BEFORE THE
FEDERAL POWER COMMISSION

IN THE MATTER OF
PACIFIC INDONESIA LNG COMPANY

DOCKET NO. CP74—

DETAILED ENVIRONMENTAL ANALYSIS
CONCERNING

A PROPOSED
LIQUEFIED NATURAL GAS FACILITY

FOR
PACIFIC INDONESIA LNG COMPANY

JANUARY 1974

DAMES & MOORE

108

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1.0 DESCRIPTION OF THE PROPOSED ACTION

Pacific Indonesia LNG Company (Applicant) proposes to construct ship unloading, transfer, storage, and vaporization facilities at Port Hueneme and Oxnard, California, for the importation of liquefied natural gas (LNG). This report discusses importation at rates up to the equivalent of one billion cubic feet of natural gas per day. However, Applicant proposes to install facilities at this time capable of handling LNG purchased in Indonesia equivalent to 546 MMcfd. The gas will be used in the public utility gas system of Southern California Gas Company (SoCal), an affiliate which serves or supplies nearly all of Southern California.

1.1 PURPOSE

Imported LNG is needed to offset the decline in gas supplies from domestic sources in a region which for historical and economic reasons has become uniquely dependent upon natural gas for fuel.

The proposed project is to provide facilities for unloading LNG ships, transfer of LNG to above-ground storage, vaporization, odorization, measurement, and delivery into the gas transmission system of SoCal for distribution to customers throughout Southern California.

The added gas supply to be made available is needed to meet the requirements of over 3.5 million firm residential, commercial, and small industrial customers served by SoCal, San Diego Gas & Electric Company, and the City of Long Beach

Municipal Gas Department. The project will not result in any surplus supply which could help satisfy a supply deficiency in other regions outside of Southern California.

It is estimated that by 1978 the total annual primary gas supply for the Southern California area served by SoCal at retail and at wholesale to the San Diego Gas & Electric Company and the City of Long Beach Municipal Gas Department will be less than the 1978 annual firm requirements under cold-year conditions, and the 1979 gas supply will be short of the 1979 need under average-year conditions, unless an additional primary supply is added to the present sources. The initial new primary gas supply from this project at the FPC application rate of 546 MMcfd annual daily average level will defer an annual supply deficiency for firm requirements for 3 years under cold-year conditions and for 4 years under average-temperature conditions.

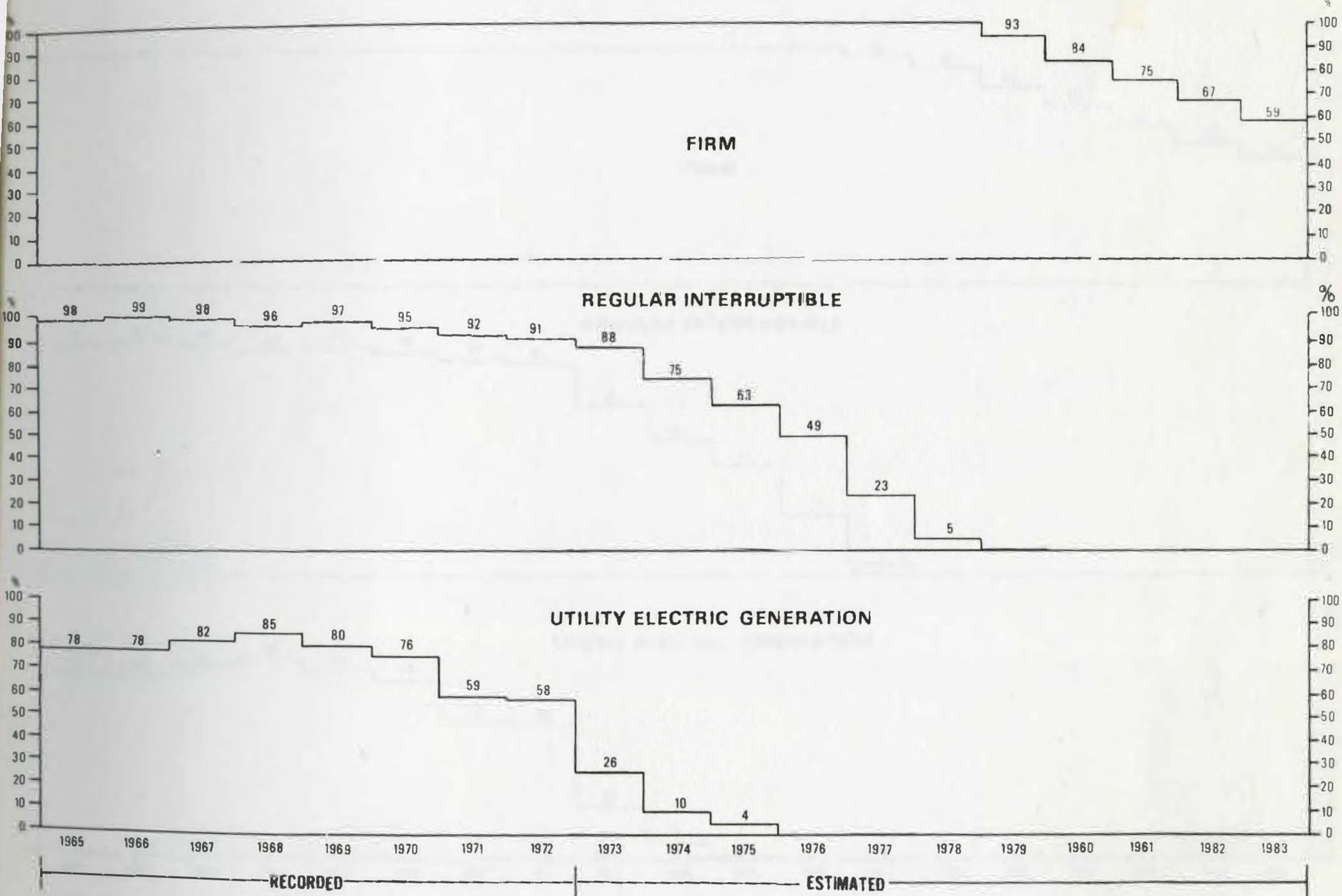
A detailed description of the SoCal experience and estimated supply requirements is set forth in the table and on the plates which follow. Table 1.1-I compares supply and requirements by sources and class of service on an annual basis for the recorded years 1965 through 1972 and as estimated from 1973 through 1983. Plate 1.1-1 shows recorded and estimated levels of service, by classes, from 1965 through 1983, on an average-temperature-year basis, assuming the forecast decline in present out-of-state supplies and no additional supply increments. Plate 1.1-2 shows the same data on a cold-year basis.

In short, the project is designed to provide gas which will, in part, enable SoCal to meet the annual and peak-day requirements of its firm customers.

Pacific Lighting Service Company
Southern California Gas Company

LEVELS OF RETAIL SERVICE RECORDED 1965-1972
AND ESTIMATED 1973-1983
ASSUMING DECLINE IN PRESENT LEVELS OF OUT-OF-STATE
SUPPLY AND NO ADDITIONAL SUPPLY INCREMENTS

AVERAGE YEAR CONDITIONS



Pacific Lighting Service Company
Southern California Gas Company

LEVELS OF RETAIL SERVICE RECORDED 1965-1972
AND ESTIMATED 1973-1983
ASSUMING DECLINE IN PRESENT LEVELS OF OUT-OF-STATE
SUPPLY AND NO ADDITIONAL SUPPLY INCREMENTS

COLD YEAR CONDITIONS

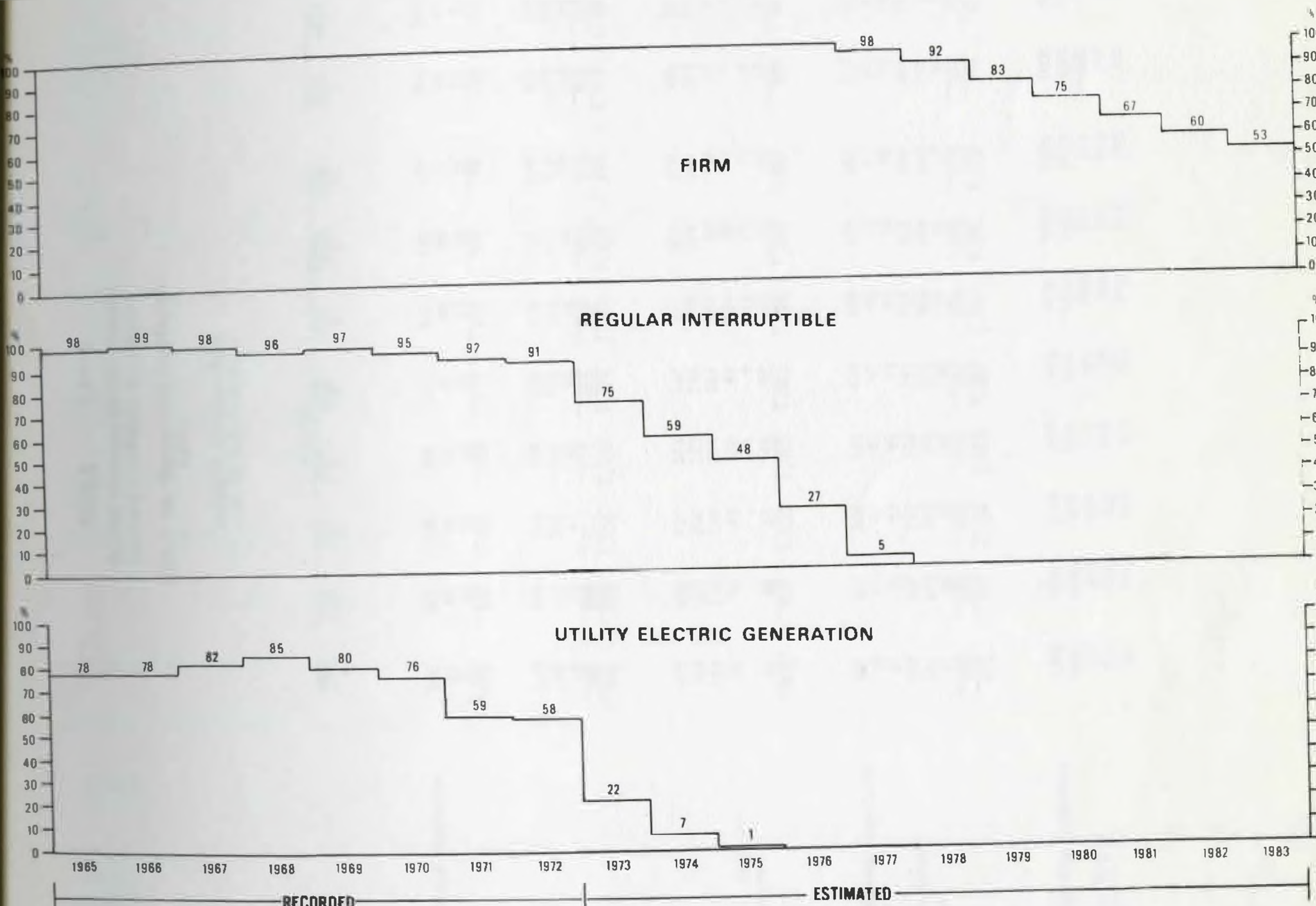


TABLE 1.1-I

Pacific Lighting Service Company
Southern California Gas Company

SUPPLY AND REQUIREMENTS COMPARISONS
ANNUAL

Billions of Cubic Feet
14.73 psia - 60^{o}F.

Line		RECORDED 1965 A	1966 B	1967 C	1968 D	1969 E	1970 F	1971 G	1972 H
	REQUIREMENTS								
	Firm Requirements								
1.	Firm Retail Other than Underground Storage Injection	366	367	394	398	425	430	478	449
2	Firm Wholesale	39	40	42	41	41	46	55	52
3.	Underground Storage Injection	47	43	53	50	53	43	54	39
4	Total Firm Requirements	452	450	489	489	519	519	587	540
	Interruptible Requirements								
5.	Regular Interruptible Retail	130	149	165	184	198	204	221	230
6.	Utility Electric Retail	310	363	391	422	402	425	417	450
7.	Wholesale	54	58	61	65	55	65	65	73
8.	Total Interruptible Requirements	494	570	617	671	655	694	703	753
9.	Total Requirements	946	1,020	1,106	1,160	1,174	1,213	1,290	1,293
	SUPPLY								
10.	Purchases from El Paso	477	479	531	543	552	571	609	636
11.	Purchases from Transwestern	154	163	206	230	244	274	274	271
12.	Receipts from California Sources	149	178	189	201	187	137	95	59
13.	Receipts from Pacific Gas and Electric Company	48	76	49	60	43	54	49	46
14.	Receipts from California Federal Offshore	-	-	-	1	5	12	15	10
15.	Underground Storage Withdrawal	44	40	55	48	52	45	51	46
16.	Total Supply Taken	872	936	1,030	1,083	1,083	1,093	1,093	1,068
	DELIVERIES								
17.	Firm Retail Other than Underground Storage Injection	366	367	394	398	425	430	478	449
18.	Firm Wholesale	39	40	42	41	41	46	55	52
19.	Underground Storage Injection	47	43	53	50	53	43	54	39
20.	Interruptible - Regular Interruptible Retail	127	147	162	178	191	194	204	209
21.	- Utility Electric Retail	242	283	321	357	323	323	246	262
22.	- Wholesale	51	56	58	59	48	57	56	57
23.	- Total	420	486	541	594	562	574	506	528
24.	Total Deliveries	872	936	1,030	1,083	1,081	1,093	1,093	1,068
	PORTION OF REQUIREMENTS SERVED								
25.	Firm Retail Other than Underground Storage Injection	100%	100%	100%	100%	100%	100%	100%	100%
26.	Firm Wholesale	100%	100%	100%	100%	100%	100%	100%	100%
27.	Interruptible - Regular Interruptible Retail	98%	99%	98%	97%	96%	95%	92%	91%
28.	- Utility Electric Retail	78%	78%	82%	85%	80%	76%	59%	58%
29.	- Wholesale	94%	97%	95%	91%	87%	88%	86%	78%

Line		ESTIMATED AVERAGE YEAR WITHOUT INCREMENT 1973 I	1974 J	1975 K	1976 L	1977 M	1978 N	1979 O	1980 P	1981 Q	1982 R	1983 S
	REQUIREMENTS											
	Firm Requirements											
1.	Firm Retail Other than Underground Storage Injection	464	473	484	497	504	515	524	536	544	554	565
2	Firm Wholesale	64	67	69	71	72	74	75	76	76	76	77
3.	Underground Storage Injection	54	82	62	79	90	97	81	57	38	24	11
4	Total Firm Requirements	582	622	615	647	666	686	680	669	658	654	653
	Interruptible Requirements											
5.	Regular Interruptible Retail	233	244	258	276	287	300	307	316	324	332	338
6.	Utility Electric Retail	520	590	628	677	737	794	836	826	840	824	791
7.	Wholesale	96	105	117	130	140	149	157	144	129	128	129
8.	Total Interruptible Requirements	849	939	1,003	1,083	1,164	1,243	1,300	1,286	1,293	1,284	1,258
9.	Total Requirements	1,431	1,561	1,618	1,730	1,830	1,929	1,980	1,955	1,951	1,938	1,911
	SUPPLY											
10.	Purchases from El Paso	596	532	485	441	399	366	337	313	289	268	246
11.	Purchases from Transwestern	273	266	236	219	206	190	171	157	142	127	114
12.	Receipts from California Sources	50	44	44	46	43	42	43	40	38	35	34
13.	Receipts from Pacific Gas and Electric Company	-	-	-	-	-	-	-	-	-	-	-
14.	Receipts from California Federal Offshore	8	6	5	9	18	27	30	33	33	33	32
15.	Underground Storage Withdrawal	29	43	63	94	90	97	81	57	38	24	11
16.	Total Supply Taken	956	891	833	809	756	722	662	600	540	487	437
	DELIVERIES											
17.	Firm Retail Other than Underground Storage Injection	464	473	484	497	504	515	486	449	409	372	336
18.	Firm Wholesale	64	67	69	71	72	74	70	64	58	51	43
19.	Underground Storage Injection	54	82	62	79	90	97	81	57	38	24	11
20.	Interruptible - Regular Interruptible Retail	204	182	163	136	66	14	-	-	-	-	-
21.	- Utility Electric Retail	136	57	28	-	-	-	-	-	-	-	-
22.	- Wholesale	34	30	27	26	24	22	25	30	35	40	47
23.	- Total	374	269	218	162	90	36	25	30	35	40	47
24.	Total Deliveries	956	891	833	809	756	722	662	600	540	487	437
	PORTION OF REQUIREMENTS SERVED											
25.	Firm Retail Other than Underground Storage Injection	100%	100%	100%	100%	100%	100%	93%	84%	75%	67%	59%
26.	Firm Wholesale	100%	100%	100%	100%	100%	100%	93%	84%	76%	67%	56%
27.	Interruptible - Regular Interruptible Retail	88%	75%	63%	49%	23%	5%	-	-	-	-	-
28.	- Utility Electric Retail	26%	10%	4%	-	-	-	-	-	-	-	-
29.	- Wholesale	35%	29%	23%	20%	17%	15%	16%	21%	27%	31%	36%

TABLE 1.1-I

1.2 LOCATION

The general location of the Applicant's proposed LNG terminal and its orientation with respect to the boundaries of the state and SoCal's major gas transmission pipeline system are shown on Plate 1.2-1. The proposed facilities are approximately 60 highway miles from the center of the city of Los Angeles, which is the load center for SoCal's public utility gas system.

Ventura County lies on the Pacific Coast of California, immediately northwest of the Los Angeles metropolitan area. The County has a coastline of approximately 40 miles and contains a total of 1,865 square miles, about half of which is mountainous. At the time of the 1970 census, it had a population of 378,500 persons. The LNG plant is about 11 miles south of the city of Ventura (county seat).

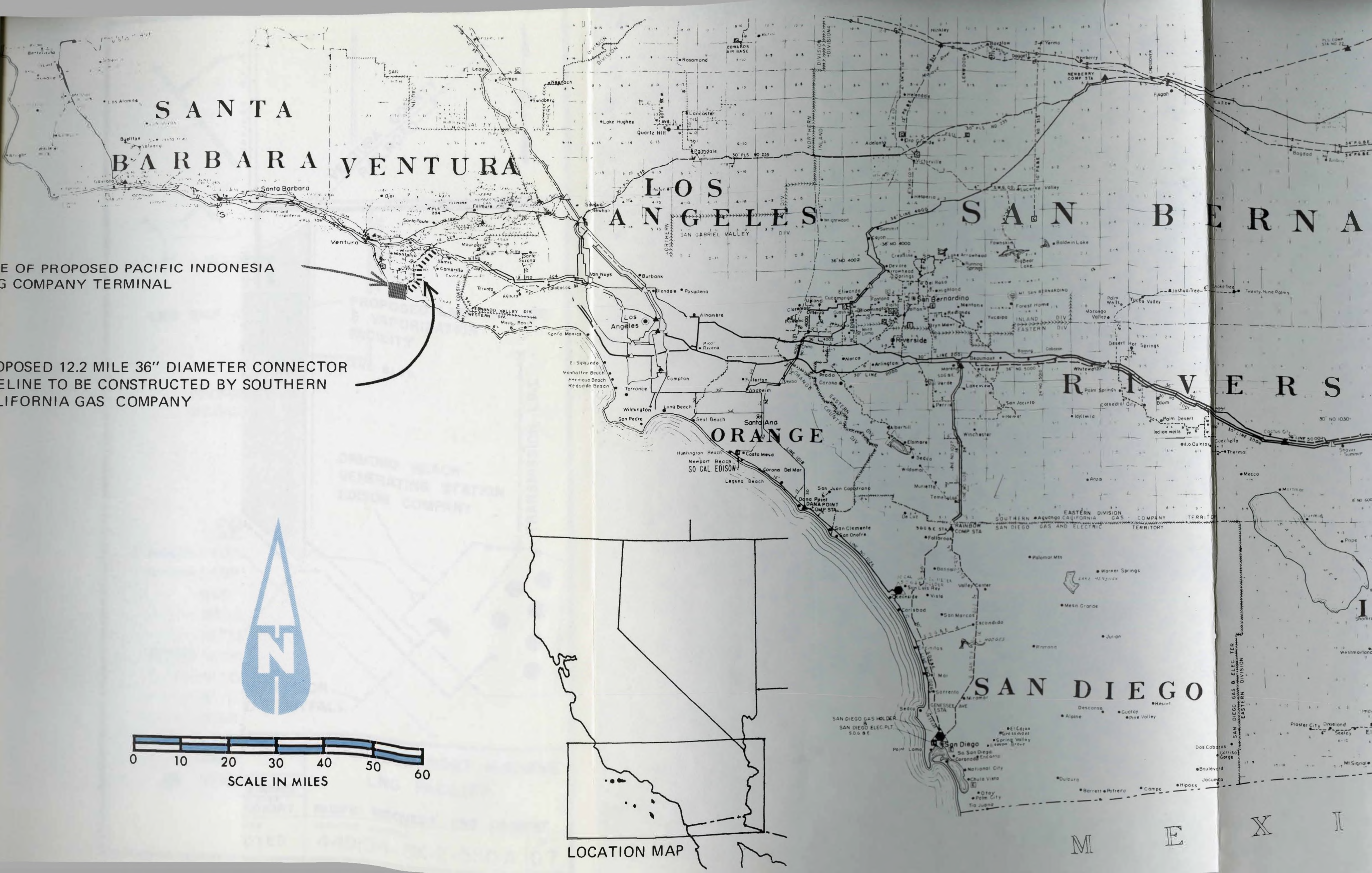
The proposed facilities are to be located on two parcels of land in or adjacent to the cities of Port Hueneme and Oxnard in the western portion of Ventura County, California, as shown on Plate 1.2-2.

The coastal facility where LNG ships will be berthed and unloaded lies immediately southeast of the entrance to Port Hueneme Harbor, its northern limit being the existing south jetty. The inland facility, which will be the site of the storage and vaporization plant, lies about 1 1/2 miles east of the harbor facility. Photographs of the inland and coastal sites are presented on Plates 1.2-3 and 1.2-4, respectively.

There are two significant pipelines in the immediate area at present. One is a fuel oil line connecting tanker unloading facilities in Port Hueneme Harbor with the Southern

California Edison Company's steam electric Ormond Beach Generating Station, as shown on Plate 1.2-2. The other is a 30-inch gas transmission line operated by SoCal. It terminates at the Ormond Beach Generating Station, about 1 1/2 miles south-east of the proposed LNG plant, and is shown on Plate 1.2-1.

About a quarter of a mile east of the inland plant site, a high tension electric transmission line parallels the plant's easterly border. This line connects the Ormond Beach Generating Station with its transmission system.



SANTA BARBARA
VENTURA
LOS ANGELES
SAN BERNA
ORANGE
RIVERS
SAN DIEGO
MEXI
E OF PROPOSED PACIFIC INDONESIA
G COMPANY TERMINAL
OPOSED 12.2 MILE 36" DIAMETER CONNECTOR
ELINE TO BE CONSTRUCTED BY SOUTHERN
LIFORNIA GAS COMPANY
0 10 20 30 40 50 60
SCALE IN MILES
LOCATION MAP
Santa Barbara
Ventura
Los Angeles
Long Beach
Santa Ana
San Bernardino
Riverside
San Diego

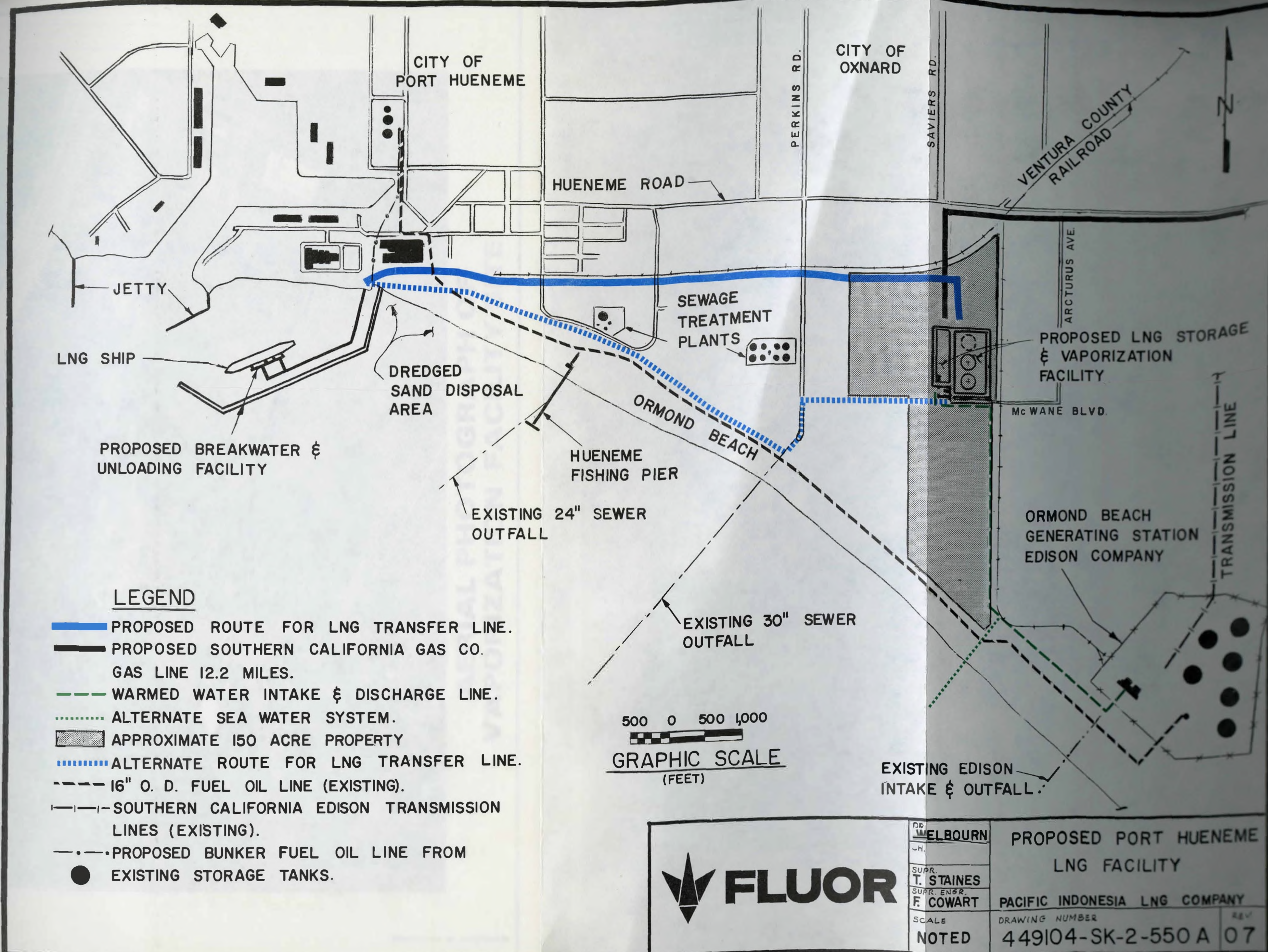

CITY OF PORT HUENEME
CITY OF OXNARD
PERKINS RD.
SAVIERS RD.
VENTURA COUNTY RAILROAD
N
HUENEME ROAD
ARCTURUS AVE.
JETTY
SEWAGE TREATMENT PLANTS
PROPOSED LNG STORAGE & VAPORIZATION FACILITY
LNG SHIP
DREDGED SAND DISPOSAL AREA
Mc WANE BLVD.
ORMOND BEACH
TRANSMISSION LINE
PROPOSED BREAKWATER & UNLOADING FACILITY
HUENEME FISHING PIER
EXISTING 24" SEWER OUTFALL
ORMOND BEACH GENERATING STATION EDISON COMPANY
LEGEND
PROPOSED ROUTE FOR LNG TRANSFER LINE.
PROPOSED SOUTHERN CALIFORNIA GAS CO. GAS LINE 12.2 MILES.
WARMED WATER INTAKE & DISCHARGE LINE.
ALTERNATE SEA WATER SYSTEM.
APPROXIMATE 150 ACRE PROPERTY
ALTERNATE ROUTE FOR LNG TRANSFER LINE.
16" O. D. FUEL OIL LINE (EXISTING).
SOUTHERN CALIFORNIA EDISON TRANSMISSION LINES (EXISTING).
PROPOSED BUNKER FUEL OIL LINE FROM EXISTING STORAGE TANKS.
EXISTING 30" SEWER OUTFALL
500 0 500 1,000
GRAPHIC SCALE
(FEET)
EXISTING EDISON INTAKE & OUTFALL
FLUOR
DR. WELBOURN
CH.
SUPR. T. STAINES
SUPR. ENGR. F. COWART
SCALE NOTED
PROPOSED PORT HUENEME LNG FACILITY
PACIFIC INDONESIA LNG COMPANY
DRAWING NUMBER 449104-SK-2-550 A
REV 07

PLATE 1.2-2

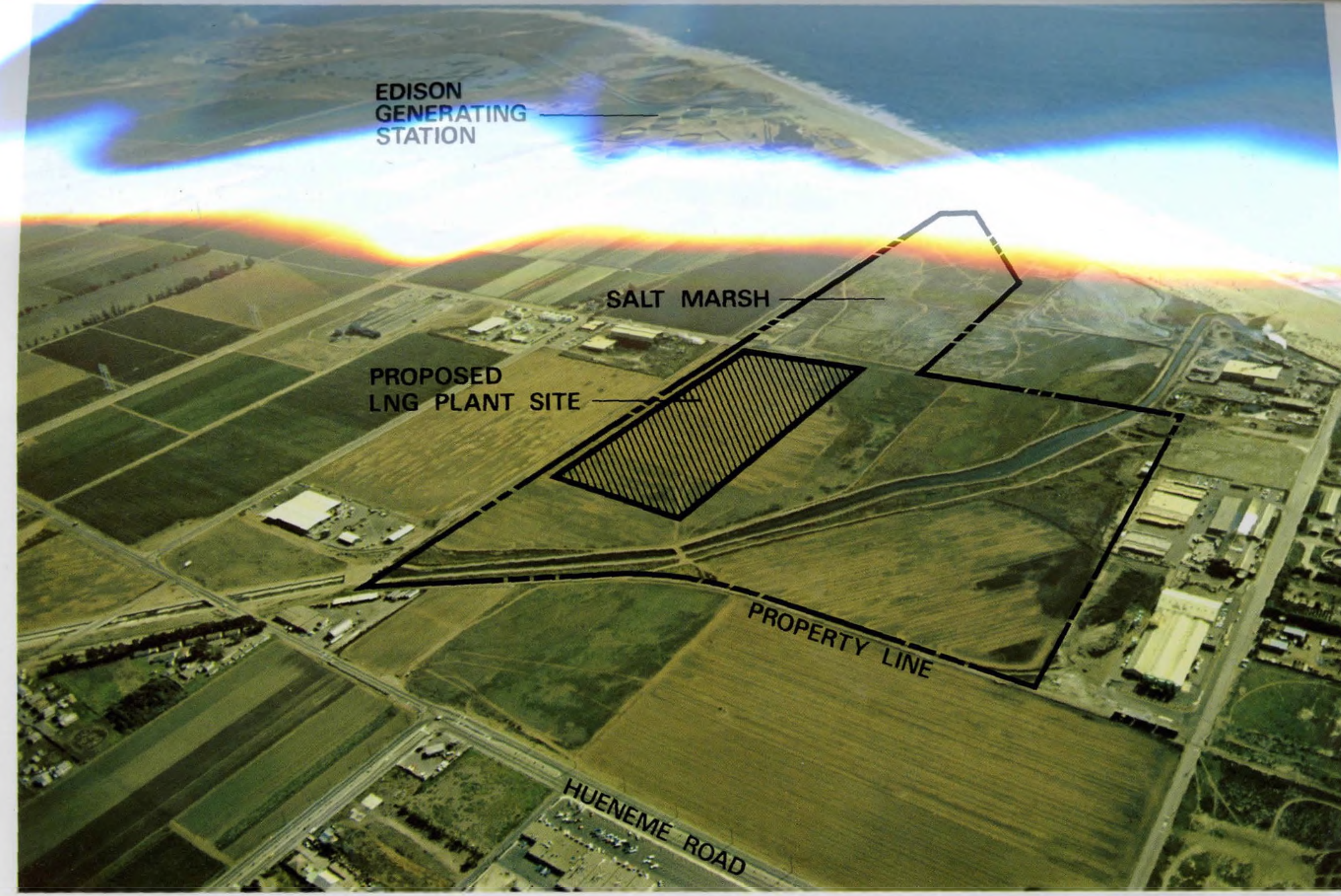


PLATE 1.2-3

DAMES & MOORE

AERIAL PHOTOGRAPH OF VAPORIZATION FACILITY SITE

AERIAL PHOTOGRAPH OF MARINE FACILITY SITE

DAMES & MOORE

PLATE 1.2-4

1.3 LAND REQUIREMENTS

The ship berthing facility will occupy approximately 83 acres of leased subtidal lands of which about 32 acres will be deepened by dredging. Its general arrangement is shown on Plate 1.3-1. Approximately 5 acres of land will be needed during the construction period as the temporary casting yard for concrete breakwater elements (Tribars).

Property already acquired for the inland facility consists of an irregularly shaped parcel of approximately 150 acres south of the Ventura County Railroad (Plate 1.3-2). Since it will be necessary to maintain the Oxnard Industrial Drain, not all of the area will be usable. There is, however, room for later addition of a third storage tank that would be required for expansion to a one billion cubic foot per day plant capacity. Present plans will leave about 60 percent of the owned land unaffected by plant construction.

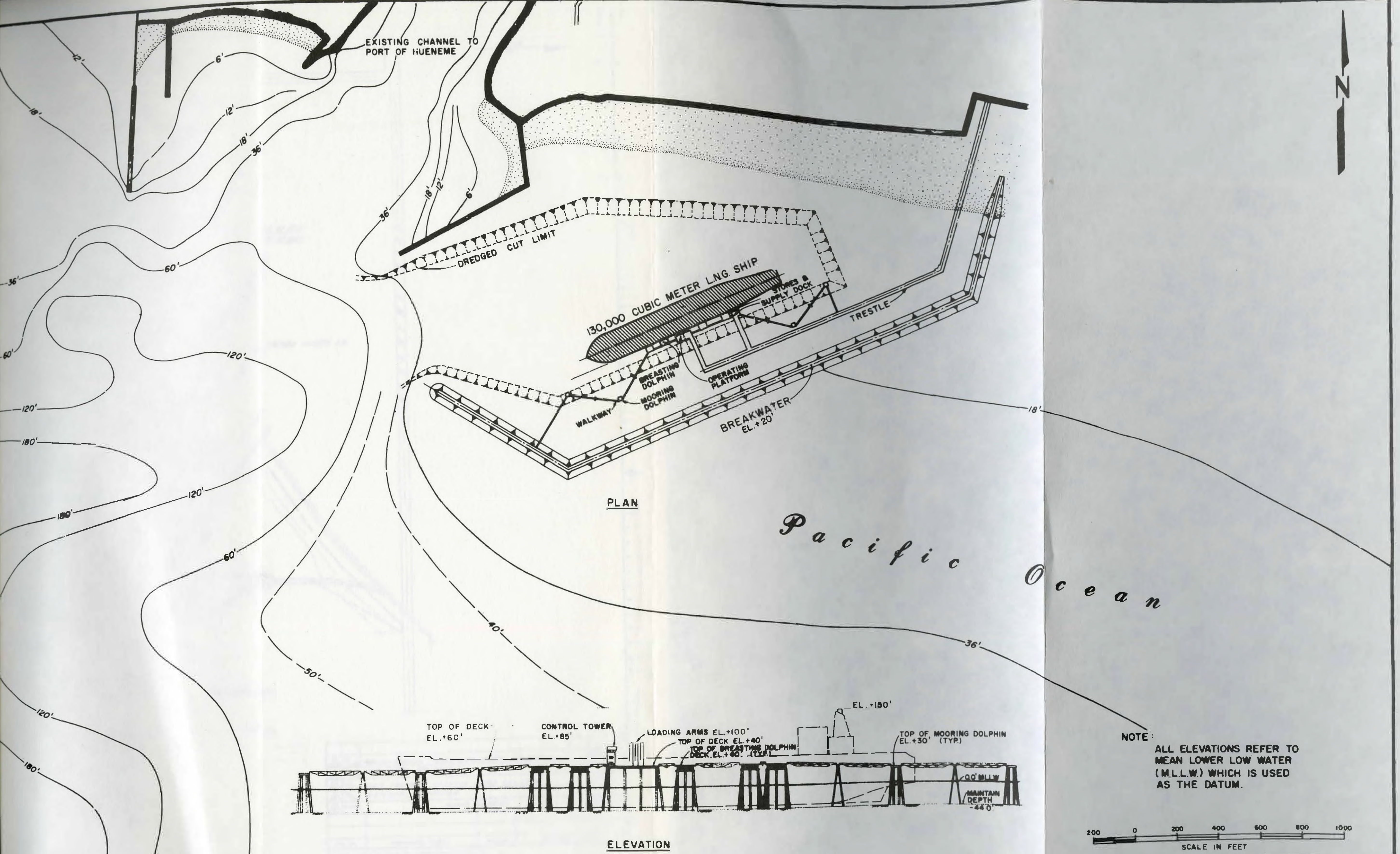
The plant site is bounded on the north and east by rights-of-way occupied by the Ventura County Railroad, a freight-only common carrier which operates exclusively during daylight hours to serve industrial plants in the area (Plate 1.2-2 and 1.3-2). The rail lines will allow ready delivery of machinery, steel, and heavy materials to the construction site.

Two branches of the rail line diverge at the north-east corner of the site. The northerly branch extends westward from the plant site to the vicinity of the proposed berthing facility; the easterly branch extends southward to the Southern California Edison Ormond Beach Generating Station.

A cryogenic LNG transfer system will be constructed between the LNG ship berthing facility and the plant site. It will be approximately 11,000 feet long, part of which will be buried in a 15-foot wide trench. Two routes are being considered and are shown on Plate 1.2-2. One is along the railroad right-of-way, and the other is along a proposed dedicated street behind Ormond Beach.

Two parallel 48-inch lines will provide warmed seawater to the plant for use in the LNG vaporizers. These lines will connect the plant with the Ormond Beach Generating Station. One will deliver warmed water from Edison's condenser cooling system, and the other will return the water to the Edison circulating system after it has vaporized the LNG. These lines will be buried in a 10-foot-wide trench.

It will be necessary for SoCal to construct approximately 12.2 miles of 36-inch diameter pipeline, primarily in public streets and highways, to connect the LNG plant to its transmission system. A separate Environmental Impact Report covering the pipeline project was prepared by SoCal concurrently with this report.

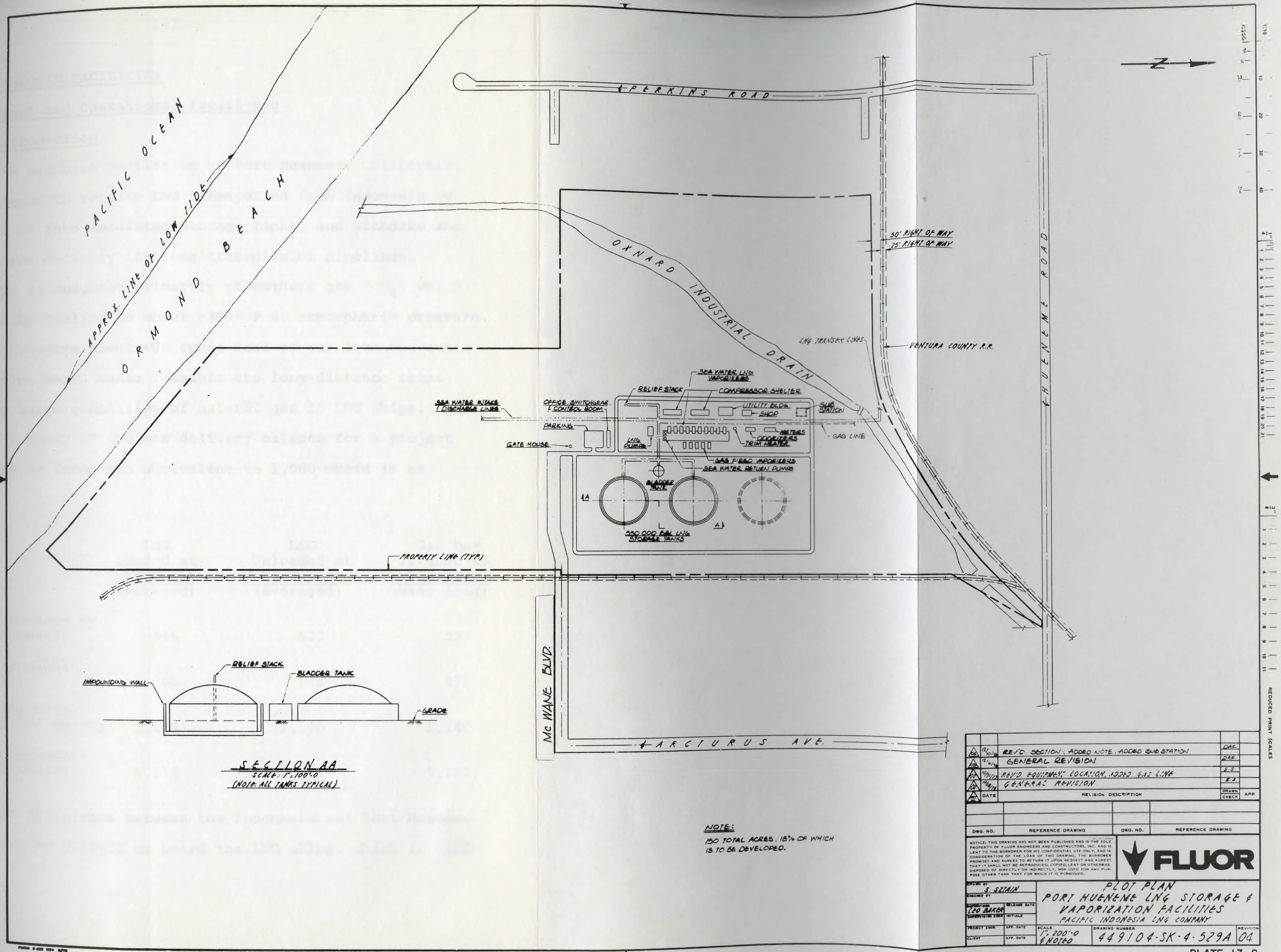


REFERENCES	MK	DATE	BY	APPROVED	REVISIONS	MK	DATE	BY	APPROVED	REVISIONS

FLUOR OCEAN SERVICES

DRAWN BY	CHECKED BY	ENGINEER	FOR APPROVAL
WRL			
DATE 11-5-73	DATE	DATE	CLIENT APPROVAL

TITLE	GENERAL HARBOR LAYOUT
	PORT HUENEME L.N.G. TERMINAL
OWNER	PACIFIC INDONESIA L.N.G. COMPANY
LOCATION	PORT HUENEME, CALIFORNIA.
SCALE	CONTRACT NO. 702107 — DRAWING NO. PLATE 1.3-1 — REV. 0


PERKINS ROAD
PACIFIC OCEAN
APPROX. LINE OF LOW TIDE
ORMOND BEACH
OXNARD INDUSTRIAL DRAIN
HUENEME ROAD
50' RIGHT OF WAY
25' RIGHT OF WAY
LNG TRANSER LINES
VENTURA COUNTY R.R.
SEA WATER LNG VAPORIZERS
RELIEF STACK
COMPRESSOR SHELTER
SEA WATER INTAKE & DISCHARGE LINES
OFFICE, SWITCHGEAR & CONTROL ROOM
UTILITY BLDG.
SHOP
SUB STATION
PARKING
GAS LINE
METERS
ODORIZERS
TRIM HEATER
GATE HOUSE
LNG PUMPS
GAS FIRED VAPORIZERS
SEA WATER RETURN PUMPS
BLADDER TANK
550,000 BBL LNG STORAGE TANKS
PROPERTY LINE (TYP.)
McWANE BLVD
ARCTURUS AVE.
RELIEF STACK
BLADDER TANK
IMPOUNDING WALL
GRADE
SECTION AA
SCALE: 1"=100'-0
(NOTE: ALL TANKS TYPICAL)
NOTE:
150 TOTAL ACRES, 18% OF WHICH IS TO BE DEVELOPED.
04 12/10/73 REV'D. SECTION; ADDED NOTE; ADDED SUB STATION DAF
03 12/6/73 GENERAL REVISION DAF
02 10/31/73 REV'D. EQUIPMENT LOCATION, ADDED GAS LINE S.S.
01 10/18/73 GENERAL REVISION S.S.
REV. DATE REVISION DESCRIPTION DRAWN CHECK APP
DWG. NO. REFERENCE DRAWING DWG. NO. REFERENCE DRAWING
NOTICE: THIS DRAWING HAS NOT BEEN PUBLISHED AND IS THE SOLE PROPERTY OF FLUOR ENGINEERS AND CONSTRUCTORS, INC. AND IS LENT TO THE BORROWER FOR HIS CONFIDENTIAL USE ONLY; AND IN CONSIDERATION OF THE LOAN OF THIS DRAWING, THE BORROWER PROMISES AND AGREES TO RETURN IT UPON REQUEST AND AGREES THAT IT SHALL NOT BE REPRODUCED, COPIED, LENT OR OTHERWISE DISPOSED OF DIRECTLY OR INDIRECTLY, NOR USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS FURNISHED.
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PROJECT ENGR. APP. DATE
CLIENT APP. DATE
PLOT PLAN
PORT HUENEME LNG STORAGE & VAPORIZATION FACILITIES
PACIFIC INDONESIA LNG COMPANY
SCALE 1"=200'-0 & NOTED
DRAWING NUMBER 449104-SK-4-529A
REVISION 04
REDUCED PRINT SCALES

PLATE 1.3-2

1.4 PROPOSED FACILITIES

1.4.1 Plant and Operational Facilities

1.4.1.1 Introduction

The proposed facilities at Port Hueneme, California, will be designed to receive LNG transported from Indonesia by ship, unload it into insulated storage tanks, and withdraw and vaporize it for delivery into gas transmission pipelines.

LNG is composed primarily of methane gas (CH_4) which is liquefied by cooling to about -260° F at atmospheric pressure. Liquefaction reduces about 600 cubic feet of gas into one cubic foot of liquid, which makes feasible the long-distance transportation of large quantities of natural gas in LNG ships.

A summary of the gas delivery balance for a project receiving LNG in Indonesia equivalent to 1,000 MMcfd is as follows:

	LNG Loaded at Indonesia (averaged)	LNG Unloaded at Port Hueneme (averaged)	Gas Delivered to Pipeline (base load)
Gas, MMcfd (covered by this application)	546	532	532
Gas, MMcfd (possible expansion)	1,000	975	975
Higher Heating Value BTU/SCF (1,000 MMcfd)	1,135	1,140	1,140
10^9 BTU per Calendar Day (1,000 MMcfd)	1,135	1,111	1,111

The difference between the Indonesia and Port Hueneme volumes is due to boiloff on board the LNG ships, which is used for ship propulsion. Although an average loading of 1,000 MMcfd of LNG in Indonesia is equivalent to 975 MMcfd of pipeline gas delivered, the design discussed in this report will be based upon a nominal capacity to vaporize at 1,000 MMcfd.

1.4.1.2 LNG Ships

Principal characteristics of the ships proposed for Indonesia to Southern California LNG trade are:

Total length	989 feet
Beam	136 feet
Design draft	38 feet
Deadweight tonnage	65,000 tons
Maximum cargo capacity	130,000 cubic meters
Crew	28
Propulsion	100,000 SHP (twin screw)
Design service speed	23 knots

A rendering of the proposed LNG ship is presented on Plate 1.4.1-1.

1.4.1.3 Marine Terminal Receiving Facilities

The unloading of LNG ships will require a new berthing facility which is proposed to be constructed by the Oxnard Harbor District south of Port Hueneme Harbor, immediately east of the existing harbor entrance. An artist's rendition of the proposed marine facilities is given on Plate 1.4.1-2. This facility will provide a sheltered berthing area located approximately 1 1/2 miles west of the LNG storage and vaporization facilities (Plate 1.2-2). The LNG ships will not enter the existing harbor. The layout of the various components of the berthing facility is shown on Plate 1.3-1.

The berthing facility will be protected by a new breakwater to be constructed of rock from an existing quarry on Catalina Island. The breakwater will be 3,245 feet long and will require 167,000 tons (104,000 cubic yards) of quarry-run rock and an overlayer of 220,000 tons (137,000 cubic yards) of 6- to 12-ton rocks. The outer face of the breakwater will be covered by 5,600 units of Tribar armor (cast on site) requiring about 59,300 cubic yards of concrete. The finished crest will be 25 feet wide at an elevation of 20 feet above mean lower low water (MLLW).

The new berthing area for the LNG ships is proposed to be dredged to a depth of 48 feet below MLLW. This depth has been set at a conservative elevation pending the performance of a model study and includes 2 feet 3 inches of advance dredging and 2 feet of overdredging. Data from the model study will determine the optimum configuration of the breakwater and dredged area, but in the meantime the environmental impact will have been assessed on the conservative 48-foot depth.

A trestle about 2,100 feet long will be constructed parallel to, and about 200 feet inside (shoreside) of, the breakwater. The trestle will be supported by tubular steel piles driven into the sea bottom and will have a steel girder superstructure. The trestle will carry the LNG transfer lines and a concrete roadway for vehicles.

An operating platform for unloading the LNG ships will be constructed at the end of the trestle. It will be a free-standing steel structure, 45 feet above the trestle, supported by tubular steel piles driven into the sea bottom.

The LNG unloading system will use two 24-inch articulated metal arms for unloading LNG and one 24-inch articulated arm for vapor return from the storage tanks. The arms will be designed to accommodate differential movement in all directions between the ship and the operating platform.

The berthing facility will include four breasting and four mooring dolphins, all of which will be constructed of steel and supported on steel piles. The four breasting dolphins will have energy-absorbing fenders; the LNG ships will be moored with their hulls against these fenders.

Walkway bridges, spanning approximately 30 yards, will connect the dolphins and the operating platform. Intermediate steel pile supports will be provided as needed, and the bridges will be trussed.

1.4.1.4 LNG Transfer Lines

An LNG transfer system will carry the LNG from the ships to the storage tanks. This system will consist of two insulated cryogenic lines 30 inches in inside diameter, one 12-inch vapor return line, and warm water tracer lines. The latter are designed to prevent freezing of the surrounding soil. This system is depicted on Plate 1.4.1-3.

Two routes for the transfer lines are under consideration (see Plate 1.2-2):

(a) Generally following the right-of-way of the Ventura County Railroad.

(b) Behind Ormond Beach in dedicated streets for about half of its route (parallel to an existing fuel oil line to the Ormond Beach Generating

Station) and then north and east to the LNG plant site.

For either case, part of the route will require underground transfer lines. An estimate of the underground and above-ground lengths were developed for both routes:

	Railroad Route	Street Route
On the trestle	2,100 feet	2,100 feet
Underground	6,500 feet	8,000 feet
Above ground (at the plant site)	2,000 feet	1,600 feet
	10,600 feet	11,700 feet

Either route is feasible, and all or part of either may be used.

1.4.1.5 LNG Storage Tanks

Two tanks of 550,000 barrels each will be required to handle the application volume of LNG equivalent to 546 MMcfd. A third tank would be required for a project of 1,000 MMcfd.

All of the tanks will have the following approximate dimensions:

Diameter	240 feet
Shell height	80 feet
Overall height	129 feet

Each tank will be surrounded with a concrete ring wall dike approximately 255 feet in diameter and 81 feet high. The tank and ring wall are to be installed about 20 feet below grade which will put the top of the tank at 109 feet, and the surrounding dike at 61 feet, above finished grade.

1.4.1.6 Vaporization Plant

The vaporization plant will consist of vaporizers, an odorizing and metering system, and required peripheral equipment. This plant will be situated adjacent to the LNG storage tanks as depicted in the artist's conception on Plate 1.4.1-5. Baseload vaporization will be accomplished by heat exchange with seawater, as discussed in the following section.

Base-Load Vaporizers

The LNG plant is near the Ormond Beach Generating Station (Plate 1.2-2). This steam electric power plant discharges a large quantity of seawater which has been warmed by condensing steam, and the proposed LNG plant requires warm water which will be cooled by vaporizing the LNG. Therefore, the design has been based on a combined operation in which the LNG plant can use a portion of the warmed water from the power plant, then return the cooled water for discharge to the sea mixed with the remainder of the power plant's warm water. This design has been based on the anticipated successful conclusion of negotiations with Southern California Edison for this combined operation. Gas-fired trim heaters will be installed to raise the gas temperatures from 40° F to 50° F prior to delivery to SoCal. The baseload vaporization system is summarized in Table 1.4.1-I.

Standby or Peak-Shaving Vaporizers

Five submerged combustion gas-fired vaporizers will be included. These will provide a peaking capacity of 450 MMcf for use during periods of maximum loads on the SoCal System.

1.4.2 Pipeline Facilities

1.4.2.1 Seawater Exchange Lines

Under the plan described above, two 48-inch seawater exchange pipelines will be constructed between the LNG plant and the Ormond Beach Generating Station. They will be about 6,000 feet long and will follow the route shown on Plate 1.2-2. One will supply warmed seawater and the other will return the cooled water. Existing offshore intake and discharge lines from the Generating Station will be utilized.

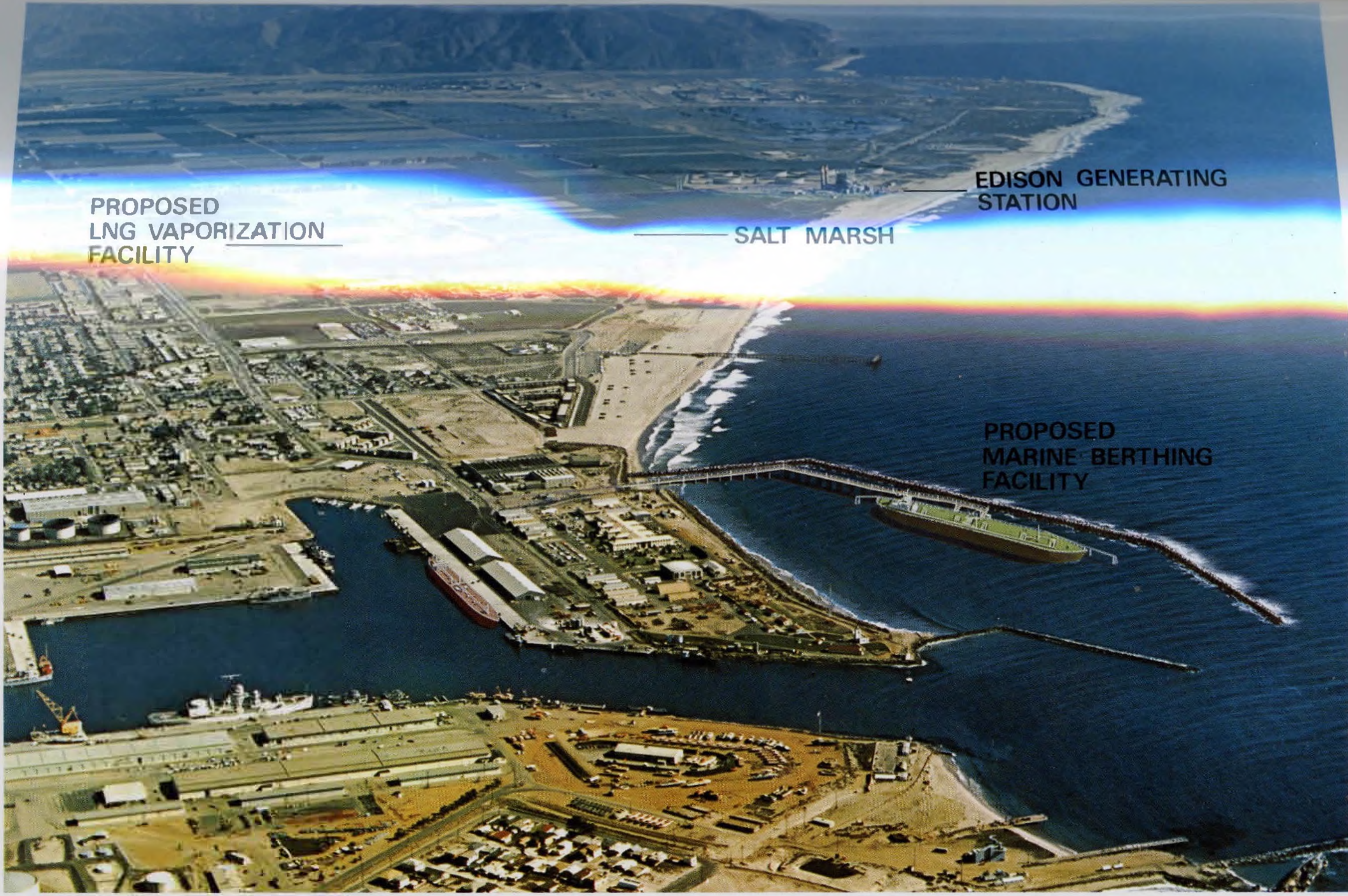
1.4.2.2 Gas Transmission

Product gas from the Port Hueneme LNG facility will be transmitted from the plant site in a new 36-inch diameter pipeline to be constructed by SoCal. The pipeline will be 12.2 miles long and will tie into the existing pipeline system of SoCal at a point to the northeast of the facility.

ARTIST'S RENDERING OF LNG SHIP

PLATE 1.4.1-1

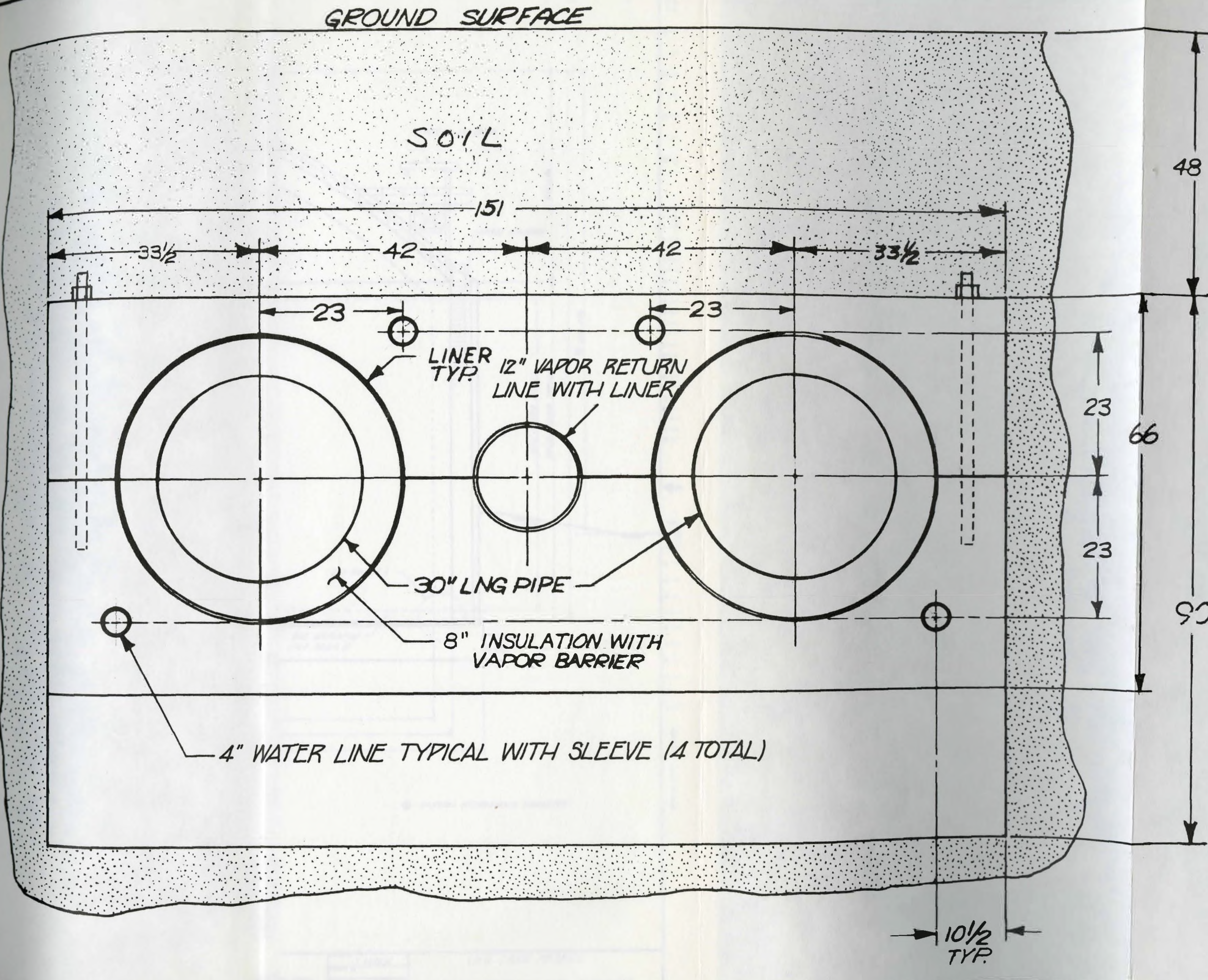
DAMES & MOORE



ARTIST'S RENDERING OF MARINE FACILITY

PLATE 14.1-2

DAMES & MOORE



NOTE: ALL DIMENSIONS ARE IN INCHES

Figure 18

Cross Section Layout For Concrete Support

Cosmodyne a Cordon International Company

SK-56027-7A

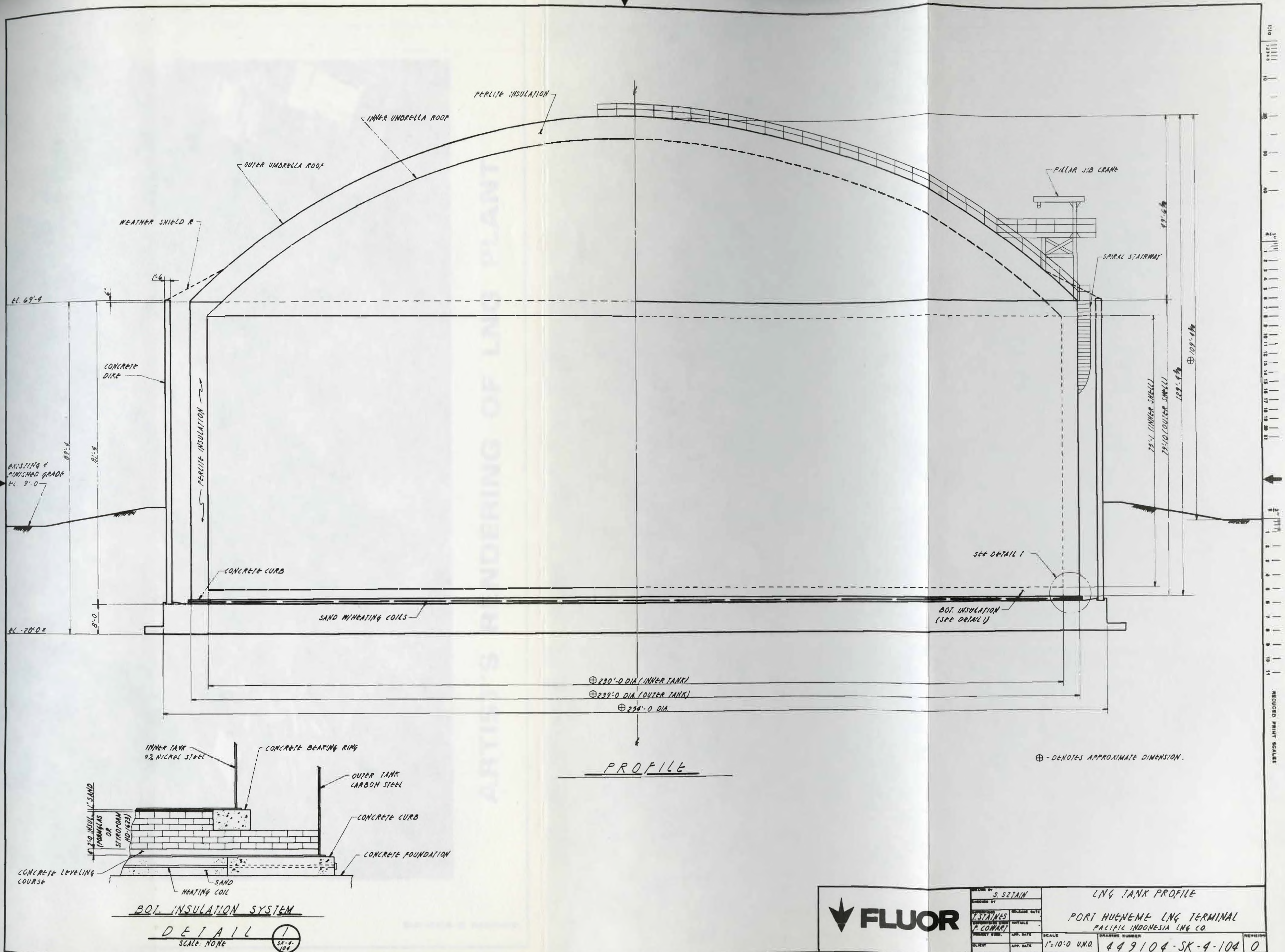
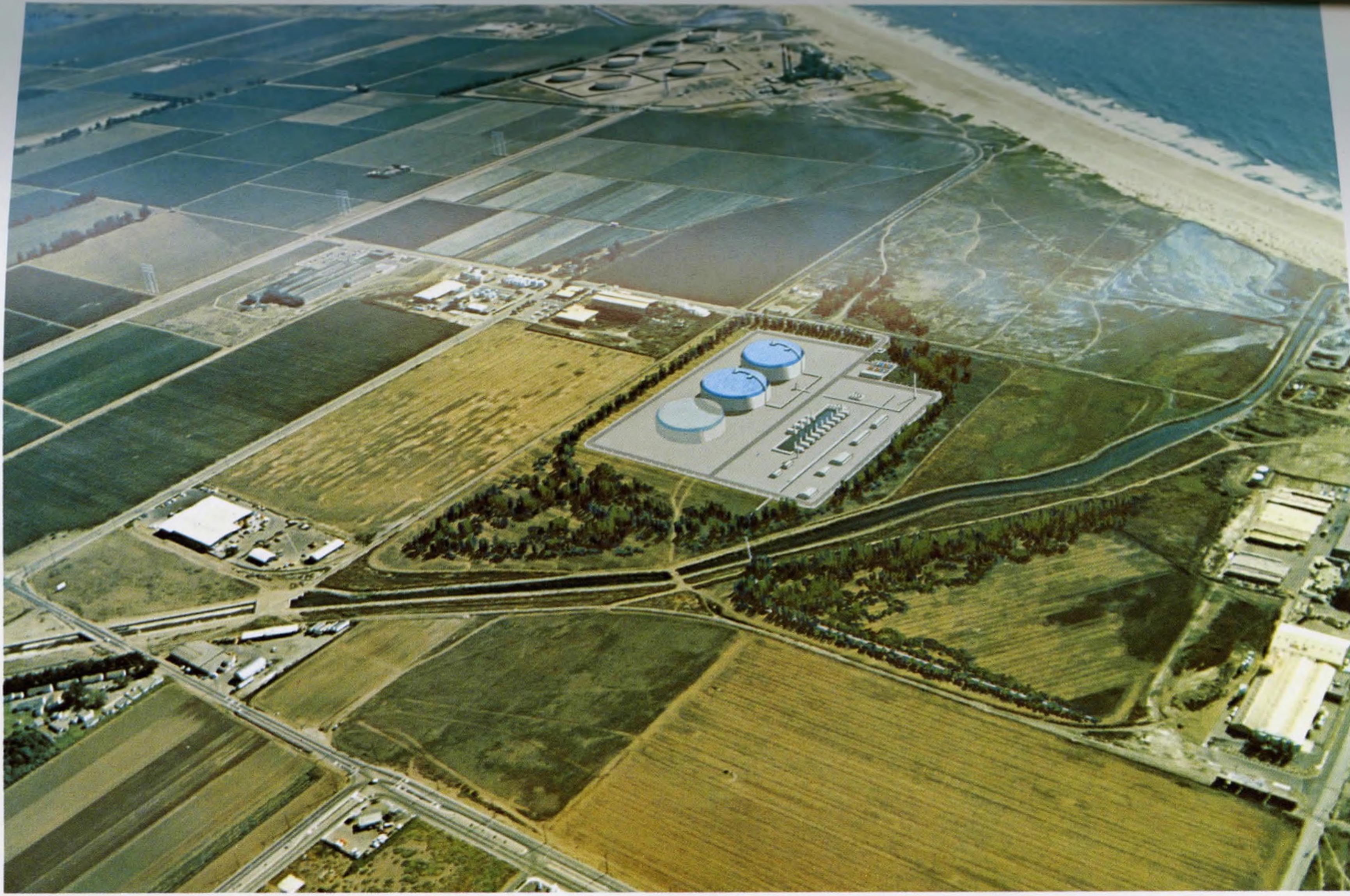

PERLITE INSULATION
INNER UMBRELLA ROOF
OUTER UMBRELLA ROOF
PILLAR JIB CRANE
WEATHER SHIELD
SPIRAL STAIRWAY
EL. 69'-4
CONCRETE DIKE
PERLITE INSULATION
EXISTING & FINISHED GRADE EL. 9'-0
SEE DETAIL 1
CONCRETE CURB
SAND W/HEATING COILS
BOT. INSULATION (SEE DETAIL 1)
EL. -20'-0±
⊕230'-0 DIA (INNER TANK)
⊕239'-0 DIA (OUTER TANK)
⊕254'-0 DIA.
PROFILE
⊕ - DENOTES APPROXIMATE DIMENSION.
INNER TANK 9% NICKEL STEEL
CONCRETE BEARING RING
OUTER TANK CARBON STEEL
CONCRETE CURB
CONCRETE FOUNDATION
CONCRETE LEVELING COURSE
SAND
HEATING COIL
BOT. INSULATION SYSTEM
DETAIL 1
SCALE: NONE
LNG TANK PROFILE
PORT HUENEME LNG TERMINAL
PACIFIC INDONESIA LNG CO.
S. SZTAIN
T. STAINES
P. COWART
1"=10'-0 U.N.O.
449104-SK-4-104
0
REDUCED PRINT SCALES

PLATE 1.4.1-4

PLATE 1.4.1-5

DAMES & MOORE



ARTIST'S RENDERING OF LNG PLANT

TABLE 1.4.1-I

SUMMARY OF BASE-LOAD VAPORIZATION OPERATION

Based on 1,000 MMcfd

	Design Operation	Average Operation
Ambient seawater, avg. °F	50	50
Power plant warm water, °F	65	73
LNG plant exit cold water, °F	50	57.8
Water temperature drop across LNG vaporizers, °F	15	15.2
Vaporized gas temperature from water exchangers, °F	40	47
LNG water exchange duty, MM BTU/hr	667.0	675.6
Water flow, gpm	89,430	89,430
Vaporized gas temperature from trim heaters, °F	50	50
Trim heater duty, MM BTU/hr	12.3	3.7
Total duty, MM BTU/hr (water & trim heaters)	679.3	679.3
Trim heater thermal efficiency, %	80.0	80.0
Trim-heating fuel, MM BTU/hr	15.4	4.6

1.5 CONSTRUCTION PROCEDURES

1.5.1 Schedule

The overall construction period for the Port Hueneme LNG plant facilities will be about 3 years, commencing in Fall 1975. Site preparation is scheduled to commence in September of that year and will take 6 to 7 months. Construction of storage tanks will start about March 1976. Construction of the vaporization plant will begin about January 1977. Construction of the breakwater will begin about December 1975. It is anticipated that the breakwater will be essentially complete before dredging begins. Dredging is scheduled to take place over a 7-month period beginning in October 1976. Final construction completion is scheduled for July 1978. Allowing for a 3-month startup and test period, the entire LNG facility is scheduled to be onstream by October 1978.

No construction schedule allowances have been made for bad weather and floods, as normal construction scheduling practice in the area does not allow for them.

1.5.2 Land Acquisition, Surveying, and Relocations

About 150 acres are owned in fee by an affiliate of Applicant at the location of the storage and vaporization facilities. Of this, about 38 acres will be occupied by the operating facilities.

Rights-of-way and permits for the LNG transfer system have yet to be acquired.

Construction of the offshore facilities will require leasing of land from the California State Lands Commission. To secure working access to the new marine facilities, a right-of-way from the public road to the new pier site will be required from the adjacent property owners.

Topographic maps for use in the plant design have been made. A record survey will be required to determine the location of the property perimeter fence. A record survey will also be required for the LNG transfer lines from the ship's berth to the vaporization site for the warm water exchange lines to and from the Ormond Beach Generating Station and for the gas transmission pipeline. No destruction of trees or crops will occur during the surveying operations.

Adequate working areas will be established within the plant property for:

1. Vehicle parking.
2. Marshalling of incoming construction material shipments.
3. Storage and warehousing of pipe and equipment.
4. Temporary construction management offices.

Upon completion of construction, these areas will be restored to their natural state or improved through landscaping and incorporated into the plant operations. The temporary construction buildings will be removed.

1.5.3 Labor Force

The estimated construction labor force during the 3-year construction period is as follows:

	Average Manpower	Peak Manpower
September 1975 - July 1976	50	90
July 1976 - July 1977	550	1,190
July 1977 - July 1978	765	1,080

No temporary housing will be required for the construction workers. All of them will come from local labor sources or from the general Southern California area.

1.5.4 Construction Materials

The new marine facilities will require 387,000 tons of rock quarried on Catalina Island and transported to the new breakwater site by barges (see Section 1.4.1.3).

Each of the LNG storage tanks will require about 2,000 tons of steel plate, which will be shipped to the site by railroad. About 200 rail car shipments will be needed to deliver the steel plate. The plant piping and mechanical equipment will arrive by rail and truck.

No on-site concrete batching plant is anticipated. All of the concrete required will be purchased from local ready-mix suppliers. About 5,600 units of Tribar armor for covering the new breakwater will require some 59,300 cubic yards of concrete and will be cast on-site.

1.5.5 Construction Utilities and Work Area

The casting yard for the Tribar requires about 5 acres. Temporary facilities for construction utilities, such as water and electric power, will be installed as required. Upon completion of construction, the temporary facilities will be removed, and any disturbed land areas will be restored to their original condition.

Chemical toilets will be provided for the labor force during construction. They will be removed at the completion of construction.

1.5.6 Site Preparation

Construction grading and site preparation will requi 6 to 7 months. On the basis of a 29-foot excavation for installation of two tanks and dikes, the total volume of soil removed will be approximately 150,000 cubic yards. Of this, about 50,000 cubic yards will be used as backfill around the two tanks. The remaining 100,000 cubic yards will be used to raise and grade the plant site and the access roads about 3 fee above the existing ground level. As the excavation will reach groundwater level, dewatering will be required. This water will be treated as required and piped to the Oxnard Industrial Drain.

The Oxnard Industrial Drain runs adjacent to the LNG storage and vaporization plant site. This drain will not be improved. However, the Ventura County Flood Control District will require a right-of-way for maintenance.

1.5.7 Dredging

Approximately 2 million cubic yards of ocean floor materials will be removed using a hydraulic dredge with a cutter head during construction of the marine terminal facilities. The new harbor basin will be dredged to a maximum depth of 48 feet below MLLW. The dredged material will be transported by pipeli to the east side of the new breakwater (Plate 1.2-2). The enti dredging operation will require about 7 months. It is anticipated that this portion of the project will be accomplished by the Oxnard Harbor District.

1.5.8 Breakwater and Pier Construction

The breakwater forming the harbor will be shore-connected and approximately 3,245 feet long. Standard construction techniques will be employed, including placement of Tribars, armor rock, and quarry-run rock by truck-mounted cranes and barges. It is anticipated that these facilities will be constructed by the Oxnard Harbor District.

1.5.9 Pipeline Construction

The LNG transfer lines and the warmed seawater exchange lines will be constructed using standard methods of excavation, pipe installation, and backfill. If the water table is higher than the excavation, dewatering techniques will be used to secure a dry work and welding area.

The gas transmission pipeline is discussed in a separate Environmental Impact Report.

1.5.10 Public Use Facilities

No public roads will be altered or widened. Some temporary road closures may result from pipeline construction. No new roads will be required outside the plant property. No construction on public use facilities is planned except for pipelines in streets. Traffic control will be provided as necessary and traffic routing and access to the site will also be planned in order to reduce its effects.

Public utilities may be temporarily interrupted during some pipeline construction. Construction of the facilities will not interrupt public utilities.

1.5.11 Environmental Planning for Construction

The construction will be carried out in such a mann as to minimize its effects upon the surrounding area. Noise and dust control measures are planned. Traffic will be dispersed, to the extent possible, to avoid congestion at and around the site.

Landscaping by planting trees around the site perime will be done prior to construction. This will help to screen the construction activities from the surrounding area.

1.6 OPERATIONAL AND MAINTENANCE PROCEDURES

1.6.1 Introduction

The LNG facility is scheduled to begin operation on a year-round basis in 1978 with an operating staff of 31 persons. It will operate on a 24-hour basis. The LNG will be unloaded from LNG ships, transferred to storage via a cryogenic pipeline from the berthing facility, and stored on-site in cryogenic tanks. It will be pumped from storage to the seawater vaporizers, through trim-heating vaporizers, the odorizer, meters, and then into SoCal's gas transmission system. Gas-fired, peak-shaving vaporizers, planned to be utilized for 480 hours per year, will be used to meet peak demands. These operational parameters are illustrated in the flow diagram on Plate 1.6.1-1.

The LNG project does not require any complex high-temperature or high-pressure processes or equipment, or any catalytic reactions. It will not require an auxiliary boiler plant or a water cooling tower. It does not create contaminated wastewaters requiring waste treatment.

Details of the operation, from loading in Indonesia through delivery to the transmission system, are given below.

1.6.2 Operating Procedures

1.6.2.1 LNG Transport

General

Deliveries of LNG will begin in Fall 1978. By 1980 there will be eight LNG ships in service. At a 1,000 MMcfd delivery rate, there would be 14 ships in service making 138 arrivals per year. Only one ship will be berthed and unloaded at any one time. Estimated development of the fleet is as follows:

Year End	Ships in Service	Ship Arrivals Per Year
1978	3	6
1979	6	38
1980	8	66-75[1]
----	14	138[2]

Each LNG ship will be loaded in Indonesia with 776,0[illegible] barrels of LNG each trip and will complete about 10 round trips per year.

The LNG ships will be loaded with sufficient bunker fuel in Indonesia for the round trip. If they require additi[illegible] bunkering for the return trip or for unexpected needs, a local supplier will provide the fuel at the LNG berth.

LNG Ship Transport Route

Description of Route. In carrying LNG from Indonesi[illegible] to the market in Southern California, LNG ships must traverse a distance of approximately 8,300 miles and will remain within voluntary international shipping routes. Each roundtrip will take approximately 30 days.

The ships will be loaded at the LNG marine terminal near the northern end of Sumatra. The LNG ships will leave the terminal and proceed southeast through the Straits of Malacca. They will then turn north into the South China Sea at

[1]For the delivery quantities presently under contract.
[2]For maximum delivery quantities assumed to be available for future contracts for purposes of this Environmental Impact Report.

a position just off Singapore. Various rhumb line courses will be followed through the South China Sea and into the North Pacific Ocean to a point at approximately 35° North Latitude and 142° East Longitude, off the coast of Japan. The ships will then sail a great circle course to a position near Point Conception in Southern California where they will enter established shipping separation lanes which pass through the Santa Barbara Channel. The ships will depart from the separation lanes at a point just off Port Hueneme and proceed to the LNG marine terminal. The ships will follow the same routes on the return trip.

Southern California Navigation. The LNG ships will enter and leave nearshore Southern California waters via established shipping lanes. These lanes provide for separation between opposing traffic and for maximum clearance between the shore and the offshore islands in the Santa Barbara Channel.

Navigation aids are well established along the Southern California portion of the routes. In addition to standard beacons, lighthouses, buoys, and horns, there are radio navigation networks throughout the area. The offshore islands offer excellent radar targets for positioning purposes.

There are no exceptional weather or sea conditions within the area. Shoals and submerged rocks are rare and where present are well marked.

1.6.2.2 LNG Transfer Lines

The LNG will be unloaded by shipboard pumps, through articulated unloading arms and transfer lines, to the onshore storage tank site. At an average pumping rate of 76,000 barrels per hour, the unloading operation will take about 10 to 12 hours per ship. Vapors displaced from the onshore storage tanks while receiving the LNG will be returned to the ship via a vapor-return line. This will prevent both inbreathing of air into the ship's tanks and atmospheric venting of gas from the onshore tanks. While in port, the ships will be electrically grounded through the operating platform via two reel-mounted electrical grounding lines.

Four-inch heat tracer lines will circulate warm water to prevent freezing of the soil around the LNG lines. Soil temperatures along the underground route will be monitored by thermocouples. The tracers will be supported in the same pipe guides as the LNG and vapor-return lines. The circulating warm water will be treated with a corrosion inhibitor to protect the lines. The heat tracer system has been designed to supply all of the heat gain for the LNG lines so as to limit the temperature effects on the surrounding soil in the immediate vicinity of the pipe system. The required heat input of about 1.4 MM BTU/hour will be supplied by 186 gallons per minute of warm water from the seawater exchange system. It will be cooled 15° F during the heat transfer process. Should the seawater exchange with the Generating Station be temporarily interrupted, warm water for the heat tracer system will be supplied from the gas-fired vaporizers.

1.6.2.3 LNG Storage

The LNG will be stored in insulated tanks at about -260° F and slightly above atmospheric pressure.

At a base-load output of 1,000 MMcfd (286,000 barrels of LNG), three tanks represents about 6 days of storage capacity. This volume of tankage would be required to provide a smooth, uniform base-load rate and a contingency for irregularities in LNG ship arrivals.

Submerged cryogenic pumps will transfer LNG from the tanks at 70 psig to booster pumps which will raise the LNG pressure to 850 psig for delivery to the vaporizers.

1.6.2.4 Vaporization Operations

Vaporization of the LNG will require heat exchange as illustrated on Plate 1.6.1-1.

Base-Load Vaporization

The base-load heat source planned for the facility will be a seawater exchange system with the Edison Ormond Beach Generating Station. The base-load vaporizers for 1,000 MMcfd will normally require 89,430 gpm of warmed seawater from Edison. The Edison plant consists of two units, either of which can supply ample warmed seawater for base-load capacity.

The average temperature of the water received from Edison will be about 73° F. The temperature drop of the water through the vaporizers will be about 15° F. However, when Edison is operating at reduced loads, the water will be 65° F, which has been selected as the design temperature. This will yield vaporized gas at 40° F. A small gas-fired trim heater will be used to raise the vaporized gas to 50° F before delivery to

SoCal's transmission pipeline. This information is summarized in Table 1.4.1-I.

In the event that both of Edison's power generation units were to be shut down simultaneously, the LNG plant could use the 450 MMcfd capacity of the gas-fired peak-shaving vaporizers to provide 45 percent of the base-load output. Another alternative would be to use ambient seawater supplied through the Edison intake, but not passing through the power plant. The return discharge water would be below ambient sea level temperatures, but such operation would not be performed if the discharg temperature became depressed below any levels which may be established by regulatory agencies.

Standby or Peak-Shaving Vaporization

When the base-load seawater vaporizers require maintenance or when gas output above base-load is needed for peak-shavin the plant will use gas-fired vaporizers. These will have a capacity of 450 MMcfd. It is estimated that these vaporizers will be in use only 480 hours per year. Their total vaporization duty will be 305.7 MM BTU/hour, and they will utilize submerged-combustion hot water baths with a thermal efficiency of 96 percent

1.6.2.5 Delivery

After vaporization by either means, the gas will be metered and odorized prior to delivery into the transmission system of SoCal. Maintaining service during major shutdowns is discussed in Section 3.2.7.3.

1.6.3 Emissions and Effluents from Operations

A diagram of air emissions and water effluents for the LNG plant is given on Plate 1.6.3-1. The emissions and effluents are described below.

1.6.3.1 Emissions

The two sources of airborne emissions from the plant will be from the gas-fired vaporizers and the trim heaters. Both types of units will utilize vaporized gas from the plant as fuel. The contractual limits of the gas will be:

Nitrogen	less than 1.5% volume
Carbon Dioxide	less than 0.01% volume
Total Sulfur	0.5 grains/100 SCF
Total Inerts	3% volume
Methane	more than 85% volume

The data in Table 1.6.3-I is typical of the trim-heater flue gas composition for operation at design fuel consumption, or heat release of 15.4 MM BTU/hour (i.e., warm water supplied at 65° F from the power plant). When operating at their average fuel consumption of 4.6 MM BTU/hour (supply water at 73° F), the trim-heaters will discharge only 30 percent of the flue gas quantity presented in Table 1.6.3-I.

The standby peak-shaving gas-fired vaporizers will discharge the typical flue gas described in Table 1.6.3-II when operating at their full capacity of 450 MMcfd.

1.6.3.2 Effluents

There are two water effluent sources within the facility. The first is the seawater received from the Ormond Beach Generating Station, which will be returned at the rate of 89,430 gpm and 15° F lower than received. The thermal "shocks" inherent in rapidly heating the water within the Generating Station and then rapidly cooling it within the LNG plant, along with the Generating Station's antifouling treatment, should prevent any persistent biological growth in the seawater exchange system.

Some of the water of combustion, formed by burning gas in the peak-shaving vaporizers, will condense in the water bath. This will result in a water overflow of about 10,000 gallons per day (7 gpm). This water will have a pH of about 5.5 due to dissolved carbon dioxide and will be discharged through the sea-water return lines along with the water from the base-load vaporizers.

1.6.4 Utility Requirements

The overall utility requirements for the selected design using warm water for LNG vaporization are presented in Table 1.6.4-I. Normal electrical power requirements will be supplied by purchased power. Emergency electrical power for lighting and control systems will be supplied by a standby 500 kW engine-driven generator.

Water required for sanitary and domestic use will be drawn from domestic mains and used directly. The domestic sanitation system at the LNG facility will discharge an estimated 1,550 gallons per day of sewage into the Oxnard sewage treatment system.

Fire water will be drawn from two independent sources. One will be domestic water mains, and the other will be a seawat[er] pump in the warmed water return system. There will also be a seawater pump at the marine facilities.

Fuel gas required by the LNG vaporizing trim heaters, peak-shaving vaporizers, and any other equipment will be obtained from the vaporized gas supply.

1.6.5 Maintenance Procedures

Most of the base-load equipment will consist of multiple units installed for parallel operation so that individual units may be shut down for inspection or maintenance while the other units remain in operation. Where essential equipment does not consist of multiple units, "spare" standby units will be provided so that the plant can maintain its required output at all times. A periodic preventive maintenance program will be in effect for all equipment.

Equipment which is only used intermittently, such as peak-shaving vaporizers and the LNG ship unloading system, will be systematically inspected and maintained when not in use.

The condition of the LNG ship unloading arms and the LNG transfer system will be closely monitored with particular attention to swivel-joints and expansion joints. Temperature sensors along the underground sections of the LNG transfer lines will provide early warning of any leak. Two parallel LNG lines will be provided so that tanker unloading can continue at a reduced rate if one line is out of service for inspection or maintenance.

1.6.6 Design for Natural Hazards and Accidents

1.6.6.1 Earthquakes

The Port Hueneme LNG facility will be designed to resist earthquakes more severe than have been recorded in the general vicinity. The design criteria used are in excess of those specified for Earthquake Zone 3 of the Uniform Building Code, which is currently the most severe earthquake design classification. The storage tank design will be based upon a designated maximum credible event.

If an earthquake of sufficient magnitude occurs, the entire LNG facility will be shut down promptly. Any ship unloading would also be shut down. The double-walled metal LNG tanks will have a closed inner top in order to fully contain any liquid "sloshing," and the full height concrete dikes will provide maximum seismic protection against any spills resulting from an earthquake.

1.6.6.2 Tsunamis (Seismic Sea Waves)

Tsunamis both high enough and in the direction necessary to overtop the new breakwater are not expected to occur but have been considered. The U.S. Government operates a tsunami warning service and provides warnings of seismic sea waves approaching coastal areas. In the event of such a warning, the vaporization facility will be shut down, and any ship in port will put out to sea.

The LNG storage tank foundations and walls will be designed to prevent floating. The land-based facilities are protected from the open sea as they are about 2,500 feet inland and about 9 feet above sea level. Tsunamis are discussed in detail in Section 2.4.3.3.

1.6.6.3 Storms and Floods

The earthquake design criteria are such that the facility will also withstand hurricane-force winds.

The LNG storage tanks and vaporization plant will be designed for adequate drainage to protect against flooding.

Stormwater runoff will be diverted into the Oxnard Industrial Drain which runs adjacent to the plant site.

LNG ships will not be allowed to enter the berth during a severe storm.

Ship design will meet the rules and regulations for construction set by the U.S. Coast Guard and the American Bureau of Shipping.

Lightning protection during storms will be provided by electrical grounding of all metal equipment and by grounded lightning points for nonmetallic facilities such as the concrete dikes. Should a severe storm disrupt the plant power supply, the plant will be safely shut down. An emergency 500 kW engine-driven generator will be used to supply emergency power.

1.6.6.4 Accidental Impacts

Other than acts of war, the only major man-caused accident that might possibly occur would be an air collision. Such an occurrence is remote, but has been considered in the plant design, including the use of concrete dikes as high as the tank walls and in the spacing of facilities. The proposed plant location is approximately 3 1/4 miles south of the downwind approach leg for Ventura County Airport and about 3,500 feet from the normal flight path for Point Mugu Naval Air Station. Investigation indicates that the proposed LNG plant will not be classified as an "obstruction" by the Federal Aviation Administration.

The concrete dikes will protect the LNG storage tanks against glancing or partial collisions from small planes. The areas of least protection will be the tank roofs. LNG which might be spilled within the concrete berm by a rupture near the tank tops will be limited to that amount being stored above the rupture.

1.6.6.5 Spills and Fires

In the event of any spill or fire, the Fire Department and Harbor District will be notified immediately. Pre-arranged shutdown plans will be implemented.

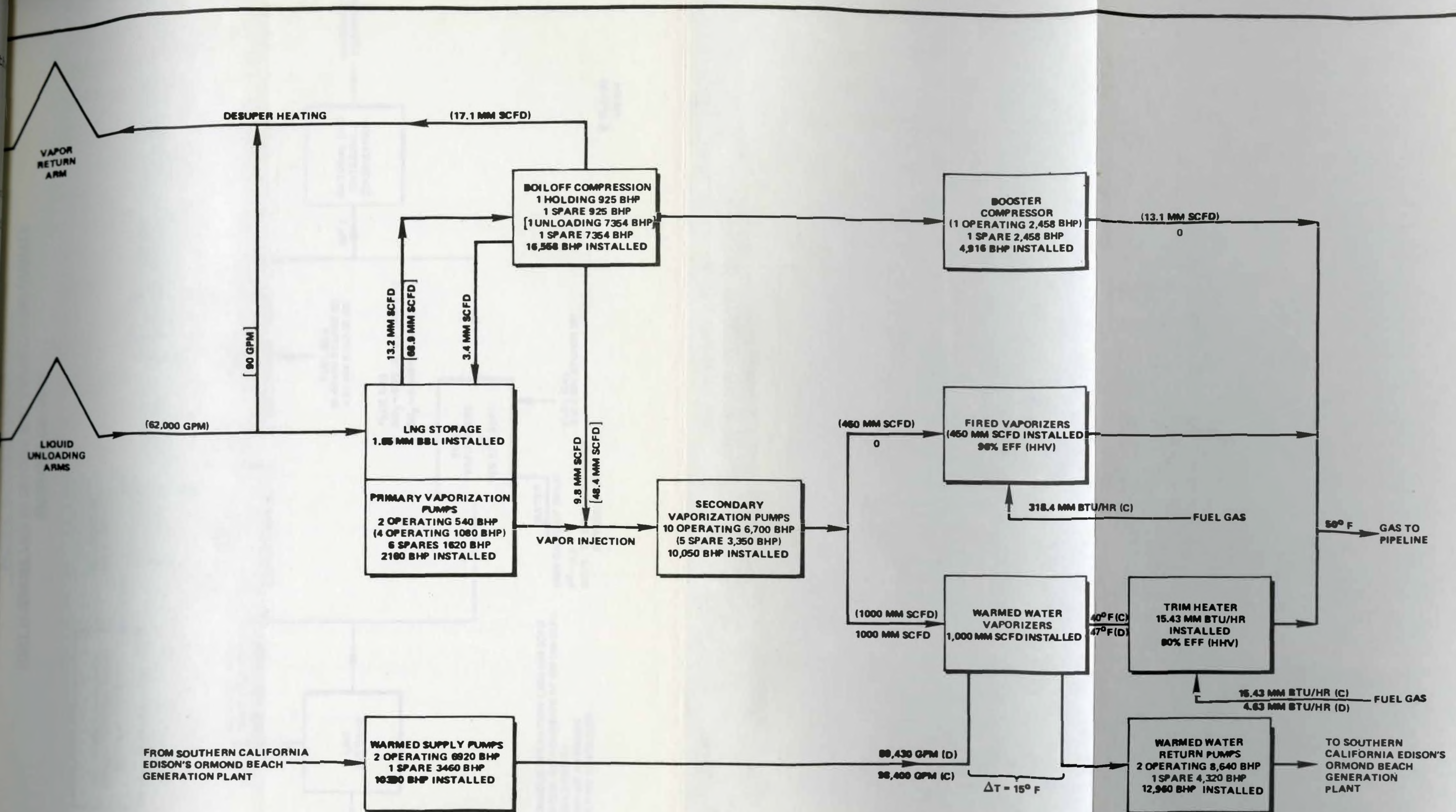
A strategically located fire and combustible vapor detection system will give immediate warning of fire hazards. A dry chemical fire extinguishing system will be provided at key locations at the marine facility and vaporization plant. In addition, a seawater pump and distribution system will be installed at the berth to provide for cooling of equipment during a fire. Gas detectors, air-breathing apparatus, and protective clothing will also be available at both facilities.

1.6.6.6 Security

Fencing, floodlighting and around-the-clock security guards will protect against acts of vandalism or sabotage. Strict in-plant traffic control and restrictions, along with careful orientation of in-plant roads with respect to plant equipment, will protect against possible damage by vehicles.

1.6.6.7 Emergency Shutdowns

In case of an emergency, an Emergency Shutdown System (ESS) will sequentially shut down pumps and transfer systems and actuate appropriate alarms. Any one of several push-button stations on board ship, at the berth or ashore, will be able to activate the ESS. It will automatically be activated if the electrical grounding lines become disconnected during unloading.



NOTES:
(A) ALL QUANTITIES ARE MM SCFD AT 14.73 PSIA AND 60° F.
(B) NUMBERS IN PARENTHESIS REPRESENT THE FOLLOWING OPERATION:
( ) – PEAK SHAVING OR STAND BY
[ ] – UNLOADING
(C) DESIGN CAPACITY (1000 MMCFD, CONTINUOUS OPERATION)
(D) NORMAL OR AVERAGE OPERATING CONDITION

NOTE: THESE PUMPS ARE LOCATED AT SOUTHERN CALIFORNIA EDISON'S ORMOND BEACH GENERATION PLANT.

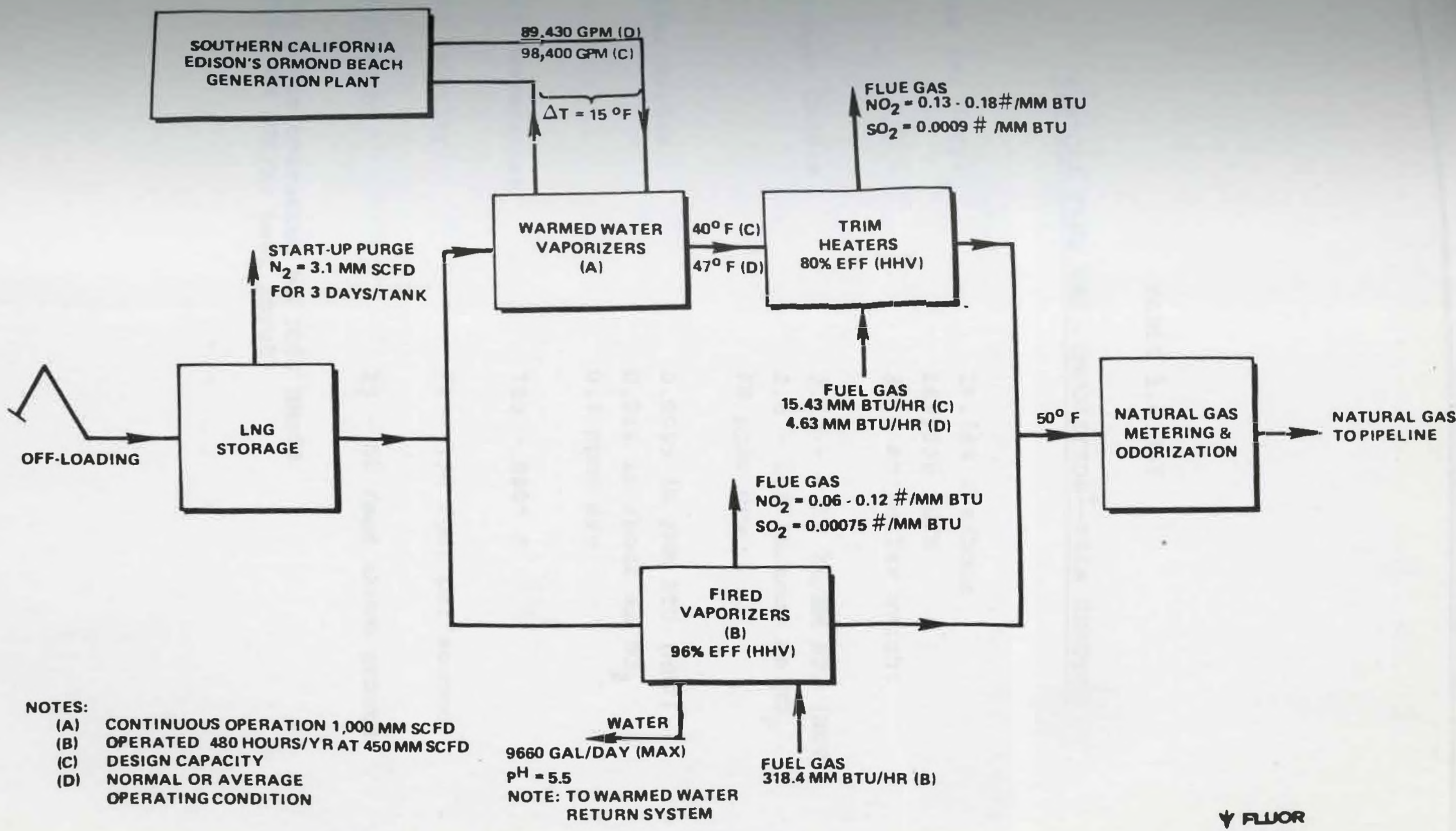
FLUOR ENGINEERS AND CONSTRUCTORS INC.

Simplified Block Flow Diagram
PORT HUENEME LNG RECEIVING AND VAPORIZATION FACILITY
ENVIRONMENTAL IMPACT REPORT
PACIFIC INDONESIA LNG COMPANY

JOB 449104
DATE 1/1974
DES. E. DRUCKER
DR. S.A. Lofstedt

PLATE 1.6.1–1

PACIFIC INDONESIA LNG COMPANY
PORT HUENEME LNG RECEIVING AND VAPORIZATION FACILITY
EMISSIONS DIAGRAM



NOTES:
- (A) CONTINUOUS OPERATION 1,000 MM SCFD
- (B) OPERATED 480 HOURS/YR AT 450 MM SCFD
- (C) DESIGN CAPACITY
- (D) NORMAL OR AVERAGE OPERATING CONDITION

FLUOR
449104

TABLE 1.6.3-I

TYPICAL FLUE GAS COMPOSITION*--TRIM HEATERS

Stack Gas (dry)	14,560 lbs/hour 169,000 SCFH 32.7 molecular weight
Nitrogen Oxides	0.13 - 0.18 lb/MM BTU (HHV) 2.0 - 2.8 lb/hour as NO_2 80 ppmv dry
Sulfur Oxides	0.0009 lb /MM BTU (HHV) 0.014 lb /hour as SO_2 0.5 ppmv dry
Exit Temperature	700 - 800° F
Exit Velocity	70 - 100 feet per second
Exit Height	25 - 50 feet above ground

* For plant operation of 1000 MMcfd
(15.4 MM BTU/hr heat input)

TABLE 1.6.3-II

TYPICAL FLUE GAS FOR PEAK-SHAVING VAPORIZERS*

Stack Gas (dry)	249,000 lbs/hour 3,177,000 SCFH 29.7 molecular weight
Nitrogen Oxides	0.06 - 0.12 lb/MM BTU (HHV) 19.1 - 38.2 lb/hour as NO_2 50 - 100 ppmv dry
Sulfur Oxides	0.0007 lb/MM BTU (HHV) 0.22 lb/hour as SO_2 0.42 ppmv dry
Exit Temperature	135° F
Exit Velocity	70 - 100 feet per second
Exit Height	25 - 50 feet above ground
Heat Release	318.4 MM BTU/hour (HHV)

* For maximum operation of 450 MMcfd

TABLE 1.6.4-I

UTILITY REQUIREMENTS

Electric Power,	peak kW	26,575
	average kW	20,020
Warm seawater,	normal gpm	89,430
	design gpm	98,400
Fresh city water, gpd		3,100
Sewage discharge, gpd		1,550
Fuel gas, billion BTU/year*		193

*This fuel gas consumption is based on 4.6 MM BTU/hour trim heating for 365 days per year, plus 318.4 MM BTU/hour peak-shave vaporizing for 480 hours per year.

1.7 FUTURE PLANS

This EIR has been written to cover possible future expansion to a daily rate of 1,000 MMcfd from the FPC application rate of 546 MMcfd with peaking facilities of an additional 450 MMcfd.

The ship berthing facilities and the storage and vaporization site can readily accommodate facilities capable of a total base-load of 1,000 MMcfd. Additional expansion beyond that point is not presently contemplated. However, there is ample additional usable space available--approximately 60 acres--beyond the 38 acres planned for the 1,000 MMcfd rate.

With initial deliveries in Fall 1978, deliveries under the existing contract will be made up to December 31, 1999. It is possible for the contract to be extended at any time by others calling for the delivery of gas from the same or other sources. In this event, the planned use and life of the facility could be extended.

The site plan (Plate 1.3-2) shows an area of approximately 50 acres lying south of the plant area proper on which no construction is indicated. This parcel will be reserved for a future use beneficial to the social or biological environment.