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**FEASIBILITY OF OPTIMIZING RECOVERY AND RESERVES FROM A MATURE
AND GEOLOGICAL COMPLEX MULTIPLE TURBIDITE OFFSHORE
CALIFORNIA RESERVOIR THROUGH THE DRILLING AND COMPLETION OF A
TRILATERAL HORIZONTAL WELL**

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Objectives

The main objective of this project is to devise an effective re-development strategy to combat producibility problems related to the Repetto turbidite sequences of the Carpinteria Field. The lack of adequate reservoir characterization, high-water cut production, and scaling problems have in the past contributed to the field's low productivity.

To improve productivity and enhance recoverable reserves, the following specific goals are proposed:

- Develop an integrated database of all existing data from work done by the former ownership group.
- Expand reservoir drainage and reduce sand problems through horizontal well drilling and completion.
- Operate and validate reservoir's conceptual model by incorporating new data from the proposed trilateral well.
- Transfer methodologies employed in geologic modeling and drilling multilateral wells to other operators with similar reservoirs.

Summary of Technical Progress

This report is an overview of the work that has been completed since the prior reporting period and is broken out by task number.

Task 1.1.1 - Database: Production Data

During this reporting period the quality of the production history database was carefully compared with historical hard copy reports and production history database available from the regulatory agency, the Minerals Management Service. Each of these databases contains a huge number of monthly oil, gas and water production values. In order to compare the two databases

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a computer program was written to compare the data on a well by well, month by month basis. The differences then were checked with the hard copy and corrections were made where appropriate.

Task 1.1.2 - Database: Well Log Data

Further progress has been made on the well log database. The well log processing system being used for this task is LOGCALC II, by Scientific Software, running on a DEC Micro-VAX II system. The status of the well log database as of 3/31/96 is shown in table 1 below:

TABLE 1
Carpinteria Well Log Status

	OCS P-0166 Status as of 3/31 (%)
Wells with log traces in digital form	100
Directional survey data completed	100
Dipmeter or mapped dip data for TVT/TST	100
Marker/zone data defined tops & bottoms	95
Log correction/normalization/manipulation	99
Porosity/Saturation calculations	95
Core/log verification/modeling	65
Saturation/porosity/OIP computer model	75
Output logs, TST & TVD logs	90

Task 1.1.4 -Well Test / PVT

Well Test Data - During this period all remaining pressure data for Lease OCS P-0166 was analyzed. A total of 39 pressure buildup test have now been analyzed which include 17 DST test. The results of these DST tests are show in table 2. Results of analysis from DST No. 3, 4 and 5, which had surface flow rates, are believed to produce the most reliable permeability values for the sub-thrust G-7 and the supra thrust G-1 and F-1 layers respectively in the drainage areas encountered during the tests.

Table 2
Analysis of Drill Stem Tests

Well No.	Fluid	Date	Type	Zones	Ref. Depth	P*, psig	k, md
CH#6	38 BOPD 12 BWPD	4/26/67	DST#3	G-7ST	-4944	2243.5	ko 1.43 kw 0.11
CH#6	348 BOPD	4/29/67	DST#4	G-1	-3436	1594	45.9
CH#6	555 BOPD	4/30/67	DST#5	F-1	-2854	1277	386.5
A-1	60% OIL 40% W	5/24/68	DST#1	G-6	-4254	1880	2.3 2FP 3.8
A-1	WATER	5/25/68	DST#2	F-4	-3467	1548.5	81.2
A-1	90% OIL	5/27/68	DST#3	F-4	-3467	1556	56.6
A-1	WATER	5/28/68	DST#4	E-1	-2641	1200.9	42.3
A-1	OIL	6/2/68	DST#5	E-1	-2641	1193.5	110.8
A-2	WATER	5/19/68	DST#1	F-4	-3496	1534	307
A-2	OIL	5/20/68	DST#2	F-1	-3170	1373	104.7
A-2	OIL	5/21/68	DST#3	E-2	-2785	1230	132.6
A-7	OIL	9/26/68	DST#1	F-1	-3077	1206	124.5
A-12	OIL	7/30/68	DST#1	G-7ST	-5120	2351	13.8
A-12	OIL	8/1/68	DST#2	G-6ST	-4829	2156	36
A-12	GAS	8/2/68	DST#3	G-5ST	-4741	-	0.3
B-2A	Oil	4/24/69	DST#1	G-5AST	-4818	2173	9.6
B-2A	Oil	4/25/69	DST#2	G-3B	-3485	1557	234

PVT Data - Further analysis of PVT data results in the data shown in Table 3 which presents a comparison between the properties of the reservoir fluids. Figure 1 shows a linear relationship of methane content with saturation pressure of the reservoir fluids.

TABLE 3
Comparison between Reservoir Fluids

No.	Type of Sample	Formation	Temp. °F	P _b , psig	R _s , SCF/STB @ P _b and Res. Temperature
1	Rec. Well CH-6	-	110	1546	223
2	Rec. Well # 40	E-1 zone	124	1218	173
3	BH sample A-7	F zone	122	2155	336
4	BH sample B-2A	G-3A zone	126	1271	212
5	BH sample B-2A	G-5A ST	145	974	273

Figure 1 - Saturation pressure vs methane content

available, will also be studied in detail. A general trend of east to west permeability decrease was observed from core data and analysis of initial oil production.

Reservoir Pressure - In addition to the static pressure data, a flowing bottom hole pressure database has been developed from fluid level measurements from the last 5 years of operations. Figure 2 presents flowing bottom hole pressure versus time.

1.2.1 - Stratigraphy and Microlamination

All available conventional core analysis from whole core and sidewall plugs from wells shown in Table 4 have been digitized. This data will be used for the microlamination study. In addition, screen or sieve analysis, where

Table 4
OCS P-0166 Core Material

Date Cored	Well	Zones Cored
August, 1968	A-9	E-1, F-1, G-2, G-6B, Subthrust
August, 1969	B-15	F-1, F-2, F-4, G-1, G-1B, G-3
August, 1978	A-49	E-1
May, 1979	B-35	G-1, G-3 + Sidewall Cores
October, 1980	B-45	E1, E1A, F1, F4, G1

Figure 2 - Sand Face Pressure vs time

1.2.2 - Reservoir Performance

Due to the heterogeneous nature of reservoir fluids in lease P-0166 and large contrasts in individual layer pressures caused by differential depletion, an effort was began to develop new methods for production allocation to individual layers utilizing commingled well production. The allocated production data will be used to calculate initial oil in place in the three main sands as well as the sub-thrust reservoirs.

Task 1.3.1 - Management and Administration

Monthly meetings of the steering committee continue to be held in POOI's Ventura office or at USC to monitor the progress of the individual tasks.

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