U. S. GEOLOGICAL SURVEY
CONSERVATION DIVISION
Gulf of Mexico OCS Operations

GEOLOGICAL AND OPERATIONAL SUMMARY CONTINENTAL OFFSHORE STRATIGRAPHIC TEST (COST) NO. 1 South Padre Island East Addition Offshore South Texas

by

Khan, A. S., Latta, L. A., Oakes, R. L.,
Pert, D. M., Sweet, W. E., Smith, N., Wall, E. J.

U. S. GEOLOGICAL SURVEY
OPEN FILE REPORT NO. 75 - 174

TABLE OF CONTENTS

I. GEOLOGICAL INTRODUCTION----------1

A. Location----------1

B. Reason for Drilling----------1

C. Lease History----------1

II. SUMMARY OF WELL DATA----------3

III. OPERATIONAL DATA----------3

A. Mud Program----------3

B. Hole Dimensions----------3

C. Drill Stem Test Data----------4

D. Cores----------4

E. Surveys----------4

F. Electrical Log Interpretation----------5

G. Rock Characteristics----------9

H. Pipe Record----------9

IV. SAMPLE AND CIRCULATION----------9

A. Sample Program----------9

B. Circulations----------9

C. Lost Circulation----------9

V. STRATIGRAPHY----------11

VI. PALEONTOLOGY----------17

VII. GEOPHYSICS----------17

VIII. ENVIRONMENTAL CONSIDERATIONS----------22

IX. CONCLUSIONS----------23

LIST OF ILLUSTRATIONS

Figures

1. Location Plat – 16"x11" - [illegible]
2. M-N Plot
3. Matrix Identification Plot
4. Seismic Cross Section (INSERT) 54"x22" [illegible]
5. Seismic Cross Section (INSERT) 44"x22" [illegible]

Tables

1. Log Interpretation Data
2. Sample Description, Porosity and Permeability Measurements
3. Stratigraphic Section Penetrated by COST No. 1 Well
4. Paleontological Summary Report

page 3 follows

I. GEOLOGICAL INTRODUCTION

A. Location

The Continental Offshore Stratigraphic Test No. 1 (COST No. 1) was drilled in Block 1076-L of the South Padre Island Area, East Addition, 40 miles offshore south Texas. (See Figure No. 1)

B. Reason for Drilling

The COST No. 1 well was drilled as a deep stratigraphic test to acquire knowledge of stratigraphic and lithologic conditions that is essentially lacking in this unexplored area of the south Texas OCS. Thirty-three oil companies participated in this program on a cost-sharing basis. Phillips Petroleum Company served as the operator and chairman of the group.

C. Lease History

The COST No. 1 well was drilled prior to the first south Texas OCS lease sale which was held in January 1975. Block 1076-L was not offered for leasing in the January sale, nor does it have any previous lease history. The drilling site was purposely located off-structure to minimize the chances of encountering hydrocarbons. The USGS approved the drilling application for the deep test in accordance with applicable Federal regulations.

II. SUMMARY OF WELL DATA

1. Company: Phillips Petroleum Company
2. Lease Designation: Unleased
3. Well No.: 1
4. Location: 3754.01' FNL, 1551.54 FEL, Block 1076-L
5. Classification: Offshore deep stratigraphic test
6. Elevation: KB. - 95.0' D.F. - 94.0'
7. Water Depth: 140'
8. Contractor: Diamond M Drilling Company
9. Spud Date: 8/25/74
10. Date T.D. Reached: 10/29/74
11. Completion Date: 11/13/74
12. Status: P & A
13. Total Depth: 15763'
14. Plug-back Depth: 385'

III. OPERATIONAL DATA

A. Mud Program

0' - 3797'	Native Gel
3797' - 9366'	Desco Gel
9366' - 13,169'	Desco
13,169' - 15,763'	Spersene Desco

B. Hole Dimensions

Size	From	To
26"	0'	1190'
17-1/2"	1190'	3797'

Size	From	To
12-1/4"	3797'	9366'
8-3/8"	9366'	13169'
6-3/4"	13169'	15763'

C. Drill Stem Test

None

D. Cores

No conventional cores were taken.

Sidewall cores were taken from 1220' - 15710'

Sidewall cores: 504

Empty sample bottles: 90

Filled with mud: 22

Samples analyzed: 392

E. Surveys

Operator	Type	Scale	Run No.	From - To
Schlumberger	ISF/Sonic	1"	1 - 4	1188' - 15724'
	ISF/Sonic	5"	1 - 4	1188' - 15724'
	Sonic(5'-7')	1"	1 - 4	1168' - 15714'
	Sonic(5'-7')	5"	1 - 4	1168' - 15714'
	Sonic(7'-9')	1"	1 - 4	1169' - 15716'
	Sonic(7'-9')	5"	1 - 4	1169' - 15716'
	Dipmeter	1"	1 - 4	1168' - 15712'
	Dipmeter	5"	1 - 4	1168' - 15712'
	CN - FDC	5"	1 - 4	1168' - 15690'

Operator	Type	Scale	Run No.	From - To
Schlumberger	Gr-FDC-CNL	5"	1 - 4	1168' - 15690'
	Temperature	1"	1	450' - 15720'
	Temperature	5"	1	450' - 15720

F. Electrical Log Interpretation

Two lithology plots have been made from the three porosity logs which were run on this well (Table I and Figures 2 and 3). This enabled a determination to be made for potential reservoir sediments. Each porosity log responds to different rock parameters.

The log response formulas can be solved for the rock matrix parameter rather than porosity. Calculations can then be made to determine the likely lithological composition of the rock. On the lithology plots, the pure matrix points for quartz (sand), lime, dolomite, and anhydrite have been plotted for reference. There are no plotted points near the location of the pure-mineral points. Even more noticeable is the greater distance of the points from the quartz location. Shale points appear below the pure mineral points on the M-N plot; and in the region between calcite, dolomite, and anhydrite on the MID plot.

Thus, these plots indicate that there are no pure sands or carbonates among the points picked from the porosity logs.

LOG INTERPRETATION DATA

POINT		DEPTH	Log Data			M-N Plot		Mid Plot	
			ϕ_{cnl}	ρ_b	Δ_t	M	N	Δ_{tma}	ρ_{ma}
1		15414-18	15	2.5	80	.725	.565	55	2.73
2		15144-46	18	2.52	92	.640	.540	64	2.78
3	(sh)	14630-770	25	2.45	115	.51	.516	88	2.81
4		14220-22	26	2.55	98	.588	.48	58	2.88
5		14120-22	18	2.45	95	.648	.565	68	2.73
6	(sh) (washed out)	13830-70	31	2.36	138	.375	.508	90	2.84
7		13126-29	21	2.57	94	.605	.503	62	2.84
8	(sh)	12830-36	36	2.35	140	.365	.475	88	2.90
9		12660-68	28	2.48	102	.59	.486	60	2.87
10		12512-14	29	2.44	100	.62	.494	56	2.86
11		12292-96	26	2.4	88	.72	.528	50	2.80
12		12026-30	29	2.41	100	.63	.504	55	2.84
13	(lime)	11980-96	20	2.5	54	.90	.533	42	2.79
14		11881-85	22	2.42	80	.77	.550	48	2.77
15		10550-53	28	2.48	97	.621	.508	55	2.87
16		10218-22	31	2.40	107	.585	.492	64	2.87
17		10104-08	39	2.12	147	.375	.545	95	2.80
18		10066-71	29	2.35	138	.38	.525		2.81
19		9907-09	29	2.24	127	.50	.572	90	2.72
20		9784-88	27	2.46	94	.65	.500	54	2.85
21		9530-35	32	2.41	91	.695	.482	47	2.88
22		9042-47	34	2.47	90	.675	.45	45	2.94
23		8888-90	32	2.40	98	.650	.485	51	2.87
24	(sh)	8826-56	37	2.30	120	.54	.485	90	2.88
25	(sh)	8530-50	43	2.20	128	.51	.475	90	2.9
26		8334-38	22	2.58	99	.57	.494	67	2.86
27		7728-34	35	2.30	100	.685	.500	50	2.86
28		7705-12	29	2.55	106	.535	.458	65	2.92
29		7568-77	33	2.26	110	.625	.530	65	2.80
30	(sh)	6836-60	40	2.2	130	.49	.500	100	2.87
31		6814-21	38	2.42	110	.555	.44	60	2.98
32		5935-40	38	2.27	145	.35	.488	100	2.88
33	(sh)	5500	50	2.1	160	.264	.455	High	2.9

NOTE: ϕ_{cnl} = porosity from compensated neutron log

ρ_b = density log reading

M,N = calculated parameters

ρ_{ma} = calculated density of rock matrix

Δ_t = sonic log reading

Δ_{tma} = calculated sonic matrix travel time

Figure 2

PHILLIPS PETROLEUM CO.
C.O.S.T. WELL
O.C.S. SO. PADRE ISLAND 1076
M—N PLOT

$$M = \frac{\Delta tf - \Delta t}{P_b - P_f} \times 0.01$$

$$N = \frac{\phi_{nf} - \phi_n}{P_b - P_f}$$

Δ_{tf} = FLUID TRAVEL TIME

Δ_t = SONIC READING

P_b = DENSITY READING

P_f = FLUID DENSITY

ϕ_{nf} = NEUTRON FLUID POROSITY

ϕ_n = CNL READING

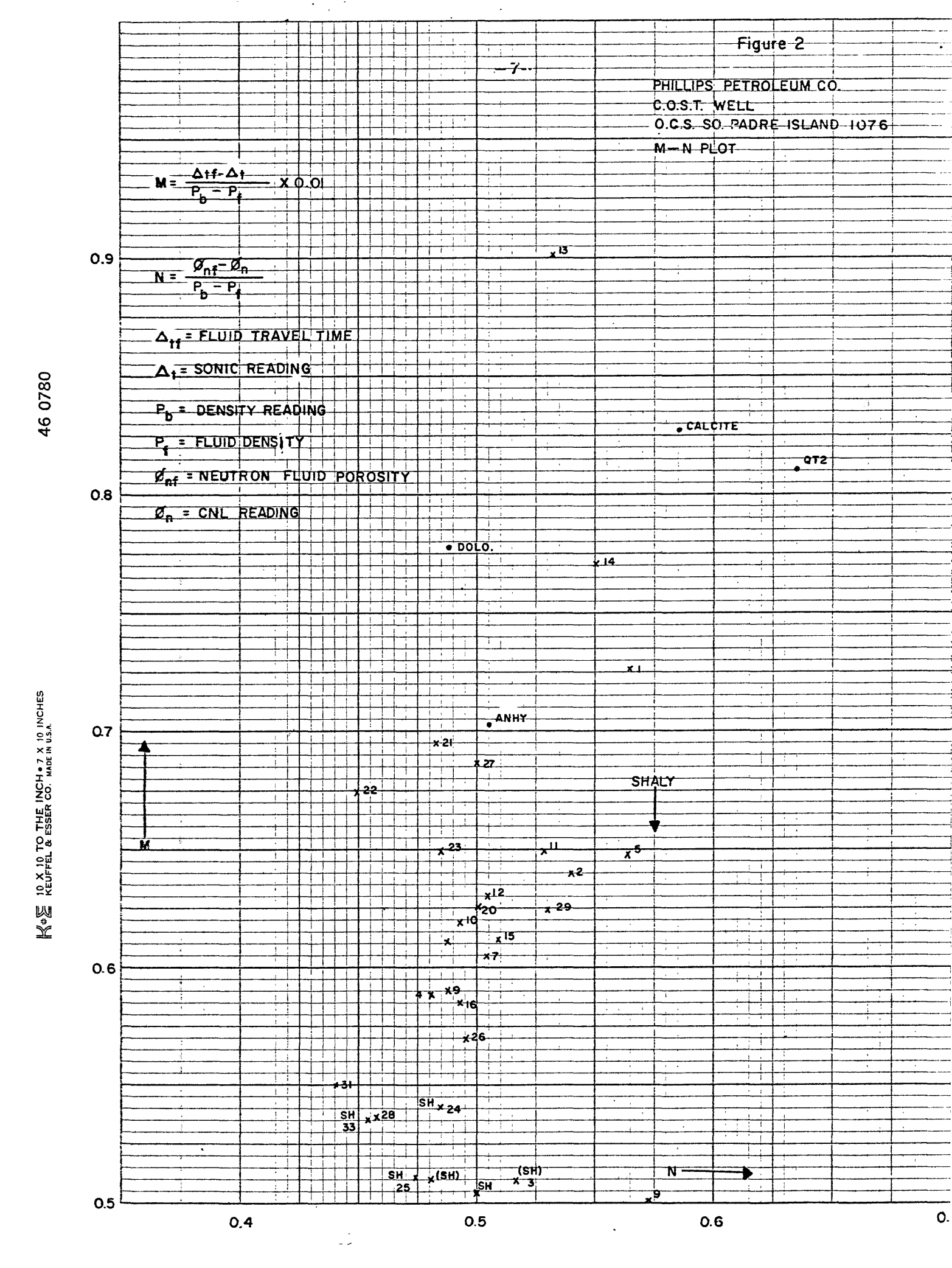


Figure 3

PHILLIPS PETROLEUM CO.

C.O.S.T. WELL

O.C.S. SO. PADRE ISLAND 1076

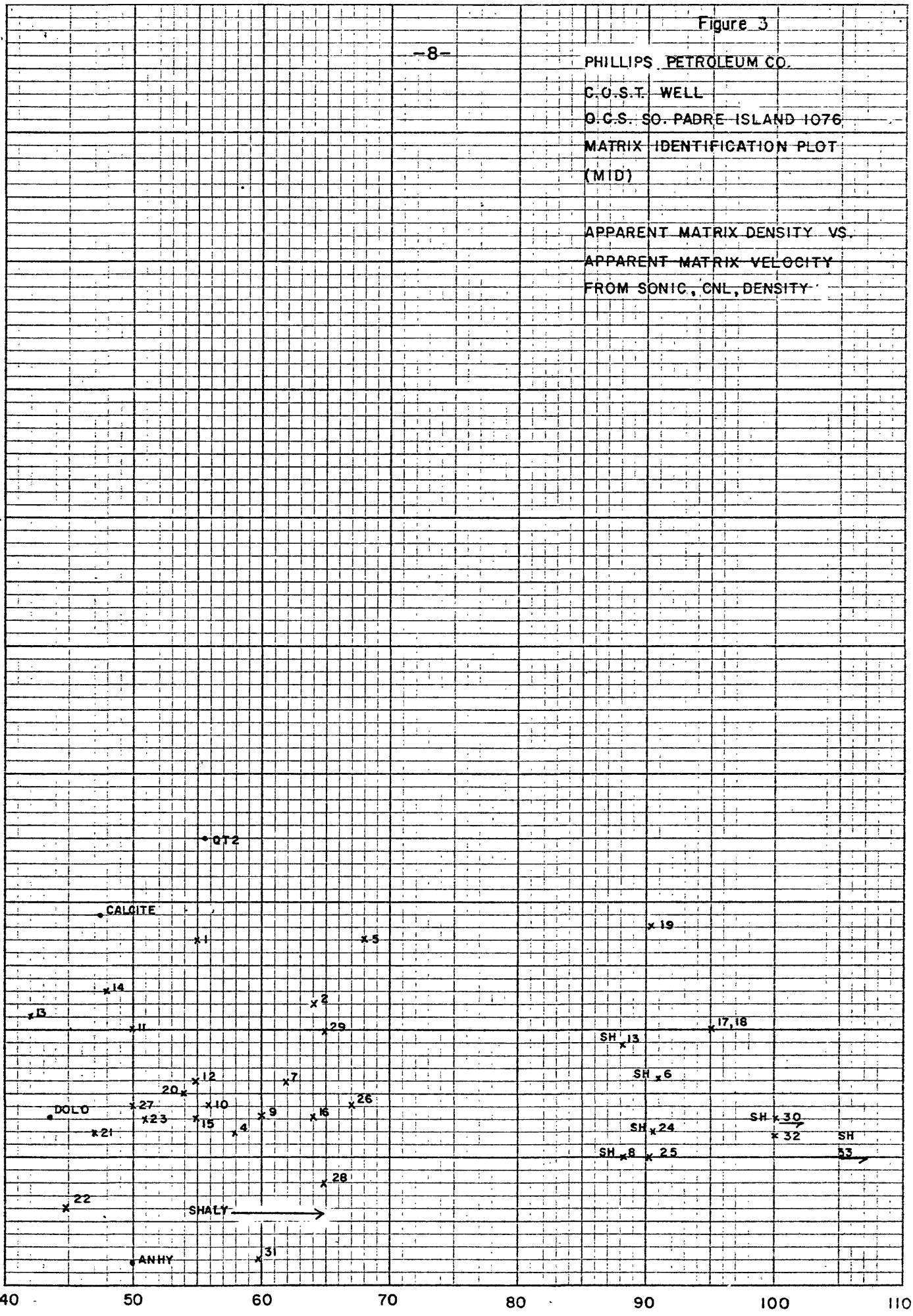
MATRIX IDENTIFICATION PLOT

(MID)

APPARENT MATRIX DENSITY VS.

APPARENT MATRIX VELOCITY

FROM SONIC, CNL, DENSITY



All lithologies are either shale or shaley carbonates. Therefore, the interpretation is made that there is no reservoir potential in this well.

G. Rock Characteristics

The following sample descriptions, permeability, and porosity measurements (Table II) on selected sidewall core samples were determined by Core Laboratories, Inc. The log calculations at these intervals indicate a 100-percent water saturation.

H. Pipe Record

Size	Depth Set (MD)	Hole Size	Cementing Record
30"	366'	Driven 131' Penetration	
20"	1169'	26"	1600 sacks
13-3/8"	3768'	17-1/2"	1800 sacks
9-5/8"	9342'	12-1/4"	817 sacks
7-5/8"	15162'	8-3/8"	200 sacks

IV. SAMPLE AND CIRCULATION

A. Sample Program

From	To	Sample Interval
366'	15756'	30'

B. Circulations

N.A.

C. Lost Circulations

N.A.

TABLE II

Depth in Feet	Permeability Millidarcys	Porosity Percent	Sample Description
1220	<0.01	29.1	Shale dark grey
1256	1070.0	33.6	Sd, gry, fn grn, Sl/shy
1287	1970.0	34.3	Sd. Gry, fn-v/fn grn, sl/shy
1334	<0.01	26.2	Sh, dk. gry
1392	601.0	36.0	Sd, gry, fn grn, Sl/shy
1430	<0.01	22.8	Sh, gry.
1504	76.0	25.9	Sd., gry, v/fn-fn grn.
1512	748.0	35.6	Sd., gry, v/fn grn.
1534	642.0	38.3	Same as above.
1538	209.0	34.4	Same as above.
1554	1.3	24.6	Shale, grey
1576	697.0	35.6	Sd., gry, fn grn.
1586	1310.0	33.5	Sd., gry, fn grn.
1606	<0.01	27.2	Sh, gry.
1620	61.0	25.5	½ Sh., Slty; ½sd. v/fn grn.
1700	0.94	23.2	Sh, dk. gry.
1950	<0.01	25.4	Sh, dk. gry.
2300	<0.01	24.2	Sh, gry.
2550	0.01	24.6	Sh, gry.
2750	7.9	23.8	Sh, dk. gry.
2950	1.7	23.2	Same as above
3150	0.01	28.6	Sh, gry.
3350	0.01	24.8	Same as above
3650	<0.01	25.5	Sh, dk. gry.
3800	0.05	26.2	Same as above
4390	14.0	28.2	Sd., gry-green
4890	0.78	26.5	Sh, gry-green
4920	2110.0	31.7	Sd., gry, v/fn, Sh/v/shy.
5270	4.9	25.6	Sh., gry-green
5470	13.0	26.3	Sd., gry-green, Slt
5655	0.33	25.1	Sh., gry-green
6050	7.4	27.2	Sh., gry.
6650	30.0	22.2	Sh., gry.
7262	0.42	23.6	Sh., gry.
7652	3.1	22.7	Sh., gry.
8106	0.05	21.5	Sh., gry.
8657	72.0	22.7	Sh., gry.
9650	0.01	20.3	Sh., gry., Slty.
10108	0.23	21.2	Sh., gry., Slty.
10762	0.73	19.4	Sh., gry., Slty.
11530	0.01	19.0	Sh., gry., Slty.
12094	0.01	22.1	Sh., gry., Slty.
12778	0.01	21.6	Sh., gry., Slty.
13114	<0.01	18.9	Sh., gry., Slty.
13190	0.03	19.9	Sh., gry., Slty.
13450	0.34	19.7	Sh., gry., Slty.
13850	0.01	20.5	Sh., gry., Slty.
14122	0.01	18.9	Sh., gry., Sl/Slty.
14580	0.03	18.0	Sh., gry., Slty.
15145	0.01	20.4	Sh., gry., Slty.

V. STRATIGRAPHY

The COST No. 1 well penetrated a thick clastic sequence of essentially massive marine shale with occasional streaks of silty sand and very thin, limey sections, mostly of Tertiary age. The sediments are of Miocene, Pliocene, and Pleistocene age. The columnar section in Table III shows the stratigraphic units penetrated in the subject well. Because of the homogeneity in lithologic characters from top to bottom in this well, regional log correlations were not possible. All the geological formations were identified strictly by paleontological examination of the sediments. The gross lithologic characters, however, were interpreted from the logs in terms of sand percentage as determined from the spontaneous potential curve of electric log.

THE MIOCENE SECTION

The offshore Miocene stratigraphic section is equivalent to the Fleming group of local usage, onshore Texas, and is divided into a lower Miocene equivalent of the Oakville Formation and an upper Miocene equivalent of the Lagarto Formation. The Miocene section penetrated in the subject well includes sediments of both lower Miocene and upper Miocene age.

The Lower Miocene Section

The oldest sedimentary sequence penetrated in the COST No.1

TABLE III

STRATIGRAPHIC SECTION PENETRATED BY C. O. S. T. No. 1

PERIOD	EPOCH		BIOSTRATIGRAPHIC ZONES
NEOGENE	PLEISTOCENE		SANGAMONIAN TRIMOSINA "A" ANGULOGERINA "B" LENTICULINA 1
	PLIOCENE		VALVULINERIA "H" BULIMINELLA 1 ROBULUS E
	MIOCENE	UPPER	TEXTULARIA 16 CRISTELLARIA "K" CYCLAMMINA 3 DISCORBIS 12 BOLIVINA 24 CIBICIDES 12 DULARGE FAUNA NODOSARIA "A" GLOBOROTALIA FOHSI FOHSI CIBICIDES OPIMA CRISTELLARIA 49A
		LOWER	CIBICIDES 38 CRISTELLARIA 54-EPONIDES 14

is of lower Miocene age. The top of lower Miocene is located at 13,200 feet and reflects ecological Zone 4. The total thickness of known lower Miocene section in the subject well is approximately 2,500 feet. It consists of predominately grey marine shale with an illitic clay component ranging from 30 to 55 percent. Infrequently the clastic sequence is interrupted by very thin, limey streaks which may be partially dolomitized. In addition to the clay mineral complex, silt-size grains of quartz, feldspar, and detrital calcite make up the shale section.

Because of the distance from the shore and the homogenous lithology in the COST No. 1 well, direct log correlations with other wells in state waters were not possible. However, paleontological determinations and isochron correlations by means of CDP seismic lines indicate that the top of lower Miocene in the subject well is about 9000 feet low with the Mobil well No. 1 to the northwest in North Padre Island Block 961-L, and about 2000 feet low with the Texaco well No. 1 to the southwest in South Padre Island Block 1150-L. These correlations are shown in Figures 4 and 5, and show a seaward thickening of the Miocene biostratigraphic zones. The paleontological examination indicates that the lower Miocene sediments penetrated in the subject well were depositied in the ecological Zone 4, an environment in which a sand/shale sequence

could have been deposited if the sands had been available to this area during the lower Miocene time.

The Upper Miocene Section

The upper Miocene rocks penetrated in the subject well are approximately 8,340 feet thick, and the lithology of these deposits is essentially the same as that of the underlying lower Miocene. The top of upper Miocene is placed at 4,860 feet based on the first occurrence of Textularia "16".

The sedimentary sequence is basically dark massive shale with clay minerals. Occasionally, thin limey sections and very silty sand streaks occur with no visible reservoir potentials. In addition to quartz, feldspar, and calcite, the X-ray diffraction identification by Core Laboratories, Inc., indicates the presence of dolomite. Quartz, feldspar, and detrital calcite components occur for the most part as subangular to subrounded, very fine sand to silt-size grains.

Regionally, the top of the upper Miocene in the subject well is about 2,300 feet low with the Mobil well No. 1 to the northwest in North Padre Island Block 961-L and 600 feet low with the Texaco well No. 1 to the southwest in South Padre Island Block 1150-L (Refer to Figures 4 and 5). The upper Miocene section exhibits a rapid lateral change in lithologic character, varying from a sedimentary sequence of alternating sand and shale in the coastal areas to massive

shale deposits with no sand potential in the COST No. 1 well, and seaward thickening of biostratigraphic zones. The upper Miocene sediments penetrated in the subject well were deposited in the ecological Zones 6, 5, 4, and 3, indicating a probable gradual change in depositional environment from deep marine conditions to a shallow outer neritic environment. This change in ecological zones probably indicates an overall regressive phase of deposition following a rapid transgression during the early upper Miocene.

THE PLIOCENE SECTION

The Pliocene rocks penetrated in the COST No. 1 well are approximately 2,310 feet thick and composed entirely of shale with no indication of reservoir potentials. For the purpose of this report, the top of the Pliocene in the subject well is placed at 2,550 feet, based on the first occurrence of Valvulineria "H" fauna. Regionally, it appears to be almost flat with the Texaco well No. 1 to the southwest in South Padre Island Block 1150-L, and about 1,500 feet low with the Mobil well No. 1 to the northwest in North Padre Island Block 961-L. This relative flatness may indicate a seaward thickening of the Pliocene biostratigraphic zones and probably a northeast-southwest strandline during Pliocene time.

Although, the Pliocene sediments in the subject well were

deposited in ecological Zone 3, an outer neritic environment, the absence of sand is probably indicative of a lack of coarse material in the source of the sediments transported across the continental shelf. The sands were mostly confined to nearshore shallow marine and transitional environments of a relatively narrow and stable Pliocene shelf.

THE PLEISTOCENE SECTION

With the exception of Holocene sediments, the youngest sedimentary sequence penetrated in the COST No. 1 well is of Pleistocene age. The known Pleistocene section in this well is approximately 2,100 feet thick. The gross lithology of these rocks is essentially the same as that of underlying Pliocene sediments, except that the top few hundred feet of Pleistocene section is composed of alternating sand and shale sequences.

The Pleistocene section penetrated in the subject well is divided into four biostratigraphic zones: (1) the Lenticulina "1" biostratigraphic zone of early Pleistocene age, approximately 660 feet thick and consisting of massive dark grey shale with occasional streaks of silty sand; (2) the Angulogerina "B" biostratigraphic zone, about 240 feet thick with lithology similar to that of the underlying Lenticulina "1"; (3) the Trimosina "A" biostratigraphic zone, approximately 570 feet thick, consisting of a sedimentary sequence

of alternating sand and shale; (4) the youngest Pleistocene sediments identified in the COST No. 1, are of Sangamon age. The top of the Sangamonian sediments is placed at 450 feet.

The sand percentage determination from the electric log shows about 40 percent sand accumulation in the section from 1,200 feet to 1,650 feet.

VI. PALEONTOLOGY

A summary of the paleontological sample analysis is given in Table IV.

VII. GEOPHYSICS

The area surrounding the COST No. 1 well location was mapped prior to the South Texas OCS Lease Sale by Petty-Ray Geophysical, Inc., under USGS Contract No. 14-08-0001-13508. The seismic maps prepared by Petty-Ray were based on a 2 x 2-mile seismic data grid, acquired by Teledyne Exploration Company in 1973, and purchased by the USGS from Teledyne under Contract No. 14-08-0001-13566. Petty-Ray's interpretation consisted of mapping two structural levels, the upper and middle Miocene. Isochron maps were prepared on the structural intervals.

As shown in Figure 1, the COST No. 1 well is located on Teledyne seismic Line 639 and 4,000 feet southwest of Teledyne seismic line 654. Structurally, the COST No. 1 is lo-

SO. PADRE ISLAND AREA
BLOCK 1076 UNLEASED
PHILLIPS
COST #1
PALEONTOLOGICAL SUMMARY REPORT

364'	First sample	
450'	Sangamonian	Ecologic Zone 3
1080'	Trimosina "A"	Ecologic Zone 3
1650'	Angulogerina "B"	Ecologic Zone 3
1890'	Lenticulina 1 Fauna	Ecologic Zone 3
2550'	Valvulineria "H" Fauna	Ecologic Zone 3
3390'	Buliminella 1	Ecologic Zone 3
4200'	Robulus "E"	Ecologic Zone 3
4860'	Textularia 16 (Bigenerina "A" Fauna)	Ecologic Zone 3
5790'	Cristellaria "K"	Ecologic Zone 3
6060'	Cyclammina 3	Ecologic Zone 3
6960'	Discorbis 12	Ecologic Zone 3
7440'	Bolivina 24 local datum	Ecologic Zone 3
8070'	Ecologic Zone 4	
8400'	Cibicides 12	Ecologic Zone 4
8970'	Ecologic Zone 5	
9150'	Dularge Fauna	Ecologic Zone 5
9630'	Ecologic Zone 6	
9840'	Nodosaria "A"	Ecologic Zone 6
10080'	Globorotalia fohsi fohsi (Approximately Bigenerina humblei)	Ecologic Zone 6

Note: The interval from 9840' to 10080' probably short - the Textularia "W" biostratigraphic zone is not developed or missing.

11640'	Cibicides opima	Ecologic Zone 6
12270'	Cristellaria 49-A	Ecologic Zone 6
13200'	Ecologic Zone 4	
13650'	Cibicides 38	Ecologic Zone 4
	Note: The stratigraphic position of this form is near the top of the Robulus 43 biostratigraphic zone.	
15600'	Cristellaria 54A - Eponides 14	
15720'	Sample total depth	

cated in an area of generally eastward dipping beds that are formed into a pattern of gentle anticlinal noses and north-south-aligned reentrants. The nearest fault to the well is a north-south trending, down-to-the-west fault 14,000 feet to the west, at a depth of approximately 9,000 feet. The COST No. 1 location appears to have been well chosen for a stratigraphic test.

Seismic/stratigraphic correlations were performed between the COST No. 1 and Mobil No. 1 in North Padre Island Block 961-L using Teledyne seismic line 660, and between COST No.1 and Texaco No. 1 in South Padre Island Block 1150-L using Teledyne seismic line 635. The latter correlation was extended shoreward using the Atlantic No. 1 in South Padre Island 1227-S, and onshore using the Glasscock No. 1 in Cameron County, Texas. The locations of the pertinent seismic lines and wells are shown on the Index Map, Figure 1. The resultant cross sections are shown in Figures 4 and 5.

The depths of the paleo markers were plotted on the cross sections using the well velocity survey run by the Birdwell Division of Seismograph Service Corporation. By having established well data at each end of the seismic lines, it was possible to account seismically for the geologic section along the lines. In the area of COST No. 1, the apparent structural correlations were not always in agreement with

the stratigraphic correlations. This situation exists because of the apparent homogeneity of the sediments down through the Bigenerina humblei zone. However, seismic interval velocity inversions occur at several depths as follows:

2730'	Approx. top of Pliocene
5612'	Approx. top of Upper Miocene
9250'	Boundary Ecologic Zones 5 & 6
10110'	Top of Bigenerina humblei
11640'	Top of Cibicides opima

Below the Bigenerina humblei zone almost all the seismic sections appear to resemble reverberations that were falsely generated by the base of the Pleistocene, Discorbis "12", and Textularia "L" zones. It is known that seismic data from adjacent onshore areas have experienced this same problem with multiples. For this reason, the reliability of reflective data below the Bigenerina humblei zone may be questionable.

Discrepancies were noted between the subsurface depths of the original Petty-Ray interpretations and those determined by the well velocity survey:

Horizon	Map Depth	Velocity Survey Depth
Upper Miocene	3790'	3615'
Upper Miocene	6400'	5591'
Middle Miocene	11 344'	9202'

These have been corrected locally in the vicinity of the

COST No. 1 well.

VIII. ENVIRONMENTAL CONSIDERATIONS

In a memorandum to the Secretary of the Interior from the Director of the Geological Survey dated July 30, 1974, it was stated that the proposal to conduct the deep stratigraphic test was not a major Federal action and did not require an Environmental Impact Statement. However, an Environmental Analysis Record for the project was filed.

The location of the test hole precluded any adverse effect upon the Coastal Zone, which was 32 miles away at the closest point. Any adverse effects of drill cuttings upon bottom communities was minimized by allowing the cuttings to settle through 140 feet of water. This probably resulted in a fairly wide dispersal. Since the primary impact, and perhaps the only impact of cuttings, would be a smothering effect, a widespread dispersal is desirable. Any localized accumulations of cuttings have probably been recolonized.

Any possible toxic effects of the drilling fluid is probably too low to be detected. No hydrocarbons were encountered and no spills occurred.

Any short term effects which could have been caused by the presence of the drilling rig, such as the obstruction of commercial or military traffic or commercial and sports fishing activities, ceased with the removal of the rig.

These short term effects probably never occurred because the location was at least 14 miles from the nearest shipping lane and four miles from the nearest known fishing bank.

In summary, no long-term adverse environmental effects were caused by survey and drilling operations, and any possible short-term effects have now ceased to exist.

IX. CONCLUSION

The COST No. 1 deep stratigraphic test offshore South Texas, was drilled to a total depth of 15,763 feet and abandoned in the lower Miocene.

Although the stratigraphic column penetrated in the subject well is similar in some respects to that of Louisiana, no reservoir rock potentials were detected in the COST NO. 1 well. The gross lithology in the well is essentially the same from top to bottom. The massive dark grey shale is infrequently interrupted by very thin, limey sections and silty-sand streaks with no visible reservoir potentials. The sonic log interpretations indicate that the clastic sediments penetrated in the subject well are essentially undercompacted and highly porous. The porosity in these shale sequences ranges from 30 to 43 percent. The thin, limey sections are dense, crystalline and partially dolomitized.

A summary of the qualitative assessment of petroleum potentials based on information from the COST No. 1 well is given below for the Pleistocene, Pliocene, and Miocene sections in the South Padre Island and East Addition OCS Area.

PLEISTOCENE SECTION: 450 feet - 2,550 feet

The early Pleistocene sediments, Lenticulina "1" and Angulogerina "B" biostratigraphic zones are composed of a massive shale with occasional silty sand streaks. The younger Pleistocene sediments, Trimosina "A" and Sangamon biostratigraphic zones, contain a sedimentary sequence of alternating sands and shale.

Although a few sand sections occur in the Trimosina "A" biostratigraphic zone, these sediments are not considered to be prospective on the structures adjacent to the COST No. 1 area. However, the Pleistocene deposits were controlled by the sea level which fluctuated from low stages during glacial periods to high stages during interglacial periods. Consequently, stratigraphic and lithologic conditions may vary laterally, and some sediments could be prospective in localized areas seaward of the well in the South Padre Island Area, East Addition. The nearest Pleistocene Production, to date, is confined to the High Island and Galveston OCS Areas.

PLIOCENE SECTION: 2,550 feet - 4,860 feet

The Pliocene sediments of the Texas OCS area have not been prolific oil and gas producers. These rocks for the most part are lacking necessary sandstone reservoir characteristics. The Pliocene section penetrated in the COST No. 1 is approximately 2,310 feet thick, and the entire sedimentary sequence consists of dark-grey shale with no reservoir potentials. Favorable conditions for any hydrocarbons accumulations evidently did not exist in this area during Pliocene time.

MIOCENE SECTION: 4,860 feet - 15,763 feet (T.D.)

Prior to the drilling of COST No. 1 well, the Miocene sediments were considered to be prospective in the South Padre Island OCS Area. Miocene Production occurs all along the Texas Coast, both onshore and offshore, and the reservoir potentials were expected to extend downdip into Federal waters. The nearest Miocene production is in the Harena Field in state waters (see Figure 1), about 30 miles to the northwest of the subject well. The Miocene rocks penetrated in the COST No. 1 well are approximately 10,840 feet thick, and the entire section is composed of dark-grey, massive shale infrequently interrupted by very thin, limey sections and silty-sand streaks with no reservoir rock potentials.

The COST No. 1 well essentially confirms the lateral change in lithologic characters which can be seen in the Miocene-Pliocene sedimentary sequences when traced from onshore to state waters in the South Padre Island Area. Three wells, Cities Service No. 1 in Block 1128-L, Texaco No. 1 in Block 1150-L, and Atlantic Richfield No. 1 in Block 1227-S, have poor reservoir sand characteristics, and show a rapid seaward decrease in sand percentage. The wells, drilled in the Block 1047-L, 1048-L, and 1066-L to the north-west of the subject well, indicate reservoir potentials in the Miocene section consisting of alternating sand and shale. Somewhere between these wells and COST No.1 the reservoir rock characteristics in the Miocene-Pliocene sediments have apparently shaled out. Any prospective Miocene sediments would probably be confined to structures to the northwest of the subject well in the South Padre Island Area. The Miocene sediments on structures adjacent to and seaward of COST No. 1 are not considered to be prospective.

The absence of reservoir sand characteristics in the Miocene-Pliocene sediments penetrated in the COST No. 1 well probably reflect that very little coarse material was available to this gradually subsiding area during Miocene and Pliocene time. Since the Miocene and Pliocene depocenters were located east of the Sabine Arch, it seems that very little

coarse material was being carried across the arch into the Texas shelf by the longshore currents. The Texas streams were probably not large enough to build large deltas. Much of the sand brought down by these rivers was probably carried away from the deltas by longshore currents and deposited on beaches and offshore bars in shallow marine and transitional environments. Only fine sediments were apparently transported to the outer-shelf areas in the Rio Grande Embayment.