WATER FLOODING VALUATIONS RESERVOIR STUDIES

TELEPHONE - 817-723-2166

PETROLEUM ENGINEERS
STEPHENS ENGINEERING
WICHITA FALLS, TEXAS

POST OFFICE BOX-2249

WICHITA FALLS, TEXAS
76307

April 23, 1985

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

Attn: Gilbert P. Quintana
U.I.C. Director

Re: Marlisue Queen Unit
Waterflood Case No. 8002/Order No. R-7422
Injection Pressure Increase

Dear Mr. Quintana:

Stephens Engineering has reviewed the step rate test performed by B & D Well Testers on March 26, 1985 on Marlisue well No. 2-6. It is the opinion of Stephens Engineering that the fracture pressure established by B & D Well Testers of 1,060 psi wellhead pressure is probably low due to the fact that the step rate test began with the injection well on a vacuum. It should be noted that fracture gradients are directly related to pore pressure, which in the case of this well was at a minimum due to the fact that fillup of the near wellbore storage area had not been established prior to the step rate test. Without this fillup the near wellbore area will have a minimum pore pressure and therefore an abnormally low fracture gradient until such time that the injection well reaches fillup. This phenomenon is easily illustrated when step rate tests are run concurrently on producing and injection wells in the same reservoir. The producing well, due to the decreased pore pressure caused by production, will show an extremely low fracture gradient whereas the injection well will show a much higher fracture gradient due to increased pore pressure caused by injection. This phenomenon can further be proved by the fact that fracture gradients increase as waterfloods become more mature. The reason is the same. Increased injection causes an increase in fillup and therefore an increase in pore pressure which is directly related to an increase in the fracture gradient.

In conclusion, Stephens Engineering is of the opinion that step rate tests should be run on wells which have stabilized rates and stabilized pressures below a minimum calculated fracture gradient. This will allow both the step rate test to be started below a minimum fracture gradient and more closely establish a true fracture gradient in the reservoir due to the higher pore pressure which occurs due to injection.

If you have any questions concerning this information, please do not hesitate to contact us at 817-723-2166.

Yours very truly,

STEPHENS ENGINEERING

DeWayne Travelstead

DT/dk

# B & D WELL TESTERS

## Step Rate Test

Phone (505) 397-3914 — Hobbs, New Mexico 88240

Company McClellan Oil Corp. — Test Date 3-26-85 — Unit

Lease Marlisue Tract #2

Total Depth 1944' — Plug Back TD — Elevation — Well # 6

Csg size 4½" Wt d Set at — Perfs: From 1909' To 1917' — Sec Twp-Blk Rge

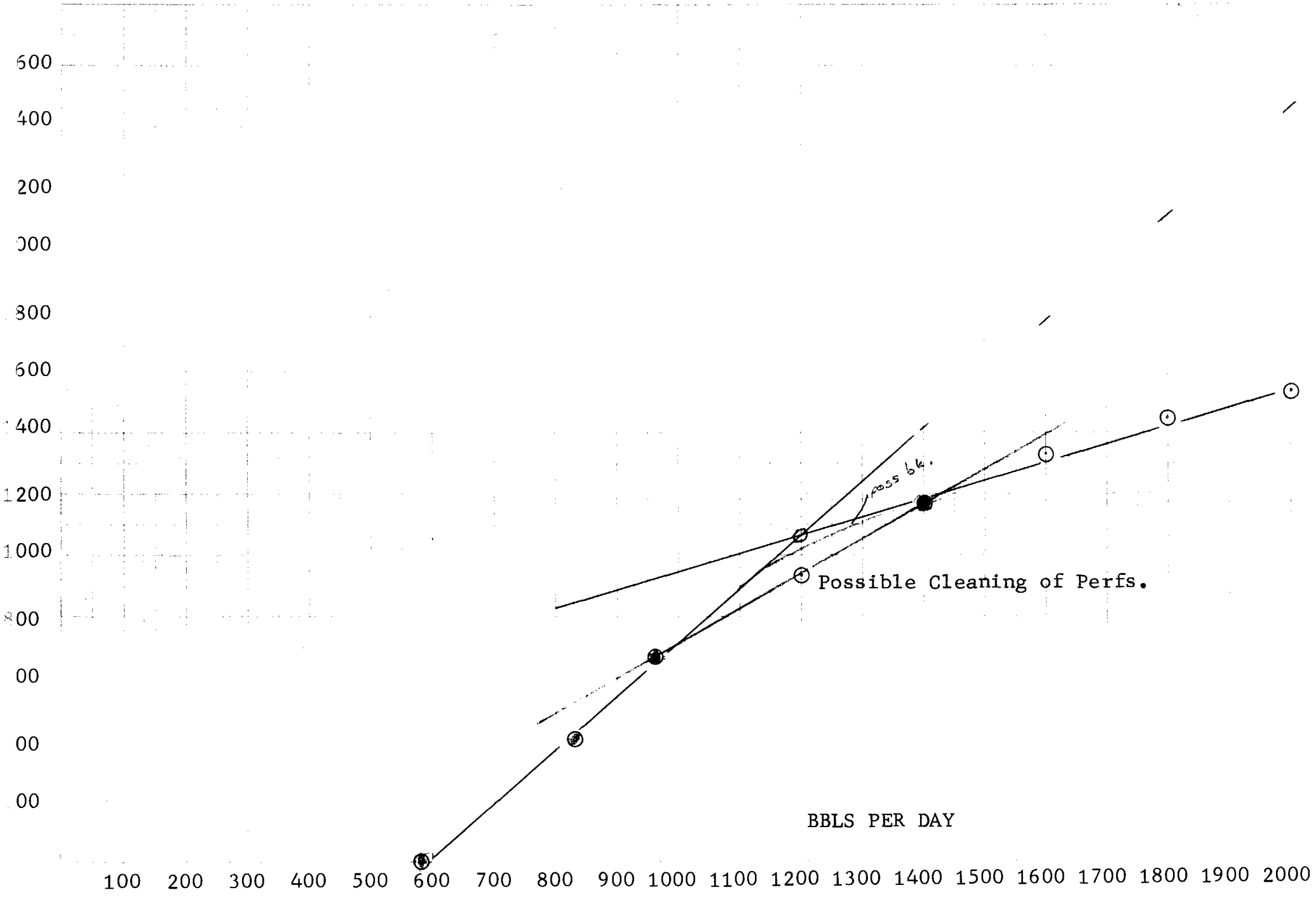
Tbg size Wt d Set at — Perfs: From To — County Chaves State NM

Producing thru — Packer set at 1856' — Co. Rep Cleo Brown

| Time of Reading | Elap Time Hrs. | Well Information: Rate BBLS Per Day | Total BBLS Per Rate | Surface PSIG | Surface PSI Cor for Friction | BHP | Remarks |
|---|---|---|---|---|---|---|---|
| 10:35 | shut in | | | 0 | | | Bombs at 1913' @10:35 |
| 10:40 | start | | | 0 | | | surface psi vaccum bottom |
| 10:45 | | 580 | | 0 | | | hole-surface readout not |
| 10:50 | | 580 | | 0 | | | working properly-calculate |
| 10:55 | 15 | 580 | 6.0 | 0 | | | surface psi only |
| | | | | | | | |
| 11:00 | | 830 | | 250 | | | |
| 11:05 | | 830 | | 355 | | | |
| 11:10 | 30 | 830 | 8.6 | 400 | | | |
| | | | | | | | |
| 11:15 | | 960 | | 557 | | | |
| 11:20 | | 960 | | 620 | | | |
| 11:25 | 45 | 960 | 9.9 | 668 | | | |
| | | | | | | | |
| 11:30 | | 1200 | | 835 | | | Change 1½"TM at 11.30 |
| 11:35 | | 1200 | | 895 | | | |
| 11:40 | 1hr | 1200 | 12.5 | 935 | | | |
| | | | | | | | |
| 11:45 | | 1400 | | 1095 | | | |
| 11:50 | | 1400 | | 1135 | | | |
| 11:55 | 15 | 1400 | 14.6 | 1165 | | | |
| | | | | | | | |
| 12:00 | | 1600 | | 1290 | | | |
| 12:05 | | 1600 | | 1320 | | | |
| 12:10 | 30 | 1600 | 16.6 | 1330 | | | |
| | | | | | | | |
| 12:15 | | 1800 | | 1426 | | | |
| 12:20 | | 1800 | | 1462 | | | |
| 12:25 | 45 | 1800 | 18.7 | 1445 | | | |
| | | | | | | | |
| 12:30 | | 2000 | | 1520 | | | |
| 12:35 | | 2000 | | 1536 | | | |
| 12:40 | 2hr | 2000 | 20.8 | 1528 | | | |
| ISIP | | | | 1175 | | | |
| 12:41 | 5 minute fall off | | | 1140 | | | |
| 12:42 | | | | 1110 | | | |
| 12:43 | | | | 1090 | | | |
| 12:44 | | | | 1080 | | | |
| 12:45 | | | | 1060 | | | |
| | | | | | | | |

B-6615

McClellan Oil Corp. Marlisue Tract 2 #6 3-26-85



McCLELLAN OIL CORP.
MARLISUE TRACT 2 #6
3-26-85

# McClellan Oil Corporation

April 30, 1985



Oil Conservation Division
P. O. Box 2088
Santa Fe, NM 87501

Attention: Gilbert P. Quintana
UIC Director

Re: Marlisue Queen Unit
Waterflood Case No. 8002/
Order No. R-7422
Injection Pressure Increase

Dear Mr. Quintana:

In response to your letter of March 14, 1985, we conducted a step-rate test on the Marlisue Queen Tract 2, Well No. 6. The test was conducted by B & D Well testers from Hobbs, New Mexico and was witnessed by Mike Stubblefield. Also, a bottom hole pressure guage was run but failed to record, therefore, surface pressures are only available.

Enclosed is the data from the step-rate test that you requested. B & D Well Testers plotted the frac pressure at 1060 psi WHP, whereas, I plotted the frac pressure at 1280 psi WHP. It is evident that the requested 1000 psi wellhead injection pressure will not result in fracturing of the Queen Formation in this unit.

Therefore, we request that the referenced Order No. R-7422 limiting injection pressure to .2 psi per foot be revised to read that the maximum wellhead pressure be 1000 psig.

Sincerely yours,

Paul Ragsdale

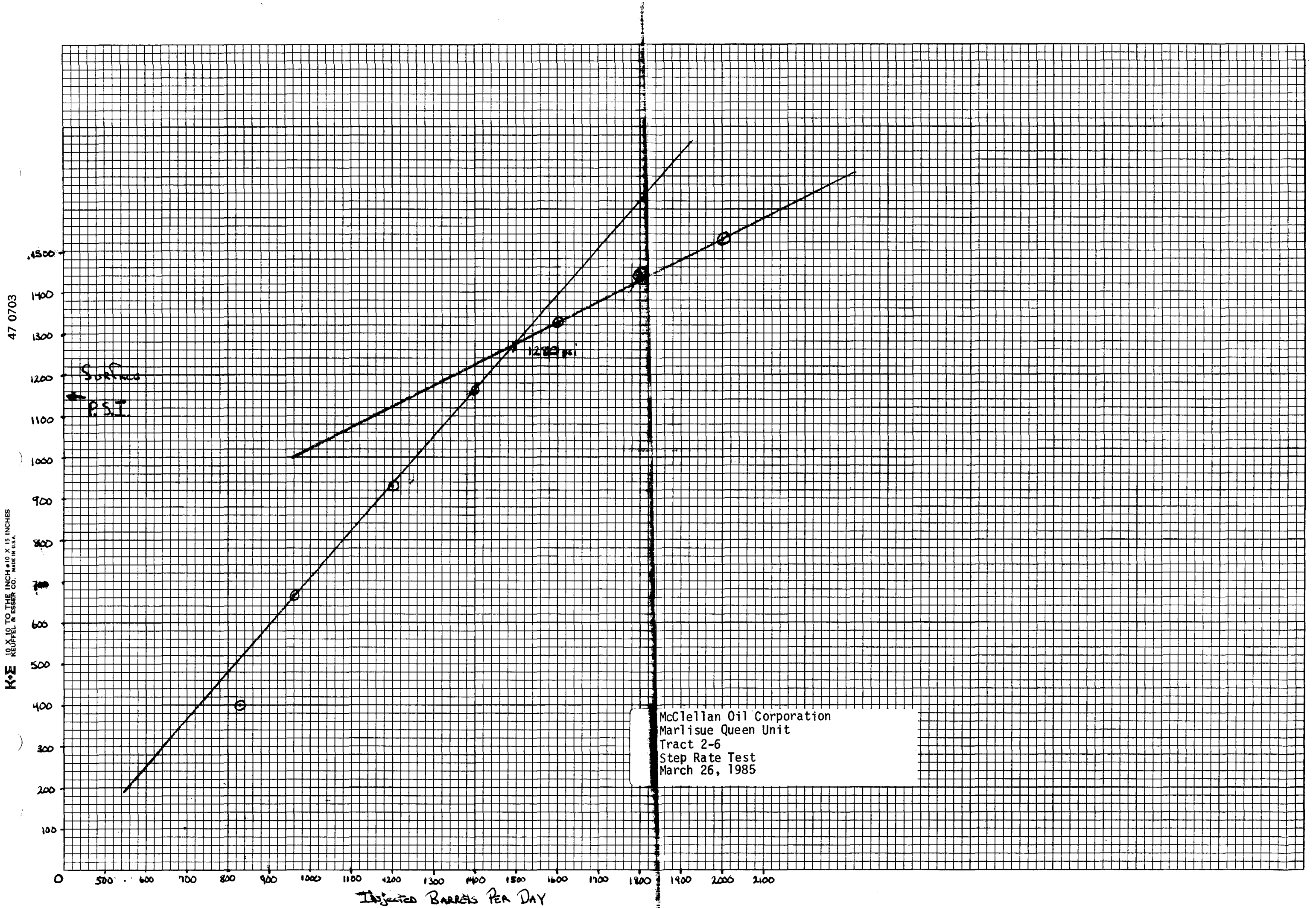
Paul Ragsdale
Operations Manager

cc file

850 United Bank Plaza — Drawer 730 — 505/622-3200 — Roswell, New Mexico 88202

As per McClellans request to inject @ 1000 psi!
the steprate test on the Mc[illegible]ve Tr. 2#6 3-26-85
indicates a break @ 1080 as plotted. A low pressure
value of 935 is indicated as possible cleaning of perforations?
W/ the low values implied and the upper ~~1080~~ pressure
considered a break could have occurred @
~~1020~~ psi.

B Brooks.


47 0703
K&E 10 X 10 TO THE INCH • 10 X 15 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.
Surface
P.S.I.
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
Injected Barrels Per Day
McClellan Oil Corporation
Marlisue Queen Unit
Tract 2-6
Step Rate Test
March 26, 1985

McClellan Oil Corporation

May 1, 1985

Oil Conservation Division
P. O. Box 2088
Santa Fe, NM 87501

Attention: Gilbert P. Quintana

Re: Tract 1-4
Sulimar Queen Unit Waterflood
Chaves County, New Mexico

Dear Mr. Quintana:

The referenced well in the Sulimar Queen Unit, Tract 1-4, located 2310 FSL & 2310 FWL Section 24-T15S-R29E is presently shut-in waiting for your approval to inject. I submitted the requested information on a C-108 form on March 19, 1985. We have not received a reply or a request for further information concerning this well. Please advise me if you did not receive the information or if approval to inject has been obtained.

Sincerely yours,

Paul Ragsdale

Paul Ragsdale
Operations Manager

cc: OCD Artesia

PR/cpt

850 United Bank Plaza — Drawer 730 — 505/622-3200 — Roswell, New Mexico 88202