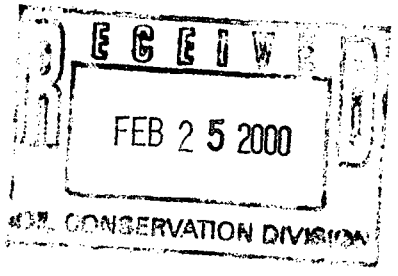
DHC 3/16/00

devon
ENERGY CORPORATION

20 North Broadway, Suite 1500
Oklahoma City, Oklahoma 73102-8260

Telephone 405/235-3611
FAX 405/552-4550

February 22, 2000




**Certified Mail No. Z 068 589 780**

STATE OF NEW MEXICO
Energy, Minerals and Natural Resources Dept.
Oil Conservation Division
2040 S. Pacheco
Santa Fe, NM 87505-6429

2685

RE: Downhole Commingling
Eagle 34 J Federal #20
Section J-34-17S-27E
API #30-015-29641
Red Lake (Q-GB-SA) and
Red Lake (Glorieta-Yeso) Fields
Eddy County, NM

Gentlemen:

Concerning the referenced, enclosed please find the Form C-107A Application for Downhole Commingling and attachments (and three copies).

Please direct inquiries concerning this application to Ernie Buttross at (405) 235-3611, Ext. 4509.

Yours truly,

DEVON ENERGY CORPORATION (NEVADA)

Tonja Rutelonis
Engineering Tech.

/trr
Enclosures

Exhibit 2

DISTRICT I
P.O. Box 1980; Hobbs, NM 88240

DISTRICT II
P.O. Drawer DD, Artesia, NM 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-102
Revised February 10, 1994
Instruction on back
Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies

# OIL CONSERVATION DIVISION

P.O. Box 2088
Santa Fe, New Mexico 87504-2088

☐ AMENDED REPORT

## WELL LOCATION AND ACREAGE DEDICATION PLAT

| API Number | Pool Code | Pool Name |
|---|---|---|
| | | Red Lake (Q-GB-SA); Red Lake; Glor-Yeso |

| Property Code | Property Name | Well Number |
|---|---|---|
| | Eagle 34 J Federal | 20 |

| OGRID No. | Operator Name | Elevation |
|---|---|---|
| | Devon Energy Corporation | 3588' |

### Surface Location

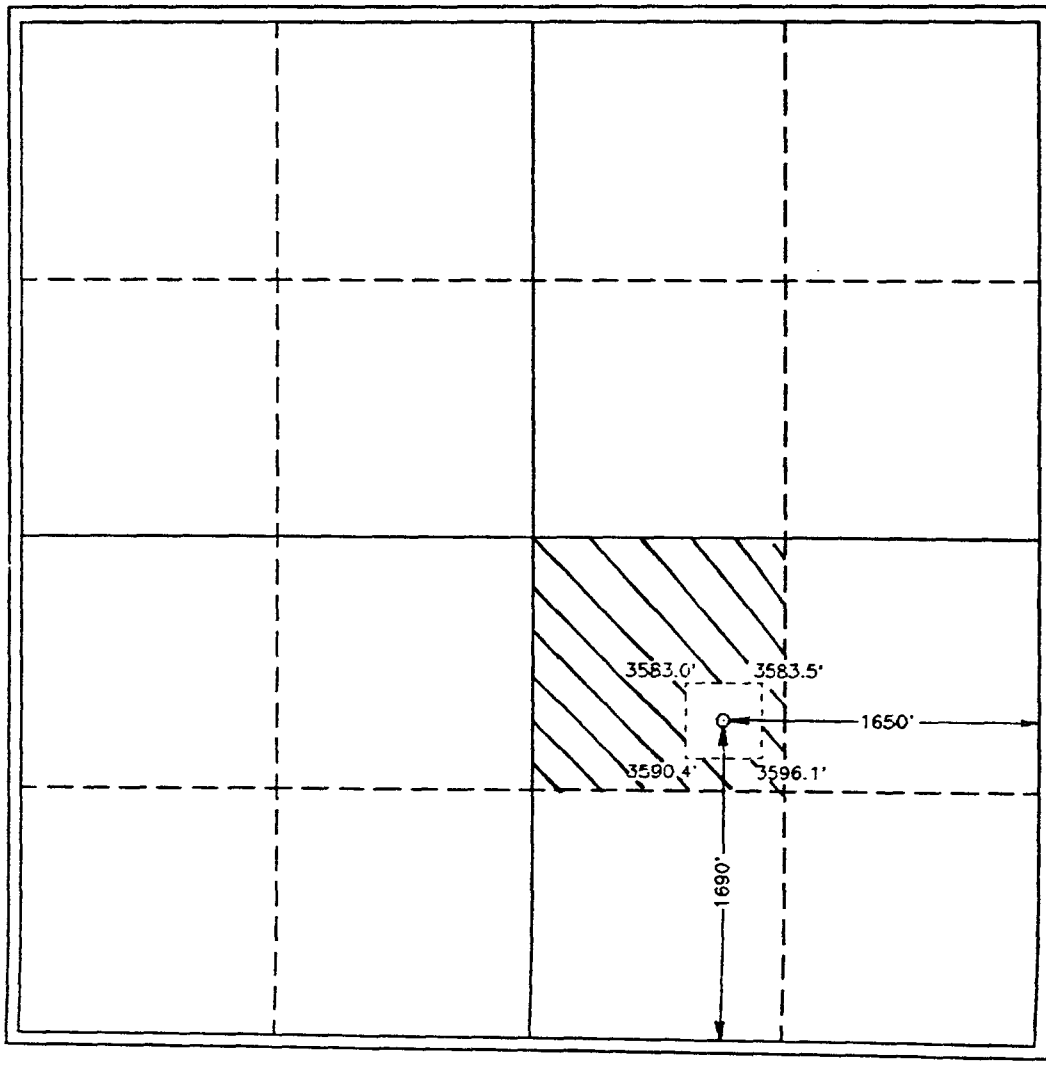
| UL or lot No. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---|---|---|---|---|---|---|---|---|---|
| J | 34 | 17 S | 27 E | | 1690 | South | 1650 | East | Eddy |

### Bottom Hole Location If Different From Surface

| UL or lot No. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

| Dedicated Acres | Joint or Infill | Consolidation Code | Order No. |
|---|---|---|---|
| 40 | | | |

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION




### OPERATOR CERTIFICATION

*I hereby certify the the information contained herein is true and complete to the best of my knowledge and belief.*

E. L. Buttross, Jr.
Signature

E. L. Buttross, Jr.
Printed Name

District Engineer
Title

April 28, 1997
Date

### SURVEYOR CERTIFICATION

*I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervison, and that the same is true and correct to the best of my belief.*

April 11, 1997
Date Surveyed

Signature & Seal of Professional Surveyor

7977

W.O. No. 7022a

Certificate No. Gary L. Jones 7977

BASIN SURVEYS

DISTRICT I
P.O. Box 1980, Hobbs, NM 88241-1980
DISTRICT II
811 South First St., Artesia, NM 88210-2835
DISTRICT III
1000 Rio Brazos Rd, Aztec, NM 87410-1693
DISTRICT IV
2040 S. Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources Department

# OIL CONSERVATION DIVISION

2040 S. Pacheco
Santa Fe, New Mexico 87505-6429

Form C-107-A
Revised August 1999

APPROVAL PROCESS:
___ Administrative ___ Hearing

EXISTING WELLBORE
___ YES ___ NO

## APPLICATION FOR DOWNHOLE COMMINGLING

Devon Energy Corporation (Nevada) — Operator
20 N. Broadway, Suite 1500, Oklahoma City OK 73102-8260 — Address

Eagle 34 J Federal — Lease
20 — Well No.
J – 34-17S-27E — Unit Ltr. - Sec - Twp - Rge
Eddy — County
Spacing Unit Lease Types: (check 1 or more) X

OGRID NO. 6137 Property Code 19418 API NO. 30-015-29641 Federal ___, State ___, (and/or) Fee ___

| The following facts are submitted in support of downhole commingling: | Upper Zone | Intermediate Zone | Lower Zone |
|---|---|---|---|
| 1. Pool Name and Pool Code | Red Lake (Q-GB-SA) | | Red Lake (Glor-Yeso) |
| 2. Top and Bottom of Pay Section (Perforations) | 1940'-2420' | | To be perforated 2850'-3150' |
| 3. Type of production (Oil or Gas) | Oil | | Oil |
| 4. Method of Production (Flowing or Artificial Lift) | Artificial Lift | | Artificial Lift |
| 5. Bottomhole Pressure<br>Oil Zones - Artificial Lift: Estimated Current<br>Gas & Oil - Flowing: Measured Current<br>All Gas Zones: Estimated Or Measured Original | a. (Current) 50 psi producing BHP | a. | a. 100 psi producing BHP |
| | b. (Original) | b. | b. |
| 6. Oil Gravity (°API) or Gas BTU Content | 39.5° | | 41.8° |
| 7. Producing or Shut-In? | Producing | | Awaiting perfs |
| Production Marginal? (yes or no) | Yes | | Expected to be marginal |
| • If Shut-In, give date and oil/gas/ water rates of last production<br>Note: For new zones with no production history, applicant shall be required to attach production estimates and supporting data | Date: N/A<br>Rates: | Date:<br>Rates: | Date: N/A<br>Rates: |
| • If Producing, give date and oil/gas/ water rates of recent test (within 60 days) | Date: 1/18/00<br>Rates: 11 BOPD, 20 MCFGPD, 37 BWPD | Date:<br>Rates: | Date: N/A<br>Rates: N/A |
| 8. Fixed Percentage Allocation Formula -% for each zone (total of %'s to equal 100%) | Oil: 40 % Gas: 40 % | Oil: % Gas: % | Oil: 60 % Gas: 60 % |

9. If allocation formula is based upon something other than current or past production, or is based upon some other method, submit attachments with supporting data and/or explaining method and providing rate projections or other required data.

10. Are all working, overriding, and royalty interests identical in all commingled zones? X Yes ___ No
If not, have all working, overriding, and royalty interests been notified by certified mail? ___ Yes ___ No

11. Will cross-flow occur? ___ Yes X No If yes, are fluids compatible, will the formations not be damaged, will any cross-flowed production be recovered, and will the allocation formula be reliable. ___ Yes ___ No (If No, attach explanation)

12. Are all produced fluids from all commingled zones compatible with each other? X Yes ___ No

13. Will the value of production be decreased by commingling? ___ Yes X No (If Yes, attach explanation)

14. If this well is on, or communitized with, state or federal lands, either the Commissioner of Public Lands or the United States Bureau of Land Management has been notified in writing of this application. X Yes ___ No

15. NMOCD Reference Cases for Rule 303(D) Exceptions: ORDER NO(S). _____

16. ATTACHMENTS:
* C-102 for each zone to be commingled showing its spacing unit and acreage dedication.
* Production curve for each zone for at least one year. (If not available, attach explanation.)
* For zones with no production history, estimated production rates and supporting data.
* Data to support allocation method or formula.
* Notification list of working, overriding, and royalty interests for uncommon interest cases.
* Any additional statements, data, or documents required to support commingling.

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE Tonja Rutelonis TITLE Engineering Technician DATE 2/22/00

TYPE OR PRINT NAME Tonja Rutelonis TELEPHONE NO. (405) 552-4515

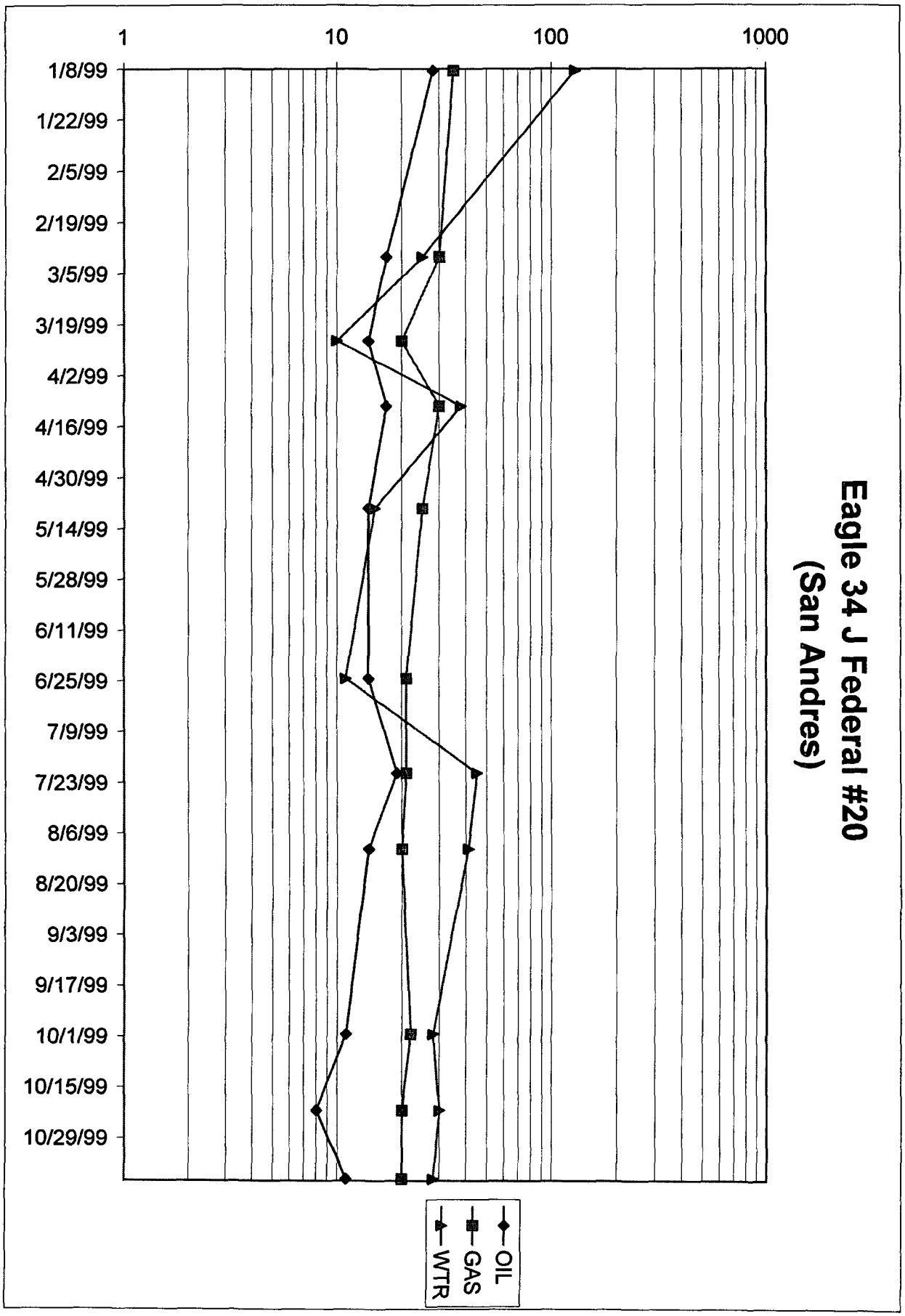
# Eagle 34 J Federal #20

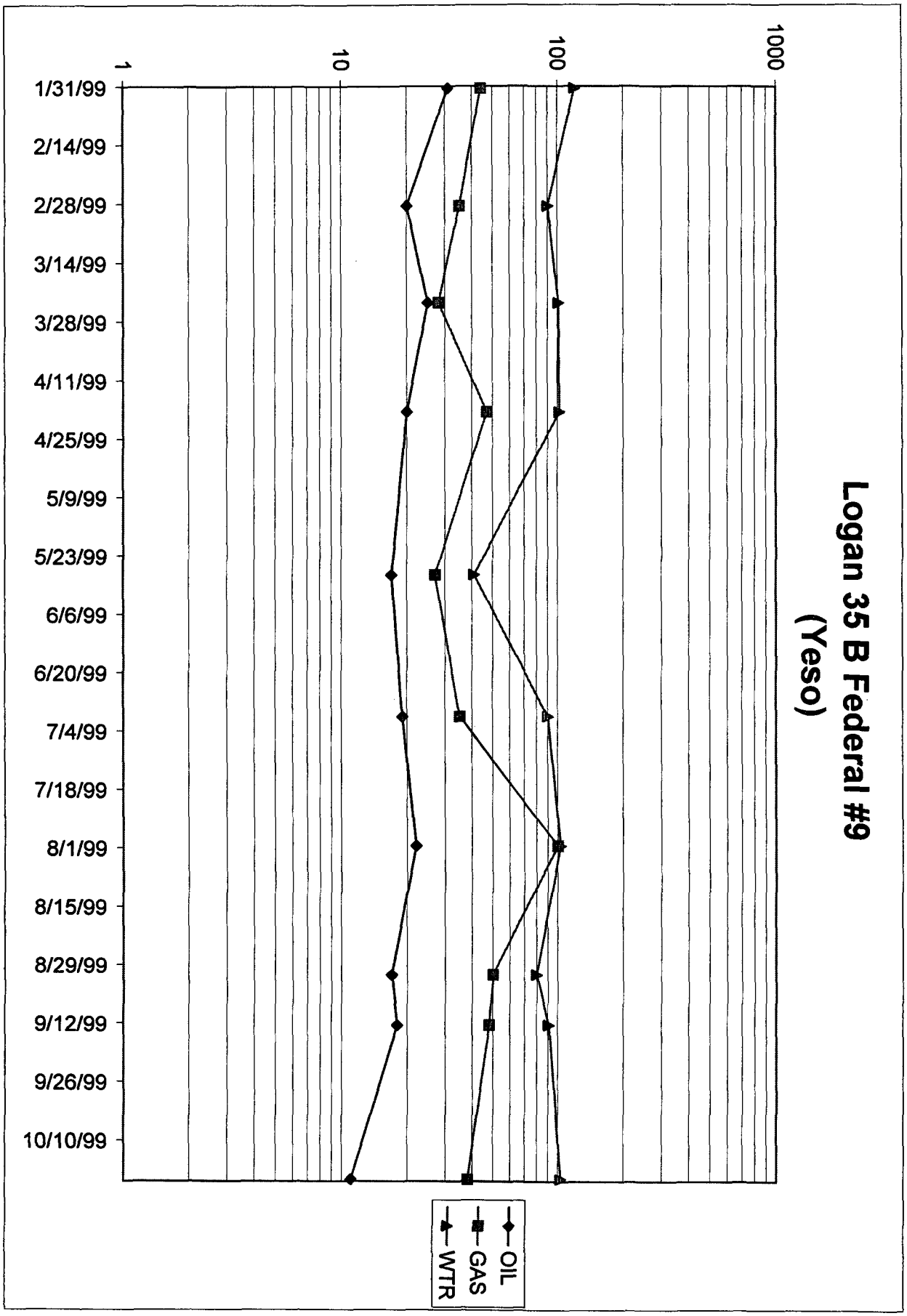
## Allocation Formula

| Well Name | Producing Formation | *Daily Production Test 3-month Average | % of Total |
|---|---|---|---|
| Logan 35 B Federal #9 | Red Lake (Glor-Yeso) | 15 BO/45 MCF/91 BW | 60 % |
| Eagle 34 J Federal #20 | Red Lake (Q-GB-SA) | 10 BO/21 MCF/29 BW | 40 % |

* From attached production plots

The above production test represents stable production from a San Andres producer (Eagle 34 J Federal #20) and a Yeso producer (Logan 35 B Federal #9). We believe these rates of production represent an acceptable means to allocate production. **We have previously received approval for downhole commingling in these fields utilizing a similar allocation method.**

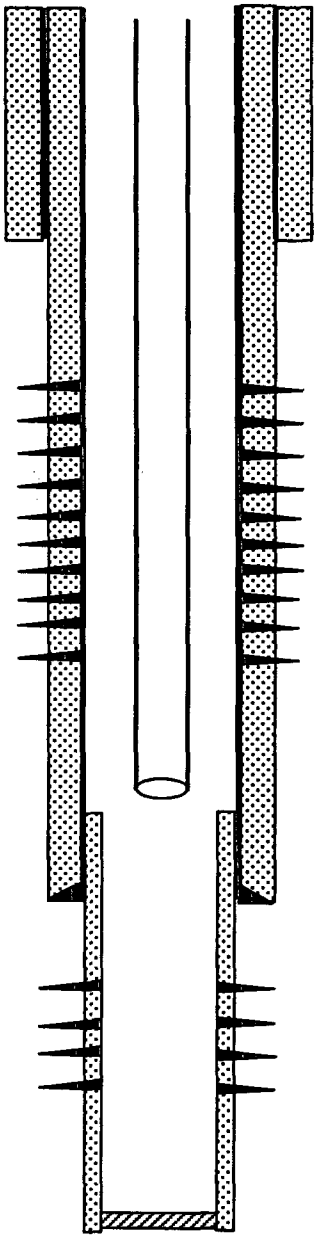

Eagle 34 J Federal #20
(San Andres)
1
10
100
1000
1/8/99
1/22/99
2/5/99
2/19/99
3/5/99
3/19/99
4/2/99
4/16/99
4/30/99
5/14/99
5/28/99
6/11/99
6/25/99
7/9/99
7/23/99
8/6/99
8/20/99
9/3/99
9/17/99
10/1/99
10/15/99
10/29/99
OIL
GAS
WTR


Logan 35 B Federal #9
(Yeso)
1000
100
10
1
1/31/99
2/14/99
2/28/99
3/14/99
3/28/99
4/11/99
4/25/99
5/9/99
5/23/99
6/6/99
6/20/99
7/4/99
7/18/99
8/1/99
8/15/99
8/29/99
9/12/99
9/26/99
10/10/99
OIL
GAS
WTR

# DEVON ENERGY CORPORATION - WELLBORE SCHEMATIC

| | | | |
|---|---|---|---|
| WELL NAME: Eagle 34 J Federal #20 | | FIELD: Red Lake | |
| LOCATION: 1690' FSL & 1650' FEL, Section 34-17S-27E | | COUNTY: Eddy | STATE: NM |
| ELEVATION: GL = 3588' | | SPUD DATE: 10/17/97 | COMP DATE: 11/1/97 |
| API#: 30-015-29641 | PREPARED BY: T. Rutelonis | | DATE: 2/8/00 |

| | DEPTH | SIZE | WEIGHT | GRADE | THREAD | HOLE SIZE |
|---|---|---|---|---|---|---|
| CASING: | 0' - 1145' | 8-5/8" | 24# | J-55 | | 12-1/4" |
| CASING: | 0' - 2699' | 5 1/2" | 15.5# | J-55 | | 7-7/8" |
| LINER: | 2600' - 4000' | 4" | 10.46# | J-55 | FL4S | 4-3/4" |
| TUBING: | 0' - 2530' | 2-7/8" | | | | |
| TUBING: | | | | | | |



☐ CURRENT ▦ PROPOSED

**OPERATOR: DEVON ENERGY CORPORATION**

8-5/8" Casing, Set @ 1145' w/ 550 sxs cmt. TOC @ surface

**SAN ANDRES PERFORATIONS:**
**1940'-2420'**

2-7/8" tbg w/ SN @ 2530'

TOL @ 2600'
5 1/2" 15.5# J-55 Casing Set @ 2699' w/ 525 sxs cmt. TOC @ surf.

**YESO PERFORATIONS:**
**±2850'- ±3150' (20 HOLES, .38")**

TD @ 4000'

Form 3160-4
(October 1990)

# UNITED STATES
# DEPARTMENT OF THE INTERIOR
## BUREAU OF LAND MANAGEMENT

SUBMIT IN DUPLICATE* OPERATOR'S COPY

FORM APPROVED

FILE COPY

(See other instructions on reverse side)

## WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

1a. TYPE OF WELL: OIL WELL ☒ GAS WELL ☐ DRY ☐ Other

b. TYPE OF COMPLETION: NEW WELL ☒ WORK OVER ☐ DEEP-EN ☐ PLUG BACK ☐ DIFF. RESVR ☐ Other

2. NAME OF OPERATOR
DEVON ENERGY CORPORATION (NEVADA)

3. ADDRESS AND TELEPHONE NO.
20 N. BROADWAY, SUITE 1500, OKC, OK 73102-8260 (405) 235-3611

4. LOCATION OF WELL (*Report location clearly and in accordance with any State requirements*)*
At surface 1690' FSL & 1650' FEL; Unit "J"

At top prod. interval reported below (SAME)

At total depth (SAME)

5. LEASE DESIGNATION AND SERIAL NO.: NM-0557370
6. IF INDIAN, ALLOTTEE OR TRIBE NAME: NA
7. UNIT AGREEMENT NAME: NA
8. FARM OR LEASE NAME, WELL NO.: Eagle "34J" Federal #20
9. API WELL NO.: 30-015-29641
10. FIELD AND POOL, OR WILDCAT: Red Lake (Q0GB-SA)
11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA: "J" Section 34-17S-27E

| 14. PERMIT NO. | DATE ISSUED | 12. COUNTY OR PARISH | 13. STATE |
|---|---|---|---|
| | 6/3/97 | Eddy County | NM |

| 15. DATE SPUDDED | 16. DATE T.D. REACHED | 17. DATE COMPL. (*Ready to prod.*) | 18. ELEVATIONS (DF, RKB, RT, GR, ETC.)* | 19. ELEV. CASINGHEAD |
|---|---|---|---|---|
| 10/17/97 | 10/22/97 | 11/1/97 | KB 3597', GL 3588', DF 3596' | |

| 20. TOTAL DEPTH, MD & TVD | 21. PLUG, BACK T.D., MD & TVD | 22. IF MULTIPLE COMPL., HOW MANY* | 23. INTERVALS DRILLED BY | ROTARY TOOLS | CABLE TOOLS |
|---|---|---|---|---|---|
| 2700' | 2651' | NA | → | X | |

24. PRODUCING INTERVAL(S), OF THIS COMPLETION-TOP, BOTTOM, NAME (MD AND TVD)*
San Andres - 1940-2420'

25. WAS DIRECTIONAL SURVEY MADE: No

26. TYPE ELECTRIC AND OTHER LOGS RUN
LDT/CNL/DLL/MSFL/GR; CBL

27. WAS WELL CORED: No

28. CASING RECORD (Report all strings set in well)

| CASING SIZE/GRADE | WEIGHT, LB./FT. | DEPTH SET (MD) | HOLE SIZE | TOP OF CEMENT, CEMENTING RECORD | AMOUNT PULLED |
|---|---|---|---|---|---|
| 8-5/8" J-55 | 24# | 1145' | 12-1/4" | surf; 350 sxs lite & 200 sxs "C" | NA |
| 5-1/2" J-55 | 15.5# | 2699' | 7-7/8" | surf; 150 sxs lite C & 375 sxs "C" | NA |
| | | | | | |
| | | | | | |

29. LINER RECORD

| SIZE | TOP (MD) | BOTTOM (MD) | SACKS CEMENT* | SCREEN (MD) |
|---|---|---|---|---|
| | | | | |
| | | | | |

30. TUBING RECORD

| SIZE | DEPTH SET (MD) | PACKER SET (MD) |
|---|---|---|
| 2-7/8" | 2101' | (OET) |
| | | |

31. PERFORATION RECORD (*Interval, size and number*)
*1940-1986' ALPHA (6 -.40" EHD holes)*
*2086-2143' "A" (3 -.40" EHD holes)*
*2168-2266' "B" (7 -.40" EHD holes)*
*2282-2328' "C" (8 -.40" EHD holes)*
*2350-2420' "D" (6 -.40" EHD holes)*

32. ACID SHOT, FRACTURE, CEMEMNT SQUEEZE, ETC.

| DEPTH INTERVAL (MD) | AMOUNT AND KIND OF MATERIAL USED |
|---|---|
| 1940-2420' | 2500 gals of 15% NeFe acid |
| 1940-2420' | 180,000 gals gel water + 6000# 100 mesh sand + 300,000# 20/40 Brady sand |
| | |

ACCEPTED FOR RECORD
JAN 08 1998
(ORIG. SGD.) GARY GOURLEY

33.* PRODUCTION

| DATE FIRST PRODUCTION | PRODUCTIONS METHOD (*Flowing, gas lift, pumping—size and type of pump*) | WELL STATUS (*Producing or shut-in*) |
|---|---|---|
| 11/6/97 | Pumping (2-1/2" x 2" x 12' RWTC Pump) | Producing |

| DATE OF TEST | HOURS TESTED | CHOKE SIZE | PROD'N FOR TEST PERIOD → | OIL—BBL. | GAS—MCF. | WATER—BBL. | GAS-OIL RATIO |
|---|---|---|---|---|---|---|---|
| 11/17/97 | 24 | NA | | 91 | 91 | 294 | 1000/1 |

| FLOW. TUBING PRESS. | CASING PRESSURE | CALCULATED 24-HOUR RATE → | OIL—BBL. | GAS—MCF. | WATER—BBL. | OIL GRAVITY-API (CORR.) |
|---|---|---|---|---|---|---|
| | | | 91 | 91 | 294 | 38° |

34. DISPOSITION OF GAS (*Sold, used for fuel, vented, etc.*)
Sold

TEST WITNESSED BY: Danny Hokett

35. LIST OF ATTACHMENTS
Logs, Deviation Surveys

RECEIVED
JAN 09 1997

36. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records.

SIGNED Diana Keys By DIANA KEYS TITLE ~~ENGINEERING~~ TECHNICIAN DATE December 8, 1997

DISTRIBUTED 1-9-98

*(See Instructions and Spaces for Additional Data on Reverse Side)

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

BAKER HUGHES
Baker Petrolite

**Analysis: 24190**

# Water Analysis Report from Baker Petrolite

| Summary of Mixing Waters | | |
|---|---|---|
| ***Sample Number*** | **133534** | **112098** |
| **Company** | DEVON ENERGY | DEVON ENERGY |
| **Lease** | HAWK 8 | HAWK "8" |
| **Well** | WELL # 3 yeso | BATTERY SAN ANDRES |
| **Sample Location** | WELLHEAD | FWKO |
| ***Anions (mg/L)*** | | |
| **Chloride** | 106,253 | 99,569 |
| **Bicarbonate** | 573 | 497 |
| **Carbonate** | 0.00 | 0.00 |
| **Sulfate** | 3,912 | 4,489 |
| **Phosphate** | 0.00 | 0.00 |
| **Borate** | 0.00 | 0.00 |
| **Silicate** | 0.00 | 0.00 |
| ***Cations (mg/L)*** | | |
| **Sodium** | 67,918 | 63,725 |
| **Magnesium** | 369 | 509 |
| **Calcium** | 1,749 | 1,770 |
| **Strontium** | 36.0 | 49.0 |
| **Barium** | 0.06 | 0.10 |
| **Iron** | 48.0 | 0.40 |
| **Potassium** | 523 | 269 |
| **Aluminum** | 0.00 | 0.00 |
| **Chromium** | 0.00 | 0.00 |
| **Copper** | 0.00 | 0.00 |
| **Lead** | 0.00 | 0.00 |
| **Manganese** | 0.00 | 0.00 |
| **Nickel** | 0.00 | 0.00 |
| **Anion/Cation Ratio** | ***1.00*** | ***1.00*** |
| **TDS (mg/L)** | 181,381 | 170,877 |
| **Density (g/cm)** | 1.12 | 1.11 |
| **Sampling Date** | 10/26/99 | 7/28/99 |
| **Account Manager** | CURRY PRUIT | CURRY PRUIT |
| **Analyst** | JOANNA RAGAN | JOANNA RAGAN |
| **Analysis Date** | | 8/4/99 |
| **pH at time of sampling** | 5.90 | 7.90 |
| **pH at time of analysis** | | |
| **pH used in Calculations** | **5.90** | **7.90** |

BAKER HUGHES
Baker Petrolite

**Analysis: 24190**

# Water Analysis Report from Baker Petrolite

**Mixes at 80°F and 0 psi**

***Predictions of Carbon Dioxide Pressure, Saturation Index and Amount of Scale in lb/1000bbl***

| Mix Waters | | $CO_2$ | Calcite $CaCO_3$ | | Gypsum $CaSO_4 \cdot 2H_2O$ | | Anhydrite $CaSO_4$ | | Celestite $SrSO_4$ | | Barite $BaSO_4$ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 133534 | 112098 | psi | Index | Amount | Index | Amount | Index | Amount | Index | Amount | Index | Amount |
| 100% | 0% | 5.52 | -0.31 | | -0.20 | | -0.18 | | -0.21 | | 0.13 | 0.01 |
| 90% | 10% | 4.90 | -0.27 | | -0.19 | | -0.17 | | -0.18 | | 0.17 | 0.01 |
| 80% | 20% | 4.30 | -0.22 | | -0.18 | | -0.16 | | -0.16 | | 0.20 | 0.01 |
| 70% | 30% | 3.70 | -0.17 | | -0.17 | | -0.16 | | -0.14 | | 0.23 | 0.02 |
| 60% | 40% | 3.10 | -0.10 | | -0.17 | | -0.15 | | -0.12 | | 0.26 | 0.02 |
| 50% | 50% | 2.51 | -0.01 | | -0.16 | | -0.14 | | -0.10 | | 0.29 | 0.02 |
| 40% | 60% | 1.92 | 0.09 | 7.5 | -0.15 | | -0.14 | | -0.08 | | 0.32 | 0.02 |
| 30% | 70% | 1.34 | 0.24 | 16.9 | -0.15 | | -0.13 | | -0.06 | | 0.35 | 0.03 |
| 20% | 80% | 0.78 | 0.46 | 26.8 | -0.14 | | -0.13 | | -0.04 | | 0.38 | 0.03 |
| 10% | 90% | 0.27 | 0.89 | 37.5 | -0.14 | | -0.12 | | -0.02 | | 0.40 | 0.03 |
| 0% | 100% | 0.05 | 1.51 | 48.8 | -0.13 | | -0.12 | | 0.00 | 0.18 | 0.43 | 0.03 |

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: $CO_2$ Pressure is absolute pressure. Total Pressure is gauge pressure.

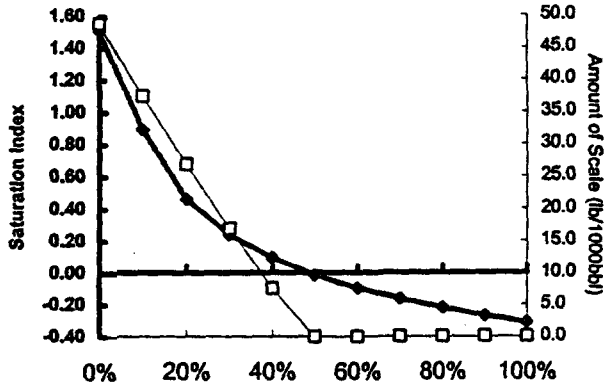
BAKER HUGHES
Baker Petrolite

# Mixture Predictions from Baker-Petrolite

**133534 with 112098 at 80°F and 0 psi**

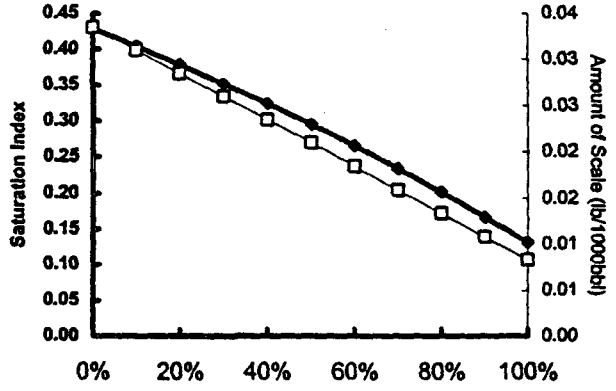
**Analysis: 24190**

### Calcite - $CaCO_3$



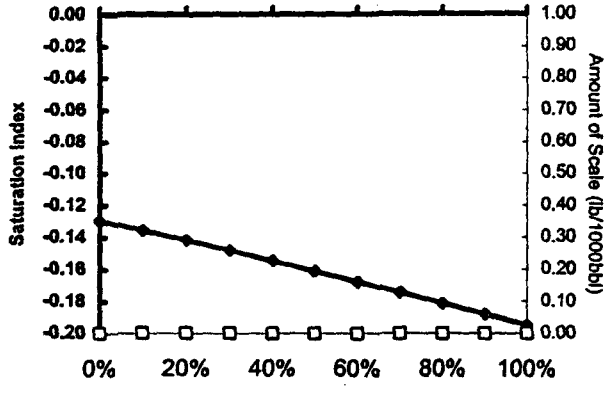

133534

### Barite - $BaSO_4$



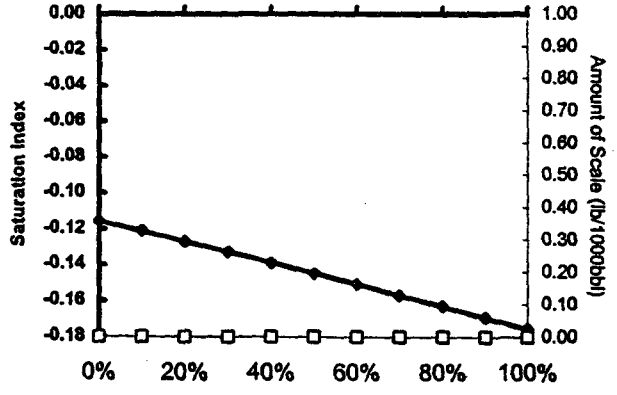

133534

### Gypsum - $CaSO_4 \cdot 2H_2O$



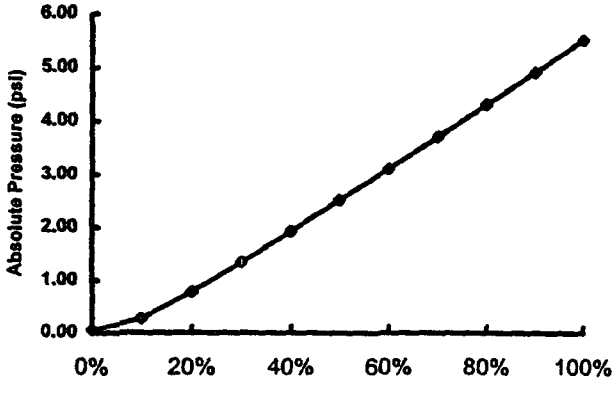

133534

### Anhydrite - $CaSO_4$



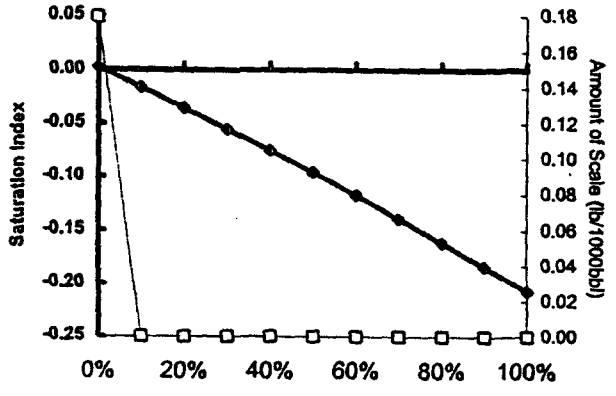

133534

### Carbon Dioxide Partial Pressure




133534

### Celestite - $SrSO_4$




133534

BAKER HUGHES
Baker Petrolite

**Analysis: 24190**

# Water Analysis Report from Baker Petrolite

**Mixes at 100°F and 0 psi**

***Predictions of Carbon Dioxide Pressure, Saturation Index and Amount of Scale in lb/1000bbl***

| Mix Waters | | $CO_2$ | Calcite $CaCO_3$ | | Gypsum $CaSO_4 \cdot 2H_2O$ | | Anhydrite $CaSO_4$ | | Celestite $SrSO_4$ | | Barite $BaSO_4$ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 133534 | 112098 | psi | Index | Amount | Index | Amount | Index | Amount | Index | Amount | Index | Amount |
| 100% | 0% | 6.73 | -0.22 | | -0.27 | | -0.19 | | -0.24 | | -0.08 | |
| 90% | 10% | 5.99 | -0.18 | | -0.27 | | -0.18 | | -0.22 | | -0.04 | |
| 80% | 20% | 5.25 | -0.13 | | -0.26 | | -0.18 | | -0.19 | | -0.01 | |
| 70% | 30% | 4.52 | -0.07 | | -0.25 | | -0.17 | | -0.17 | | 0.03 | 0.00 |
| 60% | 40% | 3.80 | -0.00 | | -0.25 | | -0.16 | | -0.15 | | 0.06 | 0.01 |
| 50% | 50% | 3.08 | 0.08 | 7.2 | -0.24 | | -0.16 | | -0.13 | | 0.09 | 0.01 |
| 40% | 60% | 2.37 | 0.18 | 15.2 | -0.23 | | -0.15 | | -0.11 | | 0.12 | 0.01 |
| 30% | 70% | 1.67 | 0.32 | 23.8 | -0.22 | | -0.14 | | -0.09 | | 0.15 | 0.01 |
| 20% | 80% | 0.99 | 0.53 | 32.8 | -0.22 | | -0.14 | | -0.07 | | 0.17 | 0.02 |
| 10% | 90% | 0.40 | 0.89 | 42.5 | -0.21 | | -0.13 | | -0.05 | | 0.20 | 0.02 |
| 0% | 100% | 0.11 | 1.37 | 53.0 | -0.20 | | -0.12 | | -0.03 | | 0.22 | 0.02 |

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: $CO_2$ Pressure is absolute pressure. Total Pressure is gauge pressure.

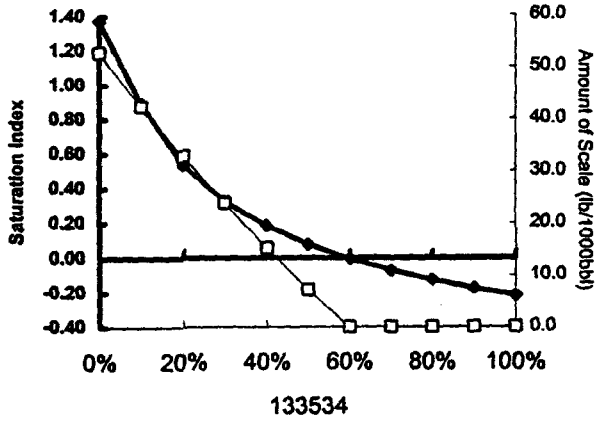
BAKER HUGHES
Baker Petrolite

# Mixture Predictions from Baker-Petrolite

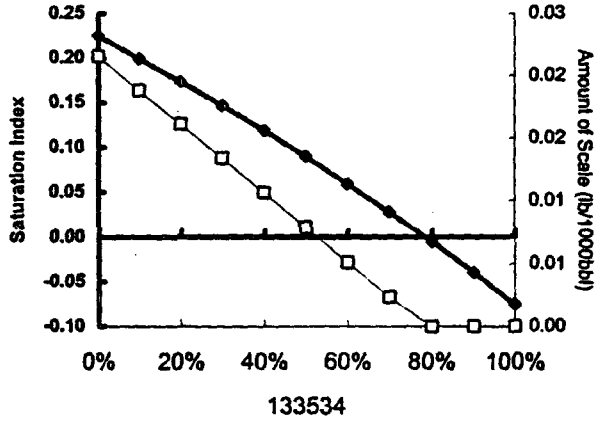
**133534 with 112098 at 100°F and 0 psi**

**Analysis: 24190**

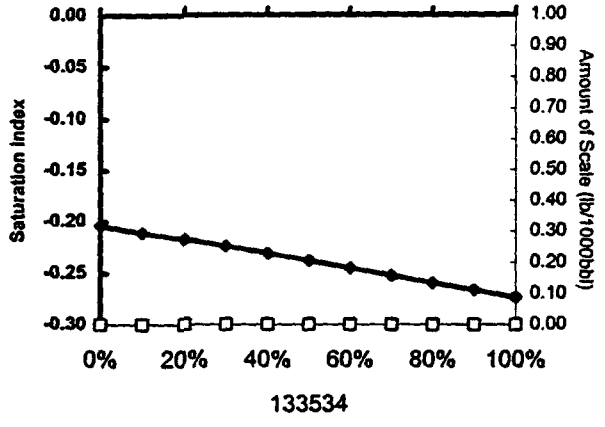
### Calcite - $CaCO_3$



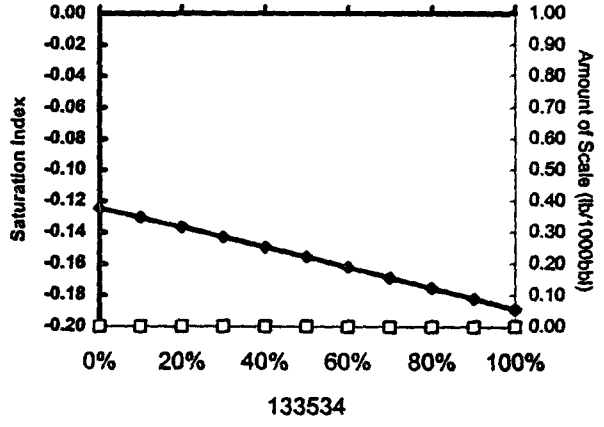

### Barite - $BaSO_4$



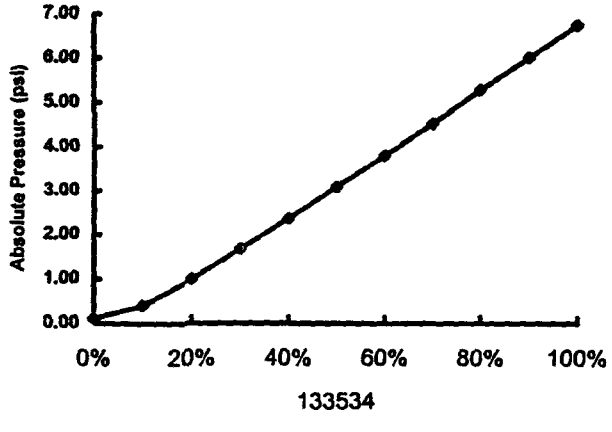

### Gypsum - $CaSO_4 \cdot 2H_2O$



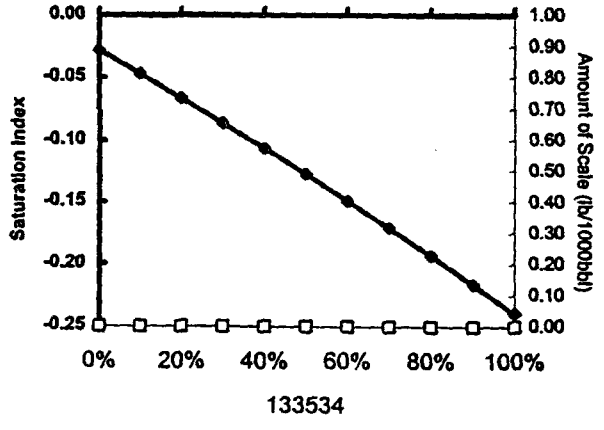

### Anhydrite - $CaSO_4$




### Carbon Dioxide Partial Pressure




### Celestite - $SrSO_4$



BAKER HUGHES
Baker Petrolite

**Analysis: 24190**

# Water Analysis Report from Baker Petrolite

**Mixes at 120°F and 0 psi**

| *Predictions of Carbon Dioxide Pressure, Saturation Index and Amount of Scale in lb/1000bbl* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mix Waters | | $CO_2$ | Calcite $CaCO_3$ | | Gypsum $CaSO_4 \cdot 2H_2O$ | | Anhydrite $CaSO_4$ | | Celestite $SrSO_4$ | | Barite $BaSO_4$ | |
| 133534 | 112098 | psi | Index | Amount | Index | Amount | Index | Amount | Index | Amount | Index | Amount |
| 100% | 0% | 7.93 | -0.12 | | -0.34 | | -0.18 | | -0.26 | | -0.26 | |
| 90% | 10% | 7.06 | -0.08 | | -0.33 | | -0.17 | | -0.24 | | -0.22 | |
| 80% | 20% | 6.20 | -0.03 | | -0.33 | | -0.16 | | -0.21 | | -0.19 | |
| 70% | 30% | 5.34 | 0.02 | 2.7 | -0.32 | | -0.16 | | -0.19 | | -0.15 | |
| 60% | 40% | 4.49 | 0.09 | 9.2 | -0.31 | | -0.15 | | -0.17 | | -0.12 | |
| 50% | 50% | 3.65 | 0.17 | 16.1 | -0.30 | | -0.14 | | -0.15 | | -0.09 | |
| 40% | 60% | 2.83 | 0.27 | 23.3 | -0.30 | | -0.13 | | -0.13 | | -0.06 | |
| 30% | 70% | 2.01 | 0.41 | 31.0 | -0.29 | | -0.13 | | -0.11 | | -0.03 | |
| 20% | 80% | 1.24 | 0.60 | 39.2 | -0.28 | | -0.12 | | -0.09 | | -0.01 | |
| 10% | 90% | 0.58 | 0.90 | 47.9 | -0.27 | | -0.11 | | -0.07 | | 0.02 | 0.00 |
| 0% | 100% | 0.20 | 1.26 | 57.4 | -0.27 | | -0.11 | | -0.05 | | 0.04 | 0.01 |

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: $CO_2$ Pressure is absolute pressure. Total Pressure is gauge pressure.

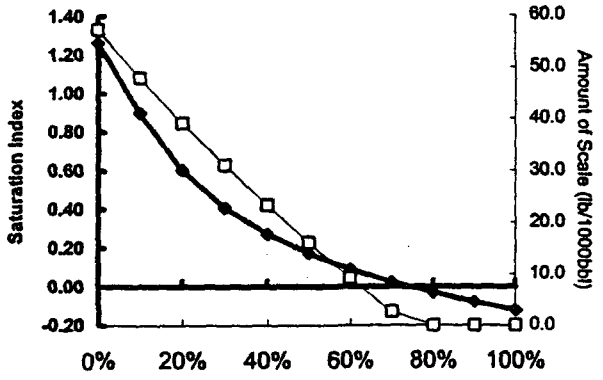
BAKER HUGHES
Baker Petrolite

# Mixture Predictions from Baker-Petrolite

**133534 with 112098 at 120°F and 0 psi**

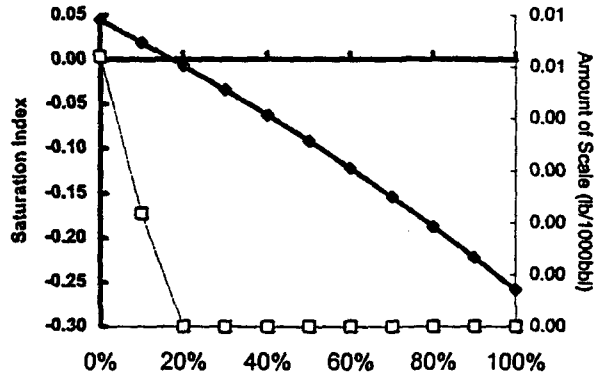
**Analysis: 24190**

### Calcite - $CaCO_3$



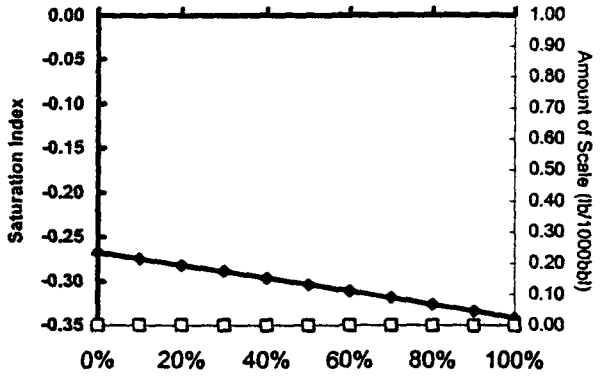

133534

### Barite - $BaSO_4$



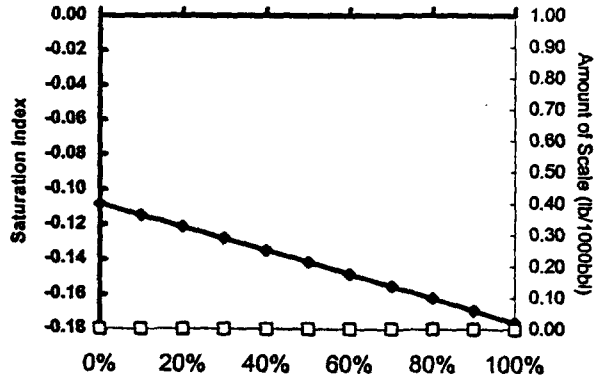

133534

### Gypsum - $CaSO_4 \cdot 2H_2O$



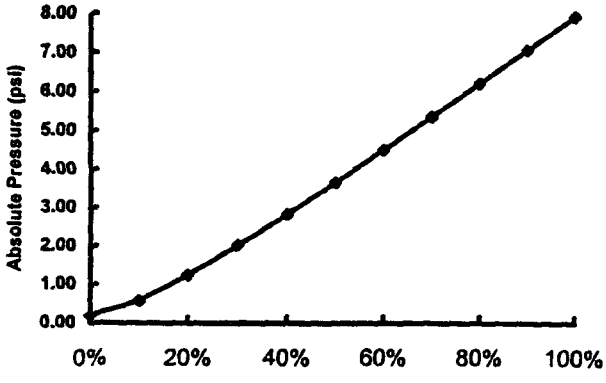

133534

### Anhydrite - $CaSO_4$



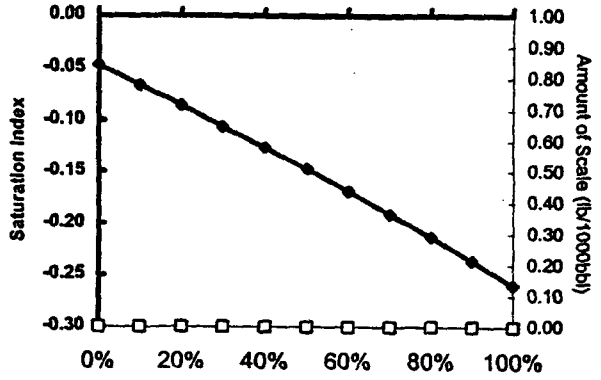

133534

### Carbon Dioxide Partial Pressure




133534

### Celestite - $SrSO_4$




133534

BAKER HUGHES
Baker Petrolite

**Analysis: 24190**

# Water Analysis Report from Baker Petrolite

**Mixes at 140°F and 0 psi**

| *Predictions of Carbon Dioxide Pressure, Saturation Index and Amount of Scale in lb/1000bbl* | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mix Waters | | $CO_2$ | Calcite $CaCO_3$ | | Gypsum $CaSO_4 \cdot 2H_2O$ | | Anhydrite $CaSO_4$ | | Celestite $SrSO_4$ | | Barite $BaSO_4$ | |
| 133534 | 112098 | psi | Index | Amount | Index | Amount | Index | Amount | Index | Amount | Index | Amount |
| 100% | 0% | 9.05 | -0.02 | | -0.40 | | -0.14 | | -0.27 | | -0.42 | |
| 90% | 10% | 8.07 | 0.02 | 2.7 | -0.39 | | -0.13 | | -0.25 | | -0.38 | |
| 80% | 20% | 7.09 | 0.07 | 8.0 | -0.38 | | -0.13 | | -0.22 | | -0.35 | |
| 70% | 30% | 6.13 | 0.13 | 13.5 | -0.38 | | -0.12 | | -0.20 | | -0.31 | |
| 60% | 40% | 5.17 | 0.19 | 19.3 | -0.37 | | -0.11 | | -0.18 | | -0.28 | |
| 50% | 50% | 4.22 | 0.27 | 25.4 | -0.36 | | -0.11 | | -0.16 | | -0.25 | |
| 40% | 60% | 3.29 | 0.37 | 31.9 | -0.35 | | -0.10 | | -0.14 | | -0.22 | |
| 30% | 70% | 2.38 | 0.49 | 38.7 | -0.34 | | -0.09 | | -0.12 | | -0.19 | |
| 20% | 80% | 1.53 | 0.66 | 46.0 | -0.34 | | -0.08 | | -0.10 | | -0.17 | |
| 10% | 90% | 0.80 | 0.90 | 53.8 | -0.33 | | -0.08 | | -0.08 | | -0.14 | |
| 0% | 100% | 0.34 | 1.18 | 62.3 | -0.32 | | -0.07 | | -0.06 | | -0.11 | |

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: $CO_2$ Pressure is absolute pressure. Total Pressure is gauge pressure.

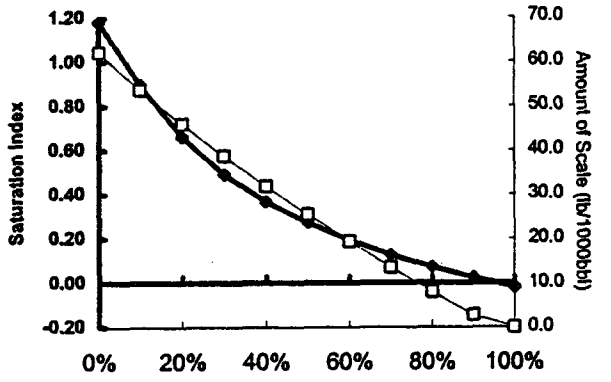
BAKER HUGHES
Baker Petrolite

# Mixture Predictions from Baker-Petrolite

**133534 with 112098 at 140°F and 0 psi**

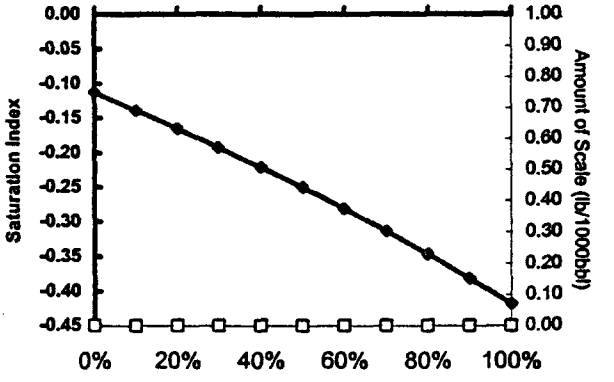
**Analysis: 24190**

### Calcite - $CaCO_3$



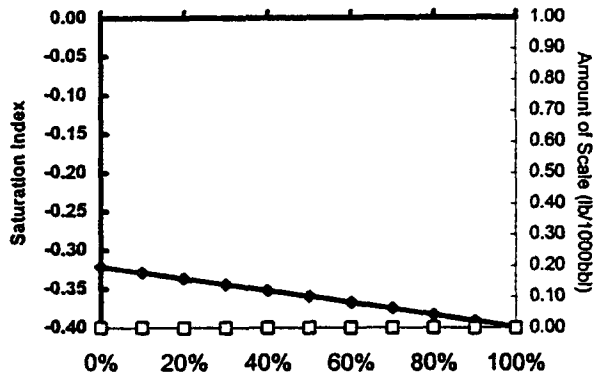

133534

### Barite - $BaSO_4$



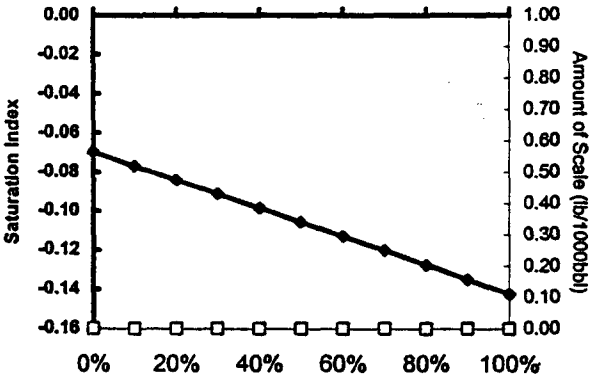

133534

### Gypsum - $CaSO_4 \cdot 2H_2O$



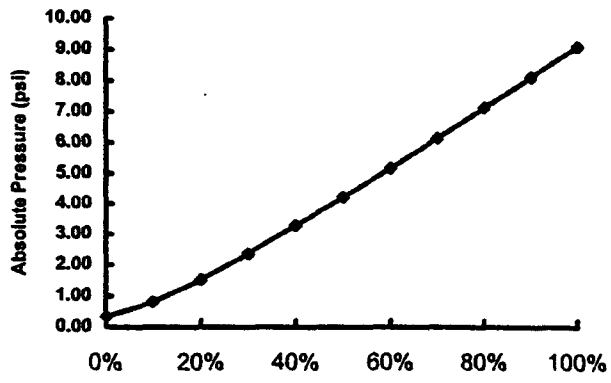

133534

### Anhydrite - $CaSO_4$



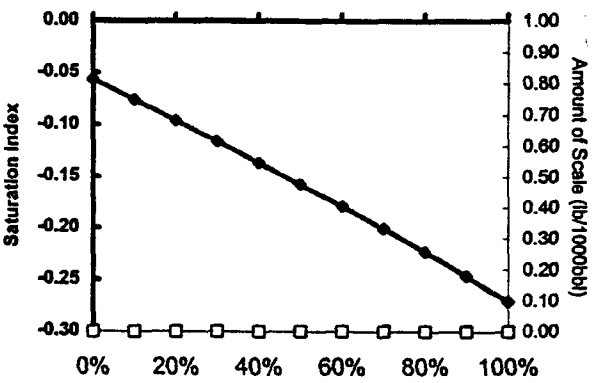

133534

### Carbon Dioxide Partial Pressure




133534

### Celestite - $SrSO_4$




133534

Mobile Analytical Laboratories
LABORATORIES IN ODESSA, GIDDINGS & STACY DAM
WEST UNIVERSITY AND WESTOVER STREET
P.O. BOX 69219
ODESSA, TEXAS 79769-0219
PHONE 337-4744
FAX 337-4781

SEPTEMBER 16, 1996

MR. ROLLAND W. PERRY
LABORATORY SERVICES
1331 TASKER DR.
HOBBS, NEW MEXICO 88240

DEAR MR. PERRY:

THE FOLLOWING ARE THE RESULTS OF THE SEVEN OIL SAMPLES FOR SULFUR CONTENT AND GRAVITY, SAMPLED 09/14/96, RECEIVED 09/15/96, LAB NOS. 1483-1489:

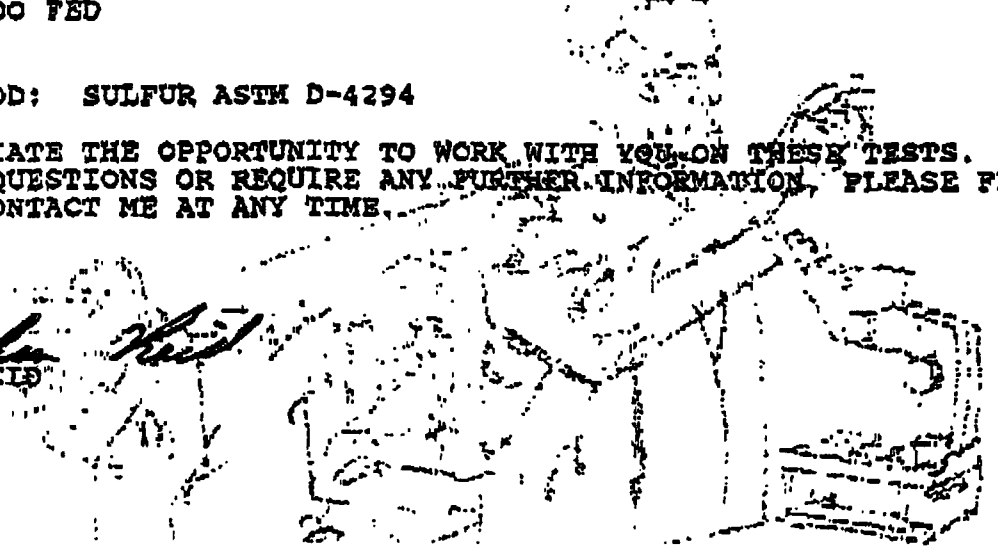
| | SULFUR | API GRAVITY @ 60 °F | SPECIFIC GRAVITY @ 60 °F |
|---|---|---|---|
| LAB NO. 1483: DEVON HAWK #8-1 | 1.347 %wt | 31.3 | 0.8691 |
| LAB NO. 1484: DEVON HAWK #8-3 | 0.684 %wt | 41.3 | 0.8188 |
| LAB NO. 1485: DEVON HAWK #8-11 | 0.700 %wt | 35.1 | 0.8492 |
| LAB NO. 1486: DEVON HAWK #8-4 | 0.643 %wt | 37.4 | 0.8380 |
| SAN ANDRES LAB NO. 1487: DEVON HAWK #8-5 | 0.609 %wt | 39.5 | 0.8275 |
| LAB NO. 1488: DEVON WEST RED LAKE | 0.690 %wt | 39.0 | 0.8299 |
| LAB NO. 1489: DEVON HONDO FED | 0.522 %wt | 38.2 | 0.8338 |

TEST METHOD: SULFUR ASTM D-4294

WE APPRECIATE THE OPPORTUNITY TO WORK WITH YOU ON THESE TESTS. IF YOU HAVE ANY QUESTIONS OR REQUIRE ANY FURTHER INFORMATION, PLEASE FEEL FREE TO CONTACT ME AT ANY TIME.

SINCERELY,

STEPHEN REID
SR/dt



Laboratory Services, Inc.
4016 Fiesta Drive
Hobbs, New Mexico 88240
Telephone: (505) 397-3713

# SULFUR IN CRUDE OIL

Devon Energy
P. O. Box 240
Artesia, New Mexico 88211-0250

Dec 15, 1999

YESO OIL Samples

| | Total Sulfur | API Gravity @ 60° F | Specific Gravity @ 60° F |
|---|---|---|---|
| Hawk 8-3 | 0.4116 wt. % | 42.6 | 0.8128 |
| Eagle 83.9 | 0.4382 wt. % | 37.3 | 0.8383 |
| Logan 35-9 | 0.4752 wt. % | 41.8 | 0.8165 |
| Logan 35-14 | 0.4430 wt. % | 41.8 | 0.8165 |

Thank You,
Rolland Perry