVISION, NAVAL FACILITIES ENGINEERING COMMAND AND THE COMMANDER, NAVAL SURFACE FORCES, PACIFIC FLEET ARE ALREADY A MATTER OF RECORD AND HAVE BEEN PROVIDED TO THE CALIFORNIA COASTAL COMMISSION, THE PUBLIC UTILITIES COMMISSION AND THE FEDERAL ENERGY REGULATORY COMMISSION. ACCORDINGLY, IT IS NOT OUR INTENT HERE TODAY TO REHASH ALL OF THESE OPPOSING VIEWPOINTS, BUT RATHER TO HIGHLIGHT THOSE CONSIDERED TO BE OF OVERRIDING IMPORTANCE AND TO SURFACE TWO ADDITIONAL FACTORS WHICH HAVE NOT YET BEEN ADDRESSED. COPIES OF THIS STATEMENT AND SOME OF THE AFOREMENTIONED CORRESPONDENCE WILL BE PROVIDED AT THE CONCLUSION OF MY PRESENTATION.

OF ALL THE FACTORS PREVIOUSLY CITED, THE FOLLOWING ARE CONSIDERED TO BE OF OVERRIDING SIGNIFICANCE:

1. THE VARIOUS ANALYSES WHICH HAVE BEEN CONDUCTED HAVE NOT YET ADDRESSED THE INCOMPATIBILITIES OF LNG OPERATIONS WITH MILITARY TRAINING OPERATIONS, OR VICE VERSUS. THEREFORE, ANY RANKING OF THE CAMP PENDLETON SITE WHICH FAILS TO FULLY CONSIDER AND DOCUMENT SUCH IMPACTS IS INCOMPLETE AND DEFECTIVE.

2. THE MARINE CORPS AND OTHER NAVAL FORCES ARE ASSIGNED SPECIFIC MISSIONS TO INSURE THE COMBAT READINESS OF AMPHIBIOUS FORCES AND ANY FURTHER ENCROACHMENT IN THE CAMP PENDLETON AREA CAN ONLY RESULT IN A DEGRADATION OF OUR ABILITY TO MAINTAIN SUCH MILITARY READINESS. THE DEGRADATION OF MILITARY READINESS IN THIS AREA ULTIMATELY RESULTS IN AN UNFAVORABLE IMPACT UPON THE NATIONAL DEFENSE READINESS POSTURE.

3. LASTLY, THE COST INVOLVED IN RELOCATING PRESENT PERMANENT FACILITIES IN ORDER TO SATISFY POPULATION DENSITY REQUIREMENTS ARE SIGNIFICANT.

ADDITIONALLY, THERE ARE TWO FACTORS WHICH HAVE NOT YET BEEN FULLY CONSIDERED OR ADDRESSED. THE FIRST OF THESE DEALS WITH THE ASSOCIATED REQUIREMENTS FOR ESTABLISHMENT OF AN LNG FACILITY. ANOTHER WAY OF SAYING THIS IS THAT WE HAVE ONLY SEEN THE TIP OF THE ICEBERG. WHAT WILL BE THE SUM TOTAL OF AND/OR THE FULL SPECTRUM OF THE IMPACTS OF ACCESS ROADS, UTILITY SERVICES FOR WATER, ELECTRICITY, SEWAGE, LNG DISTRIBUTION LINES, LOGISTIC SUPPORT FOR SHIPPING AND, LAST BUT NOT LEAST, THE PROBABILITY OF OIL SPILL? THE SECOND OF THESE DEALS

WITH AN ON GOING DEPARTMENT OF DEFENSE DIRECTED STUDY WHICH WILL ANALYSE THE POSSIBLE REALIGNMENT AND RELOCATION OF RECRUIT DEPOTS CURRENTLY LOCATED AT PARRIS ISLAND, SOUTH CAROLINA AND SAN DIEGO, CALIFORNIA. IF SUCH STUDY WERE TO RESULT IN ACTION TO RELOCATE ONE OR BOTH OF THESE DEPOTS TO CAMP PENDLETON, THERE IS A STRONG POSSIBILITY THAT SUPPORTING FACILITIES WOULD BE POSITIONED EAST OF INTERSTATE HIGHWAY 5 AND WEST OF THE COASTAL RANGE AND SOMEWHERE SOUTH OF THE PROPOSED SITE (HORNO CANYON) FOR THE LNG FACILITY. IF THAT WERE TO OCCUR, THERE WOULD UNDOUBTEDLY BE AN INCREASED POPULATION DENSITY PROBLEM WHICH WOULD AGGRAVATE AN ALREADY SENSITIVE SAFETY ISSUE.

THE NAVY AND THE MARINE CORPS CONTINUE TO OPPOSE SITING OF AN LNG FACILITY WITHIN THE CONFINES OF CAMP PENDLETON AND RECOMMEND THAT THE HORNO CANYON SITE BE DROPPED FROM FURTHER CONSIDERATION.

Headquarters Marine Corps News Release, dated 10 May 1978

IN RESPONSE TO MEDIA INQUIRIES CONCERNING THE SELECTION OF MARINE CORPS BASE, CAMP PENDLETON, AS A POSSIBLE SITE FOR A LNG TERMINAL, THE FOLLOWING STATEMENT IS PROVIDED:

"IN DUPLICATE LETTERS TO THE SECRETARY OF THE NAVY AND THE COMMANDANT OF THE MARINE CORPS, DATED 17 FEB 1978, MR. JOSEPH E. BODOVITZ, EXECUTIVE DIRECTOR, CALIFORNIA COASTAL COMMISSION, REQUESTED THE DEPARTMENT OF THE NAVY/MARINE CORPS POSITION AS TO WHETHER THE HORNO CANYON AREA OF CAMP PENDLETON MIGHT BE AVAILABLE THROUGH SALE, LEASE, EXCHANGE, OR OTHER TRANSFER, AND UNDER WHAT CONDITIONS. IN RESPONDING TO THESE LETTERS, GEN. LOUIS H. WILSON, COMMANDANT OF THE MARINE CORPS, STATED THE FOLLOWING IN A LETTER OF 16 MAR 1978:

"BEACH AREAS FRONTING HORNO CANYON ARE A PORTION OF THE ONLY REMAINING BEACH IN SOUTHERN CALIFORNIA SUITABLE FOR MAJOR MARINE CORPS AND NAVY AMPHIBIOUS ASSAULT TRAINING EXERCISES. LIQUIFIED NATURAL GAS FACILITIES IN THIS AREA WOULD CREATE MARITIME HAZARDS FOR SHIPS AND LANDING CRAFT ON MANEUVERS, AS WELL AS FOR LNG TANKER SHIPS AND SHORE INSTALLATIONS.

PIPELINES RADIATING FROM THE TERMINAL CREATE THE POTENTIAL FOR DAMAGE AND ASSOCIATED HAZARDS FROM TROOPS ON MANEUVERS WITH MECHANIZED EQUIPMENT. THE EVER PRESENT HAZARD OF UNEXPLODED ORDNANCE IN TRAINING AREAS BOTH IN AND OUT OF KNOWN IMPACT AREAS COULD PREVENT A CONSTANT DANGER.

FOR COL FRANK
T. BARR, HDQTRS MC - LFF

TROOP MANEUVERS CREATING A HIGH DENSITY OF PERSONNEL IN THE VICINITY OF AN LNG INSTALLATION WOULD CONSTITUTE AN UNACCEPTABLE EXPOSURE TO THE STILL TO BE DETERMINED HAZARDS OF THE LNG OPERATIONS.

OUTSIDE OF THE CONFLICTS WITH MILITARY OPERATIONS, THE LNG DEVELOPMENT WOULD IMPACT ADVERSELY ON AN ECOLOGY WHICH THE MARINE CORPS HAS DILIGENTLY WORKED TO PRESERVE OVER MANY YEARS.

IN SUMMARY, THE COMMANDANT OF THE MARINE CORPS FINDS IT UNACCEPTABLE TO CONSIDER EXPOSING THE MARINES, THEIR DEPENDENTS, AND THE CIVILIAN EMPLOYEES AT CAMP PENDLETON TO THE RISKS ASSOCIATED WITH AN LNG TERMINAL.

FOR REASONS STATED ABOVE, IT IS THE POSITION OF THE DEPARTMENT OF THE NAVY AND THE MARINE CORPS THAT THE HORNO CANYON OR ANY OTHER SITE AT CAMP PENDLETON IS NOT AVAILABLE FOR USE AS AN LNG TERMINAL".

ADDITIONALLY, THE DEPARTMENT OF DEFENSE, IN ITS MOST RECENT ROUND OF BASE CLOSURE AND CONSOLIDATION PROPOSALS ANNOUNCED ON 26 APR, HAS DIRECTED THE MARINE CORPS TO STUDY THE FEASIBILITY OF RELOCATING THE RECRUIT DEPOT AT SAN DIEGO TO CAMP PENDLETON. IF SUCH A MOVE WERE TO OCCUR, CAMP PENDLETON WOULD ACQUIRE A SIGNIFICANT NEW MISSION, A SUBSTANTIAL NUMBER OF ADDITIONAL PERSONNEL AND ADDITIONAL LAND WITHIN THE CONFINES OF THE BASE WOULD BE

REQUIRED TO CONSTRUCT NEW RECRUIT FACILITIES. IT IS CONCEIVABLE THAT LAND IN THE HORNO AREA MAY BE REQUIRED FOR THIS PURPOSE. THIS FURTHER EMPHASISES THE REASONS FOR THE DEPARTMENT OF THE NAVY POSITION THAT NO LAND IS AVAILABLE AT CAMP PENDLETON FOR AN LNG TERMINAL SITE."

I AM CAPTAIN WAYNE COLLINS REPRESENTING THE WESTERN DIVISION, NAVAL FACILITIES ENGINEERING COMMAND, SAN BRUNO, CALIFORNIA. OUR COMMAND HAS REPRESENTED NAVY INSTALLATIONS IN CALIFORNIA IN MANY DISCUSSIONS INVOLVING THE STATE OF CALIFORNIA'S COASTAL MANAGEMENT PROGRAM THROUGHOUT THE LAST FEW YEARS. WE HAVE ALSO COORDINATED NAVY INTERESTS FOR SIMILAR PROGRAMS IN THE STATES OF WASHINGTON AND OREGON. WE ARE SERIOUSLY CONCERNED WITH YOUR STAFF'S RECOMMENDATIONS REGARDING THE PROSPECTIVE USE OF A SITE AT CAMP PENDLETON FOR A LNG TERMINAL. MY COMMENTS ARE RELATED TO THOSE OF GENERAL HOFFMAN'S, BUT MY COMMENTS DO NOT ADDRESS NAVY/MARINE CORPS MISSION INTERFACES DIRECTLY BUT RATHER PINPOINT OBJECTIONS OF A GENERAL PLANNING POINT POLICY/OF VIEW. WHILE THESE COMMENTS RELATE TO THE NAVY/MARINE CORPS SPECIFIC INTERESTS AT CAMP PENDLETON, THEY ALSO GO BEYOND DIRECT SPECIFICS OF THAT SITE.

THE FIRST SUBJECT DEALS WITH YOUR STAFF'S VIEW AS REGARDS PUBLIC SAFETY IN THIS ISSUE. THE STAFF SEEMS TO BE CONCERNED WITH SAFETY, AT LEAST IN SOME AREAS. ALLOW ME TO CITE SEVERAL QUOTES/SUMMARIES OF STATEMENTS IN THE STAFF REPORT DEALING WITH SAFETY:

A. "THE SAFETY OF LNG OPERATIONS REMAINS UNCERTAIN."

B. "THE SINGLE TERMINAL AUTHORIZED....IS TO BE LOCATED AT A SITE REMOTE FROM HUMAN POPULATION IN ORDER TO PROVIDE THE MAXIMUM POSSIBLE PROTECTION TO THE PUBLIC AGAINST THE POSSIBILITY OF ACCIDENT."

C. "THE COMMISSION HAS SERIOUS CONCERNS ABOUT THE ADEQUACY OF MEASURES TO PREVENT AND TO COPE WITH LNG ACCIDENTS AND ABOUT THE RESEARCH UNDERTAKEN SO FAR TO PREDICT THE CONSEQUENCES OF LNG SPILLS, FIRES, AND VAPOR CLOUD DISPERSION."

D. "....THE COMMISSION HAS REMOVED LAS VARAS FROM FURTHER CONSIDERATION AS A LNG TERMINAL SITE TO MINIMIZE RISKS TO PERSONS AND PROPERTY.... EVEN THOUGH THE COMMISSION'S OWN CONSULTANTS BELIEVE THAT DESIGN FEATURES CAN MINIMIZE RISKS DUE TO SURFACE FAULTING."

E. CONDITION 14 WOULD ESTABLISH AN "INDEPENDENT GEOLOGIC SAFETY AND ENGINEERING REVIEW BOARD" TO MAKE RECOMMENDATIONS REGARDING SEISMIC SAFETY.

F. CONDITION 18 WOULD REQUIRE INGROUND LNG TANKS AT HORNO CANYON PARTIALLY TO ENSURE COMPLIANCE WITH PRC SECTION 30253 WHICH REQUIRES MINIMIZATION OF RISK TO LIFE AND PROPERTY.

G. "THERE IS GENERAL AGREEMENT THAT A MAJOR LNG SPILL....COULD HAVE SERIOUS CONSEQUENCES BEYOND 4 MILES."

DESPITE THESE COMMENTS AND RECOMMENDATIONS, THE STAFF'S OVERALL EVALUATION OF THE FIVE SITES IS CONFUSING WITH REGARD TO THE ISSUE OF PUBLIC SAFETY. THE REPORT CITES THE COMMISSION'S RANKING CHARTER FROM THE 1977 LNG TERMINAL ACT AS FOLLOWS: "THE COASTAL COMMISSION SHALL BASE ITS RANKING ON AN EVALUATION OF THE RELATIVE MERITS OF EACH SITE AND SHALL MAKE FINDINGS, APPLYING THE POLICIES, GOALS, AND OBJECTIVES OF CHAPTER 3 (OF THE CALIFORNIA COASTAL ACT OF 1976)." I RECOMMEND EACH COMMISSIONER READ ALL OF CHAPTER 3 OF THE CALIFORNIA COASTAL ACT OF 1976 FOR YOU WILL FIND WITHIN THAT CHAPTER THE FOLLOWING STATEMENTS OR EXTRACTS REGARDING PUBLIC SAFETY:

A. 30250(B): "WHERE FEASIBLE, NEW HAZARDOUS INDUSTRIAL DEVELOPMENT SHALL BE LOCATED AWAY FROM EXISTING DEVELOPED AREAS."

B. 30253: "NEW DEVELOPMENT SHALL: (1) MINIMIZE RISKS TO LIFE AND PROPERTY IN AREAS OF HIGH GEOLOGIC, FLOOD, AND FIRE HAZARD."

C. 30261....(A)....: "TANKER FACILITIES SHALL BE DESIGNED TO.... (2) MINIMIZE THE RISK OF COLLISION FROM MOVEMENT OF OTHER VESSELS.... (B)....LIQUEFIED NATURAL GAS....TERMINALS SHALL BE BUILT ONLY AT SITES REMOTE FROM HUMAN POPULATION CONCENTRATIONS."

D. 30262: "OIL AND GAS DEVELOPMENT SHALL BE PERMITTED....IF THE FOLLOWING CONDITIONS ARE MET: (A) THE DEVELOPMENT IS PERFORMED SAFELY...."

E. 30263: (A) "NEW OR EXPANDED REFINERIES OR PETROCHEMICAL FACILITIES NOT OTHERWISE CONSISTENT WITH THE PROVISIONS OF THIS DIVISION SHALL BE PERMITTED IF....(5) THE FACILITIES IS SITED SO AS TO PROVIDE A SUFFICIENT BUFFER AREA TO MINIMIZE ADVERSE IMPACTS ON SURROUNDING PROPERTY."

IT APPEARS THAT THE CLEAR INTENT OF SECTION 3 OF THE CALIFORNIA COASTAL MANAGEMENT ACT IS TO MAKE SURE COASTAL DEVELOPMENTS NOT ONLY PROTECT PUBLIC ACCESS, RECREATION, MARINE ENVIRONMENT, ETC., BUT TO ALSO ENSURE THAT NEW HAZARDOUS INDUSTRIAL DEVELOPMENTS ARE PLANNED FULLY CONSIDERING PUBLIC SAFETY. DESPITE THIS OBVIOUS INTENT, THE STAFF REPORT SAYS: "SINCE THE SAFETY OF LNG TERMINAL AND TANKER OPERATIONS IS NOT WITHIN THE COMMISSION'S LEGISLATIVE JURISDICTION, ONLY LIMITED STUDY WAS MADE OF THESE SAFETY ISSUES." ADDITIONALLY,: "THE BASIS FOR SITE RANKING IS THE HEAVY WEIGHTING OF COASTAL ACT POLICIES ON RECREATION, PUBLIC ACCESS, PROTECTION OF NATURAL RESOURCES, AND MINIMIZING ADVERSE DEVELOPMENT IMPACTS....LESS WEIGHT HAS BEEN GIVEN TO THE COASTAL ACT POLICIES PROVIDING FOR CONSIDERATION OF TERMINAL COST AND SAFETY DIFFERENCES AT THE SITES."

THESE LAST TWO STATEMENTS CLEARLY CONFLICT WITH THE INTENT OF CHAPTER 3 OF THE CALIFORNIA COASTAL MANAGEMENT ACT AND STAFF'S OWN WORDS QUOTED EARLIER VOICING CONCERN OVER SAFETY ISSUES AND THE OUTRIGHT DISMISSAL OF AT LEAST ONE SITE DUE SOLELY TO SAFETY CONSIDERATIONS. CLEARLY ANY MAJOR LNG TERMINAL RANKING EFFORT BY THE STATE WHICH DOES NOT FULLY INCLUDE ASPECTS OF PUBLIC SAFETY IS LITTLE MORE THAN AN INTERESTING ACADEMIC EXERCISE. THE ISSUE OF PUBLIC SAFETY MUST BE A MAJOR, AND WE WOULD SUGGEST THE PRIME, CONSIDERATION BEFORE A FINAL STATE DECISION ON SITING IS MADE.

IF, IN FACT, YOU FEEL THAT YOUR RANKING CHARTER DOES NOT PERMIT CONSIDERATION FULLY OF PUBLIC SAFETY ISSUES, THEN THIS LIMITATION MUST BE FULLY DISCLOSED

TO THE PUBLIC THROUGH THE MEDIA AND THE OTHER CONSIDERATIONS REGARDING PUBLIC SAFETY ARE NOT APPROPRIATE IN YOUR REPORT - SUCH AS THE DISMISSAL OF ONE OR MORE SITES FOR SAFETY REASONS. IF SAFETY IS A CONSIDERATION IN YOUR FINDINGS, THEN YOU MUST THOROUGHLY EXPLORE ALL ASPECTS OF THE SAFETY ISSUE, NOT JUST THE ONES WHICH ARE MOST FAVORABLE TO A PARTICULAR POINT OF VIEW OR WHICH MIGHT BE MOST EASILY UNDERSTOOD. THE OPERATIONAL HAZARDS AT CAMP PENDLETON, WE BELIEVE ARE MORE SEVERE FROM A PROBABILITY POINT OF VIEW THAN SEISMIC, CONSIDERING THE PROPOSED SITING OF A TRESTLE AND TANKER BERTH IN THE TRACK OF NAVAL SHIPS ON MANEUVERS AND SITING OF THE TERMINAL WHERE IT WOULD BE REGULARLY OVERFLOWN BY ARMED HIGH PERFORMANCE AIRCRAFT AT LOW ALTITUDE IN RESTRICTED AIR SPACE. YOU CANNOT PICK AND CHOOSE THE SAFETY ASPECTS YOU CONSIDER AS THE ONES BEST FITTING EITHER THE ANSWER YOU WANT OR THE ONES YOU BEST UNDERSTAND. YOU MUST LOOK AT THE SAFETY QUESTION CAREFULLY AND COMPLETELY, OR TELL THE WORLD THAT YOUR RANKING HAS NO CONSIDERATIONS REGARDING THE QUESTION OF PUBLIC SAFETY WITHIN IT, BUT IS LIMITED ONLY TO CONSIDERATIONS OF AN ENVIRONMENTAL NATURE.

AS AN ADDED PARENTHETICAL COMMENT ON SAFETY, WE STILL CANNOT UNDERSTAND THE STATE'S POPULATION DESPITE RESTRICTIONS, WHICH ARE CONCERNED ONLY WITH PERMANENT RESIDENTS AND WORKERS NEAR A LNG TERMINAL. WHEN YOU CONSIDER, (1) THAT INTERSTATE 5 IS ABOUT AS CLOSE AS YOU CAN GET TO THE SITE WITHOUT BEING ON IT, (2) AND THE STATE'S PERMANENT POPULATION DENSITY RESTRICTION IS ABOUT 27 PEOPLE LIVING OR WORKING WITHIN ONE MILE OF THE SITE, AND (3) THAT THE STAFF REPORTS THE PEAK DENSITY ON INTERSTATE 5 IN THE VICINITY OF HORNO CANYON TO BE 7,080 PEOPLE PER MILE, IT IS DIFFICULT FOR US TO UNDERSTAND THE RECOMMENDATION THAT THIS IS THE BEST SITE IN CALIFORNIA FOR THIS FACILITY. THE SAFETY ISSUE SHOULD CENTER ON REDUCING THE TOTAL NUMBER OF POTENTIAL CASUALTIES RESULTING FROM THE MAXIMUM CREDIBLE ACCIDENT, NOT WHETHER THEY LIVE OR WORK IN THE AREA ON A REGULAR BASIS. PEOPLE ARE PEOPLE, WHETHER THEY ARE TRANSIENT OR NOT.

I WOULD LIKE TO RAISE ONE LAST QUESTION OF A DIFFERENT NATURE. THIS ENTIRE RANKING ISSUE WITH WHICH YOU ARE EMBROILED IS BEING CARRIED OUT UNDER THE JURISDICTION OF THE STATE'S COASTAL MANAGEMENT PROGRM, WHICH, IN TURN, IS UNDER THE JURISDICTIONAL UMBRELLA OF THE FEDERAL COASTAL MANAGEMENT ACT. I AM CERTAIN YOU ARE AWARE OF THE FOLLOWING LANGUAGE IN THE FEDERAL COASTAL ZONE MANAGEMENT ACT: "EXCLUDED FROM THE COASTAL ZONE ARE LANDS THE USE OF WHICH IS BY LAW SUBJECT SOLELY TO THE DISCRETION OF OR WHICH IS HELD IN TRUST BY THE FEDERAL GOVERNMENT." OBVIOUSLY, NEITHER CAMP PENDLETON, NOR ANY OF THE OTHER NAVY/MARINE CORPS PROPERTY IN CALIFORNIA, IS LOCATED WITHIN THE STATE OF CALIFORNIA'S COASTAL ZONE. THE AUTHORITY OF THIS COASTAL ZONE COMMISSION TO PUBLICLY CONSIDER FUTURE DEVELOPMENT ON THIS NON-EXCESS FEDERAL PROPERTY TO THE EXTENT OF INCLUDING THE SITE IN A PUBLIC RANKING LIST ALONG WITH OTHER SITES WHICH ARE UNDER THE COMMISSION'S JURISDICTION, AND USING RANKING CRITERIA CONTAINED IN THE STATE'S COASTAL MANAGEMENT LEGISLATION, IS QUESTIONED.

THANK YOU FOR PERMITTING THE TIME FOR THESE COMMENTS.

GENTLEMEN -

MY NAME IS BRIGADIER GENERAL CHEATHAM. I AM THE DIRECTOR OF THE FACILITIES AND SERVICES DIVISION OF HEADQUARTERS MARINE CORPS. IN THIS CAPACITY I AM RESPONSIBLE TO THE COMMANDANT FOR THE ADMINISTRATION OF REAL PROPERTY IN THE MARINE CORPS AND THOSE BUILDINGS LOCATED THEREON.

MY PURPOSE FOR APPEARING HERE TODAY IS TO PERSONALLY REEMPHASIZE THE MARINE CORPS' STRONG OPPOSITION TO ANY FURTHER ENCROACHMENT ONTO THE MARINE CORPS' ONLY WEST COAST AMPHIBIOUS TRAINING AREA AT CAMP PENDLETON.

IN HIS LETTER OF 16 MARCH 1978 TO THE EXECUTIVE DIRECTOR OF THE CALIFORNIA COASTAL COMMISSION THE COMMANDANT STATED, IN PART, AND I QUOTE:

"BEACH AREAS FRONTING HORNO CANYON ARE A PORTION OF THE ONLY REMAINING BEACH IN SOUTHERN CALIFORNIA SUITABLE FOR MAJOR MARINE CORPS AND NAVAL AMPHIBIOUS ASSAULT TRAINING EXERCISES. LIQUEFIED NATURAL GAS FACILITIES IN THIS AREA WOULD CREATE MARITIME HAZARDS FOR SHIPS AND LANDING CRAFT ON MANEUVERS AS WELL AS FOR LNG TANKER SHIPS AND SHORE INSTALLATIONS.

PIPELINES RADIATING FROM THE TERMINAL CREATE THE POTENTIAL FOR DAMAGE AND ASSOCIATED HAZARDS FROM TROOPS ON MANEUVERS WITH MECHANIZED EQUIPMENT. THE EVER PRESENT HAZARD OF UNEXPLODED ORDNANCE IN TRAINING AREAS BOTH IN AND OUT OF KNOWN IMPACT AREA COULD PRESENT A CONSTANT DANGER.

TROOP MANEUVERS CREATING A HIGH DENSITY OF PERSONNEL IN THE VICINITY OF AN LNG INSTALLATION WOULD CONSTITUTE AN

UNACCEPTABLE EXPOSURE TO THE STILL TO BE DETERMINED HAZARDS OF THE LNG OPERATION."

IN CLOSING, I WOULD LIKE TO STATE AGAIN THAT THE MARINE CORPS IS STRONGLY OPPOSED TO THE INSTALLATION OF AN LNG TERMINAL AT CAMP PENDLETON. THANK YOU FOR THIS OPPORTUNITY OF ADDRESSING THIS GROUP.

DEPARTMENT OF THE NAVY
HEADQUARTERS UNITED STATES MARINE CORPS
WASHINGTON, D.C. 20380

IN REPLY REFER TO:
CS-LFF-1:rpt
26 Mar 78

AFTER ROUTING ☐ FILE ☐ DESTROY

CODE	INITIAL / DATE
20	3/31
202	
2022	4/3
6	
2012.5	FILES

31 MAR 1978

Mr. Joseph E. Bodovitz
Executive Director
California Coastal Commission
1540 Market Street, Second Floor
San Francisco, California 94102

Dear Mr. Bodovitz:

This is in response to your letters of 17 February 1978 to the Secretary of the Navy and me soliciting the views of the Department of the Navy and the Marine Corps on the possible use of a portion of Marine Corps Base, Camp Pendleton as a liquefied natural gas (LNG) terminal site. The Secretary of the Navy has requested that I respond in his behalf.

In his letter of 26 January 1978, the Commanding Officer, Western Division, Naval Facilities Engineering Command provided valid reasons why the Horno Canyon site at Camp Pendleton cannot be made available for LNG facilities. The reasons are restated for emphasis:

a. Beach areas fronting Horno Canyon are a portion of the only remaining beach in southern California suitable for major Marine Corps and Naval Amphibious Assault Training Exercises. Liquefied natural gas facilities in this area would create maritime hazards for ships and landing craft on maneuvers, as well as for LNG tanker ships and shore installations.

b. Pipelines radiating from the terminal create the potential for damage and associated hazards from troops on maneuvers with mechanized equipment. The ever present hazard of unexploded ordnance in training areas both in and out of known impact areas could present a constant danger.

c. Troop maneuvers creating a high density of personnel in the vicinity of an LNG installation would constitute an unacceptable exposure to the still to be determined hazards of the LNG operation.

CS-LFF-1:rpt

d. Outside of the conflicts with military operations, the LNG development would impact adversely on an ecology which the Marine Corps has diligently worked to preserve over many years.

In summary, I find it unacceptable to consider exposing the Marines, their dependents, and the civilian employees at Camp Pendleton to the risks associated with a LNG terminal. Accordingly, the Horno Canyon or any other site at Camp Pendleton should not be considered for use as a LNG terminal.

I hope the above is satisfactory for your purposes.

Sincerely,

LOUIS H. WILSON
General, U.S. Marine Corps
Commandant of the Marine Corps

Blind copy to:
COMNAVFACENGCOM
CG MCB Camp Pendleton
CO WESTNAVFACENGCOM

STATEMENT OF ROBERT R. TALLEY, SENIOR PLANNER, WESTERN DIVISION, NAVAL FACILITIES ENGINEERING COMMAND, TO CALIFORNIA PUBLIC UTILITIES COMMISSION, MAY 12, 1978.

GOOD MORNING, _____. FOR THE RECORD, MY NAME IS ROBERT ROSS TALLEY. I'M A SENIOR PLANNER REPRESENTING THE COMMANDING OFFICER, WESTERN DIVISION, NAVAL FACILITIES ENGINEERING COMMAND, SAN BRUNO, CALIFORNIA. MY OFFICE IS RESPONSIBLE FOR THE PHYSICAL PLANNING FOR ALL NAVY AND MARINE CORPS PROPERTY ON THE WEST COAST.

OUR COMMAND HAS BEEN INVOLVED EXTENSIVELY IN THE ANALYSES OF VARIOUS PROPOSALS TO LACATE LNG TERMINAL FACILITIES IN SOUTHERN CALIFORNIA SINCE EARLY IN 1975. AT THAT TIME, THE THEN FEDERAL POWER COMMISSION WAS CONSIDERING PROPOSALS TO SITE LNG FACILITIES AT OXNARD, LONG BEACH AND POINT CONCEPTION. THE DEPARTMENT OF THE NAVY BECAME AN INTERESTED PARTY TO THOSE PROCEDINGS BECAUSE OF OUR CONCERN OVER THE POTENTIAL IMPACTS SUCH FACILITIES COULD HAVE ON OUR ON-SHORE AND OFF-SHORE OPERATIONAL AREAS.

IN 1975 AND 1976 THE NAVAL CIVIL ENGINEERING LABORATORY AT PORT HUENUME, AND OUR COMMAND, CONDUCTED A DETAILED ANALYSIS OF THE OPERATION OF LNG TERMINAL FACILITIES AND WHAT SPECIFIC IMPACTS AND CONSTRAINTS A TERMINAL AND RELATED SHIP TRANSITS WOULD HAVE ON THE MISSIONS OF THE PACIFIC MISSILE TEST CENTER AT POINT MUGU, AND ON FLEET MANUEVERS OFF THE COAST. MUCH OF THAT ANALYSIS OF THE SAFETY AND OPERATIONAL CONFLICTS WAS FORWARDED AS THE NAVY'S OFFICIAL RESPONSES TO THE DRAFT ENVIRONMENTAL IMPACT REPORT AND DRAFT ENVIRONMENTAL IMPACT STATMENT PREPARED BY THE CITY OF OXNARD AND THE FEDERAL POWER COMMISSION, RESPECTIVELY. IT WAS DETERMINED BY THE NAVY THAT AN LNG FACILITY AT OXNARD, LONG BEACH OR POINT CONCEPTION COULD POSSIBLY BE ACCEPTABLE WITH RESPECT TO NAVAL OPERATIONS, HOWEVER CLOSE COORDINATION WOULD BE IMPERATIVE IN ORDER TO AVOID SERIOUS

IN THE INSTANT CASE THE NAVY HAS REVIEWED THE FIVE SITES NOMINATED IN JANUARY FOR CONSIDERATION BY THE CALIFORNIA COASTAL COMMISSION. INCLUDED IN A LETTER FROM OUR COMMAND TO THE EXECUTIVE DIRECTOR OF THE COASTAL COMMISSION DATED JANUARY 26, 1978, WERE THE NAVY DEPARTMENT'S RECOMMENDATIONS FOR LNG TANKER ROUTES AND OTHER CONTROLS WHICH WOULD MINIMIZE CONFLICTS WITH NAVAL OPERATIONS. IN THAT SAME LETTER SEVERAL REASONS WERE POINTED OUT AS TO WHY THE NAVY DEPARTMENT CONSIDERS THE CAMP PENDLETON LNG SITE TO BE TOTALLY UNACCEPTABLE. THE LETTER WAS SUBMITTED TO YOUR SAN FRANCISCO OFFICE ON FEBRUARY 13, 1978, AND SUBSEQUENTLY TO THE FEDERAL ENERGY REGULATORY COMMISSION. FOR THE REASONS STATED THEREIN THE DEPARTMENT OF THE NAVY REQUESTED THAT CAMP PENDLETON BE DROPPED FROM FURTHER CONSIDERATION. THIS BRINGS US UP TO THE PRESENT WHICH COLONEL FRANK HAS SUMMARIZED. AS HE INDICATED, WE ARE READY TO ASSIST YOU IN THE DEVELOPMENT OF ANY ADDITIONAL INFORMATION YOU MAY NEED TO FULLY APPRECIATE WHAT HAS BEEN SAID TO DATE. I WOULD LIKE TO AFFIRM, ON BEHALF OF THE COMMANDING OFFICER OF THE WESTERN DIVISION, NAVAL FACILITIES ENGINEERING COMMAND, THAT WE WILL DEDICATE OUR CONSIDERABLE EXPERIENCE IN THIS SUBJECT TO THAT TASK. IT HAS BEEN A PLEASURE TO HAVE THIS OPPORTUNITY TO SPEAK ON THIS MATTER OF COMMON CONCERN. THANK YOU.

09P:AWC:lms
23 JAN 1978

Mr. Joseph E. Bodovitz, Executive Director
California Coastal Commission
1540 Market Street, 2nd Floor
San Francisco, California 94102

Dear Mr. Bodovitz:

Your public announcement of 11 January 1978 listing four coastal sites for further LNG terminal consideration and calling for a public hearing on this subject on 18 January was received at this Command on 16 January. The announcement called for written comments to be provided by 24 January.

This letter is an interim reply, meeting the 24 January submission date, which vigorously objects to consideration of any Camp Pendleton property for use as an LNG terminal and is seriously concerned with other Southern California proposed locations which would impact adversely upon offshore fleet and Missile Test Center, Point Mugu, operations. The lack of any on-site Navy or Marine Corps coordination of the study efforts to date which apparently have concluded that the Camp Pendleton site should be further studied, coupled with the public notation that the Coastal Commission has recommended transfer of further Camp Pendleton property for state park use are inappropriate. Camp Pendleton property is not available for LNG terminal use or further state park use.

Lack of advance notification of any staff coordination on this subject makes a thorough reply to your 16 January announcement impossible by 24 January. This letter will serve as an interim reply pending a more complete Navy position which will be provided by 15 February 1978.

Sincerely,

PAUL D. OLSON
Captain, CEC, USN
Commanding Officer

bbc: 09P, 20, 202

Blind copy to:

CNO (OP-642)	CG FMFPAC
NAVFACENGCOM	MCB CAMP PENDLETON
COMELEVEN	PACMISTESTCEN POINT MUGU
CINCPACFLT	CIVENGRLAB PORT HUENEME
COMNAVAIRPAC	WESTNAVFACENGCOMBRO SAN DIETO
COMNAVSURFPAC	

2022.6:GBW:hs
Ser P2-212

12 APR 1978

California Coastal Commission
631 Howard Street, Fourth Floor
San Francisco, California 94105

Subj: Proposed Liquefied Natural Gas (LNG) Terminal at Camp Pendleton

Gentlemen:

The Department of the Navy is specifically concerned with the nomination of Marine Corps Base (MCB), Camp Pendleton, as an alternate LNG terminal site and the effects an LNG facility, as proposed, would have on the mission and operational capability of the base and related offshore areas. Upon analysis of the proposal, the Navy has determined that location of an LNG facility at Camp Pendleton would have a severely adverse impact on the base. This Command notified the California Coastal Commission on 26 January 1978 and the California Public Utilities Commission on 13 February 1978, that Camp Pendleton is not available for use as an LNG terminal and should not be considered as a viable site. The Commandant of the Marine Corps, on 16 March 1978, responding also for the Secretary of the Navy, has advised the California Coastal Commission that the Camp Pendleton site is not available.

While the findings reported in the Arthur D. Little, Incorporated DEIR Technical Report No. 23, "Alternative Site Analysis," dated December 1977, appear accurate as far as they go, they do not go far enough. Nowhere is addressed the adverse impact an LNG terminal would have on the military training operations conducted in the area, and the adverse impact on the LNG operations that this military training would impose. Specific impacts are illustrated in the report and maps enclosed. When these are considered, the LNG proposal is revealed as an untenable encroachment incompatible with national security needs.

2022.6:CBW:hs
Ser P2-212

12 APR 1978

For the Marine Corps and Naval forces to continue to perform their assigned missions and tasks of maintaining military readiness, Camp Pendleton must be retained in its present land use. Any further encroachment cannot be accepted in view of the national defense mission assigned.

Sincerely,

PAUL D. OLS...
Captain, CEC, USN
Commanding Officer

Enclosures

Copy to: (w/o encl)
Comprehensive Planning Organization
of the San Diego Region
Security Pacific Plaza, Suite 524
1200 Third Avenue
San Diego, California 92101

California Public Utilities Commission
California State Building
San Francisco, California 94102

Mr. Robert Arvedlund
Federal Energy Regulatory Commission
825 N. Capitol Street, Room 6112
Washington, DC 20426

SITE EVALUATION

PROPOSED LNG TERMINAL AT CAMP PENDLETON

The location of an LNG terminal at Camp Pendleton is considered incompatible with, and detrimental to, Camp Pendleton's capability to perform its vital mission. Camp Pendleton provides the Pacific Fleet and other military forces with the only existing amphibious landing site where all aspects of amphibious training, support, and follow-through capabilities can take place for evaluation and testing concurrently. These operations include the following, and are illustrated on Figures 1 through 4:

a. Mine sweeping by both helicopters and sea vessels;

b. Troop and equipment movements by air (helicopters and airdrops) other than ship-to-shore;

c. High speed reconnaissance by both air and water craft;

d. Offshore combatants simulating shore bombardment;

e. Ship-to-shore movement of troops and equipment during all periods of the day and/or night, and conditions of visibility via boat, amphibious vehicle, tanker landing ship, and helicopter; and

f. High performance fixed wing aircraft flying low level bombardment approaches to the ordnance impact areas.

The Arthur D. Little report also evaluated the Camp Pendleton site based on criteria of the State of California Legislature's requirements (SB1081) for siting LNG terminals. Their findings identified the areas falling within the one-mile and the four-mile SB1081 population criteria. Records show, however, that during 1977, within one mile of the proposed LNG site, the 27-man density figure established by SB1081 was exceeded two-thirds of the year.

Investigation of the site at Camp Pendleton locates the proposed site approximately 2.3 miles north of Red Beach, the base's primary amphibious landing zone, and directly in the path of air and sea support operations conducted at Camp Pendleton. Current utilization of the areas adjacent to the proposed site (and within the one-mile distance delineated in SB1081 LNG siting criteria) are Beach Section B and areas--Uniform, Romeo II, and Papa II (Figure 1). Because Camp Pendleton is both remote (for a purpose) and the only remaining location with full amphibious capabilities available to the military, the training areas are consistently used by all services which have amphibious units (Army, Navy, and National Guard, as well as Marine Corps). During 1977, records show that the training areas within one mile of the proposed site area were occupied an average of 200 days out of the year. (See the chart on the next page.)

Listed Areas Impacted by LNG Up to 4 Miles

Beach Area		West of I5		East of I5	
Zone	Days	Zone	Days	Zone	Days
B*	204	Uniform	235	Romeo I	119
C	209	Victor	236	Romeo II*	135
D	212			Romeo III	100
E	219			Papa I	255
CP AVA	203			Papa II*	257
CP AAA	200			Oscar II	259

*Within one mile of site.

In addition to the land operations at Camp Pendleton, essential sea and air operations are conducted. The construction of a 9,000-foot trestle (associated with the LNG terminal) extending seaward would be in the direct path frequently used by naval vessels (Figure 2). The trestle would also present a major navigation hazard to transient vessels moving in shallow water parallel to the coast. This hazard would also apply to commercial and private vessels when the area is unrestricted. The Navy is also concerned about the potential of hazards and restrictions that could develop due to LNG tanker traffic in "blue water" operating areas (Figure 3). The Navy is involved in the testing and the training of personnel in the evaluation and handling of explosive ordnance in these areas. Accidents do occur, and the compounded hazard of LNG tankers would severely restrict naval operations.

Furthermore, the siting of an LNG terminal encroaches into military restricted air space controlled by Camp Pendleton, Zone R2533 (low altitude) and R2503 (high altitude). Within these two controlled air zones, Camp Pendleton controls two aircraft bombing and strafing impact areas (Zulu and Whiskey impact areas) (Figure 4).

The siting of an LNG terminal at Camp Pendleton's beach would present a severe hazardous condition in conjunction with flight operations. The flight operations conducted at Camp Pendleton are of two basic types. The first type is the use of helicopters to transport personnel and equipment to beach areas during amphibious operations. (Also, helicopters are in constant flight operation in the vicinity of the proposed LNG site practicing touch-and-go landings and general flight proficiency.) The second type of flight operations involves the use of high performance fixed wing aircraft conducting air strikes to the bombing and strafing impact areas located in Zone R2503. During 1977, Camp Pendleton recorded 99 days during which ordnance strikes were made into the bombing impact areas. The low altitude approach pattern into the impact area is located directly over the proposed LNG site and through the Horno Canyon.

Current Marine Corps and Navy-owned lands and restricted operating areas are considered vital to maintain military readiness. Any encroachment severely restricting fleet operation is a serious adverse impact on fleet capabilities to carry out its assigned mission and tasks. The ultimate effect of adverse encroachment in the Southern California operating areas seriously jeopardizes the fleet readiness, increases operating costs, affects homeporting, and incurs potential community impacts.

The above discussion of the operational and training activities which occur at Camp Pendleton demonstrates how an LNG facility would be incompatible with current military and naval usage of this coastal area. Approval of the LNG project would no doubt mean the abandonment of Camp Pendleton as a training area which is vital to the nation's defense needs. Since the beachfront and offshore waters provide a location which cannot be duplicated on the West Coast, this unique training facility and its support units would have to be relocated to some other coastal area, if a suitable replacement facility could be found. The DEIR fails to consider the socio-economic impacts such an abandonment would create in terms of lost jobs, disruption of the local economy, federal support of local schools, and degradation of the nation's defense posture.

In conclusion, the Navy has found that use of Camp Pendleton for an LNG terminal site would be highly incompatible with national security needs, and the base is not available for nonmilitary uses.

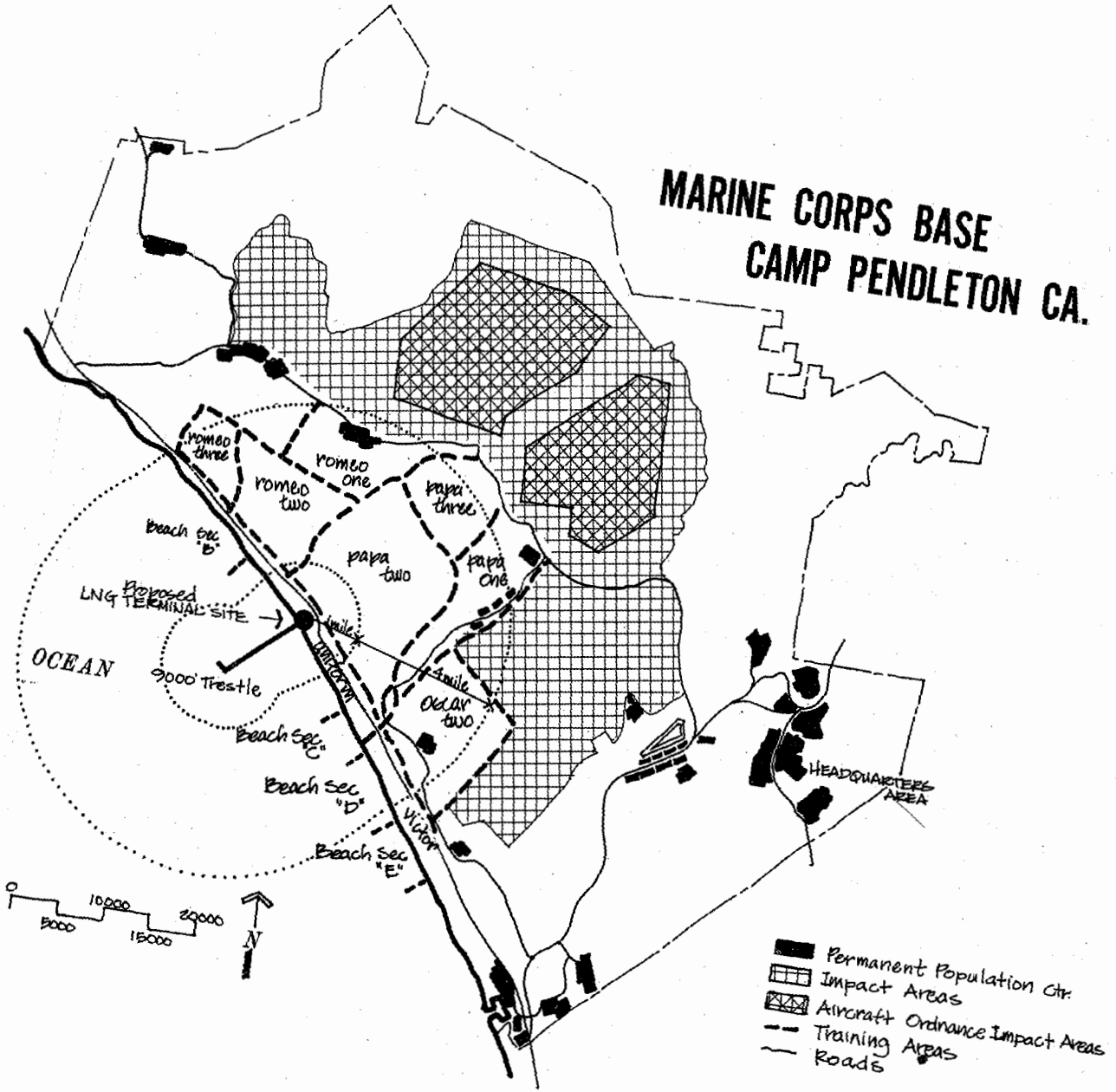

MARINE CORPS BASE
CAMP PENDLETON CA.
PACIFIC
OCEAN
romeo three
romeo two
romeo one
papa three
papa two
papa one
oscar two
Beach Sec "B"
Proposed LNG TERMINAL SITE
1mile
1mile
INTERSTATE 5
9000' Trestle
Beach Sec "C"
Beach Sec "D"
Beach Sec "E"
VICTOR
HEADQUARTERS AREA
5000
10000
15000
20000
N
Permanent Population Ctr.
Impact Areas
Aircraft Ordnance Impact Areas
Training Areas
Roads

figure 1

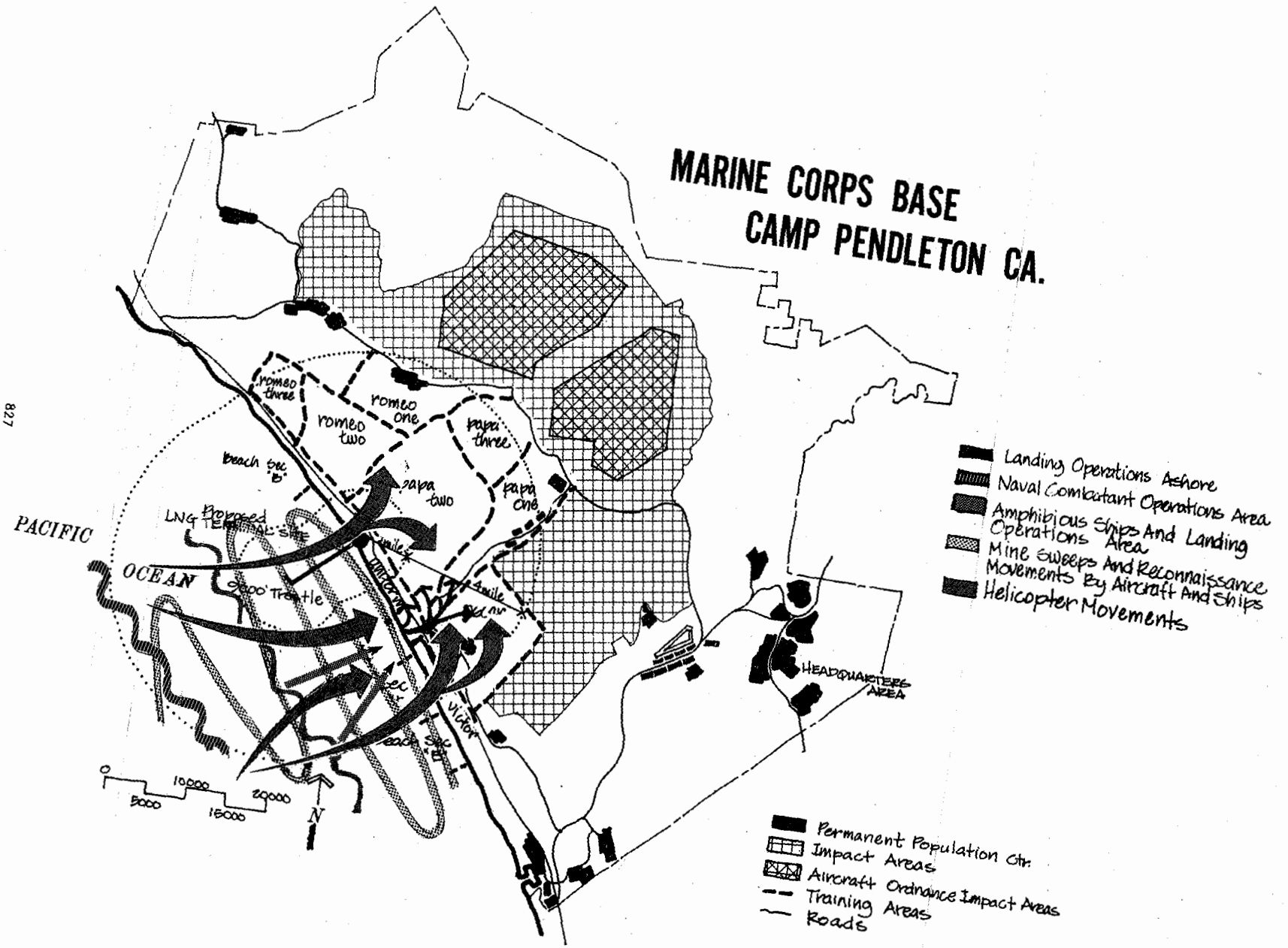
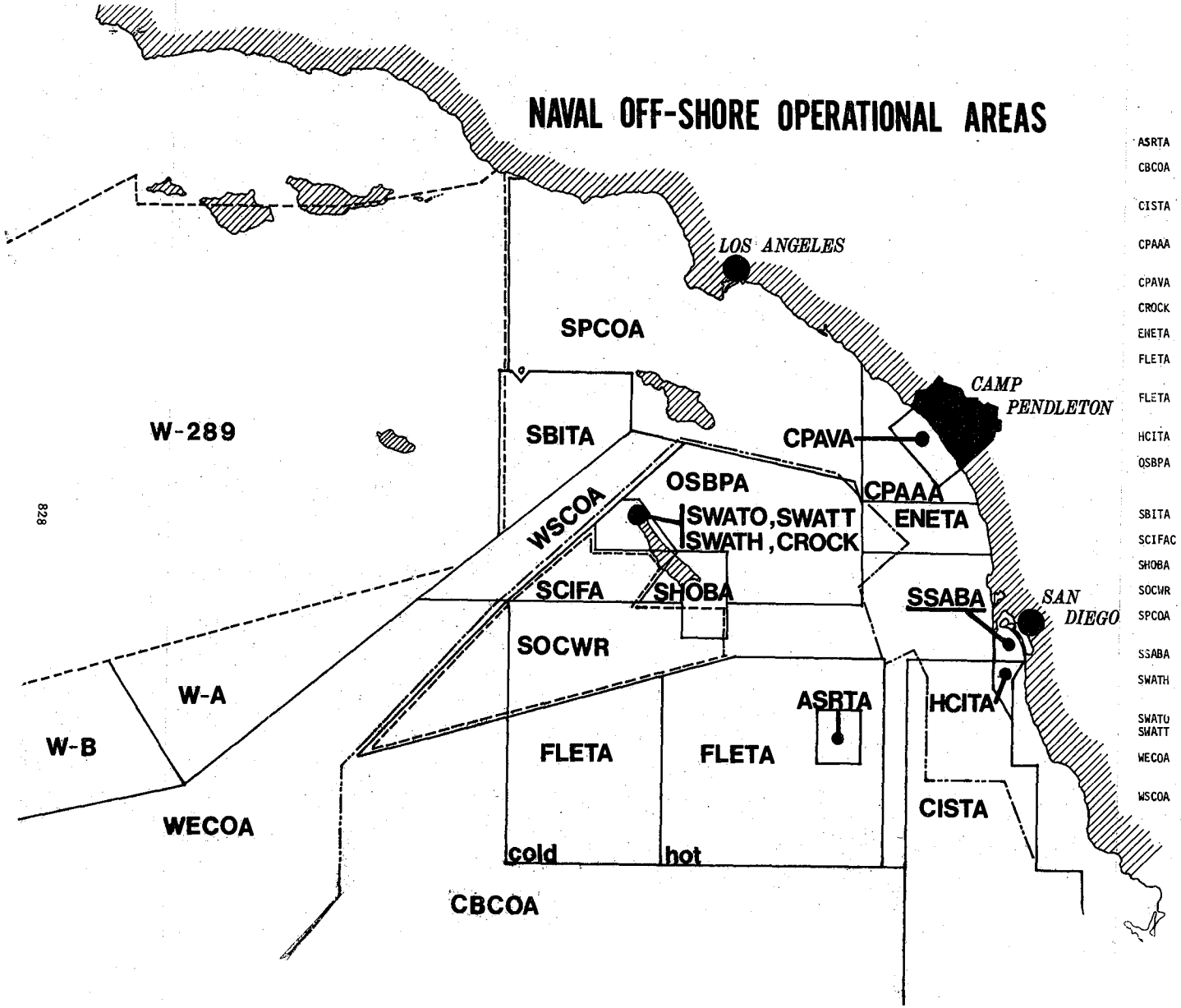

MARINE CORPS BASE
CAMP PENDLETON CA.
PACIFIC
OCEAN
romeo three
romeo two
romeo one
papa three
papa two
papa one
Beach Sec "B"
LNG Proposed TERMINAL SITE
9000' Trestle
HEADQUARTERS AREA
victor
0
10000
20000
5000
15000
N
Landing Operations Ashore
Naval Combatant Operations Area
Amphibious Ships And Landing Operations Area
Mine Sweeps And Reconnaissance
Movements By Aircraft And Ships
Helicopter Movements
Permanent Population Ctr.
Impact Areas
Aircraft Ordnance Impact Areas
Training Areas
Roads

figure 2

NAVAL OFF-SHORE OPERATIONAL AREAS



ASRTA	Rocket Thrown Torpedo
CBCOA	Carrier Operations, Air Intercept Control, No Ordnance
CISTA	Anti-Submarine Training, Some Ordnance Firing
CPAAA	Simulated Low Level Bombing, Simulated Rocket Firing
CPAVA	Amphibious Operations
CROCK	Low Level Bombing
ENETA	Encinitas Naval Electronic Test Area
FLETA	(Cold) Intensive Air & Surface Operations
FLETA	(Hot) Intensive Air & Surface Operations Involving Live Ordnance
HCITA	Helicopter Training
OSBPA	Rocket Thrown Torpedo, Surface Launched Torpedo, Carrier Operations, Submarine Operations
SBITA	Air Combat Maneuvering, Missile Impact
SCIFAC	Anti-Air Gunnery
SHOBA	Ship Gunnery
SOCWR	Special Weapons Firing (used infrequently)
SPCOA	Independent Steaming Exercises, No Ordnance Except Small Arms & Torpedo
SSABA	Amphibious Landings, Fleet Anchorages
SWATH	UDT & Seal Team Training, No Ordnance Firing
SWATO SWATT	UDT & Seal Team Training, Land Demolitions Only
WECOA	Carrier Operations & Submarine Warfare, Surface Gunnery
WSCOA	Fleet Training, Some Weapons Test Firing

figure 3

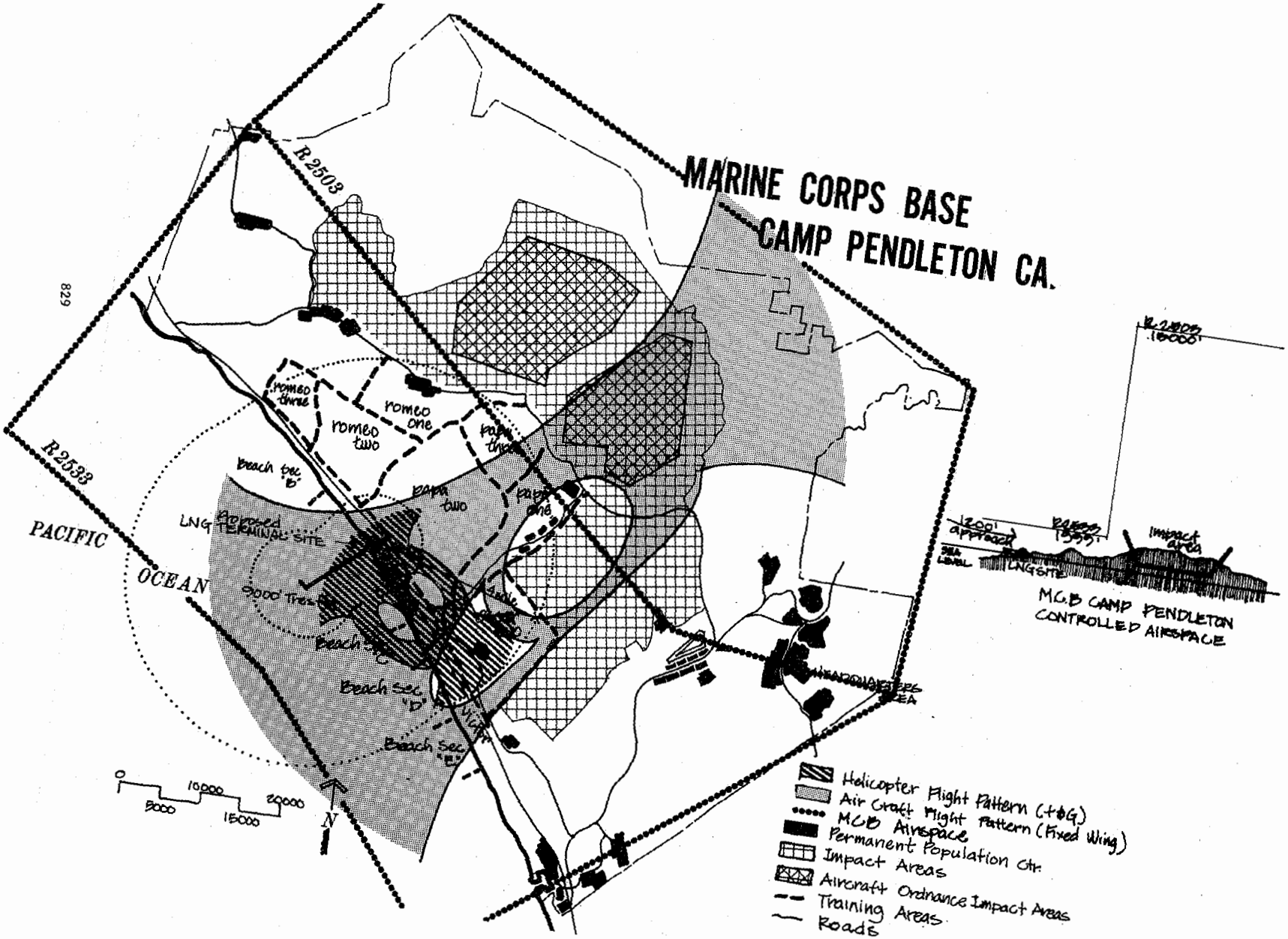


figure 4

☆ U. S. GOVERNMENT PRINTING OFFICE: 1978 O - 276-119