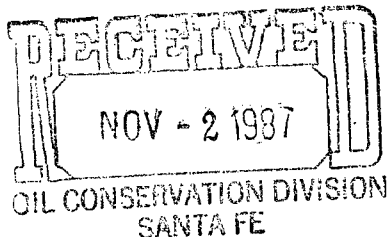




105 SOUTH FOURTH STREET  
ARTESIA, NEW MEXICO 88210  
TELEPHONE (505) 748-1471



S. P. YATES  
PRESIDENT  
JOHN A. YATES  
VICE PRESIDENT  
B. W. HARPER  
SEC. - TREAS.

October 29, 1987

Mr. David Catanach  
New Mexico Oil Conservation Division  
P. O. Box 2088  
Santa Fe, New Mexico 87501

RE: Request for Administrative Approval for Downhole Commingling:  
Hoover "ADR" State #6, M-1-17S-33E, Lea County, NM

Dear Mr. Catanach:

Pursuant to Rule 303-C, Yates Petroleum Corporation requests administrative approval for downhole commingling of the Queen formation and the Grayburg-San Andres in the subject well. Application was made on September 21, 1987 and a hearing was requested due to exceptions to Rule 303-C. Since that date, conditions in the well have changed, and the requirements for administrative approval have been met.

Attached, please find three copies of a revised application for downhole commingling. The differences between this application and the September 21, 1987 application are highlighted below:

1. Productivity from the Grayburg-San Andres zone has fallen off significantly.
2. The Queen formation has been completed and tested.
3. The economics have been revised.
4. The allocation procedure has been revised.

All offset operators were notified of the proposed commingling concurrent with the application for hearing. Please advise if you would like me to notify them of the changes.

Sincerely,

James S. Brown  
Engineer

xc: Chad Dickerson

JSB/cvg

## APPLICATION FOR DOWNHOLE COMMINGLING

Yates Petroleum seeks administrative approval for downhole commingling of production from the Queen and Grayburg-San Andres formations in the Hoover "ADR" State #6, located 330' FSL & 990' FWL of Section 1-17S-33E, Lea County, New Mexico. See Attachment 1.

Yates Petroleum drilled the Hoover "ADR" State #1 (Unit I, Section 1-17S-33E) as a deep Wolfcamp test in 1986. The Wolfcamp was dry, but there was a porous Queen zone plus fair shows in the San Andres. The well was completed as a Queen producer from perforations at 3767-74 and Yates has subsequently drilled seven additional Queen producers in what is now called the Sanmal Queen pool. The Hoover "ADR" State #6 was drilled within the Sanmal Queen field to a depth of 4750' to test the San Andres on the basis of the San Andres shows in the discovery well.

The Hoover "ADR" State #6 was completed in the Grayburg and San Andres formations as described in Attachment 2. The well was produced for one month from July 25, 1987 until August 24, 1987, after acidizing the zones, but before hydraulically fracturing them. As shown in Attachment 3, the fracture treatment on August 26, 1987 was unsuccessful: the Grayburg-San Andres was produced until October 7, 1987, and averaged 8 BOPD for the final week.

On October 8, 1987, the Grayburg-San Andres zones were isolated below a retrievable bridge-plug, and the Queen formation was perforated, acidized, and hydraulically fractured, as described in Attachment 2. The Queen has been producing by itself since October 13, 1987, and has averaged 7 BOPD for the last week, as shown in Attachment 3. Attachments 4 and 5 are copies of the porosity log, showing the Queen and Grayburg-San Andres zones, for your reference.

During the production tests in both zones, tubing was run below the perforations and the well was produced with a sucker-rod pump. In both production tests, the fluid level in the wellbore was pulled down to the perforations, or "pumped off." Therefore, the producing bottom-hole pressure is equal to the surface casing pressure plus the gas column hydrostatic pressure, or about 30 psig. Therefore, there is no danger of cross-flow between formations.

As shown in Attachment 3, the Grayburg-San Andres does not produce water, and therefore there will be no potential for incompatibility of fluids.

The oil in both the Queen and the lower zones is Texas/New Mexico Sour, and is presently being sold to Unocal Refining & Marketing, a Division of Unocal Corporation. Queen oil

gravity is 35 API, and Grayburg-San Andres oil gravity is 39 API. As shown on page 2 of Attachment 6, Unocal's gravity adjustment is \$0.015 per 0.1 API. Since API gravity is a volumetric property, the value of the commingled production will be equal to the sum of the values of the individual streams.

Yates Petroleum proposes to allocate 50 percent of the total oil production to the Queen formation, and 50 percent to the Grayburg-San Andres, based on production tests shown in Attachment 3. To verify allocation accuracy, the measured API gravity of the commingled oil will be monitored. Since the API gravities of the two zones to be commingled are different, the ratio of production from the zones can be calculated.

The mineral ownership for all of the zones is identical.

#### Economics

The incentive behind this application is economics: without approval to commingle production, the Grayburg-San Andres reservoir will not be produced.

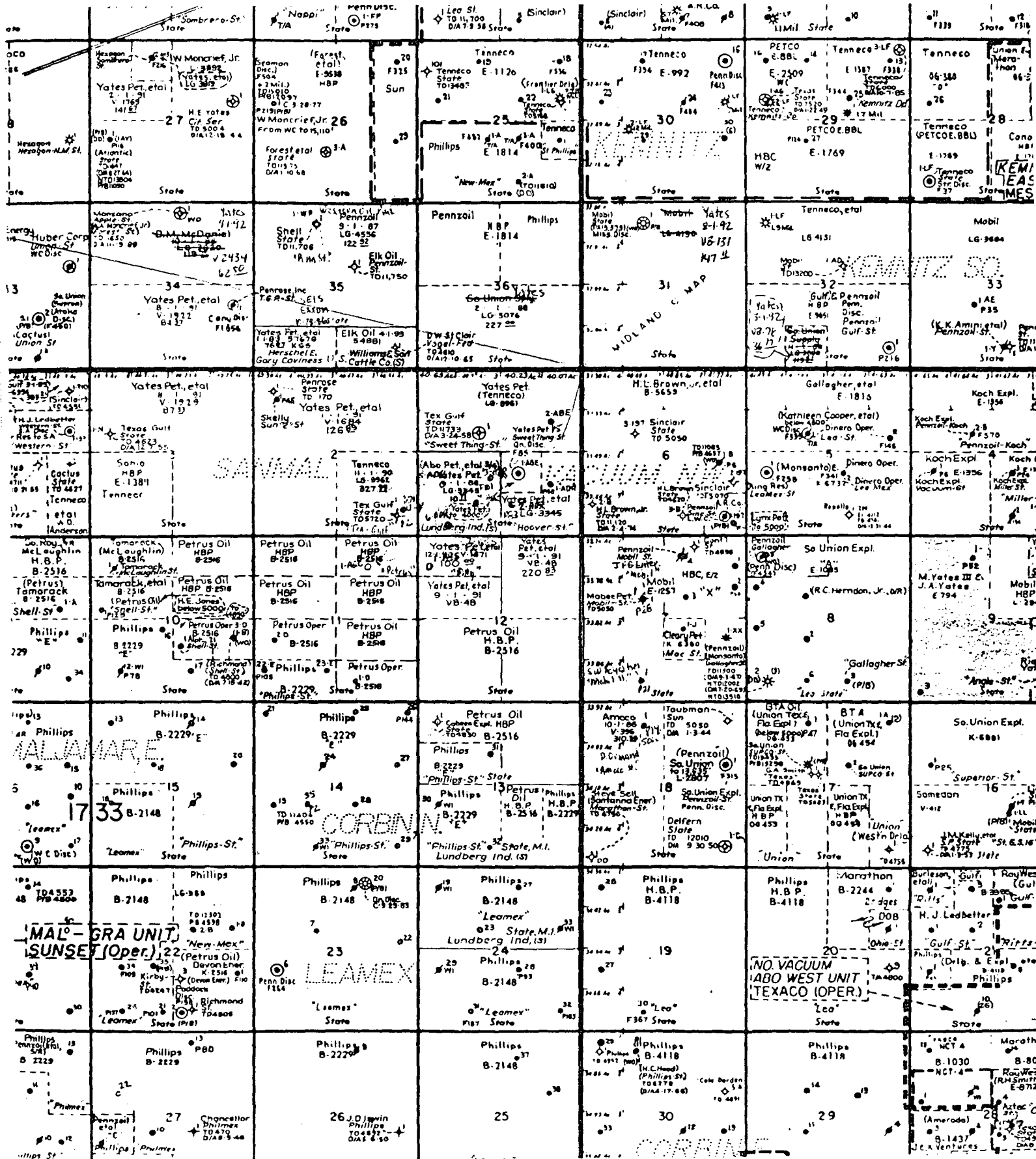
Attachment 7 summarizes the equipment and operating cost estimates and the results of the economic evaluation of commingled production versus dual completion. The equipment cost estimates represent the incremental costs to install production facilities to produce the Grayburg-San Andres in excess of the cost to install production facilities to produce the Queen. Likewise, "incremental operating costs" represent the incremental cost to operate a well completed in the Queen-Grayburg-San Andres in excess of the cost to operate a well completed in the Queen only. The economic evaluation shows that if a dual completion is required, Yates Petroleum loses \$92,000 due to the incremental investment to produce the Grayburg-San Andres reserves. If commingling is approved, an operating profit of \$94,000 is realized. It should be noted, however, that Yates Petroleum spent \$120,000 incrementally to drill, case, and complete the Grayburg-San Andres formations. Therefore, even if commingling is approved, Yates will lose \$26,000 attempting to develop the Grayburg-San Andres formation. Also noteworthy is the fact that if commingling is not approved, Yates will not produce the Grayburg-San Andres formation at all.

## ATTACHMENT 1

Plat

HOOVER "ADR" STATE #6

Unit M Section 1-17S-33E



Attachment #2

Hoover "ADR" #6

Completion History

| <u>Perforations</u> | <u>Formation<br/>(Zone)</u>       | <u>Acid<br/>Treatment</u> | <u>Swabbing<br/>Report</u>                                        | <u>Fracture<br/>Treatment</u>                                       |
|---------------------|-----------------------------------|---------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------|
| 4470-74             | Grayburg<br>(Metex)               | 1000 gal                  | ISDP 3000 psi,<br>swab 0 BO, 11 BW                                |                                                                     |
| 4521-26             | Grayburg<br>(Premier)             | 1000 gal                  | ISDP 2450 psi.<br>swabbed with Metex<br>40 BO, 50 BW              | Frac'd Metex,<br>Premier, and<br>Vacuum together<br>with 52000 gal. |
| 4596-4600           | San Andres<br>(Vacuum)            | 1000 gal                  | ISDP 3300,<br>Swab 32 BO, 106 BW                                  | cross-linked gal<br>and 90,000 #<br>20/40 sand                      |
|                     |                                   | 10,000 gal                | ISDP 3190 psi.<br>Swab 139 BO, 304 BW                             |                                                                     |
| 4661-65             | San Andres<br>(Lovington<br>Sand) | 1000 gal                  | ISDP 3400 psi<br>Swab 0 BO, 46 BW<br>Isolated by CIBP<br>at 4650. |                                                                     |
| 3757-75             | Queen                             | 1500 gal                  | N/A                                                               | 40,000 gal gelled<br>water with 60,000#<br>sand                     |

ATTACHMENT 3

HOOVER ADR STATE #6 WELL TEST\*

GRAYBURG-SAN ANDRES ZONES

| <u>DATE</u> | <u>OIL<br/>(BBLs)</u> | <u>WATER<br/>(BBLs)</u> | <u>DATE</u> | <u>OIL<br/>(BBLs)</u> | <u>WATER<br/>(BBLs)</u> |
|-------------|-----------------------|-------------------------|-------------|-----------------------|-------------------------|
| 7/25/87     | 14                    | 129                     | 8/22/87     | 39                    | 0                       |
| 7/27/87     | 23                    | 0                       | 8/23/87     | 30                    | 0                       |
| 7/28/87     | 87                    | 0                       | 8/24/87     | 25                    | 0                       |
| 7/29/87     | 57                    | 0                       | 8/25/87     | 0                     | 0                       |
| 7/30/87     | 57                    | 0                       | 8/26/87     | Frac Job              |                         |
| 7/31/87     | 58                    | 0                       | 8/27/87     | 0                     | 245                     |
| 8/01/87     | 49                    | 0                       | 8/28/87     | 0                     | 42                      |
| 8/02/87     | 51                    | 0                       | 8/29/87     | 0                     | 6                       |
| 8/03/87     | 56                    | 0                       | 8/30/87     | 0                     | 0                       |
| 8/04/87     | 37                    | 0                       | 8/31/87     | 0                     | 0                       |
| 8/05/87     | 43                    | 0                       | 9/01/87     | 0                     | 110                     |
| 8/06/87     | 43                    | 0                       | 9/02/87     | 0                     | 96                      |
| 8/07/87     | 31                    | 0                       | 9/03/87     | 0                     | 85                      |
| 8/08/87     | 39                    | 0                       | 9/04/87     | 0                     | 92                      |
| 8/09/87     | 11                    | 0                       | 9/05/87     | 0                     | 76                      |
| 8/10/87     | 66                    | 0                       | 9/06/87     | 0                     | 85                      |
| 8/11/87     | 42                    | 0                       | 9/07/87     | 0                     | 80                      |
| 8/12/87     | 31                    | 0                       | 9/08/87     | 0                     | 81                      |
| 8/13/87     | 44                    | 0                       | 9/09/87     | 0                     | 76                      |
| 8/14/87     | 39                    | 0                       | 9/10/87     | 0                     | 83                      |
| 8/15/87     | 41                    | 0                       | 9/11/87     | 1                     | 80                      |
| 8/16/87     | 38                    | 0                       | 9/12/87     | 5                     | 70                      |
| 8/17/87     | 41                    | 0                       | 9/13/87     | 10                    | 50                      |
| 8/18/87     | 32                    | 0                       | 9/14/87     | 20                    | 30                      |
| 8/19/87     | 45                    | 0                       | 9/15/87     | 19                    | 20                      |
| 8/20/87     | 35                    | 0                       | 9/16/87     | 20                    | 20                      |
| 8/21/87     | 28                    | 0                       | 9/17/87     | 20                    | 20                      |

\*No gas measurement capability at test battery.

## ATTACHMENT 3 (continued)

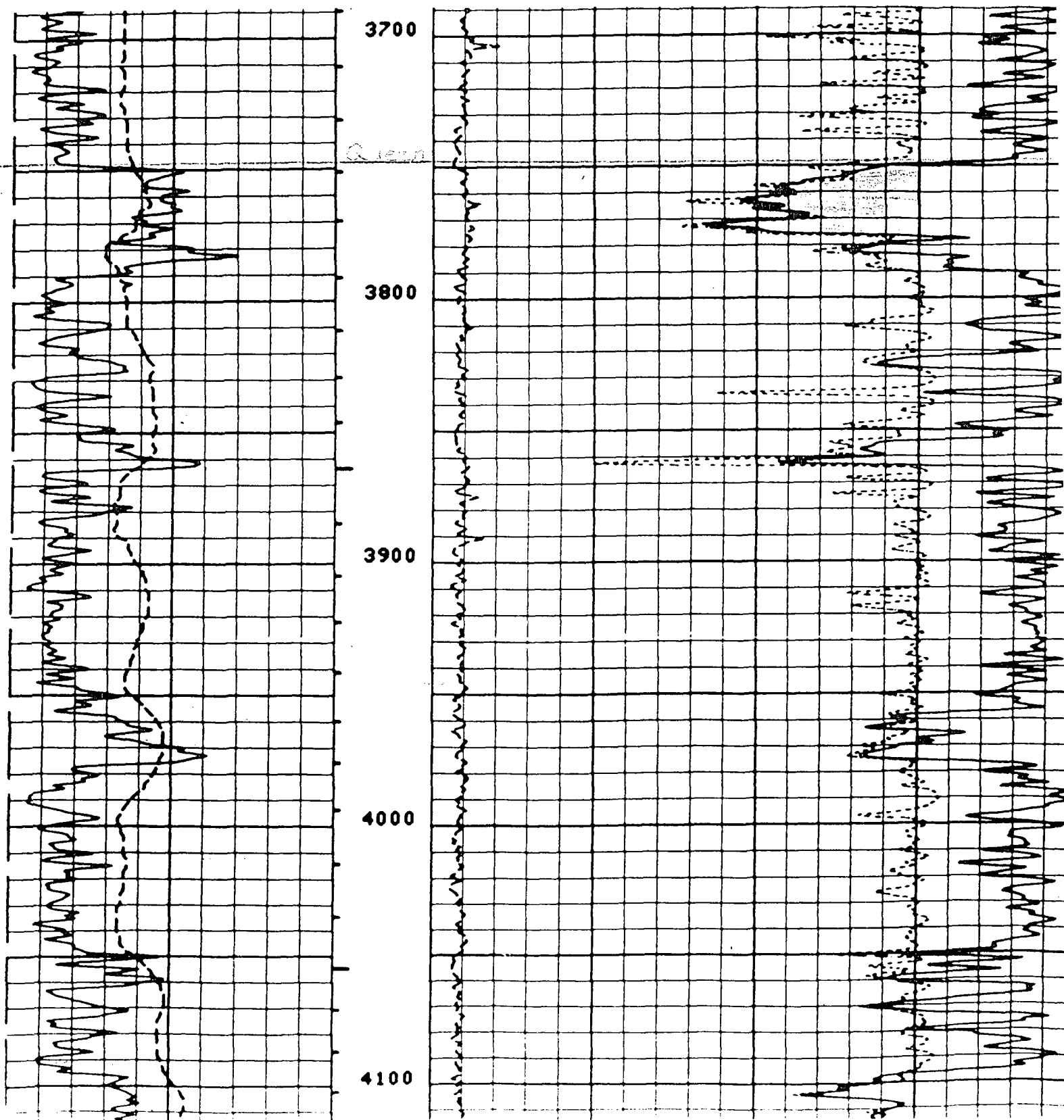
## HOOVER ADR STATE #6 WELL TEST\*

## GRAYBURG-SAN ANDRES ZONES

| <u>Date</u> | <u>OIL<br/>(BBLs)</u> | <u>WATER<br/>(BBLs)</u> | <u>Date</u>             | <u>OIL<br/>(BBLs)</u>   | <u>WATER<br/>(BBLs)</u> |
|-------------|-----------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 09/18/87    | 10                    | 10                      | <u>Queen Formation:</u> |                         |                         |
| 09/19/87    | 4                     | 4                       | 10/08/87                | Perforate Queen         |                         |
| 09/20/87    | 5                     | 8                       | 10/09/87                | Acidize and Frac. Queen |                         |
| 09/21/87    | 8                     | 0                       | 10/10/87                | Swab                    |                         |
| 09/22/87    | 8                     | 0                       | 10/11/87                | Swab, trip tubing       |                         |
| 09/23/87    | 7                     | 0                       | 10/12/87                | Put on pump             |                         |
| 09/24/87    | 8                     | 0                       | 10/13/87                | 0                       | 27                      |
| 09/25/87    | 7                     | 0                       | 10/14/87                | 0                       | 50                      |
| 09/26/87    | 8                     | 0                       | 10/15/87                | 0                       | 41                      |
| 09/27/87    | 7                     | 0                       | 10/16/87                | 0                       | 33                      |
| 09/28/87    | 9                     | 0                       | 10/17/87                | 0                       | 63                      |
| 09/29/87    | 7                     | 0                       | 10/18/87                | 8                       | 12                      |
| 09/30/87    | 6                     | 0                       | 10/19/87                | 7                       | 6                       |
| 10/01/87    | 7                     | 0                       | 10/20/87                | 7                       | 6                       |
| 10/02/87    | 8                     | 0                       | 10/21/87                | 9                       | 8                       |
| 10/03/87    | 11                    | 0                       | 10/22/87                | 7                       | 7                       |
| 10/04/87    | 6                     | 0                       | 10/23/87                | 7                       | 6                       |
| 10/05/87    | 9                     | 0                       | 10/24/87                | 6                       | 5                       |
| 10/06/87    | 7                     | 0                       | 10/25/87                | 7                       | 3                       |
| 10/07/87    | 11                    | 0                       | 10/26/87                | 7                       | 6                       |
|             |                       |                         | 10/27/87                | 6                       | 2                       |
|             |                       |                         | 10/28/87                | 6                       | 1                       |
|             |                       |                         | 10/29/87                | 7                       | 3                       |

\*No gas measurement capability at test battery.

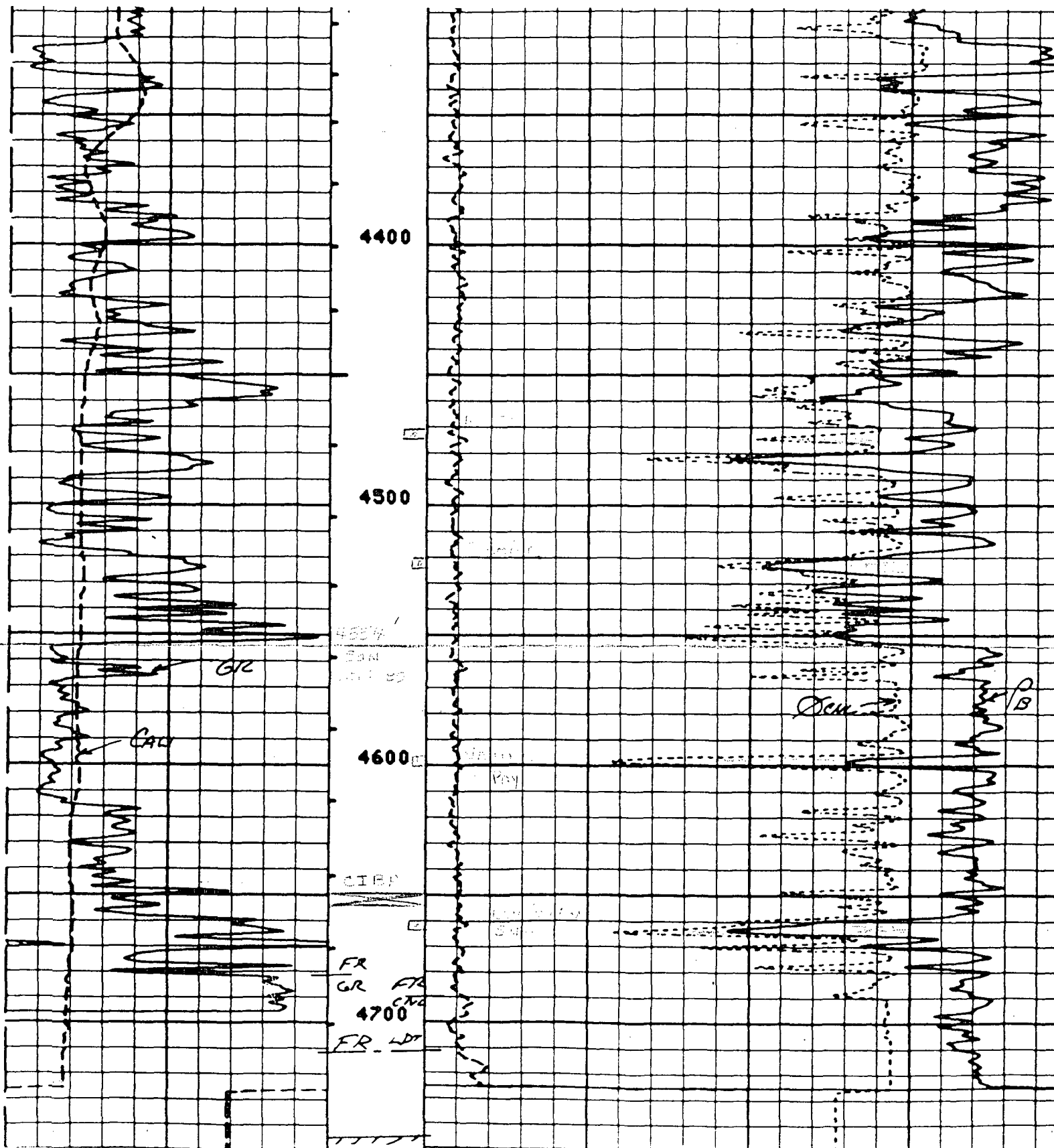
ATTACHMENT 4  
Compensated Neutron-Litho Density Log  
for HOOVER "ADR" #6



## ATTACHMENT 5

Compensated Neutron-Litho Density Log

for HOOVER "ADR" #6



**Unocal Refining & Marketing Division**

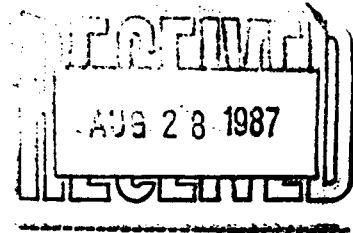
1650 East Golf Road  
Schaumburg, Illinois 60196 J8

Domestic Crude Supply

ATTACHMENT 6

**UNOCAL 76**

**CRUDE OIL PRICE SCHEDULE NO. 87-12**



Effective 7:00 a.m., August 20, 1987, subject to change without notice, and subject to the terms and conditions of its Division Orders and other contracts, Unocal will pay the following prices for each barrel of 42 U.S. gallons of merchantable crude oil and condensate purchased and delivered for its account into the facilities of its authorized receiving agent. All prices are shown for 40° API gravity and above, except as noted, and are subject to deductions for transportation and other charges where applicable.

| <u>AREA</u>      |                                       | <u>PRICE:</u><br><u>\$/BARREL</u> | <u>FOR GRAVITY ADJUSTMENT</u><br><u>SEE COLUMN</u> |
|------------------|---------------------------------------|-----------------------------------|----------------------------------------------------|
| Alabama/Florida  | Panhandle Sweet. . . . .              | 19.50 *                           | 1                                                  |
| Colorado         | Eastern Sweet. . . . .                | 19.25 *                           | 1                                                  |
| Illinois         | Sweet. . . . .                        | 19.00 *                           | 2                                                  |
| Kansas           | Sweet. . . . .                        | 19.00 *                           | 3                                                  |
| Louisiana        | South Louisiana Sweet (Onshore). . .  | 19.85 *                           | 3                                                  |
| Montana          | Cutbank Sour . . . . .                | 19.25 *                           | 5                                                  |
| Nebraska         | Sweet. . . . .                        | 19.25 *                           | 1                                                  |
| Oklahoma         | Sweet. . . . .                        | 19.50 *                           | 3                                                  |
| Texas/New Mexico | Intermediate . . . . .                | 19.50 *                           | 1                                                  |
|                  | Sour . . . . .                        | 19.50 *                           | 5                                                  |
| Texas            | Gulf Coast Sweet . . . . .            | 19.50 *                           | 1                                                  |
|                  | North Texas Sweet. . . . .            | 19.50 *                           | 1                                                  |
| Wyoming          | Sweet (Carbon, Lincoln, Sublette, . . | 20.25                             | 1                                                  |
|                  | Sweetwater & Uinta Counties)          |                                   |                                                    |
|                  | Sweet (All Other Counties) . . . . .  | 19.25 *                           | 1                                                  |
|                  | Asphalt Sour . . . . .                | 19.00 *                           | 4                                                  |
|                  | General Sour . . . . .                | 19.00 *                           | 4                                                  |

Merchantable crude and condensate is defined as virgin crude and/or condensate, produced from wells, which is free of either injected or outside foreign contamination, or added chemicals containing, but not limited to, halogenated organic compounds and/or oxygenated compounds which is fit for normal refinery processing and acceptable to the receiving agency designated by Unocal.

Prices are based upon the use of 100% tank tables or mutually acceptable automatic measuring equipment with customary adjustment of volume and gravity for temperature and full deduction for basic sediment and water. The company reserves the right to reject any crude petroleum which does not meet its standards of purity.

If any governmental authority causes the prices hereon to be amended, whether or not retroactive, causing any excess payment by Unocal, Unocal reserves the right to withhold an amount equal to the excess payment from future purchases or separately invoice for such excess.

\* Indicates Change

# GRAVITY ADJUSTMENT DEDUCTIONS

(DEDUCTION IN \$/BARREL)

| GRAVITY °API | 1    | 2    | 3                                            | 4    | 5                                               |
|--------------|------|------|----------------------------------------------|------|-------------------------------------------------|
| Above 45.0   | **   | **   | **                                           | **   | **                                              |
| 40 to 45.0   | 0.00 | 0.00 | 0.00                                         | 0.00 | 0.00                                            |
| 39 to 39.9   | 0.02 | 0.02 | 0.02                                         | 0.02 | Below 40.0<br>Deduct \$0.015<br>per 0.1° API    |
| 38 to 38.9   | 0.04 | 0.04 | 0.04                                         | 0.04 |                                                 |
| 37 to 37.9   | 0.06 | 0.07 | 0.06                                         | 0.06 |                                                 |
| 36 to 36.9   | 0.08 | 0.10 | 0.08                                         | 0.08 |                                                 |
| 35 to 35.9   | 0.10 | 0.13 | 0.10                                         | 0.12 |                                                 |
| 34 to 34.9   | 0.12 | 0.16 | Below 35.0<br>Deduct \$0.015<br>per 0.1° API | 0.16 | Below 34 to 20<br>Deduct \$0.02<br>per 0.1° API |
| 33 to 33.9   | 0.14 | 0.19 |                                              |      |                                                 |
| 32 to 32.9   | 0.16 | 0.22 |                                              |      |                                                 |
| 31 to 31.9   | 0.18 | 0.25 |                                              |      |                                                 |
| 30 to 30.9   | 0.20 | 0.28 |                                              |      |                                                 |
| 29 to 29.9   | 0.22 | 0.31 |                                              |      | Below 20.0<br>Deduct \$0.04<br>per 0.1° API     |
| 28 to 28.9   | 0.24 | 0.34 |                                              |      |                                                 |
| 27 to 27.9   | 0.26 | 0.37 |                                              |      |                                                 |
| 26 to 26.9   | 0.28 | 0.40 |                                              |      |                                                 |
| 25 to 25.9   | 0.30 | 0.43 |                                              |      |                                                 |
| 24 to 24.9   | 0.32 | 0.46 |                                              |      |                                                 |
| 23 to 23.9   | 0.34 | 0.49 |                                              |      |                                                 |
| 22 to 22.9   | 0.36 | 0.52 |                                              |      |                                                 |
| 21 to 21.9   | 0.38 | 0.55 |                                              |      |                                                 |
| 20 to 20.9   | 0.40 | 0.58 |                                              |      |                                                 |
| Below 20     | 0.42 | 0.61 |                                              |      |                                                 |

## Examples:

|      |      |      |       |      |       |
|------|------|------|-------|------|-------|
| 27.6 | 0.26 | 0.37 | 1.21  | 1.44 | 1.86  |
| 18.3 | 0.42 | 0.61 | 2.605 | 3.64 | 3.255 |

\*\* Above 45.0°, deduct \$0.015 per 0.1° API

## FIELD OFFICE CONTACTS

| <u>Area</u>                                                                                             | <u>Address</u>                                                          | <u>Phone No.</u> |
|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|------------------|
| Kansas, Oklahoma, East Texas,<br>North Texas                                                            | 717 N. Harwood Street, Suite 2630<br>DALLAS, TX 75201                   | 214-969-1976     |
| Colorado, Montana, Nebraska,<br>the NW Quarter of New Mexico,<br>No. Dakota, So. Dakota, Utah & Wyoming | 410 Seventeenth Street<br>Suite 530<br>DENVER, CO 80202                 | 303-623-1776     |
| Gulf of Mexico & Texas Gulf Coast                                                                       | 4615 Southwest Freeway<br>620 Executive Plaza East<br>HOUSTON, TX 77027 | 713-621-7600     |
| Alabama, Louisiana (Onshore),<br>Mississippi, & other S.E. states                                       | 315 S. College Road<br>Suite 180<br>LAFAYETTE, LA 70503                 | 318-234-1804     |
| New Mexico, Panhandle & West Texas                                                                      | 1004 N. Big Spring, Suite 501<br>MIDLAND, TX 79702                      | 915-684-8231     |

## ATTACHMENT 7

## ECONOMICS

|                                                           | <u>DUAL<br/>COMPLETION</u> | <u>COMMINGLED<br/>COMPLETION</u> |
|-----------------------------------------------------------|----------------------------|----------------------------------|
| <u>EQUIPMENT COSTS</u>                                    |                            |                                  |
| Incremental tank battery                                  | \$ 44,000                  |                                  |
| Incremental pumping equip't                               | 33,500                     | \$ 4,000                         |
| Dual pkr., wellhead, tubing                               | <u>19,500</u>              | <u>          </u>                |
| Total Incremental Equipment<br>Costs to develop the GB-SA | \$ 97,000                  | \$ 4,000                         |
| <u>OPERATING COSTS</u>                                    |                            |                                  |
| Incremental operating cost,<br>\$/well/month              | 2,500                      | 500                              |
| <u>ECONOMICS</u>                                          |                            |                                  |
| Initial oil rate, BOPD                                    | 7                          | 7                                |
| Gas-oil ratio, SCF/STB                                    | 1,000                      | 1,000                            |
| Decline rate, %/year                                      | 20                         | 20                               |
| Oil price, \$/bbl                                         | 18                         | 18                               |
| Gas price, \$/MCF                                         | 1                          | 1                                |
| Recoverable oil, bbl                                      | 2,800                      | 9,700                            |
| Gross revenue, \$                                         | 53,000                     | 184,000                          |
| State royalty and severance taxes                         | 10,000                     | 36,000                           |
| Operating expenses, \$                                    | 38,000                     | 50,000                           |
| Operating profit, \$                                      | 5,000                      | 98,000                           |
| Operating profit after capital cost, \$                   | -(92,000)                  | 94,000                           |
| Less incremental drilling and<br>completion cost          | <u>-110,000</u>            | <u>120,000</u>                   |
| Profit developing GB-SA                                   | <del>\$(212,000)</del>     | <del>\$(26,000)</del>            |

*\$-(202,000)*

ATTACHMENT 8

OFFSET OPERATORS

Petrus Oil Co.  
12201 Merit Dr.  
Suite 900  
Dallas, TX 75251

Tenneco Oil Co.  
7990 IH 10-W  
San Antonio, TX 78230

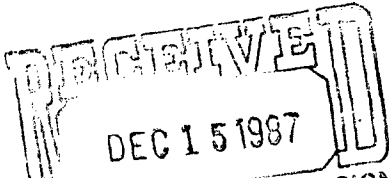


STATE OF NEW MEXICO  
ENERGY AND MINERALS DEPARTMENT  
OIL CONSERVATION DIVISION  
HOBBS DISTRICT OFFICE

GARREY CARRUTHERS  
GOVERNOR

12-10-87

POST OFFICE BOX 1980  
HOBBS, NEW MEXICO 88241-1980  
(505) 393-6161



OIL CONSERVATION DIVISION  
P. O. BOX 2088  
SANTA FE, NEW MEXICO 87501

RE: Proposed:

MC \_\_\_\_\_  
DHC ☒ \_\_\_\_\_  
NSL \_\_\_\_\_  
NSP \_\_\_\_\_  
SWD \_\_\_\_\_  
WFX \_\_\_\_\_  
PMX \_\_\_\_\_

Gentlemen:

I have examined the application for the:

Gates Pet Corp. Hoover AOR #6-M 1-17-33  
Operator Lease & Well No. Unit S-T-R

and my recommendations are as follows:

OK

Yours very truly,

Jerry Sexton  
Supervisor, District 1

/ed