Chevron U.S.A. Inc.
December 1, 1980

OCS Lease P 0296

Platform Edith

Development & Production Plan

Chevron

Development & Production Plan

for

Proposed Platform Edith

San Pedro Bay
Offshore Southern California
Federal OCS Lease P 0296
Chevron U.S.A. Inc.
November 24, 1980

Address inquiries to:
Mr. Charles N. Segnar
Chevron U.S.A. Inc.—Western Region Production Dept.
575 Market Street
San Francisco, CA 94105
Phone (415) 894-2851

or

Mr. Clair Ghylin
Chevron U.S.A. Inc.—Land Dept., Western Region
575 Market Street
San Francisco, CA 94105
Phone (415) 894-4442

DEVELOPMENT AND PRODUCTION PLAN

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SECTION I

Introduction

Chevron U.S.A. Inc. (hereinafter called Chevron) is to be the operator for development of the Beta field crude oil reserves located in Lease OCS-P 0296. Union Oil Company of California and Champlin Petroleum Company are colessees of Lease OCS-P 0296 and participants in the project. Chevron and the participants in the project will hereinafter be referred to as Chevron et al.

Shell Oil Company (hereinafter called Shell) was the first operator in the Beta field with two platforms, Platform Elly and Platform Ellen on Lease OCS-P 0300. Further development of the reserves on Lease OCS-P 0296 necessitates the addition of platform, "Edith", to be operated by Chevron.

Lease OCS-P 0296 was acquired in December 1975 by Chevron and its partners for a total lease bonus of $105,177,000. The original participation percentages in the lease were Chevron 30.0%, Union Oil Co. 26.0%, Getty Oil Co. 22.0% and Skelly 22.0%. The present participation percentages are Chevron 47.3%, Union Oil Co. 46.5%, and Champlin 6.2%.

The proposed Platform Edith will be located in 161 feet (49.1m) of water approximately 8.5 (13.7 km) miles southwest of Huntington Beach.

The coordinates for the proposed platform are:

Lambert coordinates zone 6	x =	1,424,260'E
	y =	525,220'N
Polar coordinates Longitude		118° 08' 26.63" W
Latitude		33° 35' 45.05" N

In accordance with Title 30, Code of Federal Regulations 250.34 and OCS Order Number 8, Pacific Region, this Development and Production Plan (D&PP) for proposed Platform Edith is submitted for approval. It should be read in conjunction with the Environmental Report for proposed Platform Edith (November 24, 1980) and the EIR/EA for Shell's OCS Beta Unit Development (December 1, 1978).

This Plan includes descriptions of the following: regional geology, Lease OCS-P 0296 field history, platform structural design considerations, drilling facilities, production/general facilities, pipeline facilities, and the first submittal of the Design Verification Plan describing the selection and job description of the Verification Agent for the proposed Platform Edith project.

The anticipated schedule for the project is shown in Figure 1-1. The platform will have 72 slots for delineation and development wells. Present plans include the drilling of 47 producing wells

on a 15-acre pattern and 18 water injection wells. It is anticipated that the drilling and completion of these wells will be accomplished in approximately three years by using two electric drilling rigs. Most of the wells will be directionally drilled from proposed Platform Edith to develop the largest of two accumulations which lay in the south half of the lease. This accumulation exists in three zones that have been designated as the First, Second and Third zones. Additional directional drilling will be carried out to evaluate the second, a small hydrocarbon accumulation which lies to the west and across a major fault from the main accumulation. The production schedule for the platform predicts peak production of 7900 barrels per day which is estimated to occur during 1985.

Platform Edith Project
P-0296
San Pedro Bay Development
Chevron U.S.A. Operator

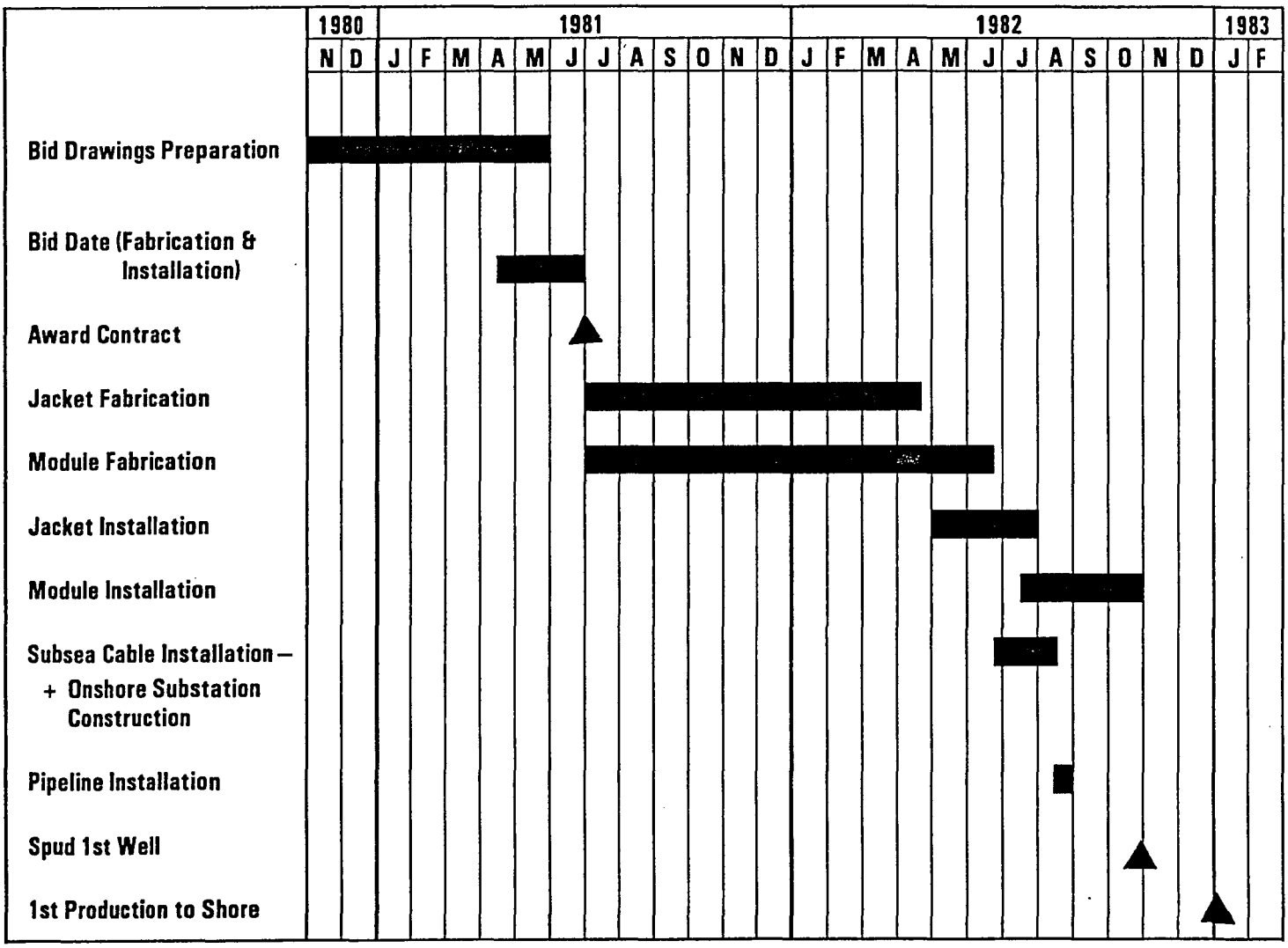

Figure 1-1

SECTION II

GEOLOGY

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SECTION II

GEOLOGY

2.1 Introduction

Chevron's area of planned development, geographically, lies in the San Pedro Channel approximately 10 miles (16.1 km) due south of the City of Long Beach. The nearest land-fall is at Huntington Beach, approximately 8.5 miles (13.7 km) to the northeast (Figure 2-1). The San Pedro Channel is defined as an offshore basin (Ref. 1) that lies between Santa Catalina Island and the Southern California coastline. As part of the California Continental Borderland, within the Penninsula Range Province, it is typified by elongated northwest and west-trending seafloor ridges, shelves and basins. Along the northeast side of this basin, between the Palos Verdes Hills and Newport Beach area, there is a shelf area of shallower water, which is considered to be a southerly seaward extension of the onshore Los Angeles Basin. Lease OCS-P 0296, on which the planned development will take place, is located on this shelf in water depths between 140' (42.7m) and 175' (53.3m).

2.2 Regional Geology

The Beta field is located in the Southern California offshore area (Figure 2-2) which is a submerged portion of the Peninsular Ranges. As shown on Figure 2-2 the Peninsular Range province is comprised of numerous major northwest trending faults, with associated ridges and basins. These terminate at their northerly end against the east-west trending Transverse Range. The submerged portion of the province, termed the "Continental borderland," is in turn characterized by a complex of basins, banks, shelves, islands and canyons. The Beta field is located in one of these basins, the San Pedro Basin (Figures 2-2 and 2-3). This basin also consists of certain major structural features. These features are the northwest trending Palos Verdes and the Newport-Inglewood fault zones, which are separated by the Wilmington Graben (Figure 2-3). These fault zones consist of throughgoing strike-slip faults with components of vertical offset. The numerous associated secondary faults and folds are typical of the structural style of the region. Lease OCS-P 0296 lies astride one of these major structural trends, the Palos Verdes anticlinorium and fault zone. The history of tectonic activity along these trends as well as within the San Pablo Channel area has been discussed in reports by Junger et al (Ref. 3), Dames and Moore (Ref. 6) and Yerkes et al (Ref. 5).

The stratigraphy of the area surrounding San Pedro basin has been described in detail by Junger and Wagner (Ref. 3), and Vedder et al, (Ref. 1). Most of the information presented in the following has been directly abstracted from these references.

The basinward projection of the mainland geology and scattered seafloor sediment samples have formed the basis for describing the stratigraphy of the San Pedro basin and vicinity. The subsea distribution of the principal rock units is shown on the geologic map, Figure 2-3.

San Pedro Bay lies within a belt of clastic strata which extends along the southern California coast from San Diego to Los Angeles. The width of the belt increases several fold in the Los Angeles basin area where the strata thicken abruptly to a maximum of about 32,000 feet (9700m) (Ref.4).

In the offshore part of the Peninsular Range province, submarine outcrops of basement rocks are confined to a few known exposures on and adjacent to Catalina Island and scattered ridges. Distinctive metamorphic rocks, represented by Catalina Schist, have been penetrated by several oil wells and are believed to underlie large portions of the offshore region west of the Newport-Inglewood fault zone (Ref. 1).

This interpretation is supported by seismic reflections interpreted to come from the top of the Catalina Schist. They are present in the geophysical profiles which run southeast of the Palos Verdes Hills, in San Pedro Bay (Ref. 3).

Pre-Miocene subsea sediments have not been described in the vicinity of San Pedro Bay. Miocene rocks, including both volcanic and sedimentary types, form most of the high-standing topography of the submerged part of the continental borderland. Seafloor exposures of both rock types are widely distributed along ridges and on knolls, but commonly are covered by a thin veneer of Quaternary sediments. The Miocene sedimentary section is estimated to be 3,000 feet (900m) thick (Ref. 1). Locally, the Miocene stratigraphic successions, even though thick, appear to be interrupted by unconformities.

Seafloor samples indicate that, lithologically, submerged Miocene rocks are as varied as their mainland counterparts. Siliceous shale and mudstone as well as sandstone and siltstone of middle and late Miocene age have been sampled on the crest of the Palos Verdes uplift, and along the San Pedro escarpment.

Pliocene sediments have accumulated on many of the lower slopes and in all basins of the borderland (Ref. 1). They

consist of interbedded sands and clays of varying thickness. Pliocene strata, consisting of Repetto and Pico formations in the central part of the San Pedro Basin, are estimated to have a maximum thickness of 7,000 feet (2100m) (Ref. 1).

The basin sediments of Pliocene age cannot be directly correlated to known occurrences of Pliocene strata on the mainland. The pliocene stratigraphic sequence has been established largely by correlation of unconformities observed in the offshore basins with those described in the Los Angeles basin (Ref. 3).

Unconsolidated sand and mud of Pleistocene and Holocene age form relatively thick deposits which cover near shore shelves and slopes. Vedder et al (Ref. 1) report as much as 1,100 feet (335m) of Quaternary deposits in the San Pedro Basin. This thickness may be an underestimation, since late Pleistocene sediments alone within the Wilmington Graben are reported to be between 1,000 and 1,200 feet (300 to 365m) thick (Ref. 13 p. 77), half of which were penetrated by site boreholes.

Flat-lying marine Holocene deposits ranging in thickness from 0 to 90 feet (27m) exist on the San Pedro shelf west of the Palos Verdes fault zone. East of the fault, in San Pedro Bay, Holocene sediments thicken to between 25 and 60 feet (7-18m) (Ref. 4). About 30 to 55 feet (9-16m) of Holocene

deposits were encountered in the platform siting area. A detailed description of these and other units are presented below under Site Geology.

Oil is currently being produced from accumulations in folded structures associated with the Palos Verdes and Newport-Inglewod fault zones both onshore and offshore in the San Pedro Bay to Newport Beach area. This proposed plan will develop a similar accumulation in a faulted anticline along the Palos Verdes fault zone. Also Chevron's development on Lease OCS-P 0296 is a northwesterly extension of the hydrocarbon accumulation that Shell is now developing on Leases OCS-P 0300 and OCS-P 0301.

The regional geology of the San Pedro Basin has been described in considerable detail by Nardin et al (Ref. 2), Junger et al (Ref. 4), Green, et al (Ref. 4), Vedder et al (Ref. 1), and Yerkes et al (Ref. 5). These reports provide an added comprehensive geologic summary of the stratigraphy and structure in the San Pedro Basin.

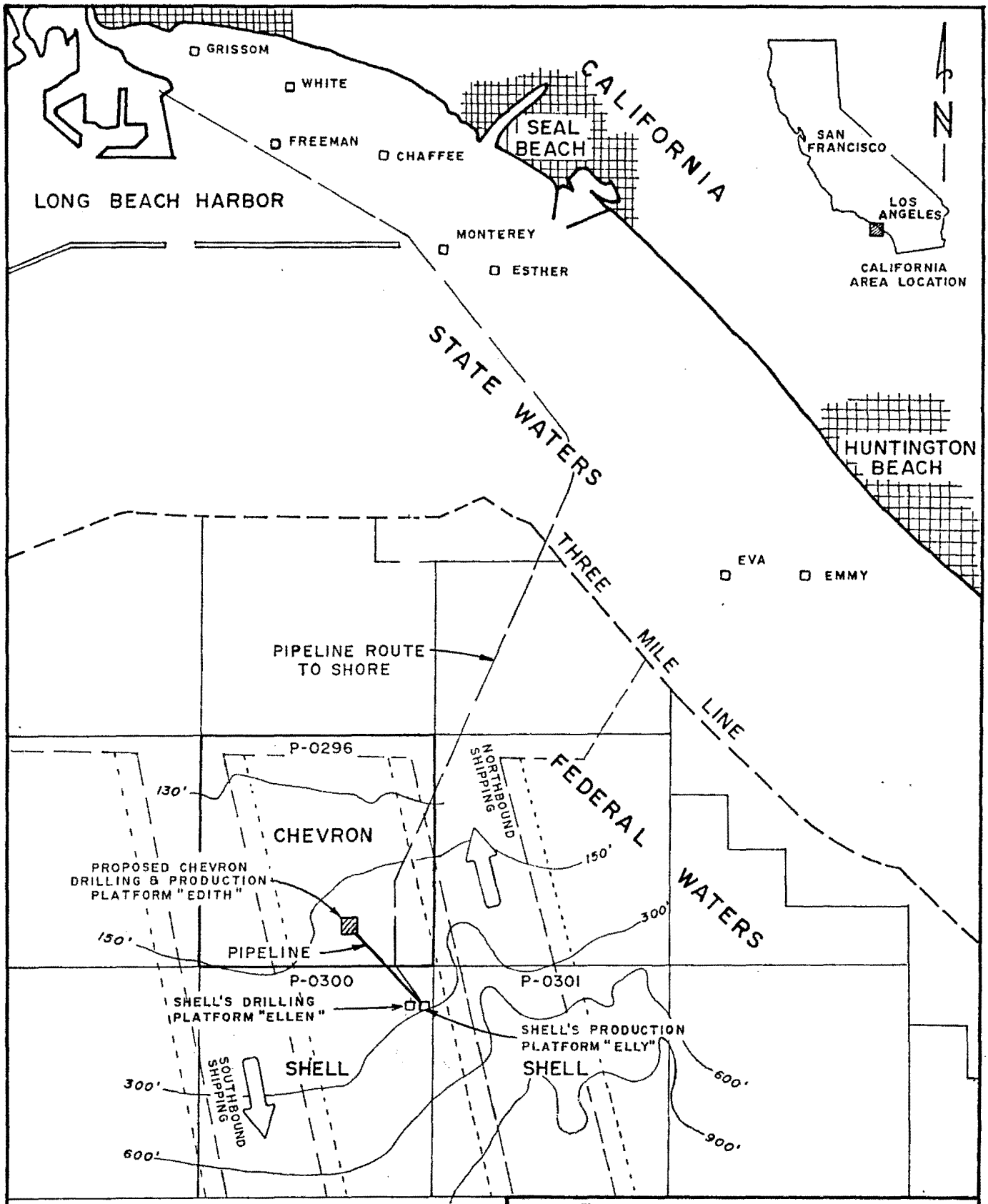
2.3 Area Geology

The Beta field oil accumulation underlies Leases OCS-P 0296, P 0300, P 0301 and P 0306. The trapping structure is comprised of a northwest trending elongated anticline which is truncated on the Southwest by the Palos Verdes fault.

Secondary faults with small displacements divide the structure into several blocks (Figures 2-4, 2-5, and 2-6). Motion along the Palos Verdes fault is both strike-slip and reverse. The strike-slip component appears to be right-lateral movement and the reverse movement is westside up relative to the eastside. On the westside of the Palos Verdes fault on Lease OCS-P 0296, there is a dome-shaped anticline which also contains a hydrocarbon accumulation. In the area of the Beta field, the Palos Verdes fault appears to reach the sea floor, based on high-resolution profiles and ocean floor sampling (Figures 2-3 & 2-7). According to Greene, et al (Ref. 4), ocean floor sediments east of the fault are Holocene and Pleistocene in age whereas to the west older sediments of Pliocene and Miocene age are exposed.

Sedimentary strata in the area of the proposed development range in age from lower Miocene to Holocene. The section is predominantly interbedded turbidite sands and deep-water shales. The uppermost units of late Pleistocene and Holocene age include shallow water marine shale and fluvial marine sand and gravel filled channel deposits. Basement rocks in the area consist of blue schist and metamorphosed quartz diorite.

Stratigraphic relationships of the major units are illustrated in Figure 2-6. A more detailed diagram of the Quaternary stratigraphy is shown on Figure 2-8.



CHEVRON PLATFORM "EDITH" LOCATION

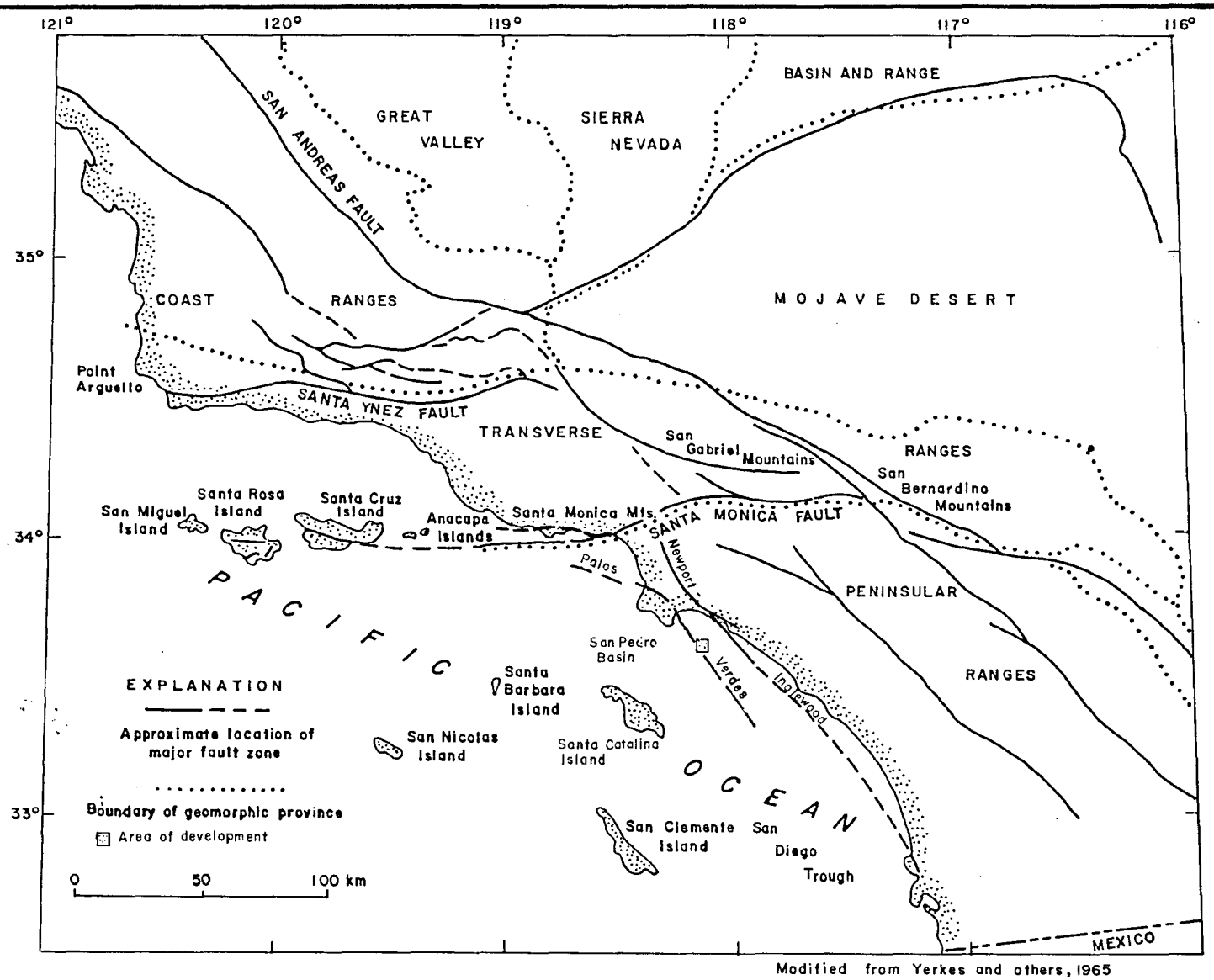
X=1,424,260 Y=525,220

CALIFORNIA (LAMBERT) COORDINATE SYSTEM ZONE 6

Chevron U.S.A. Inc.
Western Region Production Department

CHEVRON'S PLATFORM "EDITH"
SAN PEDRO BAY DEVELOPMENT

FIGURE 2-1

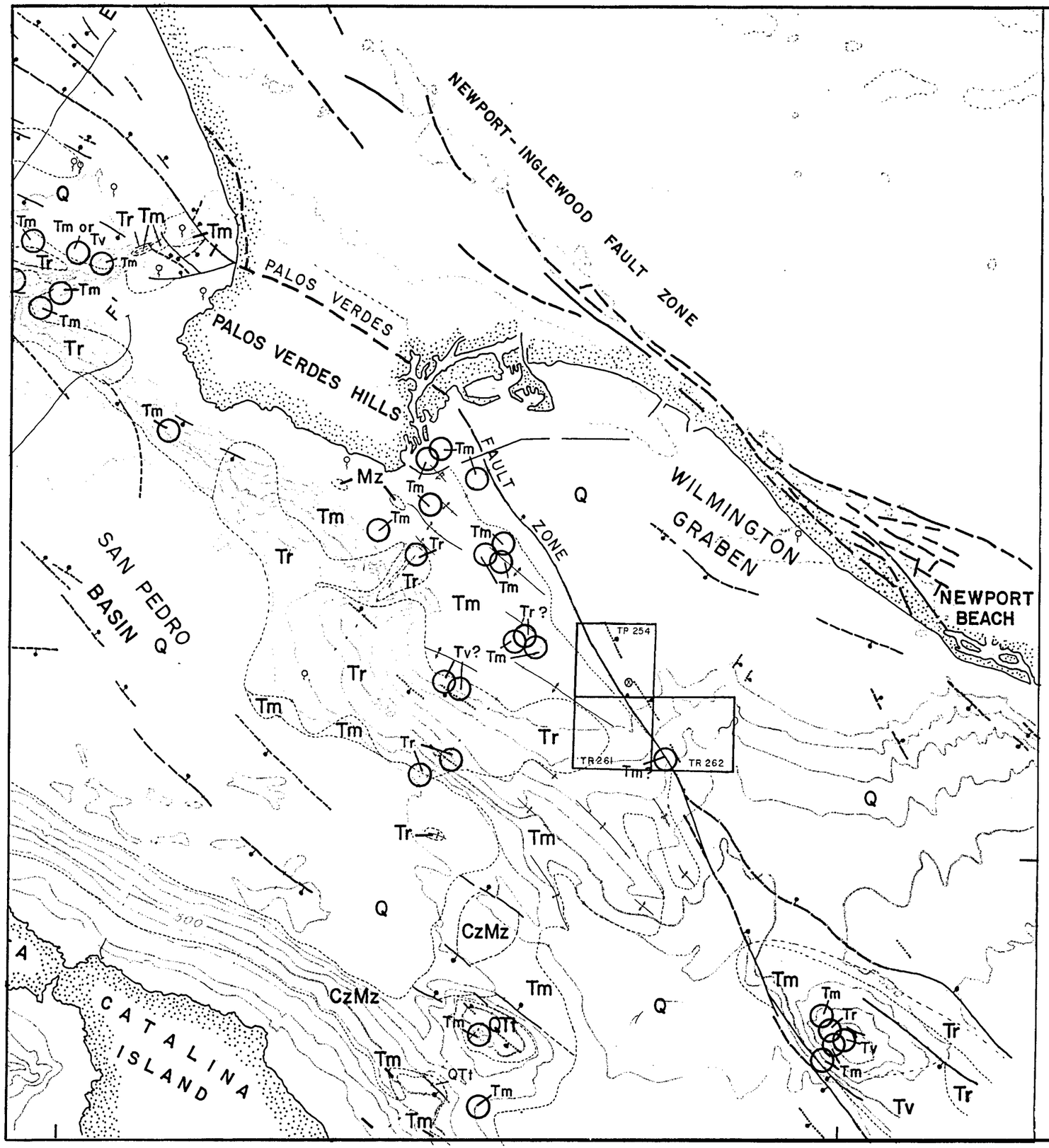


Modified from Yerkes and others, 1965

Index Map of Southern California Showing Development Area, Fault Zones and Boundaries of Major Geomorphic Provinces.

Chevron U.S.A. Inc.
Western Region, Production Department

FIGURE 2-2



LEGEND

⊗ PLATFORM EDITH SITE

---------?--? CONTACT BETWEEN ROCK UNITS
? DENOTES POSITION UNKNOWN

SOLID WHERE CUTTING HOLOCENE BEDS OR TO SEAFLOOR IN OLDER ROCKS; LONG DASHED WHERE CUTTING PLEISTOCENE BEDS; SHORT DASHED WHERE CUTTING PLIOCENE BEDS; DOTTED WHERE CUTTING MIOCENE AND OLDER ROCKS. BAR AND BALL ON DOWNTHROWN SIDE.

ANTICLINE

OUTLINE OF OIL OR GAS FIELD

OIL OR GAS SEEP

Tm BEDROCK SAMPLE

Q = QUATERNARY SEDIMENTS

QTf = TERRACE DEPOSITS. (QUATERNARY / TERTIARY)

Tr = REPETTO Fm (PLIOCENE)

Tm = MONTEREY SHALE (MIOCENE)

TV = VOLCANICS (MIOCENE)

CzMz = ACOUSTIC BASEMENT ROCKS (CENOZOIC / MESOZONE UNDIFF.)

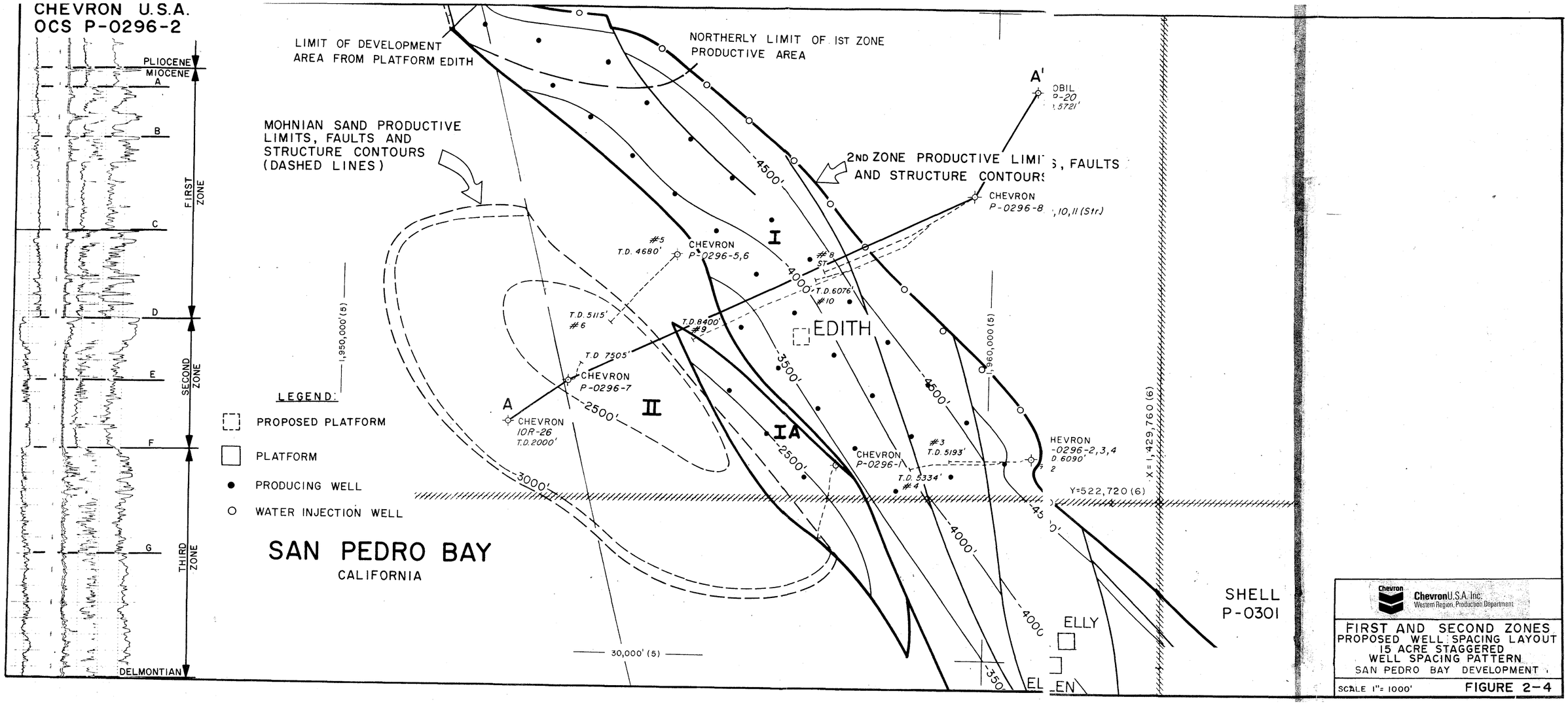
Mz = BASEMENT ROCKS

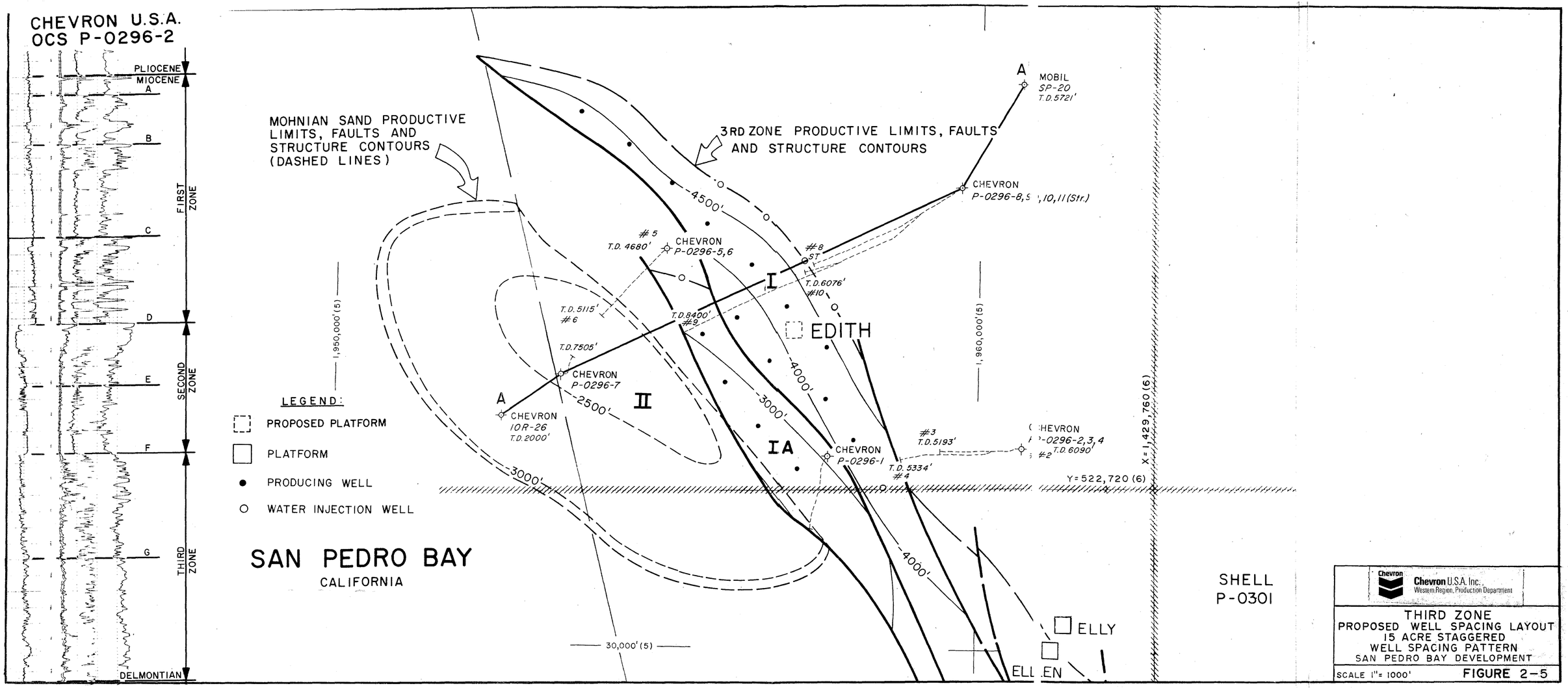
MODIFIED FROM JUNGER & WAGNER, 1977

Chevron U.S.A. Inc.
Western Region, Production Department

SURFACE GEOLOGIC MAP
BETA UNIT
SAN PEDRO BAY DEVELOPMENT

SCALE 1:250,000 FIGURE 2-3


CHEVRON U.S.A.
OCS P-0296-2
PLIOCENE
MIOCENE
A
B
C
D
E
F
G
FIRST ZONE
SECOND ZONE
THIRD ZONE
DELMONTIAN
LIMIT OF DEVELOPMENT AREA FROM PLATFORM EDITH
NORTHERLY LIMIT OF 1ST ZONE PRODUCTIVE AREA
MOHNIAN SAND PRODUCTIVE LIMITS, FAULTS AND STRUCTURE CONTOURS (DASHED LINES)
2ND ZONE PRODUCTIVE LIMITS, FAULTS AND STRUCTURE CONTOURS
A'
MOBIL P-20
CHEVRON P-0296-8
9,10,11 (Str.)
#5 T.D. 4680'
CHEVRON P-0296-5,6
#8 ST
T.D. 6076' #10
T.D. 8400' #9
T.D. 5115' #6
T.D. 7505'
CHEVRON P-0296-7
EDITH
A
CHEVRON 10R-26 T.D. 2000'
I
II
IA
4500'
4000'
3500'
2500'
3000'
1,950,000 (5)
1,960,000 (5)
X=1,429,760 (6)
Y=522,720 (6)
#3 T.D. 5193'
CHEVRON P-0296-1
T.D. 5334' #4
CHEVRON P-0296-2,3,4 T.D. 6090'
LEGEND:
PROPOSED PLATFORM
PLATFORM
PRODUCING WELL
WATER INJECTION WELL
SAN PEDRO BAY
CALIFORNIA
30,000' (5)
ELLY
SHELL P-0301
Chevron U.S.A. Inc.
Western Region, Production Department
FIRST AND SECOND ZONES
PROPOSED WELL SPACING LAYOUT
15 ACRE STAGGERED
WELL SPACING PATTERN
SAN PEDRO BAY DEVELOPMENT
SCALE 1"= 1000'
FIGURE 2-4


CHEVRON U.S.A.
OCS P-0296-2
PLIOCENE
MIOCENE
A
B
C
D
E
F
G
FIRST ZONE
SECOND ZONE
THIRD ZONE
DELMONTIAN
MOHNIAN SAND PRODUCTIVE LIMITS, FAULTS AND STRUCTURE CONTOURS (DASHED LINES)
3RD ZONE PRODUCTIVE LIMITS, FAULTS AND STRUCTURE CONTOURS
MOBIL SP-20 T.D. 5721'
CHEVRON P-0296-8,9,10,11(Str.)
#5 T.D. 4680'
CHEVRON P-0296-5,6
#8 ST T.D. 6076'
#10
T.D. 5115' #6
T.D. 6400' #9
T.D. 7505'
CHEVRON P-0296-7
CHEVRON IOR-26 T.D. 2000'
CHEVRON P-0296-1
#3 T.D. 5193'
CHEVRON P-0296-2,3,4
T.D. 6090' #2
T.D. 5334' #4
EDITH
ELLY
EL EN
I
IA
II
4500'
4000'
3000'
2500'
3000'
4000'
1,950,000'(5)
1,960,000'(5)
30,000'(5)
X=1,429,760(6)
Y=522,720(6)
LEGEND:
PROPOSED PLATFORM
PLATFORM
PRODUCING WELL
WATER INJECTION WELL
SAN PEDRO BAY
CALIFORNIA
SHELL P-0301
Chevron U.S.A. Inc.
Western Region, Production Department
THIRD ZONE
PROPOSED WELL SPACING LAYOUT
15 ACRE STAGGERED
WELL SPACING PATTERN
SAN PEDRO BAY DEVELOPMENT
SCALE 1"= 1000'
FIGURE 2-5

A

A'

CHEVRON

10R26 PROJ. 100' NW
K.B. 22'
W.D. 149'

P-0296-7 PROJ. 100' SE
K.B. 29'
W.D. 151'

N 64 E

PROPOSED PLATFORM EDITH
(projected 900' NW)

CHEVRON
P-0296-8,9,10,11
D.F. 27'
W.D. 160'

MOBIL
SP-20
PROJ. 900' SE
D.F. 22'
W.D. 155'

P-0296 | TRI24

S.L.
O.B.

T/1st
P/M
T/2nd
T/3rd
T.D. 2000'
T/MOHN
T/MOHN SHALEY
T/237 SHALE
T/BASAL CONGL. SD
T/SCHIST

-2000'
-4000'
-6000'
-8000'

II
IA
I

T.D. 7505'
ST

H/L FAULT

T.D. 8400'
#9
TVD 6059'

T.D. 6076'
#8 ST

T.D. 5726'
#10

T.D. 4464'
#8 O.H.

T.D. 6700'
#11

T.D. 5721'

Prob. PICO Unconf.
T/M. PICO
P/R
T/REP. ZONE
T/REP. CLAY

SCALE: 1" = 1000'

Chevron U.S.A. Inc.
Western Region, Production Department

STRUCTURE CROSS SECTION A-A
PARCEL P-0296
SAN PEDRO BAY DEVELOPMENT

SCALE 1"= 1000'

FIGURE 2-6

Y=538,560 (6)

Y=538,560 (6)

118°10'00"

33°37'30"

#13
T.D. 6525'

#12
T.D. 10,973'

Surface Trace

Palos Verdes Fault

CHEVRON
ET AL
P-0296
254
40,000' (±)

SOUTHBOUND

NORTHBOUND

X=1,413,920 (6)

1,950,000' (±)

1,980,000' (±)

1,970,000' (±)

30,000' (±)

Y=522,720 (6)

16" pipeline

EDITH

Elly

Ellen

MOBIL
10-4
625'

Signal
(12-2)
6032

CHEVRON
P-0296-12

10R-7
639'

10R-6
512'

10R-5
647'

CHEVRON
(10R-32)
2500'

10-15
642'

ARCO
(Belmont) CH
5151'

Union
(S-2) CH
2852'

5
T.D. 4680'
CHEVRON
P-0296-5,6

T.D. 5115'
#6

T.D. 8400'
#9

#8ST
T.D. 6076'
#10

T.D. 7505'
CHEVRON
P-0296-7

CHEVRON
(10R-26) CH
2000'

CHEVRON
(10R-16) CH
5383'

CHEVRON
P-0296-8,9,10,11 (Str)

CHEVRON
P-0296-1

T.D. 5334
#4

Signal
(111-3) 3614'

T.D. 5193'
#3

CHEVRON
P-0296-2,3,4
T.D. 6090'
#2

T.D. 10,895'

Mobil
(S2-20) CH
7107'

Shell
P-0300-12

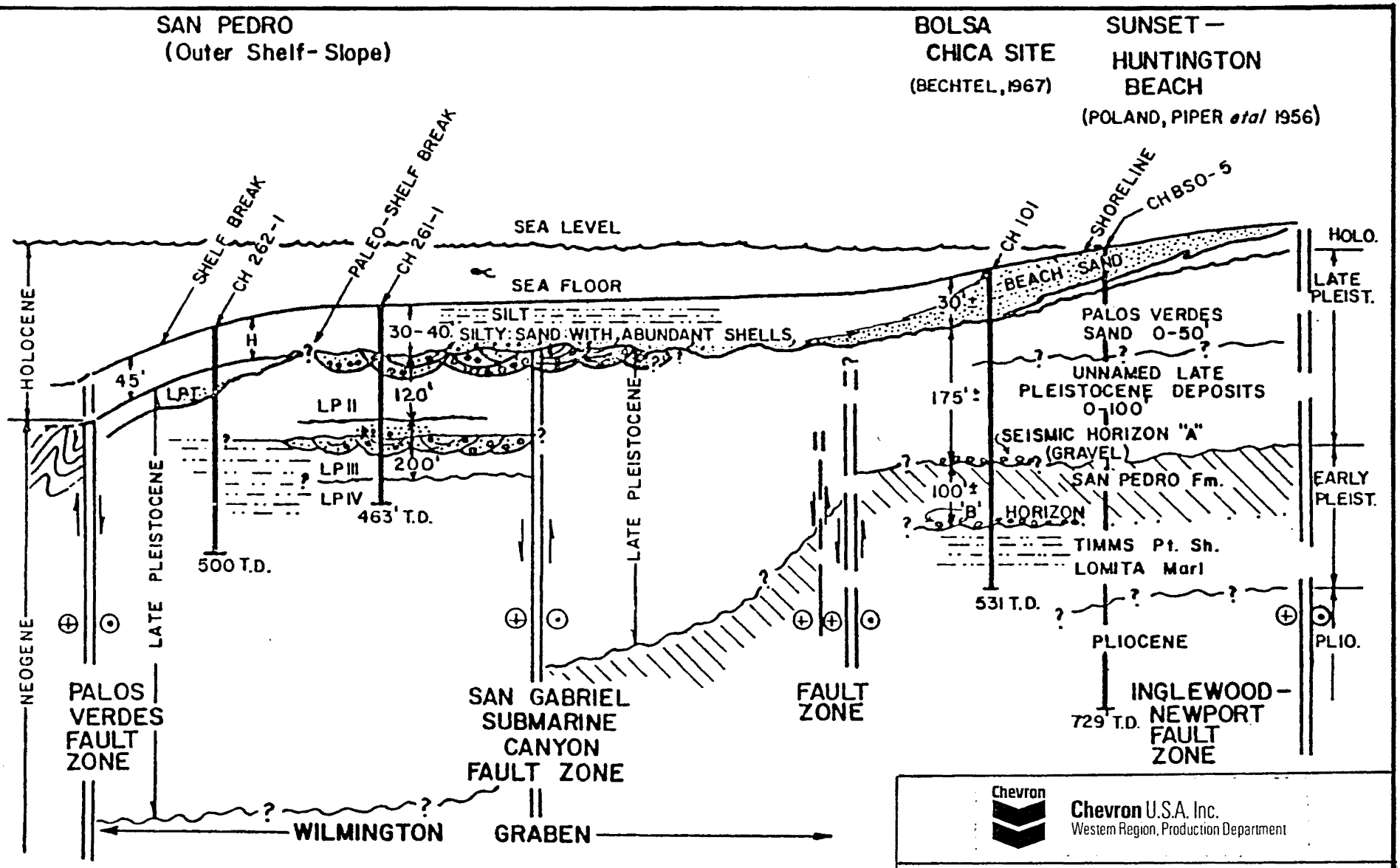
120 125 130 140 150 160 175 200 250 300 350

Chevron U.S.A. Inc.
Western Region, Production Department

BATHYMETRIC CONTOURS
PARCEL P-0296
SAN PEDRO BAY DEVELOPMENT

SCALE 1"= 2000'

FIGURE 2-7



Chevron U.S.A. Inc.
Western Region, Production Department

DIAGRAM OF QUATERNARY STATIGRAPY

SAN PEDRO BAY SHELF AREA

SOURCE: JUNGER AND WAGNER, 1977

NO SCALE

FIGURE 2-8

SECTION III

FIELD HISTORY AND RESERVOIR EVALUATION

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SECTION III

FIELD HISTORY AND RESERVOIR EVALUATION

3.1 Introduction

Lease OCS-P 0296 (Tract 254) was acquired in December, 1975 by Chevron, et al. Exploratory drilling on the lease occurred in two phases. During the first phase, pre-December, 1975 lease sale, twelve exploratory wells of varying depths were drilled and abandoned on the lease (Table 3-1). Several of these wells encountered heavy oil (Tar) shows in thinly bedded Pliocene sands. Following the lease sale of December 1975, Chevron as operator, drilled thirteen exploratory and confirmation wells on this lease (Table 3-2).

Field history, reservoir evaluation, and development plans for the proposed drilling from Platform Edith on Lease OCS-P 0296 are included in the paragraphs below. A development plan for other known portions of the Beta field, Leases OCS-P 0300 and OCS-P 0301 has been prepared and submitted to the USGS by Shell.

3.2 History of Lease OCS-P-0296

Following the December, 1975 acquisition of Lease OCS-P 0296, Chevron et al drilled and abandoned thirteen evaluation wells (Table 3-2) on this lease. The Beta field exploratory discovery wells were drilled by Chevron (OCS-P 0296 #1) and Shell (OCS-P 0301 #1) during the period July to October, 1976. Thereafter Chevron drilled wells #2 through #13 during the period between November, 1976 through March, 1978. In the Chevron et al's OCS-P 0296 #1 well, hydrocarbons were encountered in Miocene sands between the drilled depths of 2904' (885m) and 3520' (1073m). Formation tests of these sands yielded 17.7° oil at a maximum rate of 70 barrels/day (Figure 3-1). This well was subsequently drilled to a total depth of 10,895 feet (3321m) where it bottomed in basement rock consisting of a schist breccia. As a result of all the drilling on this lease, three more or less separate accumulations of 17° API oil have been delineated. These accumulations are defined as Blocks I, II and III. On Figures 2-4 and 2-5 only Blocks I and II are shown. Block III lies to the north of Block I, off the area shown on these Figures. A more detailed discussion of each accumulation follows under Sections 3.3 and 3.5.

3.3 Reservoir Description

The Beta field accumulations are located in sedimentary rocks of Upper Miocene Delmontian age. Lithologically the reservoir rock in these accumulations is composed of numerous sands interbedded with tough brown clayey shales. These beds dip about 30° to the northeast. Based on reservoir fluid properties, electric log correlations and varying oil water interfaces, the various sand reservoirs have been assigned to three zones. However, the physical properties of the sand beds are quite similar, having an average porosity of 23% and an average air permeability of 777 millidarcies.

The largest accumulation, Block I which lies in the southern portion of the lease, contains an estimated 172,000,000 barrels of original oil in place (O.O.I.P.). This accumulation has been further subdivided into the First, Second and Third Zones of the Miocene Delmontian age sediments. Block II is estimated to contain 95,000,000 barrels of O.O.I.P. in shallow Miocene Mohnian sands. Block III, the smaller northern accumulation, contains an estimated 96,000,000 barrels of O.O.I.P. in the same three zones as found in Block I.

3.4 Reservoir Fluid Properties

The average gravity of the Miocene oil, both Delmontian and Mohnian, is 17.4 degrees API (Table 3-3) on Chevron et al's lease. Shell noted in their Plan of Development of the Beta Unit (1977) that the oil gravity varies from the structural crest to the oil water interface within the reservoirs. More testing and production will be required on Chevron et al's lease to determine if a similar condition exists. Shell also noted an increase in oil gravity with depth from their A sands (first zone) to D sands (second zone). This condition has not been identified on Chevron et al's lease.

PVT data, formation volume factor, gas in solution and other reservoir characteristics are shown on Table 3-3. The bubble point pressure, according to Shell, is very near the reservoir pressure.

3.5 Development Plan

The proposed location of Platform Edith is very critical to maximize oil recoveries and at the same time avoid mechanical problems in drilling, completing and producing wells with high angle holes. After careful consideration, it was decided that the optimum platform location should be in the southeast portion of Lease OCS-P 0296. A platform at this location will maximize oil recoveries from the main oil

accumulation in Block I. Also, most of the potential reserves in Block II could be developed from this location. Some of the important considerations in the development plan and location of Platform Edith were:

1. Maximize oil recoveries from Block I.

2. Further evaluate and possibly develop Block II.

3. Gravel flow pack completions in deviated holes.

4. Intermediate water sands will require cemented blank casing within the gravel flow pack intervals.

5. Maximum practical hole angle is 60°. Some curved conductors will be required to reach this deviation angle at shallow depths.

It is now planned that the proposed platform will have slots for a maximum of 72 wells. 65 of these wells will be drilled to Miocene sand reservoirs located in Block I. This plan calls for developing Block I with 47 producing wells on a 15-acre spacing pattern plus 18 water injection wells. The preliminary well locations are shown on Figures 2-4 and 2-5. The Lambert zone (6) coordinates of each proposed production and injection well, where they will intersect the midpoint of the producing zone, are listed on Table 3-4. These locations

have not been given a well number because Chevron, as operator, does not know at this time the order in which these wells will be drilled.

Seven (7) slots are available, under the present plan, to be used for evaluation and possible development wells in Block II. Depending on how the development of Block I progresses more or less additional slots to develop Block II may or may not become available.

The following is a summary of development plans for the Beta field on Lease OCS-P 0296.

Block I: This is a Palos Verdes fault footwall accumulation in the southeast portion of Lease OCS-P 0296. The objective sands are Miocene Delmontian First, Second and Third Zones (Figures 2-4, 2-5, & 2-6). The reservoir rock consists of thinly bedded sands. Intermediate water sands occur in some places and must, therefore, be excluded from the oil productive sands. This is the main accumulation so it will be developed first. If during development of the field, it is ascertained that additional First Zone reserves are present downdip from the proposed water injectors, an additional row of downdip oil producing wells will be required.

Block II: This is a Miocene Mohnian accumulation in the hanging wall of the Palos Verdes fault, West and adjacent to Block I. The reservoir is composed of sands with numerous thin shale interbeds. Some oil (20 B/D of 17.1° API) was recovered from these sands during a formation test in well OCS-P 0296 #7 (Figure 3-1). This accumulation can be developed from the proposed Platform Edith location if commercial production can be established through gravel flow pack completion.

Block III: This is a northwesterly extension of the main Block I accumulation in the footwall of the Palos Verdes fault. This accumulation is not shown on any of the attached figures. Only two wells, the OCS-P-0269 #12 and #13, have been drilled into the accumulation. No tests of the oil saturated Miocene sands were made. Future development plans for this accumulation will depend on additional delineation drilling in the block and the results of the northerly most development in Block I.

A water injection program is proposed to enhance the recovery of the hydrocarbon accumulations. An evaluation of the anticipated reservoir performance, based on presently known reservoir parameters (Table 3-3), was made. It shows that by relying on normal reservoir depletion (i.e. the natural reservoir energy drive) only 10% of the original oil in place can be economically recovered. By introducing a water

injection program, simultaneously with the oil development, up to 26% of the original oil in place can be economically recovered. A peripheral water flood will be initiated early in the development of Block I. Consideration to change the proposed injection well pattern (Figures 2-4 and 2-5) will be based on the performance of this injection program.

Pipeline quality oil will be shipped to shore from Platform Edith via a pipeline to Shell's production platform, Elly. At Elly, production from Lease OCS-P-0296 will be commingled with Shell's production in the pipeline to shore which is to be jointly owned with Shell. As shown on Figures 2-4 and 2-5, the First and Second zones will be developed together and the Third zone will be developed with separate wells.

3.6 Anticipated Production

The estimated peak oil production from the 47 Miocene zone wells will be approximately 7900 barrels/day by 1985. Based on the present state-of-the-art production technology, it is estimated that ultimate oil recovery will be about 46,000,000 barrels over a 20-year life, assuming a successful water flood. Estimated initial production from each well from the First and Second zones is 250 barrels of oil per day and from the Third zone, 375 barrels of oil per day. Gas production will be small and all gas will be used as fuel or reinjected. Hydrogen sulfide and sulfur content of the oil appears to be low.

PRE-LEASE SALE DRILLING ACTIVITY
LEASE OCS-P 0296
(OCS TRACT 254)

WELLS	LAMBERT ZONE	APPROXIMATE SURFACE LOCATION X	APPROXIMATE SURFACE LOCATION Y	BOTTOM HOLE LOCATION	T.D. MEASURED	D.F. ELEVATION	DATE SPUDDED
Socal 10R-26	(6)	1428765'	523840'	Straight Hole	2000'	22'	05/11/64
Socal 10R-32A	(6)	1428600'	529570'	Straight Hole	2512'	17'	06/01/64
Richfield C.H. #1	(6)	1423140'	529700"	Straight Hole	5151'		07/08/58
Mobil SP-20	(6)	1427880'	528940'	Straight Hole	5700'	22'	02/08/65
Signal II-2	(6)	1422070'	534840'	Straight Hole	6037'	32'	10/25/64
Mobil 10-4	(5)	1951790'	45190'	Straight Hole	625'	7-1/2'(K.B.)	09/03/56
Chevron 10R-15	(5)	1950400'	38250'	Straight Hole	642'	8' (K.B.)	01/25/56
Chevron 10R-14	(5)	1947250'	47980'	Straight Hole	622'	8' (K.B.)	01/23/56
Chevron 10R-5	(5)	1951700'	39200'	Straight Hole	647'	7' (K.B.)	12/22/55
Chevron 10R-6	(5)	1946650'	41200'	Straight Hole	512'	8' (K.B.)	12/27/55
Union S-2	(5)	1955300'	37000'	Straight Hole	2852'	-	11/08/56
Signal 111-3	(5)	1960000'	33200'	Straight Hole	3614'	32.5'	11/10/64

Table 3-1

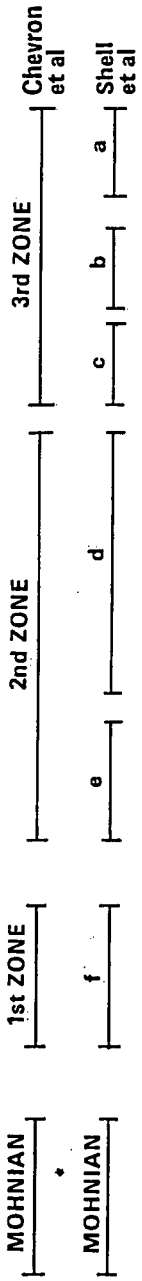
POST-LEASE SALE DRILLING ACTIVITY

WELL			SURFACE LOCATION X	SURFACE LOCATION Y	BOTTOM HOLE LOCATION X	BOTTOM HOLE LOCATION Y	T.D. MEASURED	T.D. VERTICAL	D.F. ELEVATION	DATE SPUDDED
			(LAMBERT ZONE 6)							
Chevron, et al	No.	1	1424768	523215	1424512	522108	10895'	10690'	27	07/20/76
OCS-P 0296	No.	2	1427783	523353	1427599	523426	6090'	6082'	27	11/25/77
	No.	3(1)	1427783	523353	1426486	523323	5193'	4915'	27	01/17/77
	No.	4(1)	1427783	523353	1425943	523219	5336'	4714'	27	02/03/77
	No.	5	1422266	526457	1422314	523691	4680'	4678'	27	03/07/77
	No.	6(2)	1422266	526457	1421250	525407	5115'	4675'	27	03/28/77
	No.	7	1420620	524520	1420830	524791	7505'	7466'	29	04/09/77
	No.	8	1426856	527389	1424543	526206	6076'	4987'	29	08/11/77
	No.	9(3)	1426856	527389	1422532	525147	8400'	6058'	27	08/21/77
	No.	10(3)	1426856	527389	1424436	526073	5726'	4423'	27	09/20/77
	No.	11(3)	1426856	527335	1426850	527335	6700'	6696'	27	10/18/77
	No.	12	1418367	533961	1416934	533497	10973'	10691'	27	11/09/77
	No.	13(4)	1418367	533961	1415502	535621	6525'	4957'	27	02/05/78

(1) Redrill of OCS-P 0296 #2
(2) Redrill of OCS-P 0296 #5
(3) Redrill of OCS-P 0296 #8
(4) Redrill of OCS-P 0296 #12

Table 3-2

LEASE OCS-P 0296
SUMMARY OF TESTING



Chevron et al			
296 #1	296 #4	296 #7	296 #10
Not tested	Not tested minor shows	Wet not tested	Tested in conjunction with B sand Shaly and very thin sands probably not contributing to production
Tested through perforations No oil recovered	Tested gravel packed liner 17.3°API 214 B/D no sand problems	Wet not tested	Tested gravel packed liner 16.5°API 185 B/D no sand problems
Tested through perforations and gravel packed inner liner 17.7°API 70 B/D sand problems	Wet not tested	Wet not tested	Not penetrated
Wet not tested	Not penetrated	Tested through gravel packed inner liner 17.1°API 20 B/D	Not penetrated

Figure 3-1

RESERVOIR CHARACTERISTICS FOR DEVELOPMENT OF BLOCK I LEASE OCS-P 0296

Depth:	2500' - 4650'
Oil Gravity:	17.4° API
Area:	593 Acres
Original Oil in Place:	172,000,000 BBLS.
Average Porosity:	23%
Water Saturation:	35%
Arith. Average Air Perm:	777 millidarcies
Geom. Mean Air Perm:	571 millidarcies
Reservoir Oil Permeability:	25 millidarcies
Initial Pressure:	1,825 psi at 4200' subsea datum
Reservoir Temperature:	155°F
Formation Volume Factor:	1.12
Reservoir Oil Viscosity:	15.5 cp.
Reservoir Water Viscosity:	0.47 cp.

Table 3-3

TABLE 3-4

Lambert Coordinates where each proposed Production and Injection Well intersects with the midpoint of the producing zone Block I OCS-P 0296.

ZONES 1 & 2 PRODUCTION WELLS (LAMBERT ZONE 6)

X	Y	X	Y
1,419,280	529,830	1,424,990	525,680
1,420,110	529,580	1,423,150	524,310
1,420,350	528,900	1,423,900	524,660
1,421,200	529,260	1,424,760	524,870
1,420,930	528,440	1,425,580	525,050
1,421,800	528,650	1,423,730	523,660
1,421,580	527,850	1,424,520	524,050
1,422,510	528,100	1,425,340	524,250
1,422,260	527,290	1,426,210	524,410
1,423,160	527,540	1,424,310	523,000
1,422,910	526,730	1,425,100	523,440
1,423,770	526,900	1,425,950	523,620
1,423,530	526,080	1,426,810	523,820
1,424,370	526,300	1,425,720	522,800
1,423,310	525,280	1,426,590	523,000
1,424,140	525,500	1,427,400	523,200

TABLE 3-4
(continued)

ZONES 1 & 2 INJECTION WELLS (LAMBERT ZONE 6)

X	Y	X	Y
1,420,730	530,010	1,425,200	526,500
1,422,060	529,460	1,425,820	525,850
1,422,730	528,930	1,426,450	525,220
1,423,400	528,400	1,427,050	524,630
1,424,100	527,800	1,427,650	524,040
1,424,700	527,140	1,428,070	522,720

ZONE 3 PRODUCTION WELLS (LAMBERT ZONE 6)

X	Y	X	Y
1,429,500	528,475	1,423,210	524,360
1,421,690	527,980	1,423,900	524,700
1,422,375	527,390	1,424,790	524,900
1,422,910	526,775	1,423,730	523,700
1,423,610	526,150	1,424,780	524,100
1,422,850	525,100	1,424,330	523,030
1,423,390	525,350	1,425,200	523,475
1,424,160	525,500	1,424,440	526,200
1,423,120	527,380	1,424,900	525,500
1,423,850	526,880	1,425,650	522,750
1,422,530	525,950		

SECTION IV

PLATFORM STRUCTURE AND SITE

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SECTION IV

PLATFORM STRUCTURE AND SITE

4.1 Introduction

This section discusses Chevron's platform to be installed on Lease OCS-P 0296 in San Pedro Bay. This platform, which will provide a foundation for the drilling of the development wells and for the offshore production facilities, is a conventional 16-leg template-type platform to be installed in 161 feet (49.1m) of water. It will be located about 10 miles (16.1 km) south of Long Beach on Lease OCS-P 0296.

The structure will be designed in accordance with the latest edition of OCS Order No. 8 for the most severe loads that might occur during launch, installation, and operations, and to safely withstand the loads caused by severe storm waves or the level of earthquake ground shaking appropriate for the seismic region.

Elevation views of the platform jacket are given in Drawings No. 800906-8001 and No. 800906-8002. Plan views of the platform are given in Drawing No. 800906-8003. Sixteen main legs framed with diagonal and horizontal bracing comprise the basic structure. This bracing system provides a high level of redundancy and adds substantially to the stability of the

platform under severe earthquake or wave loads. The structure will be secured to the ocean bottom with piles driven through the legs of the jacket attached by welding. Decks of the platform provide space and load carrying capacity for drilling equipment and production facilities with a capacity for 72 well conductors.

Complete details on site conditions, design criteria, platform analyses, fabrication and installation shall be provided as part of the Verification Documentation pursuant to OCS Order No. 8. (Appendix 1 describes a portion of the Design Verification Plan per OCS Order No. 8 Part 3.2.2.)

4.2 Geotechnical Considerations

The Platform Edith location was initially selected on the basis of data obtained from the drilling of thirteen wells on Lease OCS-P 0296. This data defined a commercial hydrocarbon accumulation which trends northwesterly through the center of the lease (Figures 2-4 and 2-5). In order to adequately develop this accumulation by directional drilling, the site shown on these two figures was selected. During June, 1980, McClelland Engineers, Inc. under contract to Chevron made a geotechnical and geophysical site investigation for both the proposed platform site and the pipeline route to Shell's Platform Elly. Their investigation and report (Ref. 7) found conditions at the platform site and

along the pipeline route to be favorable for the proposed construction.

4.2.1 Bathymetry

Ocean floor water depths and sea floor topography at the proposed platform site and along the pipeline route are shown on Figure 2-7 of this report and Plate 3 of McClelland's report (Ref. 7). Water depths within this study area range from 145 feet (44.2m) in the northwest to 265 feet (80.8m) in the southeast. At the platform site the water depth is 161 feet (49.1m) (MLLW). Water depths along the proposed pipeline route range from 161 feet (49.1m) at proposed Platform Edith site to approximately 250 feet (76.2m) at Shell's Platform Elly. (Ref. 7).

The sea floor slopes gently towards the southeast, with the slope increasing gradually with depth. At the platform site the slope is approximately 0.6 percent (i.e., 1:160 or 22 seconds). Along the pipeline route the slope gradually increases to approximately 2.5 percent at Platform Elly (i.e., 1:40 or 1°26').

4.2.2 Ocean Bottom Conditions

The McClelland Report (Ref. 7) reported that the ocean floor is generally smooth with numerous areas with slight

irregularities of less than 1 ft. (0.3m) relief (Ref. 10). One of these areas is along the proposed pipeline route. However, it does not appear to be a feature which will in any way effect the pipeline. The McClelland Report (Ref. 7) has also prepared a geologic feature and anomaly map (Ref. 10) based on their water borne high resolution geophysical surveys. The survey report (Ref. 16) concluded there are no identifiable prehistoric cultural resources which will be affected by the proposed project. Two possible historic anomalies which showed up on the side scan sonar lie very near the edge of the 2000 foot (609.6m) radius of impact area surrounding the proposed platform. These areas will be avoided during anchoring activities connected with platform and pipeline construction.

A series of dart cores were taken along the proposed pipeline route. The recovered sediments consisted primarily of sandy silt and fine silty sands. (Ref. 8).

There is no evidence of slumping or downslope movement in the ocean floor strata at the platform site or along the pipeline route.

4.2.3 Shallow Gas and Hydrocarbon Seeps

There is no shallow gas or hydrocarbon seepage in the area of the proposed platform or along the route of the proposed

pipeline. This observation is based on a review of all high resolution geophysical surveys run and reported by McClelland Engineers (Ref. 9). They reported only one water column anomaly about 4400 feet (1341m) southwest of the platform site, which appears to be caused by gas bubbles. No gas or hydrocarbons have been encountered in the shallow sediments where penetrated by wells and soil borings drilled to date.

4.2.4 Shallow Overburden Sediments

It appears that there are two ages of sediments within the proposed construction area, based on McClelland's (Ref. 7) work. The youngest of these is a wedge of Holocene sediment; the older is the underlying Pleistocene sediment. The McClelland Report (Ref. 11) has mapped the distribution of these sediments. They show the Holocene wedge to be present in the southeast portion of the lease, underlying most of the proposed pipeline route. Proposed Platform Edith will be constructed on the Pleistocene sediments. McClelland's report (Ref. 7) should be referred to for a detailed description and laboratory analyses of these sediments. In general, both the Holocene and Pleistocene sediments have similar lithology. The Holocene sediments consist primarily of a sandy silt unit that varies from 0 to approximately 30 feet (0-9.1m) along the pipeline route. The Pleistocene, which outcrops in the platform area, consists of a unit of gray fine sand, silty fine sand, and sandy silt to a depth of about 67 feet (20.4m).

4.2.5 Shallow Structural Geology

McClelland's report (Ref. 7) should be referred to for a detailed description of the geologic structure in the area of the proposed construction. Generally, both the Holocene and Pleistocene sediments dip toward the east-southeast at about 280 ft/mile. (i.e., 3°). The seismic records show two distinct shallow unconformities (i.e., erosional surfaces). These are displayed on the McClelland report (Ref. 7) Plates 7, 11, and 12. The major structural element in the study area is the Palos Verde Fault Zone (Ref. 12). The proposed platform site is 1400 feet (427m) northeast of the nearest branch of this fault. Other minor faults, which are shallow and do not cut the Holocene sediments, are also present in the area. At the platform site and along the proposed pipeline route no shallow faulting was found.

4.2.6 Deep Drilling Hazards

The usual deep drilling hazards encountered while penetrating hydrocarbon bearing formations are expected during the drilling of the proposed wells. As part of the blowout and oil spill prevention plan, Chevron's drilling program will contain a casing program that will be in accordance with OCS Order No. 2-Drilling Procedures.

The deepest hole drilled in the area, Chevron OCS-P 0296 #1 (Figure 2-4), went to a measured vertical depth of 10,690 feet (3258m). Like Chevron's other twelve post-lease sale wells drilled in the immediate area (Table 3-2), no abnormal formation pressures were encountered. No lost circulation occurred during the drilling of the wells. Since the reservoir fluids contain a low gas saturation there is a very low potential for a blow-out during drilling.

4.2.7 Earthquake Activity

The San Pedro Bay area is in a structurally complex and seismotectonically active region. Earthquake activity that might impact the platform and pipeline was investigated by Dames & Moore (Ref. 6). Their report identifies the significant active faults (Table 4-1), assigns upper level earthquake magnitudes to each fault and assesses their basic input on a probabilistic and deterministic basis at the construction site. In a follow-up report dated 1980, Dames and Moore (Ref. 14) updated and reevaluated their 1978 response spectrum (Ref. 6). They concluded that the proposed platform should be designed to withstand ground motions expected from a Magnitude 6 earthquake on the Palos Verdes fault, about 1400 feet (427m) from the platform, or a Magnitude 6-1/4 event on the Newport-Inglewood fault at a 10 mile (16.1 km) epicenter distance.

Southern California has had a long history of earthquake activity. The significant active faults are listed on Table 4-1 and their approximate locations are shown on Figure 2-2. During the past 50 years for which instrument recordings of earthquake magnitudes are available the largest nearby event was a Magnitude 6.3 earthquake. This event occurred in 1933, possibly along the Newport-Inglewood fault. The epicentral location lies about 10 miles (16.1 km) north of the proposed platform site. Larger earthquakes have occurred historically at greater distances, but the ground shaking that they imposed on the proposed site was less than that expected from an upper level earthquake on the Palos Verdes or Newport-Inglewood faults.

Studies by both Dames & Moore (Ref. 6) and McClelland Engineers, Inc. (Ref. 7) conclude that the platform site will not be effected by sudden fault displacements, ground failure or tsunamis. They also present the following conclusions concerning the possible failure modes of the near surface sediments from earthquake activity.

1. Ground Rupture

   A study of the published literature and an analysis of the test borings and high resolution surveys indicates that there are no fault traces beneath the proposed site. Therefore, ground rupturing from fault movement is not anticipated during any nearby earthquakes.

2. Ground Failure

(a) Liquefaction

The subsurface soils at the proposed sites can safely support the proposed drilling and production equipment. The studies to evaluate soil properties and liquefaction potential indicate that the potential for liquefaction at the proposed sites is extremely low (Ref. 7).

(b) Slumping

The ocean bottom in the immediate area is nearly flat with a very gentle bottom slope, and there are no indications of slumping at or near the proposed platform location. Potential slumping is unlikely.

4.2.8 Tsunami Hazards

Based on published records and the location of the platform site in open water, tsunami damage will not be a factor to be considered at the proposed platform location. Tsunamis or seismic waves are large oceanic waves that are generated by earthquakes, submarine volcanic eruptions or large submarine landslides. The waves are formed in groups having great wave length and a long period. In deep water, wave heights (crest

to trough) may be a few meters or less, wave lengths of a hundred miles or more and velocities greater than 400 knots (460 mph). However, as a tsunami enters shallower waters, wave velocity diminishes and height increases. Waves can crest at heights of more than 30m (100 feet) and strike with devastating force. Tsunami waves do not impact vessels or structures in open water because of their low amplitude and great breadth.

The largest tsunami ever reported in California followed the 1812 earthquake in the Santa Barbara Channel. The wave may have reached land elevations of 50 feet (15.2m) at Gaviota and 30-35 feet (9.1-10.7m) at Santa Barbara. The most recent tsunami to impact the California coast line occurred following the 1964 Alaskan earthquake. Only minor damage was sustained by small craft in the coastal harbors.

4.2.9 Subsidence

There is a potential for surface subsidence due to reservoir fluid withdrawal. However, it is expected to be negligible because a pressure maintenance program using water injection will begin shortly following the start of production. This injection will be continued throughout the life of the field. By maintaining this injection little reduction in reservoir pore pressure is anticipated; thus, no compensating compaction is expected.

4.2.10 Hydrology

In the Beta oil field area, no fresh water bearing formations, of any significance, are encountered below 1200 feet (365.8m). Above this depth electric logs and mud logging records show the sediments to consist mostly of tight clayey silts and silty clays with occasional thin interbeds of fine silty sand. None of this upper section is fresh water bearing either. Neither Shell nor Chevron have encountered any fresh water sands in any of the wells drilled to date.

4.2.11 Other Mineral Deposits

There appear to be no other known mineral deposits of either commercial or noncommercial value on or adjacent to Lease OCS-P 0296.

4.3 Cultural Resources

The area around proposed Platform Edith and along the route of the proposed pipeline from Platform Edith to Platform Elly was evaluated for cultural and archaeological resources. McClelland Engineers (Ref. 7) retained the services of Scientific Resource Surveys, Inc. to make this evaluation. Their report with conclusions has been included as Appendix E in the McClelland Engineers report (Ref. 7). The methods

used to make this review are described in Appendix E. They concluded from this review that there are no identifiable prehistoric cultural resources in the area of the proposed projects. Two possible historic anomalies which showed up on the side scan sonar lie very near the edge of the 2000 foot (609.6m) radius of impact area surrounding the proposed platform. These areas will be avoided during anchoring activities connected with platform and pipeline construction.

4.4 Design Criteria

Complete details on site conditions, design criteria, platform analyses, fabrication and installation shall be provided as part of the Verification Documentation required by OCS Order No. 8. (See Appendix 1 for nomination and general job description of Certified Verification Agent per Part 3.2.2 of OCS Order No. 8).

4.5 Platform Visibility

Navigation aids for Platform Edith include the following components:

a. Four lights, one on each platform corner consisting of 255 mm lenses which are visible for 5 nautical miles.

b. Fog signal with 2 nautical mile audible range.

Platform Edith will be equipped as a Class A structure per 33 CFR Part 67. The platform will be painted a bright, highly visible color per Coast Guard recommendation.

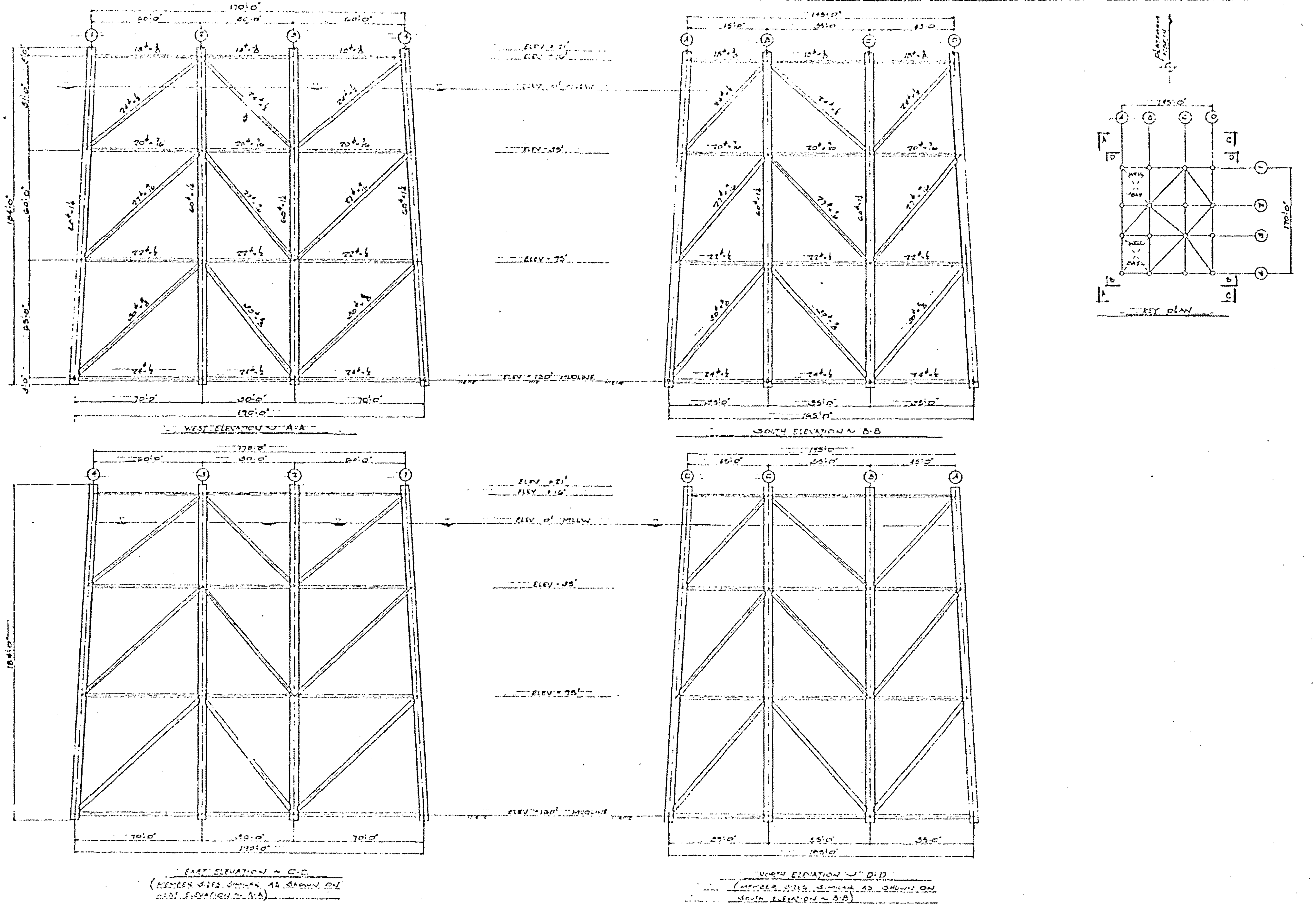
4.6 Shipping Lanes

The proposed platform is located in the center of the maritime Traffic Separation Scheme (TSS). The TSS leads from the Gulf of Catalina through the San Pedro Bay. Platform Edith will be situated 6,076 feet (1.8 km) from the northbound shipping lane and 5,468 feet (1.7 km) from the southbound shipping lane.

The proposed platform will be equipped with navigational aids and painted a bright, highly visible color so that it will be clearly visible for several miles. The platform itself can be used as a Class A navigation aid for ships traveling in their respective shipping lanes.

4.7 Platform Removal

When the reservoir produced from Platform Edith is depleted, the facilities will be removed in compliance with USGS regulations.



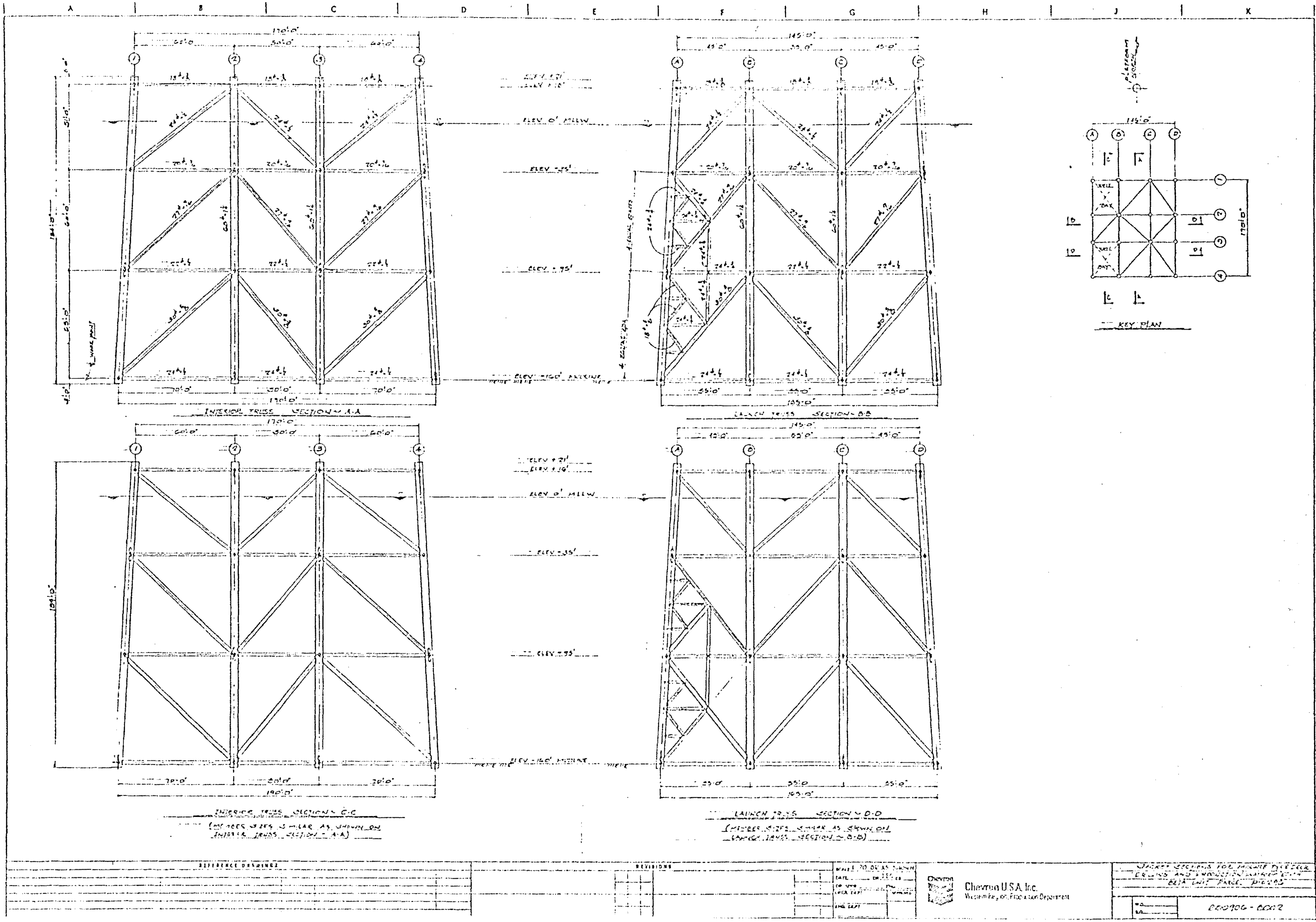
REFERENCE DRAWINGS

REVISIONS

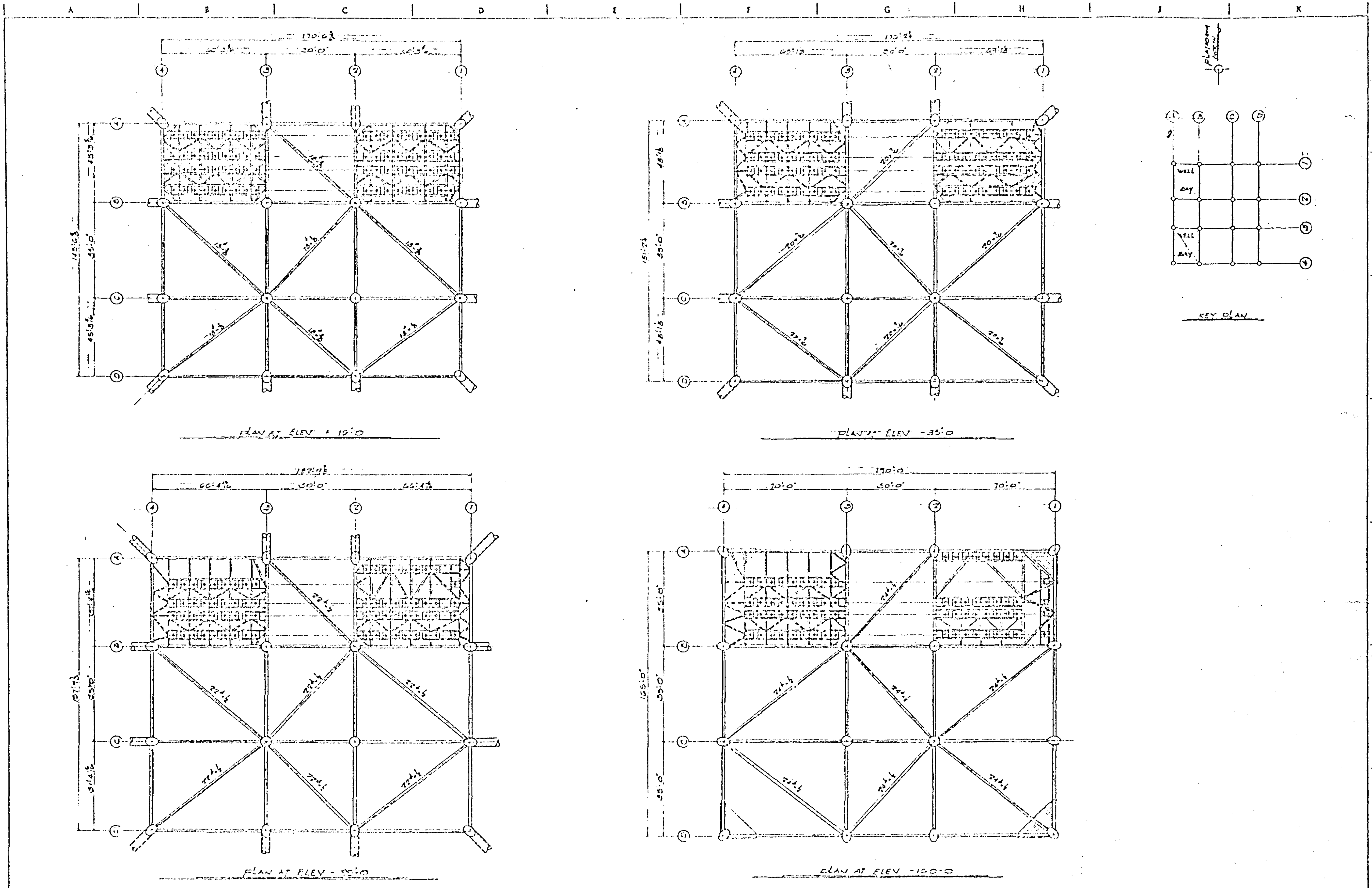
SCALE 1"=20'-0" AS SHOWN

Chevron U.S.A. Inc.
Western Region, Production Department

E00706-E001



ELEV +21'
ELEV +10'
ELEV 0' MLLW
ELEV -25'
ELEV -95'
ELEV -160' MUDLINE
170'-0"
60'-0"
50'-0"
190'-0"
145'-0"
45'-0"
55'-0"
165'-0"
INTERIOR TRUSS SECTION ~ A-A
LAUNCH TRUSS SECTION ~ B-B
KEY PLAN
INTERIOR TRUSS SECTION ~ C-C
(MEMBER SIZES SIMILAR AS SHOWN ON INTERIOR TRUSS SECTION ~ A-A)
LAUNCH TRUSS SECTION ~ D-D
(MEMBER SIZES SIMILAR AS SHOWN ON LAUNCH TRUSS SECTION ~ B-B)
REFERENCE DRAWINGS
REVISIONS
Chevron U.S.A. Inc.
Western Region, Production Department



REFERENCE DRAWINGS

REVISIONS

Chevron U.S.A. Inc.
Western Region, Production Department

JACKET PLAN SECTIONS FOR MIDDLE ... DECK

800906-8003

TABLE 4-1

SIGNIFICANT ACTIVE FAULTS
SOUTHERN CALIFORNIA

Fault	Length (km)	Length (mi)	Fault Type	Distance To Site (km)	Distance To Site (mi)	Estimated Upper Level Magnitude
Palos Verdes	65	40	Rt. Lat./Rev. Obl.	1	1	6
Newport-Inglewood	80	50	Rt. Lat.	15	9	6-1/4
San Andreas	1,100	700	Rt. Lat.	95	59	8+
San Jacinto	240	150	Rt. Lat.	92	57	7-1/2
Whittier-Elsinore	225	140	Rt. Lat.	44	27	7-1/4
Sierra Madre	130	80	Rev. Obl.	64	40	7
Santa Monica	80	50	Rev. Obl.	58	36	7
San Clemente	130	82	Rt. Lat.?	68	42	7-1/4
Norwalk	27	17	?	34	21	6
E. Catalina Basin	32	20	?	41	45	6

After: Dames & Moore Job No. 00216-197-02 (1978)

SECTION V

DRILLING FACILITIES

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SECTION V

DRILLING FACILITIES

5.1 Introduction

Platform Edith will have slots for a maximum of 72 wells. Two electric drilling rigs and associated crews and services will be contracted to drill the 65 wells presently planned.

Preliminary drilling equipment layouts are shown on Fig. 5-1 at the end of this section. It is anticipated that the rigs will be land-type with alterations necessary for this offshore adaption. The drilling contractor will have some flexibility in final equipment layouts, but equipment must be compatible with deck designs.

Drilling operations, pollution prevention systems, and safety systems will be in accordance with United States Geological Survey Pacific Region OCS Orders No. 2 and No. 5, EPA NPDES permit conditions and API Standards.

5.2 Drilling Equipment

All drilling equipment and services will be handled on a contract basis. Major drilling equipment will include:

5.2.1 Rig Components

Two land-type cantilever masts, 142 feet (43m) high with 10,000 foot (3658m) drilling and 800,000 pound hook-load capacities, will be required. The masts will be designed in accordance with A.P.I. Standard 4D for freestanding masts.

The drawworks will be electrically powered (rated at 1000 HP) and be completed with sandreel and rotary table drive.

The hook, traveling block, and crown block will be of 350 ton load rated capacity to match the mast.

The drill string will be 4-1/2" or 5" (11.4 cm or 12.7 cm), grade E drill pipe.

5.2.2 Substructures

A drilling skidbase will be provided to support the mast, drawworks subbase, and connecting stairways.

Each substructure will be supported on a skidbase, resting on elevated skidbeams. The skidbase will be equipped with a hydraulic jacking system to allow transition along the direction of the well rows. The subbase will also be equipped with hydraulic jacks to allow lateral skidding over the desired well.

Substructures will be capable of supporting the mast and setback loads. Mechanical restraint equipment will be provided to prevent substructure movement once positioned over the desired location.

5.2.3 Drilling Mud System

A separate mud system will be provided for each drilling rig.

Each rig will be equipped with two mud pumps (1000 HP each), a mud mixing tank (300 bbl±), a circulating tank (300 bbl±), and three mud storage tanks (400 bbl. each). A 10 bbl. trip tank and 40 bbl. pill tank is also provided.

Return mud will be treated with separate high speed shale shakers, mud cleaner, desilters, and degassers for each rig. The shale shaker units will be equipped with a cuttings washing system to clean any oil-contaminated cuttings before ocean disposal. Cuttings that cannot be adequately cleaned by washing will be diverted to a waste cuttings holding tank, to be hauled ashore for disposal in a Class I Disposal Site.

Mud volumes will be closely monitored using a pit volume totalizer system, an incremental flowrate indicator, and a precision fill-up measurement system. These warning systems will have visual and audible alarm signals at the driller's console. A common bulk material handling system will be

provided with 3000 cu. ft. (85 cu. m.) storage capacity for clay and barite materials. Sacks of mud additives (chemicals, lost circulation material, etc.), needed on the platform will be stored there on pallets.

5.2.4 Cementing Unit

One diesel powered dual cementing unit and three 1000 cubic foot (28 cu. m.) bulk storage tanks will be provided for well cementing operations.

5.2.5 General Layout

The drilling mud system equipment, cementing unit and completion tank will be located on the upper deck (see Figure 5-1). Above the mud package will be the pipe rack. Outboard of the pipe rack, on each side of the platform, will be the platform cranes. Rig power control package and transformers will be located above the platform power package next to the quarters building.

The masts, subbases, drawworks, and associated equipment will be installed on the skidbase above the upper deck.

Contractors living quarters and offices will be located in a central quarters building.

5.3 Drilling Operations

5.3.1 Casing Program

Casing setting depths and cementing will be in accordance with the USGS Pacific Region OCS Order No. 2 and/or field rules. The casing program (Figure 5-2) is based upon there being sufficient evidence from core hole drilling at the proposed platform site to justify a field rule that will preclude the necessity of installing the "structural casing." The 24" (61 cm) casing shown on the drawing meets the requirements for the "conductor casing."

Soil boring analyses indicate 24" (61 cm) conductor pipe will be set to -360 ft. (110m) (MLLW).

5.3.2 Well Completions

The reservoir consists of an assemblage of sands, shales and silts. The thicker shales divide the reservoir into seven zones. Because the sands are unconsolidated, sand control is required and will be achieved by gravel packing a slotted liner (or screen) inside cemented, jet perforated casing or in an underreamed open hole.

Several zones will be simultaneously opened into a common wellbore. Interzonal isolation will be needed in some cases to provide for the control of fluids either entering or leaving the wellbore and to allow for the optimum exploitation and conservation of the reserves.

The attached drawings (Figures 5-3, 5-4, 5-5) show, schematically, the mechanical configurations which will allow both gravel packing and interzonal isolation. It is not possible to select a single completion type at the present time. All of the completion types shown may be used.

5.3.3 Wellhead Equipment

Either unitized or conventional flanged wellheads will be used during the drilling phase. Block type Christmas trees will be installed for production. The wellhead assemblies will be suitable for free flow and electric submersible pumping.

5.3.4 Blowout Preventer Equipment

Blowout preventer systems will be used as required by OCS Order No. 2 and/or field rules. These systems will be hydraulically operated with control stations at the driller's console and near the quarters building.

The low pressure system will consist of a 29-1/2" (75cm) 500 psi annular-type blowout preventer with diverter system installed for drilling below the 24" (61cm) drive pipe. After 13-3/8" (34cm) surface casing is landed and cemented, the low pressure BOP stack will be removed. A 5000 psi 13-5/8" (34.6cm) BOP stack will then be nippled up to the surface casing head with a riser. The BOP equipment will include an annular preventer, two pipe rams, and a blind ram. This equipment will be actuated by pressure provided by a hydraulic accumulator unit located near the quarters building. Control stations will be located both on the drill rig floor and in a remote location (such as near the drilling superintendent's office). In addition, the BOP can be actuated manually by controls located on the accumulator unit itself (see Figure 5-6). Each rig will have its own accumulator unit.

Below the BOP a drilling spool will be provided with side outlets for separate choke and kill lines. The kill line will have two valves located adjacent to the BOP; a master and a control valve. The choke line will be connected to a choke manifold and all equipment will be in accordance with "API Recommended Practice for Blowout-Prevention Equipment Systems."

5.3.5 Pollution Prevention

To prevent pollution due to drilling operations, all runoff from drilling equipment will go to the deck drainage system (see Section 6.3.15). Oil will be removed to levels specified in NPDES permit conditions before the runoff is discharged to the ocean. Collection of any runoff will be facilitated by the inclusion of 6" (15cm) high kick boards extending around the perimeter of the platform on all decks.

To prevent pollution due to drill cuttings, a cleaning and handling system will be installed for each drilling rig below the shale shakers. Cuttings produced by drilling operations will be washed by this equipment prior to their disposal into the ocean through the disposal caisson. Oil-soaked cuttings obtained when penetrating a hydrocarbon bearing zone will be conveyed to metal bins for storage until they can be taken to shore for disposal in a Class I disposal site.

5.3.6 Safety Features

The safety system includes the following:

5.3.6.1 Fire Suppression

a. A saltwater pumping system.

b. 1-1/2" (3.8cm) hard rubber hose reels to provide coverage at any point on the platform with two hoses.

c. Fixed fog suppression system with automatic area controls capable of wetting critical surfaces with a water density of not less than .25 gpm (gallons per minute) per square foot.

d. Two 250 gpm monitors on the main deck to cover the BOP stacks and the upper well bay area.

e. Dry chemical and Halon fire extinguishers.

f. Standpipe connections on both boat landings for fireboat use.

5.3.6.2 Fire Detection and Alarm

a. Ultraviolet "fire eyes".

b. Smoke detectors.

c. Fusible plugs in the process and drilling areas.

5.3.6.3 H_2S and SO_2 Contingency Plan

The Oil Spill and Emergency Contingency Plan for Platform Edith contains a detailed emergency plan to be followed when encountering formations that contain hydrogen sulfide while drilling wells. See Appendix 8 of the Chevron Oil Spill and Emergency Contingency Plan for Platform Edith.

5.3.6.4 Critical Operations and Curtailment Plan

In compliance with OCS Order No. 2, a Critical Operations and Curtailment Plan for Platform Edith has been submitted as part of the Oil Spill and Emergency Contingency Plan for Platform Edith (Appendix 7). This plan describes the critical operations that are likely to be conducted and what circumstances or conditions the critical operations are to be curtailed.

5.3.6.5 Deck Drainage/Sump System

Platform Edith will be divided into two drainage systems for separate handling. Drainage from the upper decks, from drip pans in the rig substructure and from rig floor will gravitate to a waste tank located on the lower deck. Drainage from the lower deck areas will drain to a sump tank below the lower deck, from which the liquids will be pumped into the waste tank. Oily waste water from the waste tank

will be sent to the production train for treating. Washed cuttings and oil free sediments from the waste tank will gravitate to the skim pile for ocean disposal.

5.3.6.6 Safety and Escape Equipment

The escape system provided on Platform Edith will include life jackets and three survival capsules accommodating 35 persons each. From time of arrival of helicopter to Platform Edith, injured personnel can be delivered to Long Beach Pier in approximately ten minutes. From the Long Beach Pier, the Long Beach Memorial Hospital emergency services will transport the injured personnel to the above mentioned hospital in less than five minutes. There will also be a qualified medic onboard the platform at all times.

5.3.6.7 Safety Control Systems

Safety, anti-pollution and control systems will be installed on all piping headers, machinery, and vessels pursuant to OCS Order No. 5. The system will be a combination of electric and pneumatic controls. All automatic control valves will be designed to be fail-safe. Control devices will include the following:

1. High-low pressure alarm and shutdown sensors.

2. High-low liquid level alarm and shutdown sensors.

3. Flow safety valves.

4. Pressure safety valves.

5. Vibration sensors.

6. High-low temperature alarm and shutdown sensors.

All of the above items will be designed and installed to facilitate testing. The devices will be tested for accurate operation on a schedule to be approved by the U.S.G.S.

All of the above safety devices will be interconnected through a central control panel. When a malfunction occurs, an alarm will be sounded; and if the condition is not immediately corrected, the platform will shut down. Shut-downs will be accomplished by automatically closing the surface controlled safety valves and the surface controlled surface safety valves. Produced fluid will continue to move off the platform through the pipeline until the equipment is automatically shut down by either low levels or low pressure. If the malfunction is pipeline related, liquids would not be pumped off the platform, but instead the vessels would automatically shut in and contain the production.

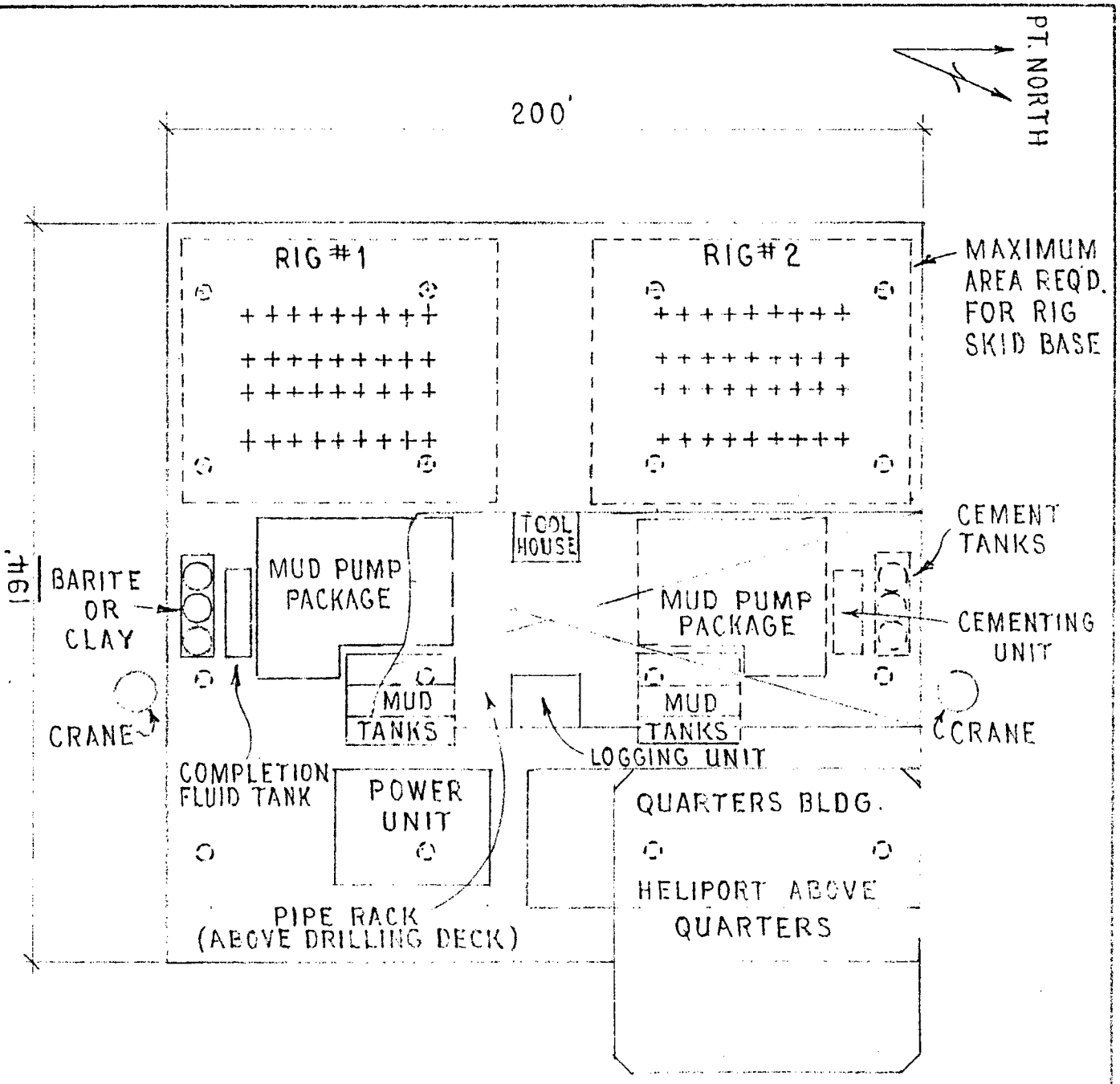
5.3.7 Crew and Supply Transport

Drilling crews will work regular 12-hour shifts, and will be quartered on the platform. Day shifts are expected to contain 25 persons and night shifts 25 persons. Supply boats will transport supplies as required.

Weather should have little effect on crew and supply boat operations, but emergency facilities and supplies will be provided to allow at least one week of normal operations if supplies delivery is interrupted.

5.3.8 Compliance With OCS Order #5

A summary of industry guidelines necessary for compliance with OCS Order No. 5 (Production Safety Systems) is included as Appendix 2 (Ref. 15).



NOTES

1. PRESSURIZED MUD LAB ROOM WILL BE PLACED NEAR OR OVER MUD TANKS.
2. DRY MUD STORAGE SPACE TO BE PROVIDED BETWEEN MUD PUMP PACKAGE.

REV															

Chevron

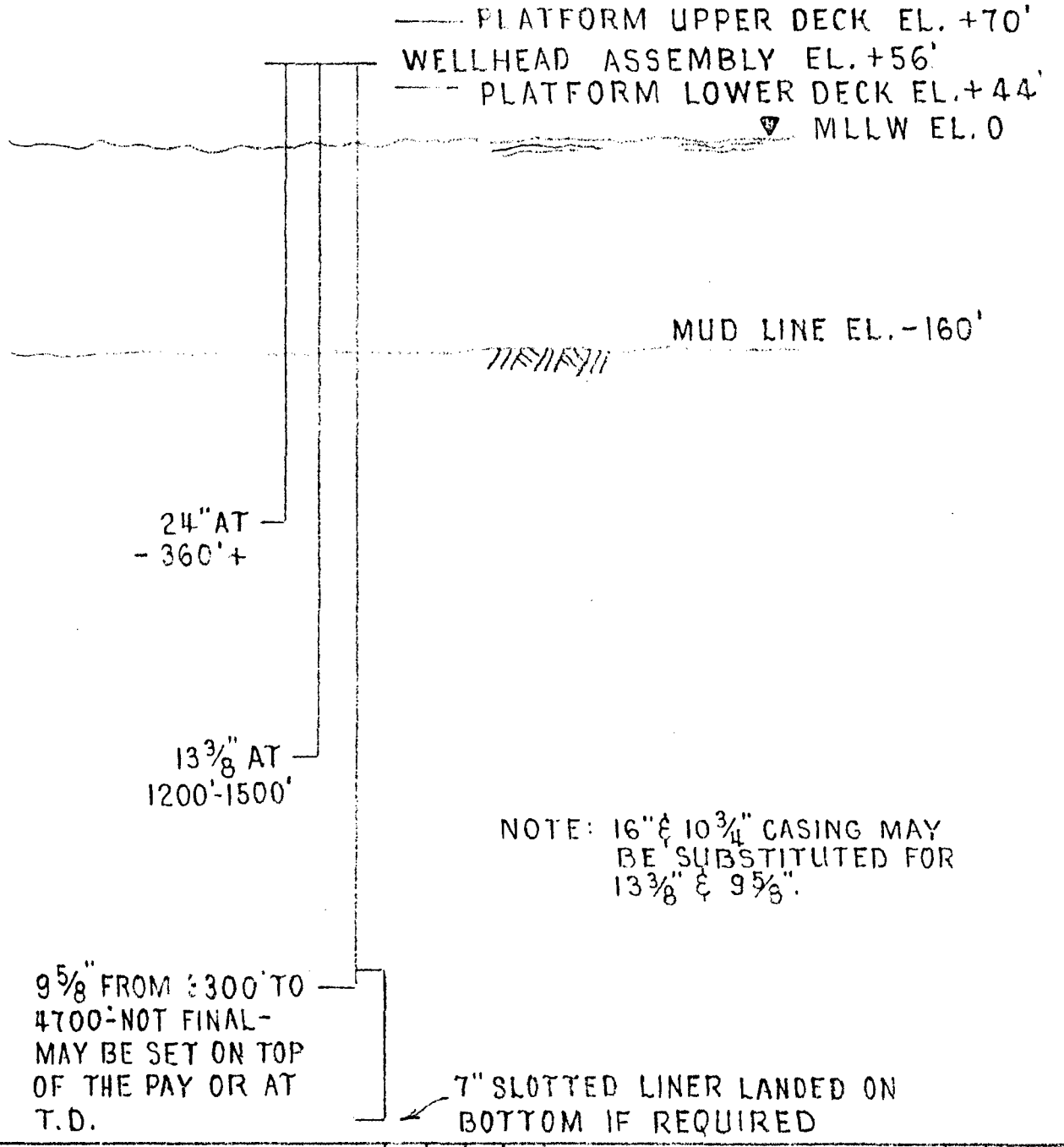
DR G.M. CH.
DR APP.
ENGR.
OPR'G. DEPT. APPROVED
ENG'R. DEPT.

PLATFORM "EDITH"
DRILLING DECK EQUIPMENT LAYOUT
DRILLING LEVEL
BETA UNIT, SAN PEDRO BAY

SCALE 1"=40' DATE 9-12-80

A W.O. S.O.

FIGURE 5-1



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Chevron

DR G.M. CH.
DR APP.
ENGR.
OPR'G. DEPT.
APPROVED
ENG'R. DEPT.

PLATFORM "EDITH"
CASING PROGRAM SKETCH
BETA UNIT

SCALE — DATE 9-12-80

A

W.O.
S.O.

FIGURE 5-2

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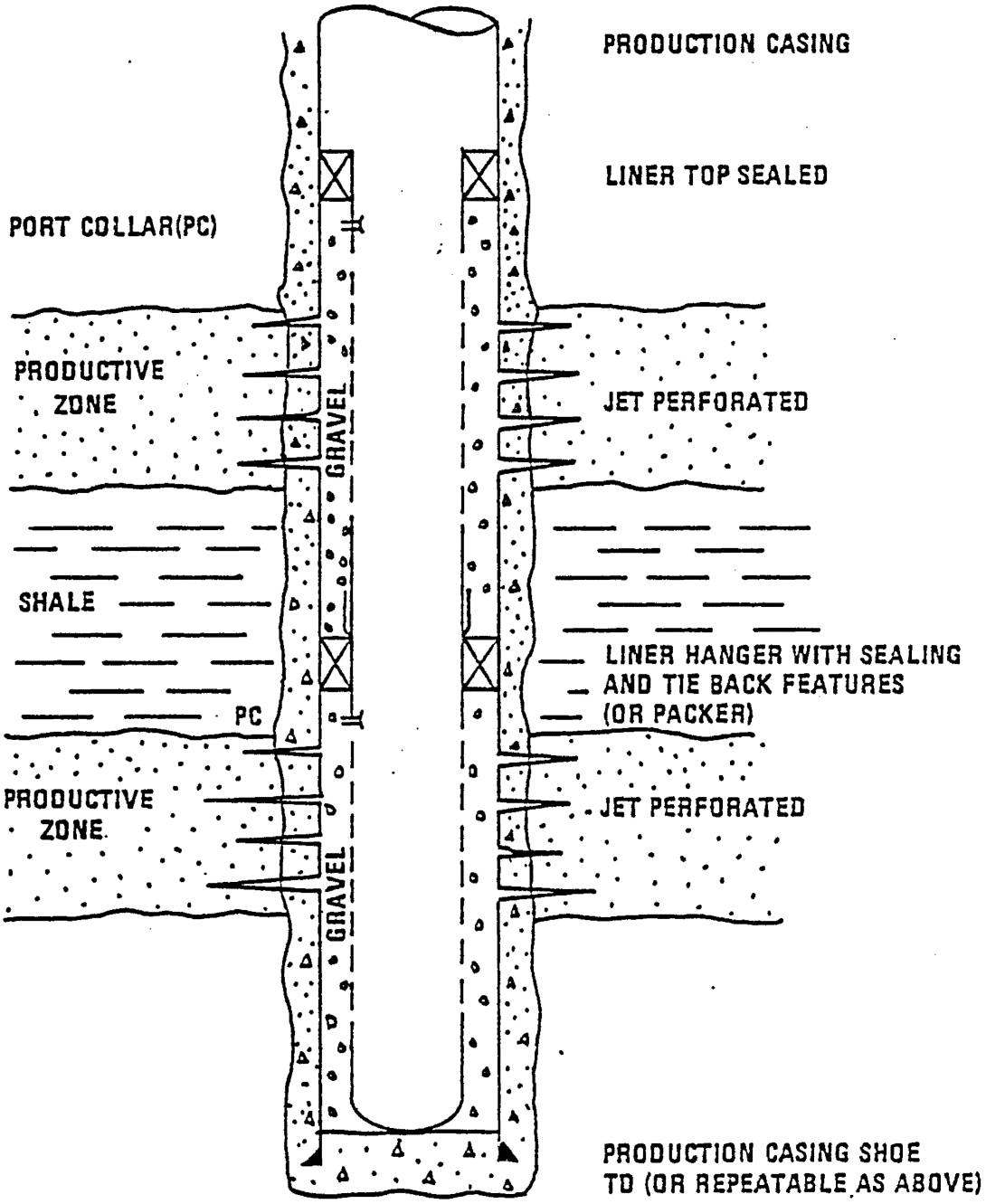
GO-580-AB (4-71)

SCHEMATIC OF CASED–HOLE TYPE COMPLETION

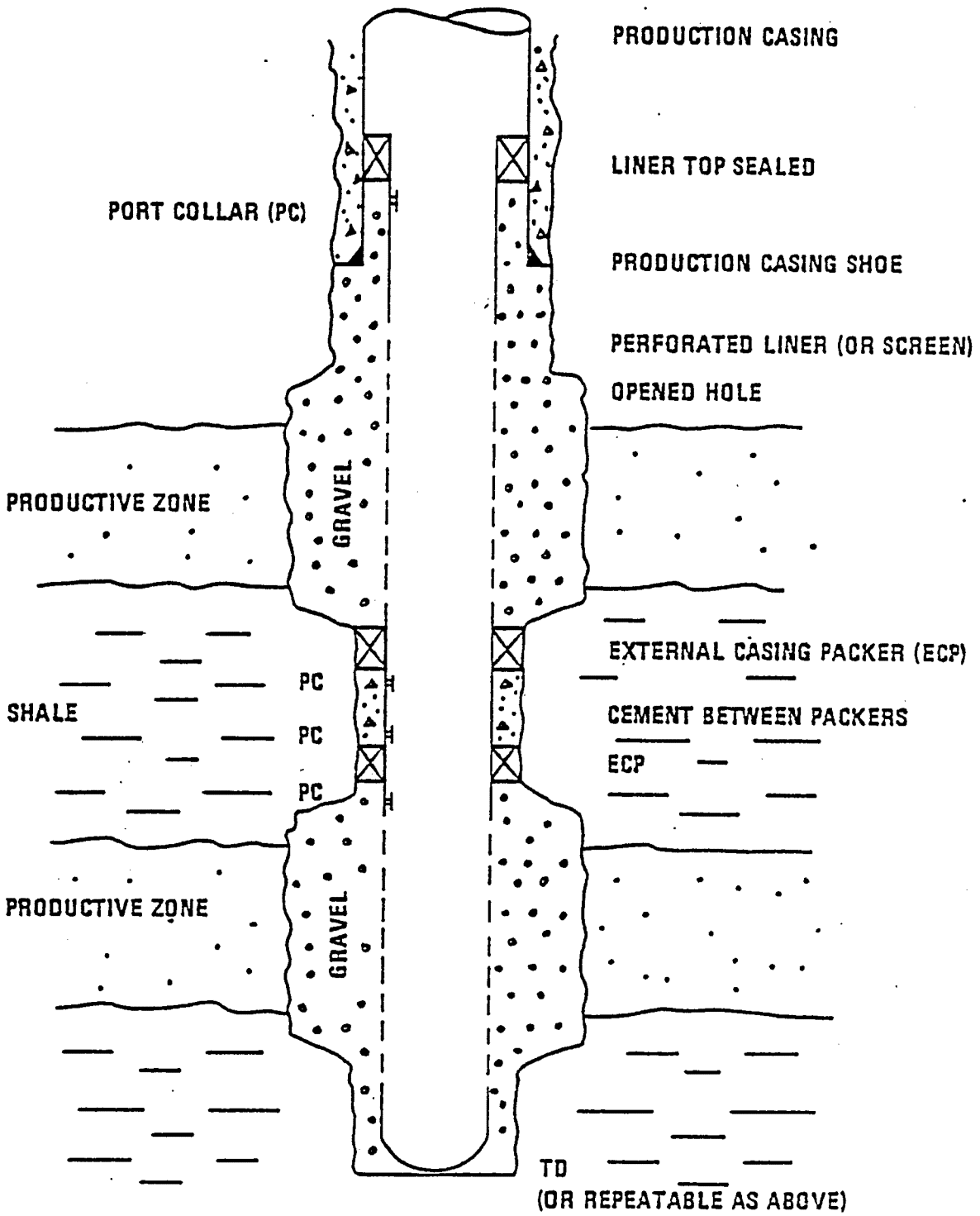


SIMPLIFIED PROCEDURE

1. DRILL THROUGH PRODUCTIVE INTERVAL – RUN LOGS
2. RUN AND CEMENT CASING
3. JET PERFORATE COMPLETION ZONES – WASH PERFORATIONS
4. RUN LOWER LINER AND GRAVEL PACK
5. RUN OPEN LINER(S) AND GRAVEL PACK
   (ALTERNATIVE TO STEPS 4 & 5 – RUN ENTIRE LINER, SET PACKERS – GRAVEL PACK THROUGH PORT COLLARS FROM BOTTOM UP)
6. WASH AND REPACK AS REQUIRED

FIGURE 5-3

SCHEMATIC OF OPEN–HOLE TYPE COMPLETION



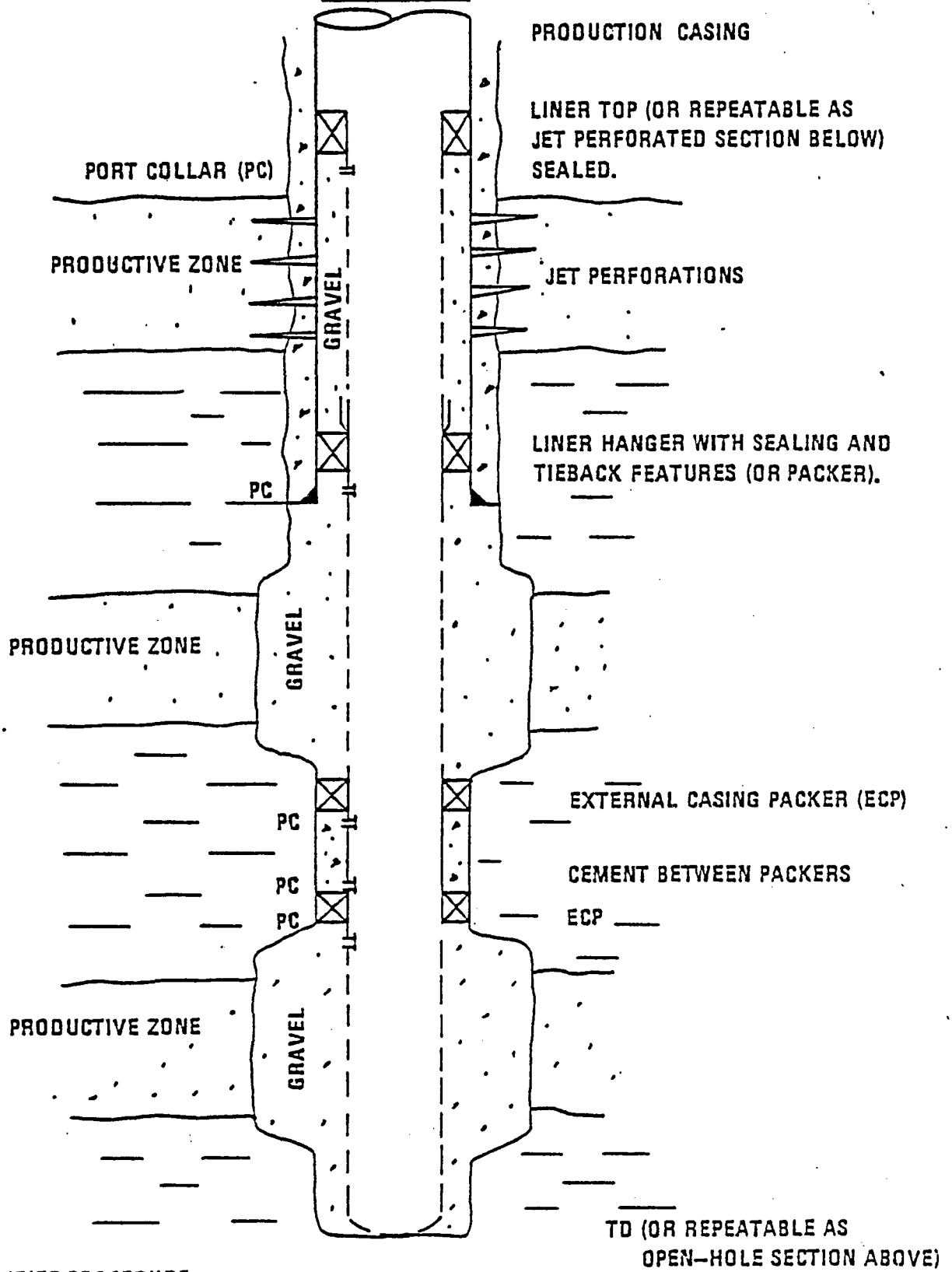
SIMPLIFIED PROCEDURE

1. SET PRODUCTION CASING
2. DRILL THROUGH PRODUCTIVE INTERVAL–LOG
3. OPEN HOLE THROUGH PRODUCTIVE ZONES–RUN LINER, SET OPEN HOLE PACKERS
4. GRAVEL PACK PRODUCTIVE ZONES (FROM BOTTOM UP) THROUGH PORT COLLARS
5. CEMENT BETWEEN ZONES (FROM BOTTOM UP) THROUGH PORT COLLARS
6. WASH AND REPACK AS REQUIRED

ZF 27488

FIGURE 5-4

SCHEMATIC OF COMBINATION TYPE COMPLETION

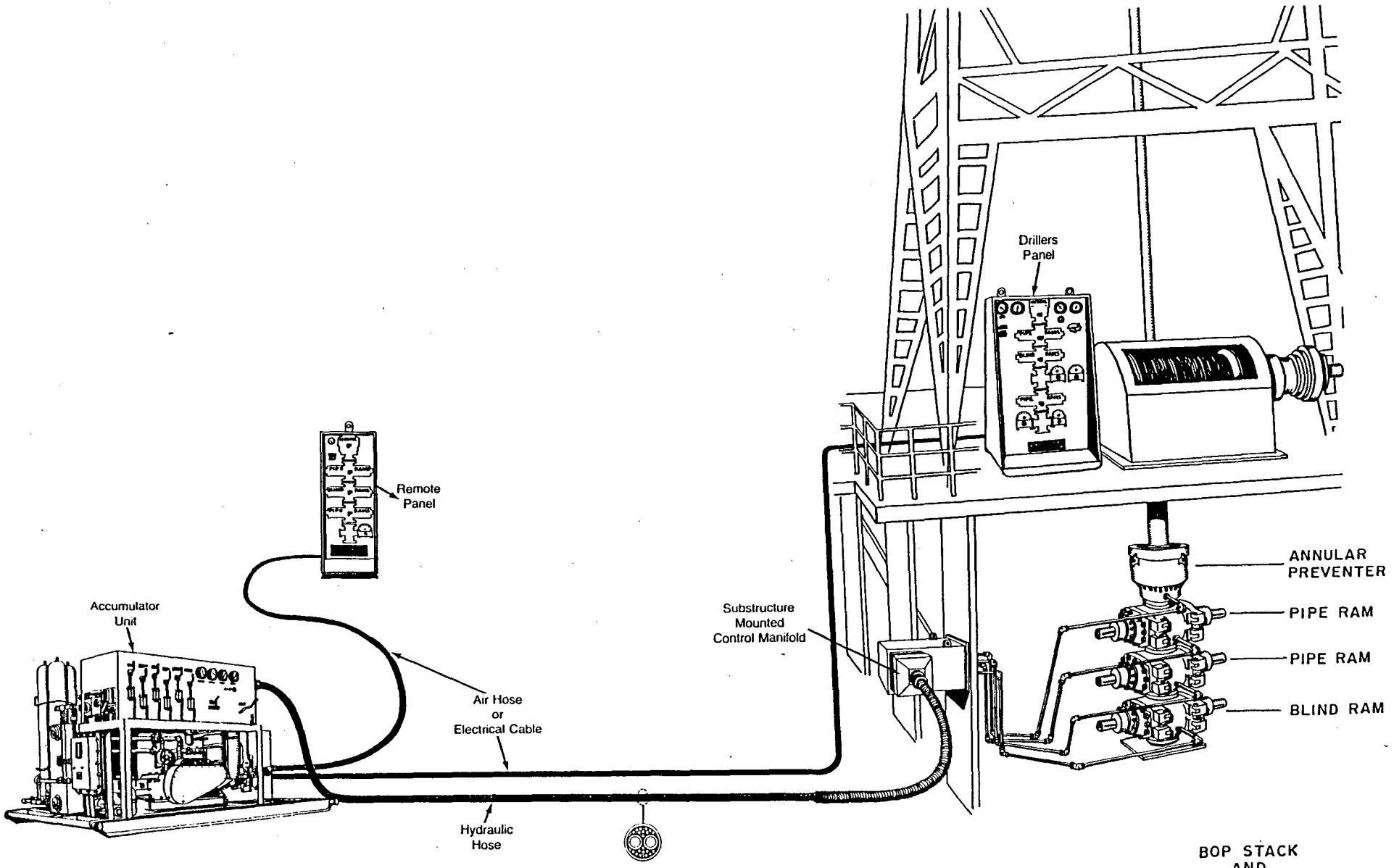


SIMPLIFIED PROCEDURE

1. FOR OPEN-HOLE SECTION, SAME AS OPEN HOLE TYPE COMPLETION
2. FOR CASED-HOLE SECTION, SAME AS CASED HOLE TYPE COMPLETION

FIGURE 5-5

ZF 2748C



BOP STACK
AND
HYDRAULIC CONTROLS
FIGURE 5-6

SECTION VI

PLATFORM FACILITIES

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SECTION VI

PLATFORM FACILITIES

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SECTION VI

PLATFORM FACILITIES

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SECTION VI

PLATFORM FACILITIES

6.1 Introduction

This section describes all production equipment and related facilities to be installed on the platform and is divided into the following four parts (1) Production Process Facilities; (2) Utility System; (3) Support Facilities; and (4) Measures to Minimize Environmental Impact.

The platform will contain complete production facilities for the treatment of the produced oil, gas, and water. Treated oil will be of marketable quality, needing no additional onshore treatment. Equipment, controls, monitors, safety devices, etc., will be installed in accordance with applicable O.C.S. Orders and industry standards.

All initial production will be from Miocene Sands in the Beta field trend. Drill stem production tests made in this area indicate that the sands consist of three permeable layers with varying hydrocarbon properties (G.O.R. and gravity). All tests indicated the presence of sulfur; levels were less than 2.8 percent in the oil. The API gravity averaged 17.4°.

Drawing Nos. 800906-1001 thru 1006, flow diagrams, show how the flow stream will be separated and treated. Produced gas will be collected at various system pressures, compressed and used for fuel in the process heater. The remainder will be injected back into the reservoir. Produced water and deck drainage will be treated and cleaned in compliance with NPDES permit conditions, then disposed into the ocean. (NOTE: Produced water will be discharged until there is a sufficient amount to meet water injection requirements. When there is sufficient produced water, it will be treated and injected into the formation, anticipated beginning 1993.

Utility systems and support facilities will be provided to allow the platform to be as self-reliant as possible. Provisions for power supply, potable water production, emergency back-up power and safety systems, etc., have been made to allow operations to continue safely even though platform resupply may be interrupted for several days.

6.2 Production Process Facilities

6.2.1 Design Criteria

1. Reservoir Data: Reservoir data utilized in the design of platform facilities have been obtained from several tests made on thirteen evaluation wells on Lease OCS-P 0296 and are as follows:

a. Maximum bottom hole pressure - 1,825 psig.

b. Bottom hole temperature - 155°F.

c. Flowing wellhead pressure (initial development) - 500 psi.

d. Maximum shut-in tubing pressure - 1,824 psig.

e. Flowing wellhead temperature - 90°F (avg.).

f. Gravity (avg.) @ 60°F-17.4° A.P.I.

g. BS&W content - 1% with trace of sand.

h. Maximum well flowing rate - 375 B.O.P.D.

i. Sulfur in oil - 2.8%.

j. H_2S content (gas) - 1100 ppm (max).

A Production Forecast Curve is attached showing Total Oil, Gas and Water vs. Time (Drwg. No. B-H-1320).

2. Production Treating Requirements - Crude Oil:

Production is to be treated to provide a marketable crude with a BS&W content of 1% or less and a vapor pressure not to exceed 11 psig. The maximum anticipated shipping pressure for the crude oil leaving the platform is 1350 psi.

3. Production Treating Requirements - Gas: The preliminary plan is to treat the gas on the platform to meet fuel gas requirements. This will be accomplished by scrubbing and interstage cooling.

4. Production Treating Requirements - Waste Water:

Produced and other waste waters are to be cleaned and discharged into the ocean. Cleaning facilities will provide water that meets the E.P.A. NPDES permit conditions for discharge into O.C.S. waters of the Pacific.

6.2.2 General Layout

As shown on Drawing No. E-H-1400, process equipment has been located to minimize the length of interconnecting piping and to segregate this equipment from personnel occupied areas. The fire wall and doors on the well deck effectively divide the well deck into hazardous (wellhead area) and non-hazardous (process) areas. No hydrocarbon processes are located adjacent to personnel areas.

6.2.3 Wellheads and Flow Manifolds

Seventy-two well conductors will be provided: forty-seven producing wells are presently planned, with eighteen injection wells and seven spares reserved for future reservoir evaluation. The wells will be arranged in four rows, with short flowlines connecting each tree to a wall-mounted manifold system.

The manifold system will allow production to be switched between pool and test separators. Lines for future casing, gas recovery, gas injection, hydraulic and pneumatic control, etc., will also be provided. All wells will be equipped with downhole hydraulically controlled safety valves in accordance with OCS Order No. 5

6.2.4 Artificial Lift

It is anticipated that artificial lift will eventually be required for all wells. It may be necessary for producing some weaker wells immediately upon completion. Therefore, initial provisions for submersible electric pumps will be provided.

6.2.5 Oil and Gas Separation

Oil and gas separation is to take place at an operating pressure of approximately 60 psi. Prior to separation, production will be heated from approximately 90°F to 150°F (32°C to 65°C) to control foaming and accelerate the breakout of produced water.

The pool and test separators will be three-phase with free water draw-offs. The well clean-up and blowdown separator will be a two-phase vessel and used primarily for new wells contaminated with drilling fluids.

6.2.6 Oil Cleaning

Two electrostatic treaters, operating at approximately 40 psi, will be provided for oil cleaning. Prior to cleaning, the emulsified oil will be heated from approximately 140°F (60°C) to 200°F (93°C). These treaters are intended to normally operate in parallel.

6.2.7 Oil Shipping

Clean oil from the treaters will be pumped from a clean oil surge tank, through a LACT meter, and finally via 6" (15cm) O.D. (Outside Diameter) subsea pipeline to Shell's Platform Elly. There it will commingle with Shell's oil and flow to shore in Shell's existing 16" (41cm) O.D. subsea pipeline.

6.2.8 Gas Processing

All vapors and low pressure (40 psi) gas streams will be boosted to 60 psi to join the casing gas and separator gas streams. Approximately 600 MCFD of the produced gas will be utilized as fuel for the process heater. The balance will be compressed and injected into the reservoir.

6.2.9 Gas Compression

Motor driven reciprocating compressors will be used for gas compression. To handle varying gas production rates the clearance pockets will be adjusted, valves will be removed, etc.

6.2.10 Condensate Handling

Condensate collected from the gas scrubbers will be injected into the oil stream prior to LACT metering.

6.2.11 Relief and Vent Systems

All high pressure balanced relief valves on vessels and gas compressors, as well as stack regulators on the gas collection systems, will be manifolded together to a high pressure stack scrubber and flare. Low pressure relief valves from the vapor recovery system, tanks, compressor

spacer block vents, etc., will be manifolded together to a vapor stack scrubber and flare.

Both the high pressure and vapor stack flares will be incorporated into a single flare boom. Liquids collected in the stack scrubbers will be drained into a waste oil tank or pumped back through the electrostatic treaters.

6.2.12 Produced Water Treatment and Disposal

Produced water resulting from the oil treating process on the platform will be discharged to the ocean through a disposal caisson. This water is discharged primarily from the two production separators with a smaller volume discharged from the two crude oil dehydrators. To meet the requirements of 40 CFR 435, Effluent Limitations for Offshore, Subcategory of the Oil and Gas Extraction Point Source category, the water will be treated by passing it through a corrugated plate interceptor followed by a flotation cell to remove suspended oil from the water. The anticipated oil content of the discharge water is less than 50 ppm. Oil and solids resulting from this treating process will be pumped to a waste tank for disposal on shore. For further detail see the Environmental Report for Proposed Platform Edith.

This method of produced water disposal will continue until the volume reaches a level that will support a water

injection program (about 30,000 barrels/day). At that time sea water injection will cease and the injection of produced water into the formation will begin.

6.2.13 Sea Water Treatment and Injection

Soon after the start of production a waterflood program will be initiated using sea water as the injection fluid. Approximately 30,000 bbls/day of sea water will be supplied by three electric source water pumps and will be filtered, deaerated, and chemically treated prior to injection at 2500 psig. This sea water injection will continue until the daily volume of produced water from the production separators is adequate to replace the sea water as the injection fluid.

6.3 Utility Systems

The platform design will include the following utilities:

6.3.1 Power

Power will be supplied to the platform via 34.5 KV submarine power cable from Chevron-owned facilities in Huntington Beach (see Figure 6-1). This power cable will consist of three 1/0 AWG stranded copper conductors cabled together and enclosed in a watertight polyethylene jacket armored with a single layer of #4 BWG polyethylene coated galvanized steel wires.

The outside diameter of the cable will be approximately 4" (10cm).

A substation with associated high voltage switchgear and transformers to take power from Southern California Edison's power grid will be located on Chevron-owned facilities in the Huntington Beach area.

All other switchgear, transformers, and distribution systems necessary to provide power for drilling rigs, process motors and utility systems will be located on the platform. All electrical wiring and equipment on the platform will conform to National Electrical Code requirements, per API RP 53, First Edition, February 1976, reissued February 1978.

6.3.2 Emergency Power Generation

Emergency power generation will be supplied by a diesel powered 400 KW generator. This unit will provide electric power under emergency conditions for critical services such as B.O.P. accumulators, lights, air pressuring systems, sump pumps, etc. The diesel generator will have an air starter and a separate air reservoir tank.

6.3.3 Diesel Fuel

Diesel fuel will be utilized for the process heater until fuel gas becomes available from producing wells. Other diesel fuel usage will include the intermittent use of the cementing pumps, cranes, and emergency generator.

Permanent diesel storage will be provided in one crane pedestal (1200 bbls.). Transfer pumps, filters, distribution piping, and day tanks at each engine will be included. Connections at the boatlanding level will be provided for the transfer of the diesel fuel from work boats to the pedestal storage tanks.

6.3.4 Fuel Gas

The primary use of fuel gas on the platform is for process heater fuel. Once the initial wells have gone on production, the heater will be switched from diesel to produced fuel gas consumption. Other potential uses for fuel gas on the platform include the flotation unit, vapor recovery makeup system, and blow case.

6.3.5 Desalinator

A desalinating unit will utilize reverse osmosis to produce freshwater from seawater for the potable and freshwater

systems. Capacity of the unit will be based on estimated freshwater requirements.

6.3.6 Potable Water System

Freshwater produced in the desalinator unit will continually resupply the 250 bbl. potable water storage tank. This water will be utilized in the personnel quarters and the washroom on the upper drilling deck.

6.3.7 Freshwater System

Approximately 4,000± bbls. of freshwater storage will be provided in 12 of the 16 jacket legs. This water will be used primarily for mixing drilling muds. Makeup into the system will be from the desalinator, with the balance transported by work boat from shore as required.

6.3.8 Heating System

Heat for the process systems will be provided by a dual-fired oilfield heater. A secondary heat medium will be circulated through the heater to transfer heat to various exchangers located in the process area. The heater itself will be placed in a non-hazardous classified area to promote safety.

6.3.9 Utility Air

A utility air system will be provided to distribute a supply of 140 psi air throughout the platform for such uses as air tools and hoists, air starting, flotation unit, etc.

One of the utility air compressors will be diesel-powered for initial start-up of the system. The system will also include adequate storage capacity, and facilities for cooling and scrubbing the air stream.

6.3.10 Instrument Air

An instrument air system will be provided to compress, dry, store and distribute an adequate supply of 100 psi instrument air throughout the platform process area.

6.3.11 Saltwater System

A saltwater system will be provided for fire suppression, washdown, cuttings cleaning, water injection, and the desalinator.

Supply pumps will be three 450 GPM electric-powered pumps and two 2500 GPM diesel-powered pumps with a 170 psi discharge pressure. The diesel-powered pumps will be used for fire suppression and thus, only in emergency situations.

6.3.12 Sewage Treatment

A packaged sewage treatment unit will be incorporated to process the sewage from the personnel building and drilling crew washrooms. The effluent from this unit will comply with U.S. Coast Guard requirements found in 33 CFR 159.53(b) and will be discharged to the ocean through the disposal caisson.

6.3.13 Hypochlorite Generator

The platform will include a hypochlorite generator for supplying chlorine to the saltwater intake system and sewage unit as required.

6.3.14 Lighting

Platform lighting will meet or exceed the Illuminating Engineering Society Recommended Levels of Illumination. Indoor lighting will consist of fluorescent fixtures and outdoor lighting will consist of high pressure sodium vapor fixtures. Critical lighting circuits will be connected to a battery backup system to provide emergency lighting in the event of a power failure.

6.3.15 Deck Drainage

All drainage from the decks will go to a waste tank where any solids entrained will drop out and any oil will float to the surface. Water from this tank, together with any oil, will then flow into a corrugated plate separator where oil will be separated and returned to a hydrocarbon sump tank. This oil is then pumped into the oil treating process facility or into a holding tank at the operator's option. Clean water from the corrugated plate interceptor is discharged to the ocean through a disposal caisson.

All drains expected to contain oil will be piped directly to the hydrocarbon sump tank mentioned above.

All decks will be solid steel plate and have a 6" (15cm) high curb around the perimeter to prevent any run-off overflow into the ocean. Spray shields will be included where possible to prevent liquid hydrocarbon spray from reaching the ocean.

6.4 Support Facilities

6.4.1 Hydraulic Control System

A hydraulic pressure system will be provided for downhole and surface safety control valves. The system will include

pneumatic-powered pumps, reservoir tanks, filters and a distribution system.

6.4.2 Control and Monitoring Systems

All platform operations will be monitored and controlled from the central control room. All control functions and monitoring will be by a programmable controller system. Platform control systems will include:

a. Automatic control of process heater and heat transfer system.

b. Automatic control of process equipment and conditions.

c. Automatic monitoring of process and production equipment (supervisory control) with annunciator panels indicating equipment status and alarms. Alarms will be recorded by hard copy printout.

d. Emergency alarms transmitted to shore.

e. Leak detection system for the crude pipeline. (See Section 7)

f. Semi-automatic well gauging system with operator input of well numbers and gauge times. Resulting totals will be recorded by hard copy printout.

g. LACT metering of oil for shipment to shore.

h. Metering of produced gas and fuel gas used in the process heater.

i. Gas detection systems with automatic emergency shutdown and fire suppression systems.

j. Fire detection systems with automatic emergency shutdown and fire suppression systems. Fire detection equipment will include ultraviolet type detectors and fusible plugs in the emergency shutdown systems.

6.4.3 Personnel Quarters

Personnel quarters are to be sized for normal drilling and production activities. Facilities include sleeping accommodations for 78 persons with restroom facilities, locker room, wash room, galley, recreation/training room, and dispensary. The quarters building will be designed to minimize transmission of vibration and noise.

6.4.4 Fire Suppression

The platform design provides a fire suppression system including:

a. A saltwater pumping system.

b. 1-1/2" (3.8 cm) hard rubber hose reels to provide coverage at any point on the platform with two hoses.

c. Fixed fog suppression system with automatic area controls capable of wetting critical surfaces with a water density of not less than 0.25 GPM/ft^2.

d. Two 250 GPM monitors on the drilling deck to cover the BOP stacks and the upper well bay area.

e. Dry chemical and Halon fire extinguishers.

f. Standpipe connections on both boat landings for fire boat use.

6.4.5 Safety Equipment

The platform will be equipped with three escape capsules (35 persons each), life jackets and escape ropes for emergency egress. First-aid and other required safety equipment will also be provided.

6.4.6 Corrosion Control

Corrosion is to be controlled by using corrosion-resistant coatings on the top-side structures and equipment, an underwater sacrificial anode system, and internal coating for selected piping, vessels and tanks.

6.4.7 Aids to Navigation

Aids to navigation will consist of four quick-flashing, Coast Guard approved, five-mile white lights (one light at each corner of the platform), and a Coast Guard approved 2-mile fog horn. All aids to navigation will meet Coast Guard regulation 33 CFR 67.20.

6.5 Measures to Minimize Environmental Impact

The two areas in which the proposed project may affect the environment are air pollution and oil spills. The policy to be followed to reduce environmental impact in each area is as follows:

6.5.1 Oil Spills

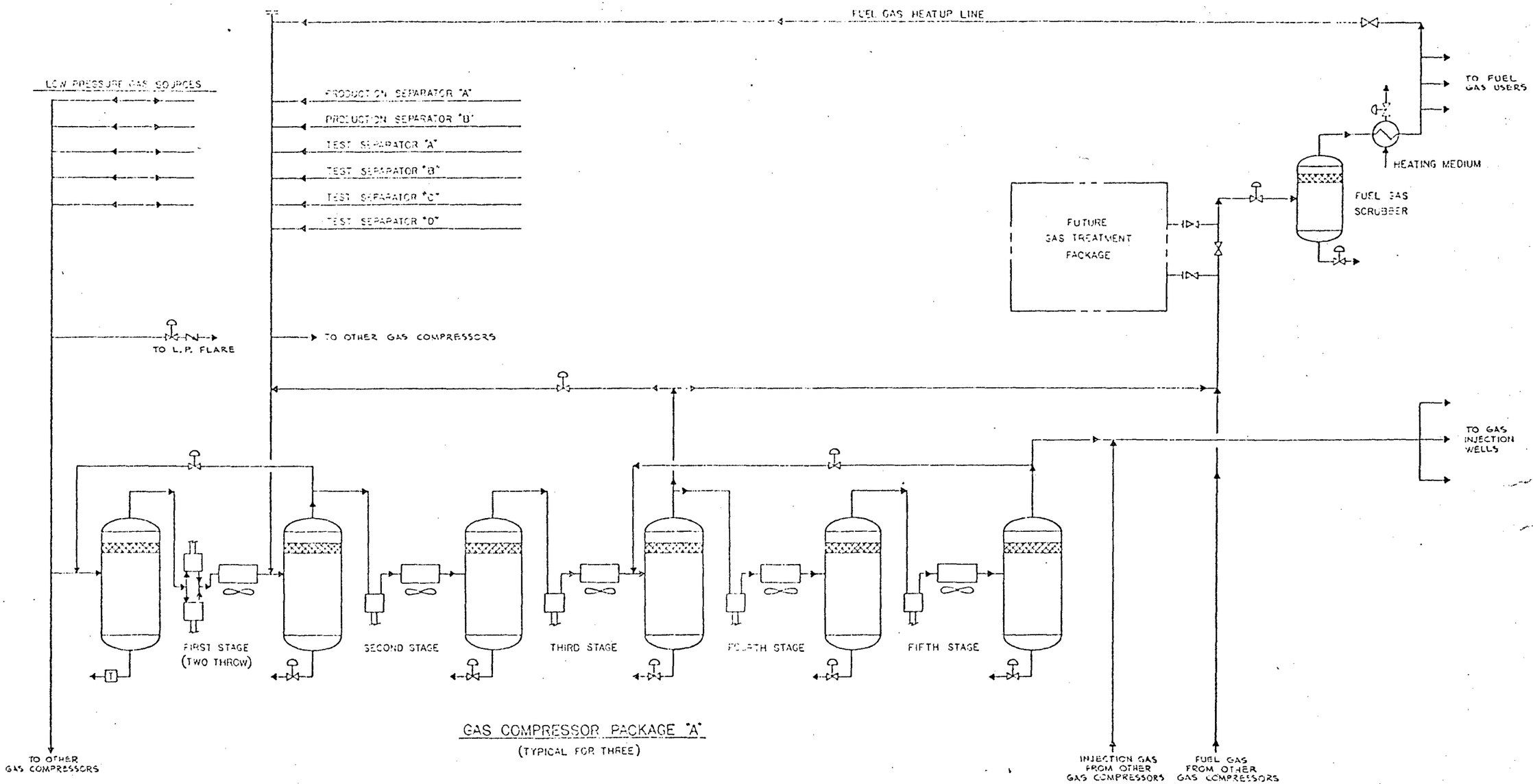
All platform facilities will be designed to prevent the occurrence of an oil spill as a result of routine operations. In the unlikely event that a spill occurs, the platform will

be equipped with a spill containment boom and boom deployment boat that can be utilized to minimize the impact of such an occurrence.

For a very detailed discussion of such a possibility as well as the proposed actions in case of occurrence, please refer to the Environmental Report for Proposed Platform Edith and the Oil Spill and Emergency Contingency Plan for Platform Edith.

6.5.2 Air Pollution

The economically feasible subsea power cable was chosen, in part, as an air quality impact mitigation measure. In addition, an economizer will be installed with the heater unit. This economizer uses hot combustion gases to preheat the process fluid. Utilization of the economizer will result in approximately an 8% increase in heater efficiency. This economizer will recover heat equivalent to burning 70 MSCFD. Use of the economizer and submarine cable (instead of turbines) result in an essentially clean operation. No impact on the near onshore air quality is anticipated from this project. For more in depth discussion of air quality impacts of the proposed project, refer to Section 2.16 and 4.2 of the Environmental Report for proposed Platform Edith.



GAS COMPRESSOR PACKAGE "A"

(TYPICAL FOR THREE)

REFERENCE DRAWINGS

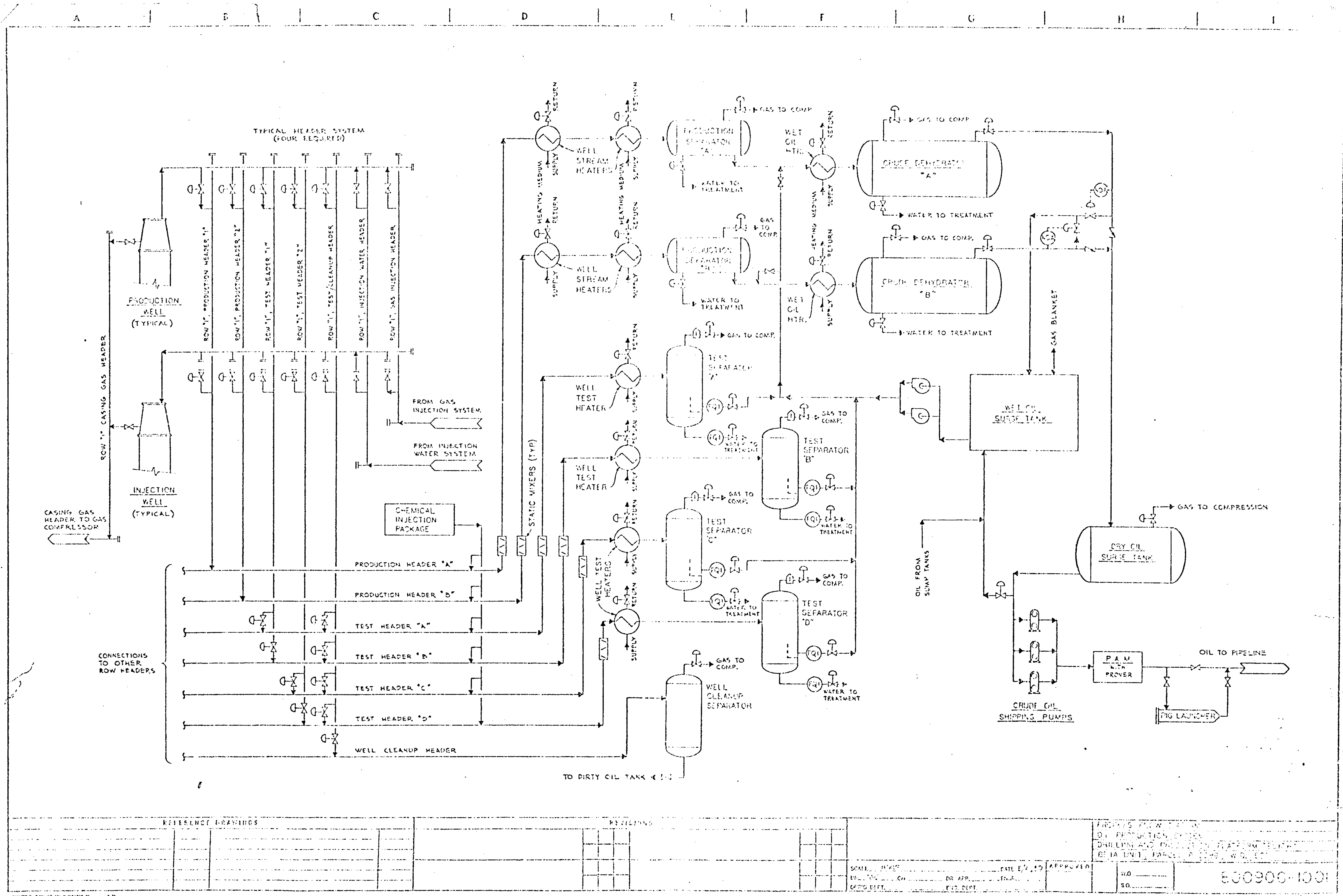
REVISIONS

PROCESS FLOW DIAGRAM
VAPOR RECOVERY AND GAS COMPRESSION SYSTEM
DRILLING AND PRODUCTION PLATFORM "EDITH"
BETA UNIT, PARCEL P-0215, W.O. 150"

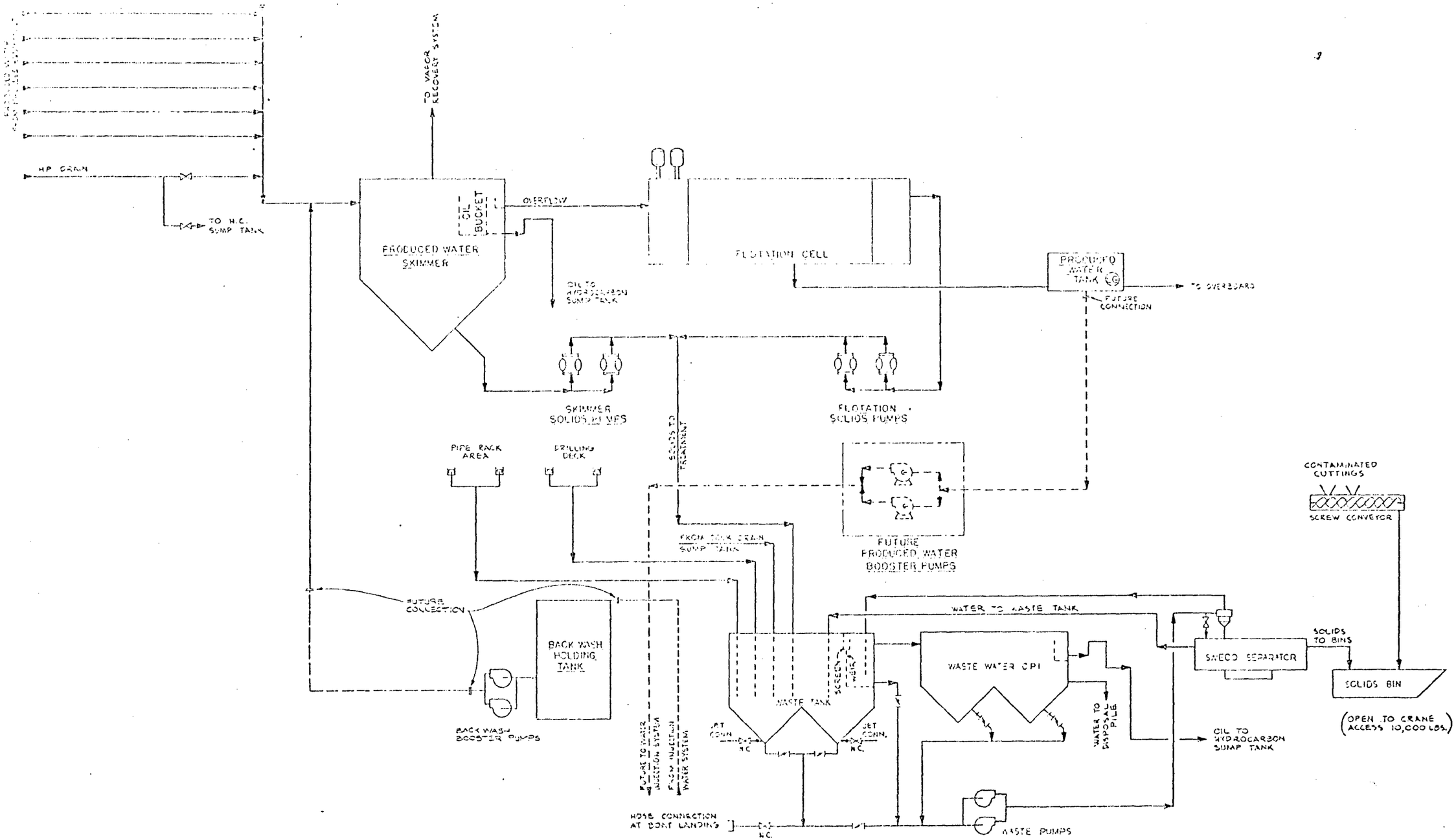
SCALE NONE DATE 2/22/00 APPROVED
DR. TAS CH DR. APP. ENGR.
OPNS. DEPT. ENG. DEPT.

W.O.
S.O.

800906-1002



TYPICAL HEADER SYSTEM (FOUR REQUIRED)
PRODUCTION WELL (TYPICAL)
INJECTION WELL (TYPICAL)
ROW "1" CASING GAS HEADER
CASING GAS HEADER TO GAS COMPRESSOR
ROW "1", PRODUCTION HEADER "1"
ROW "1", PRODUCTION HEADER "2"
ROW "1", TEST HEADER "1"
ROW "1", TEST HEADER "2"
ROW "1", TEST/CLEANUP HEADER
ROW "1", INJECTION WATER HEADER
ROW "1", GAS INJECTION HEADER
FROM GAS INJECTION SYSTEM
FROM INJECTION WATER SYSTEM
CHEMICAL INJECTION PACKAGE
STATIC MIXERS (TYP)
PRODUCTION HEADER "A"
PRODUCTION HEADER "B"
TEST HEADER "A"
TEST HEADER "B"
TEST HEADER "C"
TEST HEADER "D"
WELL CLEANUP HEADER
CONNECTIONS TO OTHER ROW HEADERS
HEATING MEDIUM
RETURN
SUPPLY
WELL STREAM HEATERS
WELL TEST HEATER
WELL TEST HEATERS
PRODUCTION SEPARATOR "A"
PRODUCTION SEPARATOR "B"
GAS TO COMP.
WATER TO TREATMENT
WET OIL HTR.
CRUDE DEHYDRATOR "A"
CRUDE DEHYDRATOR "B"
TEST SEPARATOR "A"
TEST SEPARATOR "B"
TEST SEPARATOR "C"
TEST SEPARATOR "D"
FQI
WELL CLEANUP SEPARATOR
TO DIRTY OIL TANK
GAS BLANKET
WET OIL SURGE TANK
OIL FROM SUMP TANKS
DRY OIL SURGE TANK
GAS TO COMPRESSION
CRUDE OIL SHIPPING PUMPS
P.A.M. WITH PROVER
OIL TO PIPELINE
PIG LAUNCHER
REFERENCE DRAWINGS
REVISIONS
SCALE
DATE
APPROVED
W.O.
S.O.
600900-1001



REFERENCE DRAWINGS	REVISIONS

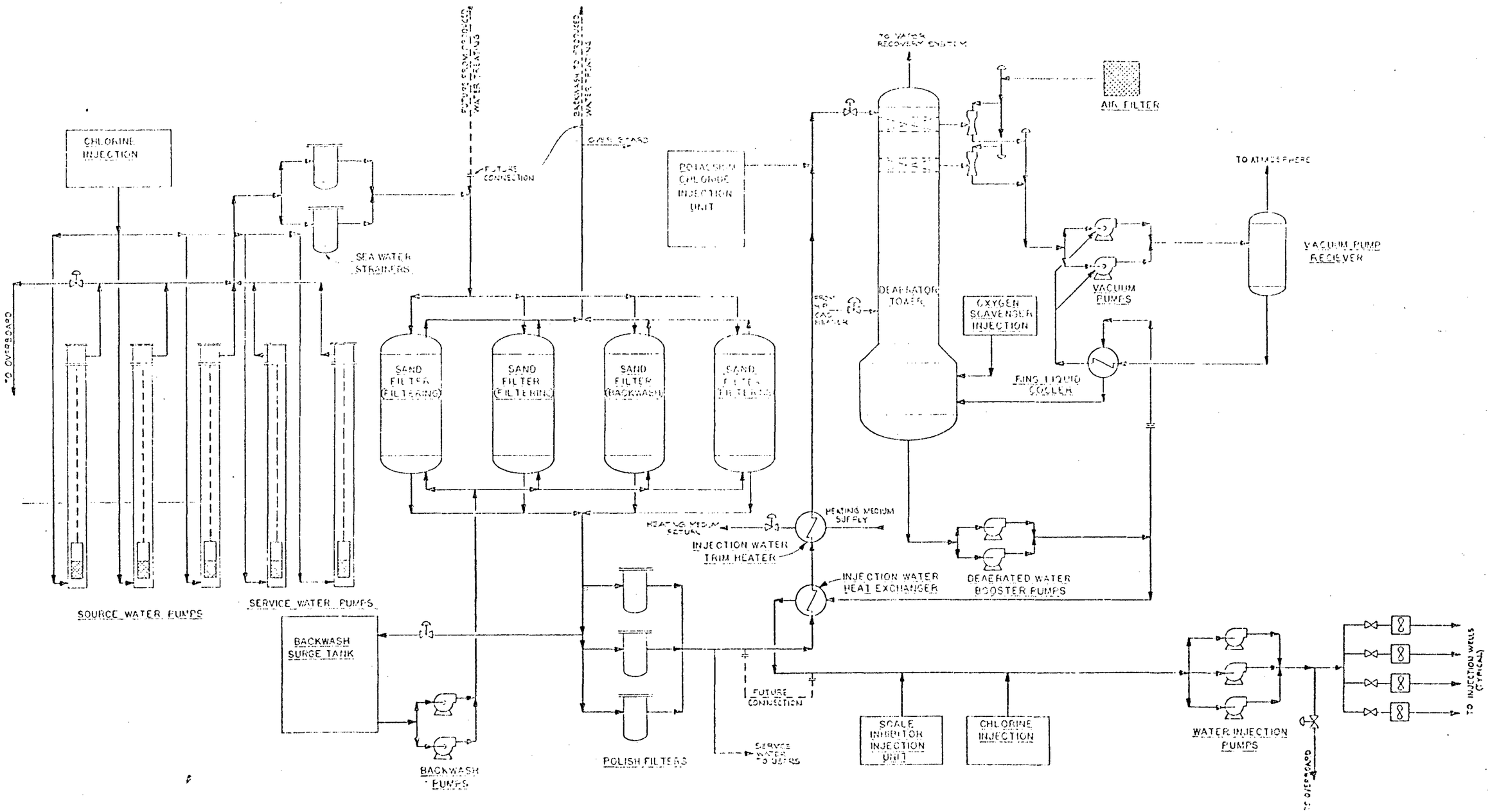
Chevron

PROCESS FLOW DIAGRAM
PRODUCED WATER TREATING / SOLIDS DISPOSAL
DRILLING AND PRODUCTION PLATFORM "EDITH"
SETA UNIT, PARCEL P-0296 , W.O. 160

SCALE NONE | DATE 31 JULY 80 | APPROVED

W.O. ——— | S.O. ———

800906-1003



REFERENCE DRAWINGS

REVISIONS

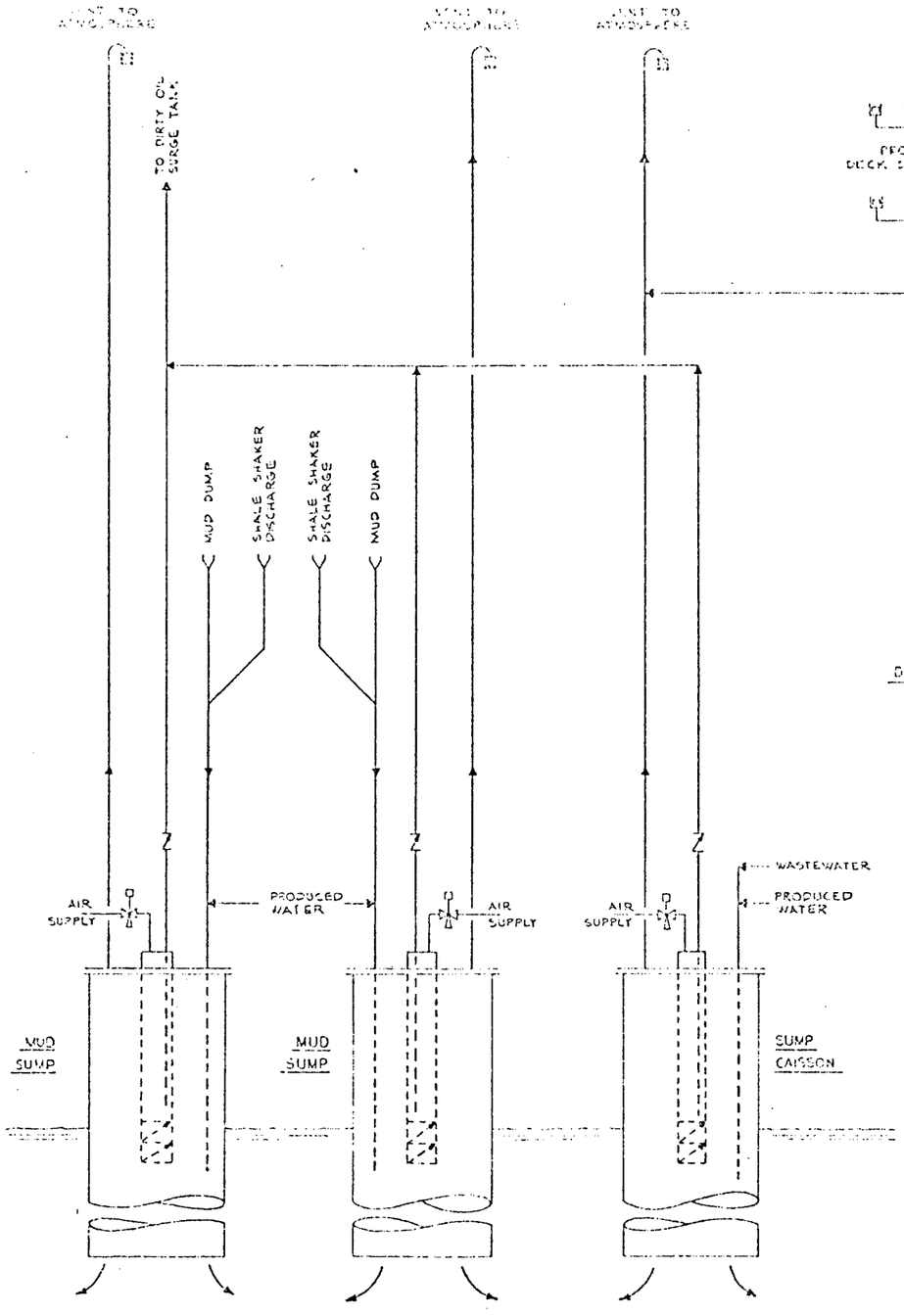
PROJECT FLOW DIAGRAM
INJECTION WATER SYSTEM
DRILLING AND PRODUCTION PLATFORM "EDITH"
BETA UNIT, PARCEL P-0296, W.D. 160'

SCALE NONE DATE 15 JULY 80 APPROVED

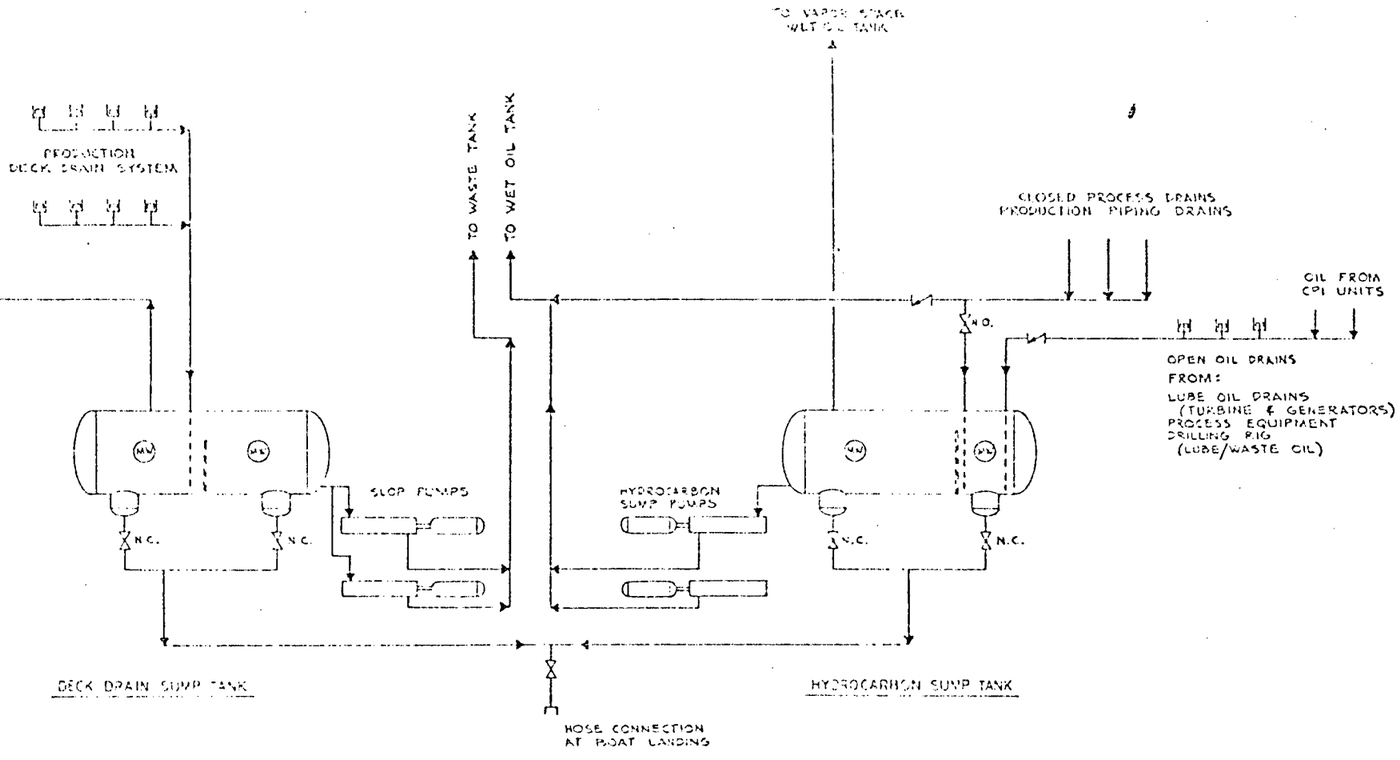
DR JGS CH DR APP ENGR

ENG (CIT)

800906-1004

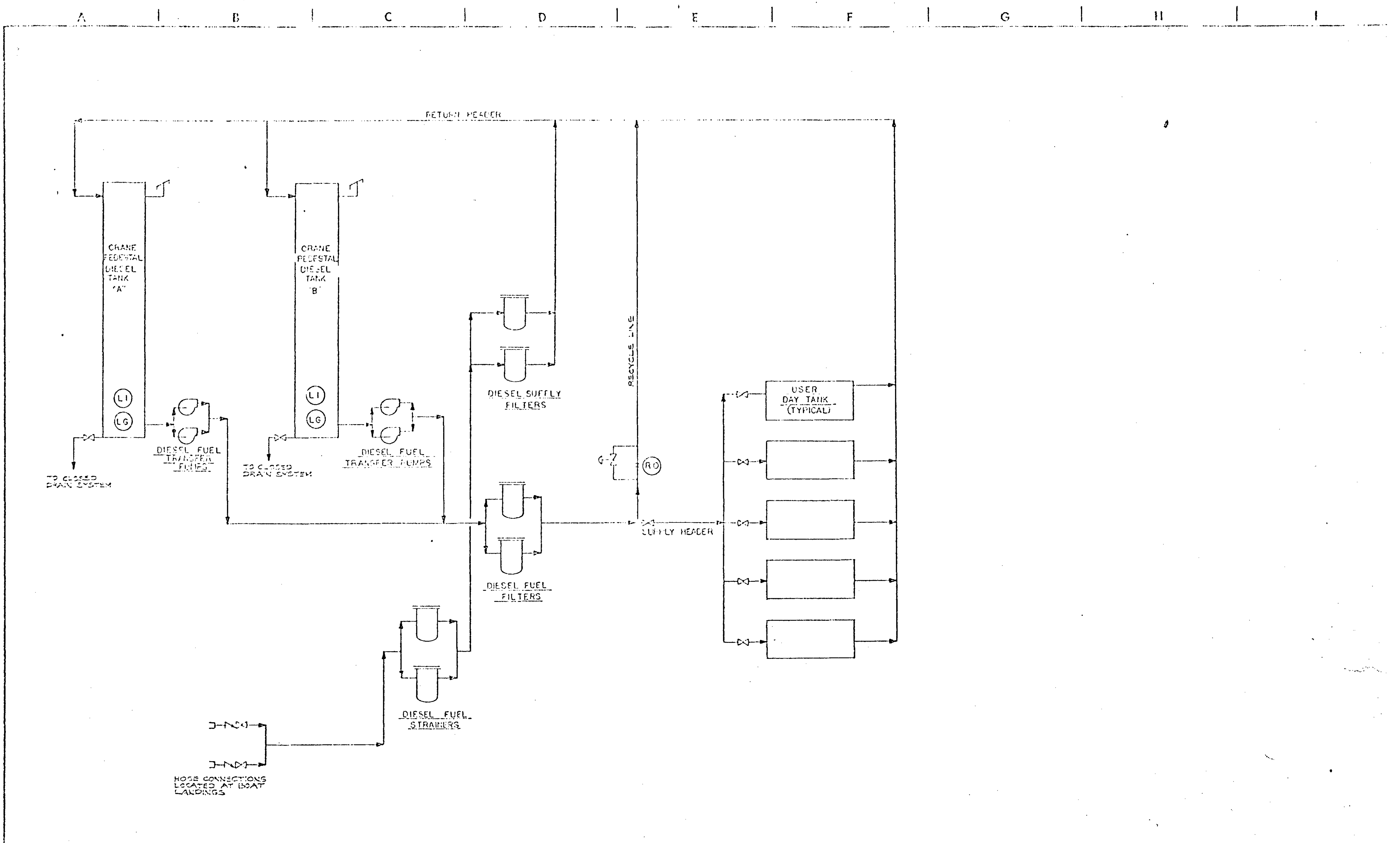


HAZARDOUS AREA DRAIN SYSTEM



HYDROCARBON DRAIN SYSTEM

REFERENCE DRAWINGS	REVISIONS	
		PROCESS FLOW DIAGRAM DRAIN SYSTEMS DRILLING AND PRODUCTION PLATFORM "EDITH" BETA UNIT, PARCEL P-0295, W.D. 160'
		SCALE NONE DATE 4/20/82 APPROVED DR TAF CH. DR. APP. ENGR OPNS DEPT. ENG. DEPT.
		W.O. S.O. 800906-1005



REFERENCE DRAWINGS

REVISIONS

Chevron

SCALE NONE

DR MH

CH

DR APP.

DATE

ENGR

APPROVED

DRAFTG DEPT.

ENG DEPT

PROCESS FLOW DIAGRAM
DIESEL FUEL SYSTEM
DRILLING AND PRODUCTION PLATFORM "EDITH"
BETA UNIT, PARCEL P-0296, W.D. 160'

W.O.

S.O.

800906-1006

PLATFORM NORTH
TRUE NORTH

WELLHEAD AREA
WELLHEAD AREA
MCC
MCC
FIREWALL
FIREWALL
BCL STORAGE
BCL STORAGE
DISPOSAL BIN AREA
DISPOSAL BIN AREA
AMECO SEPARATOR
WASTE TANK
WASTE PUMPS
WASTE WATER CPI
MCC
DRY OIL SURGE TANK
WELL TEST HEATERS
TEST SEPARATORS
GAS COMPRESSOR PACKAGE
GAS COMPRESSOR PACKAGE
CRUDE SHIPPING PUMPS
WET OIL PUMPS
WELL STREAM HEATERS
PRODUCTION SEPARATOR
PRODUCTION SEPARATOR
CRUDE DEHYDRATOR
MCC
GAS COMPRESSOR COOLERS (TWO UNITS STACKED)
COMPRESSOR SCRUBBER SKID
PAM UNIT W/ METER PROVER
PIG LAUNCHER
WET OIL SURGE TANK
MLO HEATER
WET OIL HEATER
CRUDE DEHYDRATOR
CUT LAB
CRANE PEDESTAL DIESEL FUEL STORAGE
DEAERATOR TOWER
DEAERATOR WATER BOOSTER PUMPS
INJECTION WATER FILTERS
INJECTION WATER HEAT EXCHANGER
INJECTION WATER TRIM HEATER
CARTRIDGE POLISH FILTER
SAND FILTER PACKAGE
SAND FILTER BACKWASH PACKAGE
CHEMICAL INJECTION PACKAGE
CHEMICAL INJECTION PACKAGE
SEAWATER STRAINER
SEAWATER PUMPS
DIESEL DRIVEN FIRE PUMP
DIESEL DRIVEN FIRE PUMP
POTABLE WATER MAKER
HYPOCHLORITE GENERATOR
WELL CLEAN UP SEPARATOR
DIRTY OIL SURGE TANK
AIR FLOTATION UNIT
PRODUCED WATER STRIPPER
PRODUCED WATER BOOSTER PUMPS (TYP)
PRODUCED WATER SURGE TANK
HP FLARE SCRUBBER
LP FLARE SCRUBBER
INSTRUMENT AIR COMPRESSOR PACKAGE
SEWAGE TREATMENT PLANT
SPILL BOOM REEL UNIT
FLARE BOOM

DISPOSAL PILES
HYDROCARBON SUMP TANK
DECK DRAIN SUMP TANK
SUMP PUMPS
SUMP PUMPS
CRANE PEDESTAL POTABLE WATER STORAGE

SUBCELLAR DECK
T.O.S. EL. 34'-0"

SORBENT PADS AND BOOM
DRUMS DISPERSANT
SEA CONTAINERS AND SKIMMER (ON DECK)
BOOM DEPLOYMENT BOAT (UNDERNEATH)
SPILL BOOM

NOTE:
(PEP) = POLLUTION EMISSIONS POINT.

PRELIMINARY
OCT 31 1980
EARL AND WRIGHT

REFERENCE DRAWINGS

REVISIONS

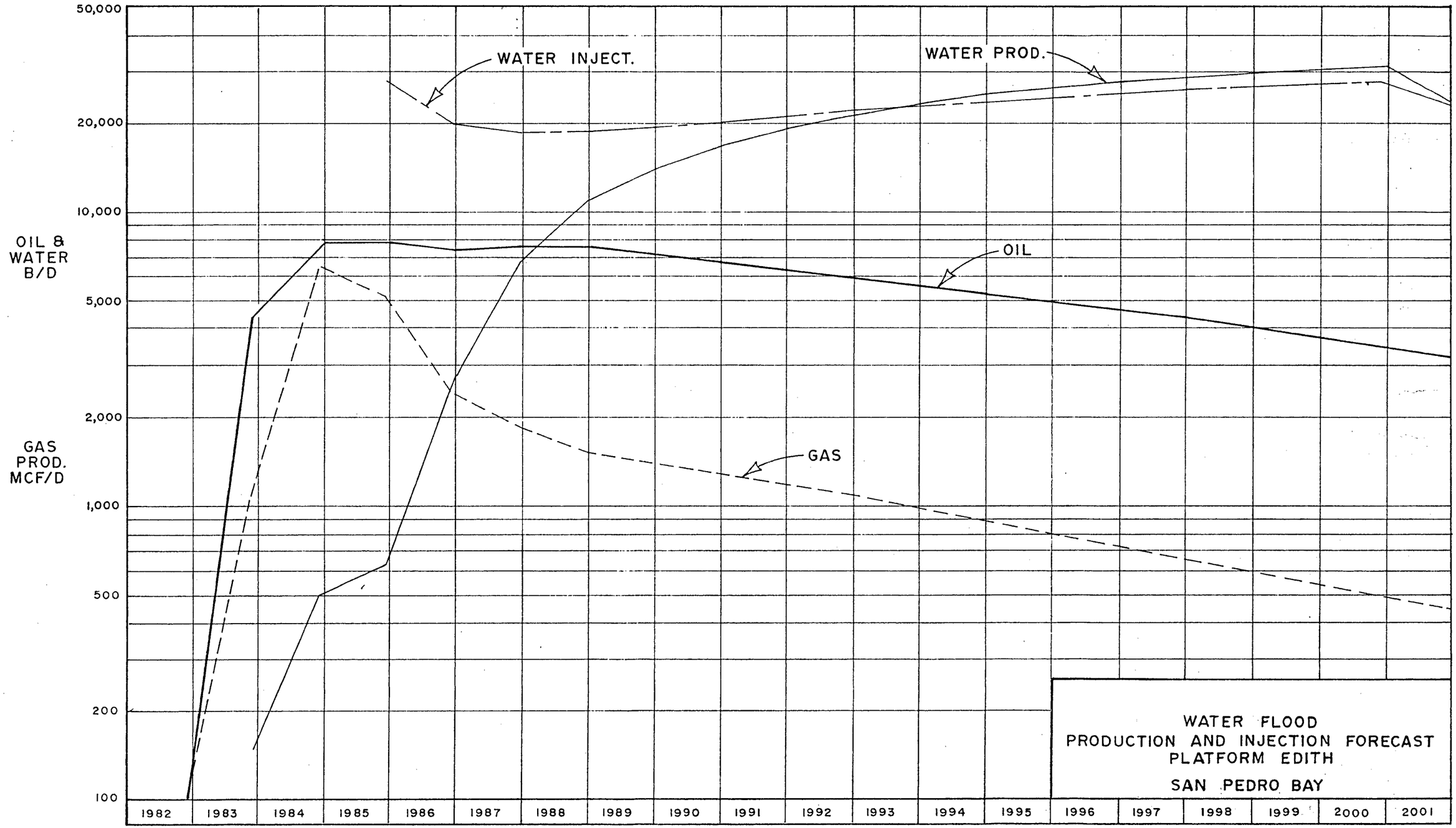
SCALE 1/8"=1'-0"
DATE 10 28 80 BY DLM CK
DR. APPR. ENG.
OPER. DEPT. APPROVED
ENG. DEPT.

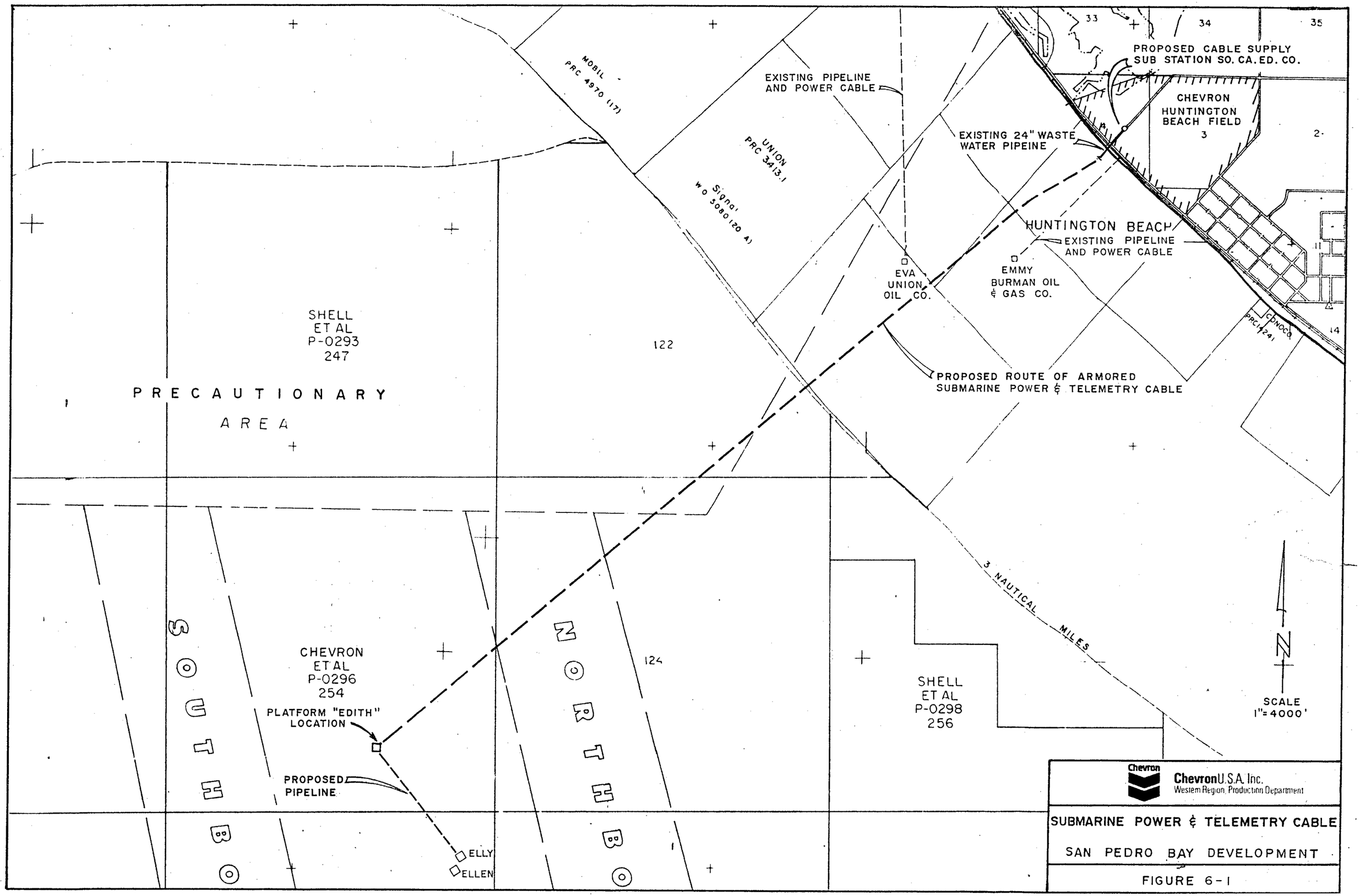
Chevron U.S.A. Inc.
Western Region, Production Department

EQUIPMENT ARRANGEMENT PLAN
PRODUCTION DECK
DRILLING AND PRODUCTION PLATFORM "EDITH"
BETA UNIT, PARCEL P-0296 WD 160'

A W.O. S.O.

E-H-1400


50,000
20,000
10,000
5,000
2,000
1,000
500
200
100
OIL & WATER B/D
GAS PROD. MCF/D
WATER INJECT.
WATER PROD.
OIL
GAS
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
WATER FLOOD
PRODUCTION AND INJECTION FORECAST
PLATFORM EDITH
SAN PEDRO BAY


MOBIL
PRC 4970 (17)
UNION
PRC 3413.1
Signal
W.O. 5080 (20 A)
EXISTING PIPELINE
AND POWER CABLE
EXISTING 24" WASTE
WATER PIPEINE
PROPOSED CABLE SUPPLY
SUB STATION SO. CA. ED. CO.
CHEVRON
HUNTINGTON
BEACH FIELD
3
33
34
35
2
HUNTINGTON BEACH
EXISTING PIPELINE
AND POWER CABLE
EVA
UNION
OIL CO.
EMMY
BURMAN OIL
& GAS CO.
CONOCO
PRC 1241
14
11
PROPOSED ROUTE OF ARMORED
SUBMARINE POWER & TELEMETRY CABLE
SHELL
ET AL
P-0293
247
PRECAUTIONARY
AREA
122
SOUTH BLOCK
NORTH BLOCK
CHEVRON
ET AL
P-0296
254
PLATFORM "EDITH"
LOCATION
PROPOSED
PIPELINE
ELLY
ELLEN
124
1
SHELL
ET AL
P-0298
256
3 NAUTICAL MILES
N
SCALE
1"=4000'
Chevron
ChevronU.S.A. Inc.
Western Region Production Department
SUBMARINE POWER & TELEMETRY CABLE
SAN PEDRO BAY DEVELOPMENT
FIGURE 6-1

SECTION VII

SUBSEA PIPELINE

TABLE OF CONTENTS

SECTION VII

SUBSEA PIPELINE

7.1 Introduction

A subsea pipeline to transport the clean crude from the dehydration facilities on the platform is planned for installation during mid-1982. The pipeline will be installed between Platform Edith and Shell's Platform Elly located on Lease OCS-P 0300. The crude will be commingled with other Beta production for transport through Shell's 16" (41 cm) line to an existing metering station at Long Beach. At this point, oil will be routed by existing pipeline facilities to Chevron's El Segundo Refinery.

Provisions have not been made for a gas pipeline since all produced gas will be used in the process facilities on the platform or re-injected.

The maximum water depth of 260-ft. (79m) encountered by the pipeline is at Shell's Platform Elly. Figure 7-1 is a general area map showing the pipeline route.

7.2 Route Survey

7.2.1 Regional Geology

The regional and area geologic conditions were discussed in Sections 2.2 and 2.3 respectively and should be referred to for further details.

7.2.2 Geotechnical Conditions

McClelland Engineers, Inc. (Ref. 7) concluded in their report that the construction and maintenance of a pipeline along the proposed route from Platform Edith to Platform Elly is feasible. Their report (Ref. 7) and Section IV should be referred to for a detailed discussion of geotechnical conditions. All of these discussions report that there are no faults, adverse structural features, or mass movement features along the pipeline route.

7.2.3 Cultural Resources

McClelland Engineers, Inc. (Ref. 7) utilized the services of Scientific Resource Surveys to review the area of the proposed project for cultural and archaeological resources. They concluded from this review that there are no identifiable prehistoric cultural resources in the area of the proposed pipeline route. Two possible historic anomalies

which showed up on the side scan sonar lie very near the edge of the 2000 foot (609.6m) radius of impact area surrounding the proposed platform. These areas will be avoided during anchoring activities connected with platform and pipeline construction. Their report with conclusions is included as Appendix E of the McClelland report (Ref. 7).

7.3 Design of Pipeline

7.3.1 Basis for Design

Presently, the crude line will be 6-inch (15 cm) O.D. and designed for a throughput of approximately 8,000 barrels per day at an operating pressure of 650 psi. Based on a design capacity of 40,000 barrels per day for the 16-inch (41 cm) line from Shell's Platform Elly to Long Beach, our 6-inch (15 cm) line capacity can be increased to 12,000 barrels per day by increasing the operating pressure to 770 psi.

API 5LX-42 pipe will be used for the pipeline and risers. Based on design factor of 0.72 for the pipeline and 0.60 for the risers; wall thicknesses of 0.312-inch (0.792 cm) and 0.375-inch (0.952 cm) are provided. These thicknesses include a 1/16-inch (0.159 cm) corrosion allowance. Flanges shall be in accordance with ASA 1316.5-1953, material specification ASTM A105 GR. 11. Flange pressure ratings are equivalent to pipeline material (ANSI 900).

7.3.2 Applicable Regulations and Codes

The oil line will be designed in compliance with USGS, Conservation Division, Branch of Oil & Gas Operations, Pacific Region, OCS Order No. 9, dated June 1, 1971, ANSI B31.4-1974, "Liquid Petroleum Transportation Piping Systems," and Department of Transportation Regulation 49, Part 195, "Transportation of Liquids by Pipeline". In addition to the above, the pipeline design and operating procedures will follow API Recommended Practice RP 1111, Design, Construction, Operation and Maintenance of Offshore Hydrocarbon Pipelines, March 1976.

7.3.3 Stability

The pipeline will be designed to resist movement under the action of on-bottom currents of 4.8' per second (1.5m per second) predicted to occur during the design 100-year storm. Stability will be achieved by proper design of submerged pipeline weight. The pipeline appropriately protected, will be placed on the ocean floor.

7.3.4 Maximum Operating Pressure

Maximum anticipated operating pressure is expected to be less than ANSI 600 (1440 psi @ 100°F). The line, however, will be designed to ANSI 900 (2160 psi @ 100°F) under applicable codes and regulations.

7.3.5 External Pressure

The pipeline will be designed to withstand external loads, including hydrostatic pressures with the pipeline void and with absolute internal pressure equal to one atmosphere. This analysis is performed utilizing Timoshenko "Theory of Elastic Stability," McGraw Hill, pp. 216-225.

7.3.6 Other Stresses

The pipeline will be designed under applicable codes and regulations to withstand stresses which result from installation, thermal and fluid expansion effects, dead loads, and surges.

For design of offshore pipelines, installed by the lay barge method, bending movement is considered the only source of pipe injury. Excess bending movement can result in buckling of the pipe. Since steel assumes the shape of an elastic curve, analysis can be made by ordinary beam theory methods. A simple but useful way to measure bending stress is in terms of pipe curvature. For elastic members in bending, the radius of curvature is selected which will hold the static strain within a certain value. For marine pipelines this is usually held to a value represented at 80% to 85% of the yield stress. These relationships are established by the equation $S = EC/R$ where S = maximum fiber stress. R = radius

of curvature, E = modulus of elasticity, C = distance from neutral axis to the most remote fiber.

For some situations, such as recovery of pipe from the ocean bottom, it is not convenient to measure stress in terms of curvature. The controlling conditions are the height and the slope of the raised end of the pipe. This analysis can be made from the differential equation for the elastic curve, which is $EI = M = d^2y/dx^2$, where I is the moment of inertia.

Drawing C-21115 is typical of the presentation made by the installation contractor for review prior to start of construction. Barge configuration, available tension machines, pontoon length and type, have to be determined for final check of pipe lay stresses.

7.3.7 External Corrosion Protection

The pipeline will be protected against external corrosion by means of external coatings and cathodic protection. Choice of coating materials and cathodic protection systems, impressed current or sacrificial anodes, will be based on detailed economic studies.

7.3.8 Internal Corrosion Protection

Internal corrosion in this clean oil pipeline is not expected. However, the use of inhibitors is planned. Testing and monitoring for internal corrosion will dictate the extent of the program.

7.3.9 Construction Method

The construction technique used for the pipeline is influenced by relative economics and availability of equipment at the time of installation. The use of the stinger-laybarge method is planned at the present time, but is subject to review.

During construction, inspection will be accomplished with full-time qualified inspectors. Girth welds will be radiographically inspected in accordance with 49 CFR 195.234. Prior to construction, the bare pipe will be inspected for defects. Upon completion, the pipeline system will be pressure tested with sea water to 90% of the yield pressure for 24 hours. After testing, the pipeline will remain full of sea water until oil production is initiated. The sea water contents will then be clarified and disposed of in accordance with applicable discharge requirements.

7.3.10 Pipeline Operation

The pipeline will be operated and regularly inspected in compliance with United States Geological Survey and Department of Transportation regulations. Safety and monitoring devices, such as leak detectors, shut-ins, etc., will be provided in accordance with OCS Order No. 9. Record keeping and reporting will be in accordance with all federal and state regulations.

At Platform Edith, the pipeline will be protected from over-pressure by means of a pressure switch set to shut down the pumps when a predetermined pressure is exceeded.

The oil pipeline to Shell's Platform Elly is monitored in two ways to detect leaks and limit the amount of oil spilled in the event of a leak. Very large leaks (i.e., pipeline rupture) will be detected by a high/low pressure sensor on the pipeline exit from Edith. In the event that this sensor detects an abnormally low pressure caused by a pipeline break, all oil shipping pumps will be automatically stopped.

A volumetric leak detection system is intended to detect leaks smaller than a rupture. This system has been provided by Shell and will be expanded to include the Edith pipeline. Pressure, temperature, and volume information will be telemetered from Edith to Elly and input to the existing leak

detection system. The system analyzed for volume imbalance will be expanded to include the pipeline from Edith.

The leak detection system will monitor the total 6 and 16-inch (15.2 and 40.6cm) pipeline network. Should a potential leak be indicated, it will be confirmed by isolating the two segments (by closing the Edith pipeline shut down valve (SDV) on Elly) and pressurizing to evaluate the integrity of the two pipeline segments.

The time required to respond to and verify a leak indication will be increased slightly by the Edith addition. Two pipeline segments must be considered rather than one. However, the 6-inch segment is much shorter and of smaller volume so that isolating and running a pressure-drop test on that segment should be a quick and straightforward procedure.

In summary, the installation of Platform Edith will be accompanied by an expansion of Beta's leak detection system to include the 6-inch (15.2cm) segment from Edith to Elly.

SHELL
ET AL
P-0293
247

PRECAUTIONARY
AREA

6805'

122

Signal
3080 (20 A)

HUNTINGTON BEACH

SIGNAL
PRC 392

CONOCO
PRC 1224

11

14

3 NAUTICAL MILES

SOUTH BOUND

CHEVRON
ET AL
P-0296
254

PLATFORM "EDITH"
LOCATION

PROPOSED
PIPELINE

ELLY

ELLEN

TRAFFIC SEPARATION
ZONE

NORTH BOUND

124

SHELL
ET AL
P-0298
256

7200'

SCALE
1" = 4000'

SHELL
ET AL
P-0300
261

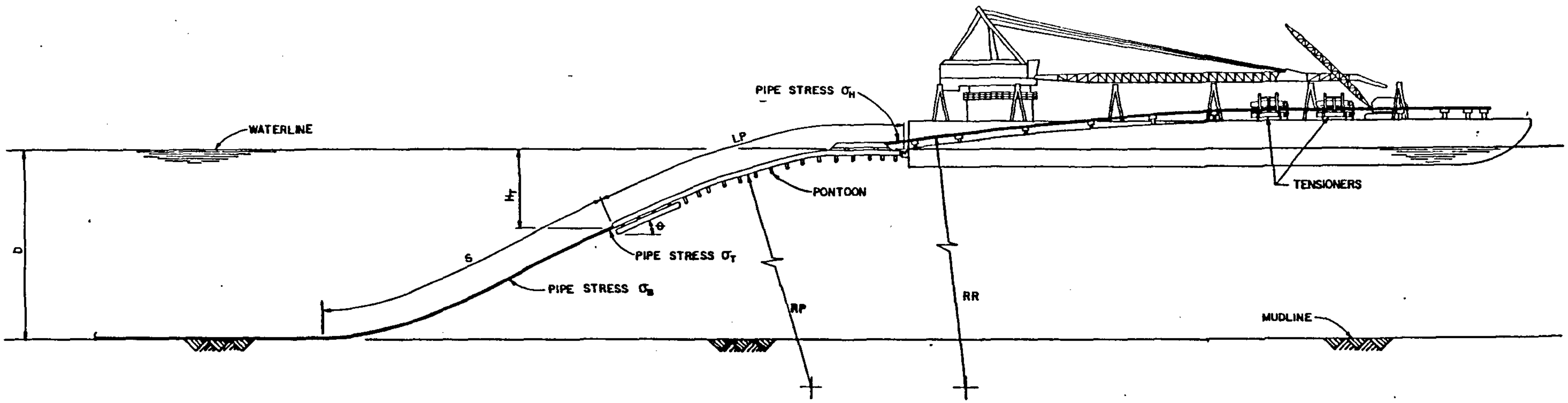
262
SHELL

GULF
P-0302
263

Chevron U.S.A. Inc.
Western Region, Production Department

SHIPPING TRAFFIC LANES
AND SEPARATION
SAN PEDRO BAY DEVELOPMENT

FIGURE 7-1



PIPE DIAMETER (INCHES)	CONCRETE COATING (IN.-LBS./FT.³)	WATER DEPTH D (FEET)	RAMP RADIUS (FEET)	PONTOON RADIUS RP (FEET)	PONTOON LENGTH LP (FEET)	PONTOON TAIL DEPTH H_T (FEET)	TENSION AT BARGE T (KIPS)	PIPE ANGLE AT LIFTOFF θ (DEGREES)	UNSUPPORTED SPAN S (FEET)	PIPE STRESSES: SAGBEND σ_B (KSI)	PIPE STRESSES: AT LIFTOFF σ_T (KSI)	PIPE STRESSES: OVER HITCH σ_H (KSI)
12.75	1"/140	125	1054	410	181.5	59	25	21.2	420	21.5	34.6	25.1
12.75	1"/140	318	1054	410	181.5	74	25	37.0	630	26.6	34.3	31.8
10.75	1 5/8"/165	125	1054	410	181.5	55	30	27.0	280	30.8	27.5	6.7
10.75	1 5/8"/165	228	1054	410	181.5	73	45	33.6	380	25.3	33.0	28.9
10.75	1"/140	228	1054	410	181.5	67	25	33.7	500	22.9	32.9	14.8
10.75	1"/140	318	1054	410	181.5	67	35	34.3	720	16.8	33.1	15.6

NOTES:

1. TAIL DEPTH (H_T) BASED ON LOCATION OF DEPTH GAUGE AT AFT ROLLER OF PONTOON TAIL SECTION.
2. PIPE GRADE: API 5LX-46
3. CORROSION COATING: 0.500" SOMASTIC

PIPE LAYBARGE BAR-264

PONTOON M-3618

REV. NO.	DATE	BY	DESCRIPTION	CHK'D.	APP'D.	REV. NO.	DATE	BY	DESCRIPTION	CHK'D.	APP'D.

Brown & Root, Inc.
Engineers · Constructors
HOUSTON, TEXAS

DRAWN BY: M WILLIAMS DATE 6-7-79
CHK'D. BY: [signature] DATE 6-5-79
ENG'D.: [signature] DATE 6/14/79
SCALE: NONE

APPROVED: A R [signature] 6/14/79
APPROVED: W R [signature] 6/14/79

SEAL

TITLE OF DRAWING: 10.75" & 12.75" PIPELINES CONFIGURATION & STRESSES DURING NORMAL LAY
NAME OF CLIENT: CHEVRON
LOCATION OF PROJECT: SANTA CLARA UNIT

CONTRACT NO. WH-0029
DRAWING NO. C-21115-0
REFERENCE NO.

SECTION VIII

REFERENCES

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6. Dames & Moore (1978). Report, Site-Specific Studies of Seismic Hazard to the Beta Prospect, San Pedro Bay Lease Area, for the Shell Oil Company.

7. McClelland engineers (1980) Geotechnical and Geophyscal site investigations proposed Platform Edith and pipeline route Beta Unit 0296 development San Pedro Bay. Report to Chevron U.S.A. Inc.

8. Ibid., Appendix D.

9. Ibid., page 6.

10. Ibid., Plate 6.

11. Ibid., page 5 and Plate 4.

12. Ibid., Plates 5 and 6.

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15. Union Oil Company of California, Santa Clara Unit Amended Plan of Development Lease OCS-P 0216 (1979), Appendix B.

16. Op.Cit., McClelland, Appendix E.

APPENDIX 1

DESIGN VERIFICATION

PER

SECTION 3.2.2 - OCS ORDER NO. 8

Design Verification Plan

Platform Edith

Lease OCS-P 0296

San Pedro Bay

The American Bureau of Shipping (ABS) has been selected by Chevron to be the Certified Verification Agent (CVA) for the design of Platform Edith. ABS has been qualified by the Platform Verification Section of the USGS.

ABS will conduct the design verification to insure that Platform Edith has been designed to withstand the maximum environmental and functional load conditions anticipated during the service life of the platform at the proposed location.

ABS will use the applicable provisions of the USGS "Requirements" and good engineering practice in conducting an independent assessment of the adequacy of all proposed planning criteria, environmental data, load determinations, stress analysis, material designations, soil and foundation conditions, safety factors, and other pertinent parameters of the proposed design.

Review of Design and Analysis Methodologies and Limits

Chevron will make available to ABS a listing of the design criteria, including the reference codes, standards, and recommended practices which Chevron plans to use, and a description of computer programs and calculating procedures which will be the basis of the structural design and analysis. ABS will review this documentation to assure that it can serve as a "defensible" basis for design within the context of the USGS Requirements.

To assess the capabilities of computer programs used in the design, ABS will receive a description of each computer program giving the methods of calculation employed. Such documentation should include sufficient information to describe the use and limitations of the program.

ABS will submit an interim report, subsequent to the review of the design criteria and computer programs, to Chevron. A final report will be prepared which summarizes the material reviewed by ABS, their findings, and their recommendations to the Supervisor. In addition, the report shall include particulars of how, and when, ABS conducted the independent review and any special comments considered necessary.

Review of Analytical Documentation

Chevron will submit to ABS reports, calculations, drawings and other documentation, which are sufficiently detailed to demonstrate the adequacy of the design of the principal members of the jacket, deck structure and piling. This documentation will be reviewed to assure that the calculation methods are adhered to, and that the given data can validly be used with the computer programs previously examined.

The submitted documentation is to include those items specifically mentioned in OCS Order No. 8, and "Requirements for Verifying the Structural Integrity of OCS Platforms". A list of the required documentation is attached which should be considered as indicative of the depth of the review which ABS will perform.

After a thorough review of the submitted documentation, ABS will issue a report indicating the extent of the design's compliance with USGS Requirements. Edith's design verification should be completed and the final report submitted to Chevron and, in triplicate, to the Supervisor within 6 weeks after receiving the complete design data.

Required Design Documentation

for

Designs Complying with the USGS Requirements

General

The required design documentation which should be submitted is to include all reports, calculations, drawings, and other documentation which is sufficiently detailed to demonstrate the adequacy of the structural design.

I. Reports

All reports submitted by meteorologists, oceanographers, geotechnical consultants, and other specialists which serve as a basis for design should be submitted for review. In this regard submitted reports dealing with:

a) Environmental Considerations

1) should describe all environmental phenomena appropriate to the areas of construction, transportation and installation. The types of environmental phenomena to be accounted for are: wind, waves, current, temperature, tide, marine growth, and earthquake.

2) should be based on defensible original data, or where permitted, data from analogous areas. Demonstrably valid statistical models to extrapolate to long term values should also be employed.

3) should be sufficiently complete and well referenced to demonstrate both the relative validity of the data reported or referred to, and the conclusions drawn from these data.

4) should preferably present data and conclusions on the relevant environmental phenomena separately.

5) should contain all necessary calculations to establish the pertinent environmental parameters (see Item IIa, below).

6) should present the parameters characterizing the environmental phenomena in a manner compatible with the methods recommended to assess the effects or loads induced on the structure by these environmental phenomena.

7) should list separately a summary showing the parameters necessary to define: the "Design Environmental Condition" and "Operating

Environmental Conditions", as defined in subsection 2.3 of the Requirements, the likely environmental conditions to be experienced during the transportation of the structure to its final site, and where necessary, the design earthquake.

8) should give recommendations on the calculation methods to be employed in the assessment of the effects or loads induced on the structure by the considered environmental phenomena.

9) may contain the calculations which quantify the effects or loadings on the contemplated structure, where these are not provided in later required design calculations (see Item IIb,1, below).

b) Foundation Data

1) should indicate that the actual extent, depth and degree of precision obtained in the site investigation program reflects the type, size and intended use of the structure.

2) should, as appropriate to the planned structure, present data and results of investigation, or when permitted, data from analogous areas, on geophysical, geological and geotechnical conditions

existing at and near the platform site. The manner in which such data is established and the specific items to be assessed is to be consistent with the performance objectives listed in subsection 7.2 of the requirements.

3) should contain descriptions of references to cover the investigation, sampling, testing and interpretive techniques employed during and after the site investigation.

4) should contain recommendations on methods to be employed to calculate the engineering properties of the soil and the predicted soil and structure performance. As appropriate to the planned structure, recommended calculation procedures may include those to determine the following: axial and lateral pile capacities and response characteristics, the effects of cyclic loading on soil strength, scour and/or scour prevention, interaction between soil and structure, slope stability, penetration resistance, etc. In all cases the recommended calculation procedures should be compatible with soil conditions previously established.

5) may contain analytical calculations covering some or all of the topics mentioned for Item 4 above,

which are pertinent to the planned structure, when these are not provided in later required design calculations (see Item IIc, below).

6) should contain recommendations relative to any special anticipated problems regarding installation, such as: hammer size, procedures to be followed should pile installation procedures significantly deviate from what is anticipated, etc.

7) should present the soil properties which are to be employed in later required structural analysis and design.

c) Materials

1) Welding, weld metals, workmanship, welder qualifications, and weld qualification tests will be in accordance with the applicable provisions of the American Welding Society.

II. Calculations

Design calculations should present in a logical manner all computations necessary to verify the adequacy of the design of the proposed structure. In this regard, calculations

should be submitted for the items listed below. When in lieu of detailed calculations, computer program input and output are submitted, the submitter may be required to submit program documentation (not listings), user manuals, and the results of program verification sample problems.

a) Environmental Conditions

Generally speaking, it is anticipated calculations may be prepared by specialists other than those directly responsible for the structural design. In such cases, calculations to quantify environmental parameters, from established statistics, and based on the required recurrence period, structural design life, and all other requisite factors shall be included in this report (see Item 5 under Ia).

b) Loadings

1) Environmental - The loading induced or affected by environmental phenomena should be calculated employing parameters compatible with the methods of load calculation selected or recommended in the specialist's report.

2) Other Loading - Calculations should be provided, as needed, to define the structural loadings defined in subsections 3.3.4 of the Requirements.

c) Stress and Deflection Calculations

Stress and deflection calculations shall be presented in a logical, well referenced manner, and descriptions of any mathematical models, such as those used in computer aided structural analyses are to be submitted. Stress calculations should be accomplished using analytical methods compatible with those used in the establishment of the stress criteria selected for the evaluation of stress results (see e, below).

The types of stress and deflection calculations which should be submitted are as follows:

1) Calculations of nominal structural element or member stresses and deflections per API RP 2A.

2) Calculations for the dynamic response of the structure as required (see subsections 5.3.3, 5.3.5, and 4.2.2.2.; 6.4.1.4 and 6.4.11 of the Requirements).

3) Calculations for the fatigue life of members and joints per API RP 2A.

4) For pile supported structures, calculations for the stresses in piles and the load capacity of the connection between the structure and the piles (see 5.5 of the Requirements).

d) Marine Operations

Calculations shall be provided in compliance with subsection 8.3 of the Requirements.

e) Evaluation of Stress and Deflection Calculation Results

When accounting for the stress resultants obtained from c and d above, calculations should:

1) demonstrate the adequacy of the structural elements, members or local structure, such as joints, with respect to a clearly identified and consistently applied allowable stress or other permissible strength criteria.

f) Corrosion Protection System Calculations

Calculations which demonstrate the adequacy of the corrosion protection system for the design life of the structure should be submitted.

III. Drawings

Drawings illustrating the principal features of the platform should be submitted in triplicate. Such drawings should include:

a) Arrangement drawings, elevations, and plan views clearly showing in sufficient detail the overall configuration, dimensions and layout of the structure and its facilities.

b) Layout drawings indicating the locations of equipment and locations of the equipment loads and other design deck loads, fender loads, etc., which are imposed on the structure.

c) Structural drawings indicating the complete structural arrangement, dimensions, member sizes, plating and framing, material properties, and details of connections and attachments.

d) Pile drawings indicating arrangements, nominal sizes, thicknesses and penetration.

e) Corrosion control system.

f) Drawings showing the arrangement of structures, such as helidecks, crane pedestals, equipment foundations and manner of reinforcement, fendering, various houses and other structures which are not normally considered vital to the overall structural integrity of the offshore structure.

APPENDIX 2

SUMMARY OF INDUSTRY GUIDELINES NECESSARY FOR COMPLIANCE WITH OCS ORDER NO. 5

SUMMARY OF INDUSTRY GUIDELINES NECESSARY FOR COMPLIANCE WITH
OUTER CONTINENTAL SHELF ORDER NO. 5

SAFETY FEATURE	SPECIFICATION *	RECOMMENDED PRACTICE	TESTING	COMPLIANCE
SUBSURFACE SAFETY VALVE (GENERAL)	API Spec 14A, 3rd Ed, 11/78	API RP 14B, 1st Ed, 10/73		1. Purchase SSSV equipment in compliance with RP 14A and SPPE-1.
1. Subsurface controlled	API Spec 14A, 3rd Ed, 11/78	API RP 14B, 1st Ed, 10/73	API RP 14B, Subsection 2.9	2. Maintain records of location and history.
2. Surface controlled	API Spec 14A, 3rd Ed, 11/78	API RP 14B, 1st Ed, 10/73	API RP 14B, Appendix E	3. Conduct inspections and tests as rec'd by RP 14B. 4. Installing, operating, and maintaining as rec'd by RP 14B. 5. Reporting equipment failures to the manufacturer, API and USGS.
PLATFORM PRODUCTION SAFETY SYSTEMS (GENERAL)		API RP 14C, 2nd Ed, 1/78 (except Section A9, "Pipelines")		
1. Wellhead surface safety valve	API Spec 14D, 2nd Ed, 11/77 (Supplement 1, 1978)		API Spec 14D; Section 4; Appendix G	1. Purchase WSSV's in compliance with Spec 14D and SPPE-1. 2. Maintain records of location & history. 3. Conduct tests and inspections as rec'd by Spec 14D. 4. Install, operate, and maintain as rec'd by Spec 14D. 5. Report failures to the manufacturer, API and USGS.

*All SPPE shall conform to ANSI/ASME SPPE-1-1977 and SPPE-2-1977.

SUMMARY OF INDUSTRY GUIDELINES NECESSARY FOR COMPLIANCE WITH
OUTER CONTINENTAL SHELF ORDER NO. 5

SAFETY FEATURE	SPECIFICATION *	RECOMMENDED PRACTICE	TESTING	COMPLIANCE
PLATFORM PRODUCTION SAFETY SYSTEMS (GENERAL) Continued				
2. Flow diagram and SAFE chart		API RP 14C, Figure E1 API RP 14C, Subsection 4.3C		Organize according to RP 14C.
3. Pipelines				
A- Materials/ dimensions	ANSI B 31.4 ANSI B 31.8			Purchase or specify pipe in compliance with ANSI specifications.
B- Safety systems		API RP 14C		Design or specify safety systems as per RP 14C. Inspect as recommended.
- gas	ANSI B31.8			
C- Welding	API Std 1104, Sec 2 ASME Code, Sec IX	API RP 1111, Sec 5		Train or have welder certified in ASME and API standards.
- welder qualification	API Std 1104, Sec 3 ASME Code, Sec IX	API RP 1107, Sec 3		
- design/preparation	API Std 1104, Sec 4			
- acceptability	API Std 1104, Sec 6	API RP 1107, Sec 6		
- radiographic inspection	API Std 1104, SEc 8			
- repairs/defects	API Std 1104, Sec 7	API RP 1107, Sec 7		
- automatic welding	API Std 1104, Sec 9			
- maintenance		API RP 1107, Sec 4		
- inspection/testing	API Std 1104, Sec 5			

*All SPPE shall conform to ANSI/ASME SPPE-1-1977 and SPPE-2-1977.

SUMMARY OF INDUSTRY GUIDELINES NECESSARY FOR COMPLIANCE WITH
OUTER CONTINENTAL SHELF ORDER NO. 5

SAFETY FEATURE	SPECIFICATION *	RECOMMENDED PRACTICE	TESTING	COMPLIANCE
PLATFORM PRODUCTION SAFETY SYSTEMS (GENERAL) Continued				
D- Design				
- pressure		API RP 14E API RP 1111, Sec 202	API RP 1111, Sec 6 API RP 1110	Design or specify piping as rec'd by RP 14E.
- temperature	ANSI B31.8 841.1	API RP 1111, Sec 200.3		Design or specify as rec'd by ANSI.
- expansion/ flexibility	ANSI B31.4 419 ANSI B31.8 832 & 833			Design or specify as rec'd by ANSI.
- supports	ANSI B31.4 421 ANSI B31.8 834 & 835			Design or specify as rec'd by ANSI.
- auxiliary piping	ANSI B31.4 ANSI B31.8			Design or specify as rec'd by ANSI.
E- Corrosion Control		NACE RP-06-75 NACE RP-01-75 API RP 1111, Sec 8		Design or specify as rec'd by NACE. Inspect as rec'd by NACE and API.
4. Area Classification Electrical Inst.		API RP 500B, 2nd Ed, 7/73		Design or specify according to RP 500B.
5. Fire & Gas Detectors	National Electrical Code 1978 Ed, Article 760	API RP 14G, 1st Ed, 9/78 Section 4, Appendix A; Section 3.2g	API RP 14G, Sec 7	1. Purchase detectors in compliance with NEC. 2. Install, operate, and maintain as per RP 14G.
6. Pressure Vessels (Coded)	ASME Boiler & Pressure Vessel Code	API RP 14C, Section A4		1. Purchase vessels in compliance with ASME code. 2. Install, operate, and maintain as per RP 14C.

*All SPPE shall conform to ANSI/ASME SPPE-1-1977 and SPPE-2-1977.

SUMMARY OF INDUSTRY GUIDELINES NECESSARY FOR COMPLIANCE WITH
OUTER CONTINENTAL SHELF ORDER NO. 5

SAFETY FEATURE	SPECIFICATION *	RECOMMENDED PRACTICE	TESTING	COMPLIANCE
PLATFORM PRODUCTION SAFETY SYSTEMS (GENERAL) Continued				
A- Pressure Relief Valves	ASME Code, Sections I, IV, VIII			1. Purchase relief valves in compliance with ASME codes. 2. Install, operate, and maintain as per ASME.
B- Steam Generators	ASME Code, Sections I, IV	API RP 14C, Section A6		1. Purchase steam generators in compliance with ASME code. 2. Install, operate, and maintain as per RP 14C.
7. Flow Lines		API RP 14C, Section A1 API RP 14E		Design or specify and install, operate, and maintain as per RP 14C and RP 14E.
8. Pressure Sensors		API RP 14C, Sections 2,3,4 OCS Order 5, Para. 5.1.2		1. Purchase sensors in compliance with RP 14C. 2. Install, operate, and maintain as per RP 14C.
9. Emergency Shutdown System		API RP 14C, Section C1		Install, operate, and maintain as per RP 14C.
10. Engine Exhausts		API RP 14C, Subsect. 4.2C(4)		Install, operate, and maintain as per RP 14C.
11. Glycol Dehydration Units		API RP 14C, Section A6 API RP 14C, Subsect. A7.2b(1), A7.3a, A7.3c.		1. Purchase dehydration unit in compliance with RP 14C. 2. Install, operate, and maintain as per RP 14C.

*All SPPE shall conform to ANSI/ASME SPPE-1-1977 and SPPE-2-1977.

SUMMARY OF INDUSTRY GUIDELINES NECESSARY FOR COMPLIANCE WITH
OUTER CONTINENTAL SHELF ORDER NO. 5

SAFETY FEATURE	SPECIFICATION *	RECOMMENDED PRACTICE	TESTING	COMPLIANCE
PLATFORM PRODUCTION SAFETY SYSTEMS (GENERAL) Continued				
12. Gas Compressors				
A- New		API RP 14C, Section A8		1. Purchase or modify gas compressors in compliance with RP 14C.
B- Existing		If enclosed by shelter, exclude from API RP 14C, Subsection A8.3b and A8.3d.		2. Install, operate, and maintain as per RP 14C.
C- Small (745 KW or less)		Exclude from API RP 14C, Subsection A8.3d.		
13. Fire Fighting Systems		API RP 14G, 1st Ed, 9/78, Subsection 5.2.		1. Purchase system in compliance with RP 14G.
				2. Install, operate, and maintain as per RP 14G.
14. Electrical Equipment				
A- Motors, lighting	National Electrical Code (1978)	API RP 500B API RP-14F, Sections 5,7		1. Specify and purchase electrical equip. in compliance w/NEC and IEEE Stds.
B- Wiring	National Electrical Code (1978) IEEE Std 45-1977	API RP 14F, Section 4		2. Install, operate, and maintain as per RP 14F.
15. Erosion		OCS Order 5, Paragraph 5.1.11		

*All SPPE shall conform to ANSI/ASME SPPE-1-1977 and SPPE-2-1977.

SUMMARY OF INDUSTRY GUIDELINES NECESSARY FOR COMPLIANCE WITH
OUTER CONTINENTAL SHELF ORDER NO. 5

SAFETY FEATURE	SPECIFICATION *	RECOMMENDED PRACTICE	TESTING	COMPLIANCE
WELDING PROCEDURES	National Fire Protection Association No. 51B, 1971	API RP 14E, Subsection 8.3 OCS Order 5, Paragraph 5.4		Conduct welding procedures in compliance with NFPA code and RP 14E.
SAFETY DEVICE TESTING (GENERAL)			API RP 14C, App D OCS Order 5, Paragraph 5.5	1. Inspect and test safety devices as rec'd by RP 14D. 2. Report failures to manufacturer, API and USGS.
1. Surface Safety Valves			API RP 14C, Sect D4, Table D2, Subsection L, Subsection H	
2. Flowline Safety Valves			API RP 14C, Sect D4, Table D2, Subsection D	
SAFETY DEVICE TRAINING		API RPT-2, 10/75		Train employees as rec'd by RPT-2.
FAILURE AND INVENTORY REPORTING SYSTEM		ANSI/ASME SPPE-1-1977, Appendix III OCS Order 5, Paragraph 6		Maintain FIRS as specified by SPPE-1.
CRANE OPERATIONS	API Spec 2C, 2/72	API RP 2D, 10/72	API RP 2D, Sect 3	1. Purchase cranes in compliance with spec 2C. 2. Conduct inspections & tests as per RP 2D. 3. Install, operate, and maintain as per RP 2D.

*All SPPE shall conform to ANSI/ASME SPPE-1-1977 and SPPE-2-1977.

SUMMARY OF INDUSTRY GUIDELINES NECESSARY FOR COMPLIANCE WITH
OUTER CONTINENTAL SHELF ORDER NO. 5

SAFETY FEATURE	SPECIFICATION	RECOMMENDED PRACTICE	TESTING	COMPLIANCE
EMPLOYEE ORIENTATION		API RP T-1, 1/74		Train and motivate employees as rec'd by RP T-1.
EMPLOYEE SAFETY PROGRAM		API Bulletin T-5, 9/74		Train and motivate employees as rec'd by API Bulletin T-5.
EMPLOYEE TRAINING AND QUALIFICATION IN WELL CONTROL EQUIPMENT		API RPT-3, 1st Ed, 7/76		Train employees as rec'd by RPT-3.

SUMMARY OF INDUSTRY GUIDELINES NECESSARY FOR COMPLIANCE WITH
OUTER CONTINENTAL SHELF ORDER NO. 7

	GUIDELINE	PERMIT COMPLIANCE
LIQUID DISPOSAL (GENERAL)	40 CFR 110 40 CFR 112.7 40 CFR 122.16 CWA - 301(b)(2)(F)	40 CFR 122.20 40 CFR 122.21 Liquids will be disposed of as recommended. Discharges will be monitored for oil content. Facilities will be inspected for leaks and unusually large quantities of oil or oil-containing liquids. Accidents will be reported to Company supervisor.
1. Drilling Mud Components	40 CFR 112.7(e)(b-7) 40 CFR 435.12	
2. Hydrocarbon Handling Equipment	40 CFR 112.7(e)(2-7) 40 CFR 435.12	
3. Curbs, Gutters, Drains	40 CFR 112.7(e)(1) 40 CFR 122.45 40 CFR 435.12	
4. Discharges from Fixed Platforms	40 CFR 110. 40 CFR 112.7(e) 40 CFR 435.12	
SOLID MATERIAL DISPOSAL (GENERAL)	40 CFR 122.16	40 CFR 122.20 40 CFR 122.21 Solids will be disposed of as recommended. All accidents will be reported to Company supervisor.
1. Well Solids	40 CFR 435.12	
2. Containers	OCS Order 7; Paragraph 1.2.2	
3. Equipment	OCS Order 7, Paragraph 1.2.3 In emergency, OCS #1, Paragraph 4	

SUMMARY OF INDUSTRY GUIDELINES NECESSARY FOR COMPLIANCE WITH
OUTER CONTINENTAL SHELF ORDER NO. 7

	GUIDELINE	PERMIT COMPLIANCE
PERSONNEL	API RP T-2 API RP T-3 API Bulletin T-5	Train personnel as recommended; periodically review and test personnel in safety procedures recommended.
POLLUTION INSPECTIONS		
1. Manned Facilities	OCS Order 7, Paragraph 2.2.1	Inspect facilities as recommended. Make necessary repairs.
2. Unattended Facilities	OCS Order 7, Paragraph 2.2.2	Inspect facilities as recommended. Make necessary repairs.
POLLUTION REPORTS	33 CFR 153.203 OCS Order 7, Paragraph 2.3	Report spills to USGS & EPA as directed.
1. Spills	CWA Section 311 OCS Order 7, Paragraph 2.3.1.	Report spills to USGS & EPA as directed.
PCE AND CONTINGENCY PLANS		
1. Equipment and Materials	40 CFR 112, Section 112.7(c)	Maintain PCE as recommended by 40 CFR 112.
2. Oil Spill Contingency Plan	40 CFR 112 API Bulletin D16	Maintain SPCC Plan as directed. Provide copy of Plan to EPA as directed.
DRILLS	OCS Order 7, Paragraph 4 40 CFR 112.7(e)(10)	Hold pollution drills as recommended. Maintain records of drills. Submit time schedule of drill.
TRAINING	OCS Order 7, Paragraph 4.2 40 CFR 112.7(e)(10)	Train personnel as rec'd. Retain course completion certificates.
SPILL CONTROL AND REMOVAL	OCS Order 7, Paragraph 5 API Bulletin D16 40 CFR 112	Take immediate corrective action as rec'd.