



STATE OF NEW MEXICO  
ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION  
AZTEC DISTRICT OFFICE

1000 RIO BRAZOS ROAD  
AZTEC, NEW MEXICO 87410  
(505) 334-6178

OIL CONSERVATION DIVISION  
BOX 2088  
SANTA FE, NEW MEXICO 87501

DATE Dec. 9, 1984

RE: Proposed MC \_\_\_\_\_  
Proposed DHC ✓ \_\_\_\_\_  
Proposed NSL \_\_\_\_\_  
Proposed SWD \_\_\_\_\_  
Proposed WFX \_\_\_\_\_  
Proposed PMX \_\_\_\_\_

Gentlemen:

I have examined the application dated 11/14/84  
for the Southland Royalty Co. Wellbore #3 D-35-32N-12W  
Operator Lease and Well No. Unit, S-T-R

and my recommendations are as follows:

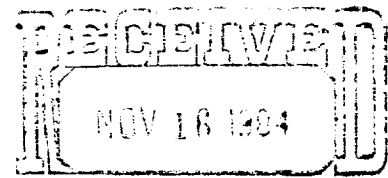
Approve  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Yours truly,

Frank J. Perry

CERTIFIED MAIL

November 14, 1984



OIL CONSERVATION DIVISION  
SANTA FE



**Southland Royalty Company**

Mr. Joe D. Ramey  
New Mexico Oil Conservation Division  
P.O. Box 2088  
Santa Fe, New Mexico 87501

RE: Downhole Commingling  
SRC - Hillstrom #3  
NW/4, Section 35, T32N, R12W  
San Juan County, New Mexico  
Fruitland/Pictured Cliffs

**RECEIVED**

DEC 07 1984

**OIL CON. DIV.**  
**DIST. 3**

Dear Mr. Ramey:

Southland Royalty Company requests permission to downhole commingle production from the Fruitland and Pictured Cliffs formations in this dual well. The Fruitland formation cannot continuously produce enough gas to lift the oil it produces. With the additional gas from the Pictured Cliffs formation, we feel that the Fruitland oil will be produced with fewer problems.

The gas produced from each zone is similar, and the Fruitland oil produced has no adverse effect on the Pictured Cliffs formation. Bottom hole pressures are similar for the two formations and there will be no crossflow between the zones, therefore no production will be lost.

Production allocation between the two zones was determined from the decline curves and cumulative production from each zone. Proposed allocation is as follows:

|                |                                     |
|----------------|-------------------------------------|
| Oil Production | 100% Fruitland                      |
| Gas Production | 95% Pictured Cliffs<br>5% Fruitland |

Royalty ownership in both zones of the well are identical. The well is currently producing and the deliverability tests were run in June 1984 and are included. In addition, copies of gas analysis from each zone, decline curves, production plats and miscellaneous data are included with this package for your information.

A copy of this application has also been sent to the Bureau of Land Management and all offset operators.

Sincerely,

  
Doug R. Harris  
Petroleum Engineer

DRH/eg

P.O. DRAWER 570 (505) 325-1841 FARMINGTON, NEW MEXICO 87401

Attachments

MISCELLANEOUS DATA

HILLSTROM #3

|                                           |         |
|-------------------------------------------|---------|
| Fruitland Bottom Hole Pressure            | 708 psi |
| Pictured Cliffs Bottom Hole Pressure      | 718     |
| Fruitland Oil Gravity                     | 47.8°   |
| BTU/cf at 14.73/60°/Dry (Fruitland)       | 1287    |
| BTU/cf at 14.73/60°/Dry (Pictured Cliffs) | 1176    |

RECEIVED  
DEPARTMENT  
OIL & GAS  
DIVISION

|                                |                |                              |                                  |                                          |                                          |
|--------------------------------|----------------|------------------------------|----------------------------------|------------------------------------------|------------------------------------------|
| KIMBARK<br>HESTON 11<br>(P.C.) | 44-102<br>0-0  |                              | 25-61<br>0-0                     | SRC<br>DECKER 5<br>(P.C.)                |                                          |
|                                | 27             |                              | 26                               | 25-59<br>0-0                             | SRC<br>DECKER 2A<br>(P.C.)               |
| KIMBARK<br>HESTON 12<br>(P.C.) | 108-109<br>0-0 |                              |                                  |                                          |                                          |
|                                |                | SEC<br>HILLSTROM 3<br>(P.C.) | 13-31 (PT)<br>103-75 (PT)<br>0-0 | MESA<br>STATG COM<br>515A                | 22-103 (PT)<br>0-0<br>22-105 (PT)<br>0-0 |
|                                | 34             |                              | 35                               | SEC<br>MESA 2<br>(P.C.)                  | 74-174<br>0-0                            |
|                                |                |                              |                                  | SEC<br>MESA 3<br>(P.C.)                  | 29-24 (PT)<br>3-7<br>33-43 (PT)<br>0-0   |
|                                |                | SEC<br>HILLSTROM<br>(P.C.)   | 79-178<br>0-0                    |                                          | MESA<br>STATG COM<br>A324G               |
|                                |                |                              |                                  |                                          | 50-92 (PT)<br>0-0                        |
|                                |                | SRC<br>DECKER A31<br>(P.C.)  | 71-535<br>0-0                    | SEC<br>PATTERSON<br>18 COM 1 R<br>(P.C.) | 26-47<br>0-0                             |
|                                |                | SRC<br>DECKER A4<br>(P.C.)   | 24-92<br>0-0                     | SEC<br>CAMPBELL<br>(P.C.)                | 4-58<br>0-0                              |
|                                | 3              |                              |                                  | 2                                        | SRC<br>DAVIS 19<br>(P.C.)                |
|                                |                | SRC<br>DAVIS 17<br>(P.C.)    | 145-321<br>0-0                   |                                          | SRC<br>DAVIS 16<br>(P.C.)                |
|                                |                |                              |                                  |                                          | 19-214<br>0-0                            |
| SRC<br>DAVIS 5A<br>(P.C.)      | 108-283<br>0-0 | 25-257<br>0-0                | SRC<br>PATTERSON<br>#3 (P.C.)    | 15-170<br>0-0                            | SRC<br>PATTERSON<br>#1 (P.C.)            |

31 N

|                           |      |                           |      |           |      |
|---------------------------|------|---------------------------|------|-----------|------|
| SOUTHLAND ROYALTY COMPANY |      |                           |      |           |      |
| HILLSTROM, # 3            |      | AREA<br>(FRUIT. - P. e.)  |      |           |      |
| (A) 35-32N                |      | LOCATION<br>-12W SAN JUAN |      |           |      |
| TYPE OF MAP               |      |                           |      |           |      |
| PRODUCTION                |      |                           |      |           |      |
| CONTOURED                 |      |                           |      |           | CL   |
| BY                        | DATE | REVISED BY                | DATE | REFERENCE | DATE |
| NOTES                     |      |                           |      |           |      |
| mcfB-mmcf                 |      |                           |      |           |      |
| BOPD-mB0 to 1-84          |      |                           |      |           |      |

## GAS ANALYSIS: TRANSCRIPTION OF TAPE FROM AUTOMATIC CHROMATOGRAPH

1

--NAME/LOCATION: 11/15/82  
STREAM NO. 4

--STATION NO. 929710

SPECIFIC GRAVITY 0.7338 BTU/CF 14.73/60F/DRY: 1286.6

| COMPONENT      | MOL %   | G.P.M. |
|----------------|---------|--------|
| CARBON DIOXIDE | 0.143   | 0.0000 |
| NITROGEN       | 0.401   | 0.0000 |
| METHANE        | 79.560  | 0.0000 |
| ETHANE         | 8.350   | 2.2340 |
| PROPANE        | 7.981   | 2.1970 |
| ISOBUTANE      | 1.258   | 0.4110 |
| N-BUTANE       | 1.468   | 0.4630 |
| ISOPENTANE     | 0.288   | 0.1050 |
| N-PENTANE      | 0.225   | 0.0810 |
| HEXANE +       | 0.343   | 0.1510 |
| TOTAL          | 100.017 | 5.6420 |

WELL # 9297-10/803 DUE: 9/00/82  
NAME: HILLSTROM 003 FRT  
RUN# 302 FREQ: 12 LAST BTU:  
DATE PULLED: 11/15/82 STREAM: 0  
DATE TESTED: 11/12/82 TIME: 1

\*\*\*\*\*NEW WELL-HEAD STATION\*\*\*\*\*

BTU MASTER WELL NO. 9297-10  
NAME ON BTU MASTER HILLSTROM 3  
LAST TEST DATE ON MASTER 00/00/00  
BTU FROM THAT TEST 0  
TEST FREQUENCY 12

TEST RUN: 15:49 17/11/82

(ECBTU/074)

SEE ~~TRD~~ RUN 14:11 @ 15:58

1

SOUTHERN UNION GATHERING COMPANY  
REPORT OF BTU TEST RESULTS

TO: SOUTHLAND ROYALTY CO (826)

REF: HILLSTROM 3 PC  
9329  
NORTHWEST NEW MEXICO ( 70)

DATE OF THIS TEST: 6/14/84  
DATE OF LAST TEST: 5/16/83  
TEST FREQUENCY: NOT SPECIFIED

RESULTS: SPECIFIC GRAVITY: 0.6646  
BTU/CF @ 14.73/60F/DRY: 1176.0

|                | MOL %   | G. P. M. |
|----------------|---------|----------|
| CARBON DIOXIDE | 0.143   | 0.0000   |
| NITROGEN       | 0.347   | 0.0000   |
| METHANE        | 86.480  | 0.0000   |
| ETHANE         | 7.410   | 10.9820  |
| PROPANE        | 3.478   | 0.9570   |
| ISOBUTANE      | 0.633   | 0.2070   |
| N-BUTANE       | 0.814   | 0.2560   |
| ISOPENTANE     | 0.285   | 0.1040   |
| N-PENTANE      | 0.185   | 0.0670   |
| HEXANE +       | 0.240   | 0.1050   |
|                | -----   | -----    |
| TOTAL          | 100.015 | 12.6780  |

## OIL CONSERVATION DIVISION

P. O. BOX 2088

SANTA FE, NEW MEXICO 87501

Form C-122-A  
Revised 10-1-78STATE OF NEW MEXICO  
ENERGY AND MINERALS DEPARTMENTWELL DELIVERABILITY TEST REPORT FOR 19 84

|                     |                       |                        |                    |
|---------------------|-----------------------|------------------------|--------------------|
| POOL NAME<br>Glades | POOL SLOPE<br>n = .85 | FORMATION<br>Fruitland | COUNTY<br>San Juan |
|---------------------|-----------------------|------------------------|--------------------|

|                                              |                                |                                        |                                           |                                                 |                           |
|----------------------------------------------|--------------------------------|----------------------------------------|-------------------------------------------|-------------------------------------------------|---------------------------|
| COMPANY<br>Southland Royalty Company         |                                |                                        | WELL NAME AND NUMBER<br>Hillstrom #3      |                                                 |                           |
| UNIT LETTER<br>D                             | SECTION<br>35                  | TOWNSHIP<br>32N                        | RANGE<br>12W                              | PURCHASING PIPELINE<br>Southern Union Gathering |                           |
| CASING O.D. - INCHES<br>4.5000               | CASING I.D. - INCHES<br>4.0520 | SET AT DEPTH - FEET<br>2999            | TUBING O.D. - INCHES                      | TUBING I.D. - INCHES                            | TOP - TUBING PERF. - FEET |
| GAS PAY ZONE<br>FROM 2430 TO 2602            |                                | WELL PRODUCING THRU<br>CASING X TUBING |                                           | GAS GRAVITY<br>.669                             | GRAVITY X LENGTH<br>1626  |
| DATE OF FLOW TEST<br>FROM 6-12-84 TO 6-19-84 |                                |                                        | DATE SHUT-IN PRESSURE MEASURED<br>6-26-84 |                                                 |                           |

## PRESSURE DATA - ALL PRESSURES IN PSIA

|                                             |                                                 |                                          |                                      |                                               |                                           |                                                              |
|---------------------------------------------|-------------------------------------------------|------------------------------------------|--------------------------------------|-----------------------------------------------|-------------------------------------------|--------------------------------------------------------------|
| (a) Flowing Casing Pressure (DWt)<br>450    | (b) Flowing Tubing Pressure (DWt)               | (c) Flowing Meter Pressure (DWt)<br>450  | (d) Flow Chart Static Reading<br>451 | (e) Meter Error (Item c - Item d)<br>-1       | (f) Friction Loss (a-c) or (b-c)<br>+0    | (g) Average Meter Pressure (Integr.)<br>429                  |
| (h) Corrected Meter Pressure (g + e)<br>428 | (i) Avg. Wellhead Press. $P_t = (h + f)$<br>428 | (j) Shut-in Casing Pressure (DWt)<br>608 | (k) Shut-in Tubing Pressure (DWt)    | (l) $P_c =$ higher value of (j) or (k)<br>608 | (m) Del. Pressure $P_d = 80\% P_c$<br>486 | (n) Separator or Dehydrator Pr. (DWt) for critical flow only |

## FLOW RATE CORRECTION (METER ERROR)

|                                |                                                            |                                                       |                                 |
|--------------------------------|------------------------------------------------------------|-------------------------------------------------------|---------------------------------|
| Integrated Volume - MCF/D<br>2 | Quotient of $\frac{\text{Item c}}{\text{Item d}}$<br>.9977 | $\sqrt{\frac{\text{Item c}}{\text{Item d}}}$<br>.9988 | Corrected Volume<br>Q = 2 MCF/D |
|--------------------------------|------------------------------------------------------------|-------------------------------------------------------|---------------------------------|

## WORKING PRESSURE CALCULATION

|                        |                               |                                                  |                   |                                 |                             |
|------------------------|-------------------------------|--------------------------------------------------|-------------------|---------------------------------|-----------------------------|
| $(1 - e^{-n})$<br>.112 | $(F_c Q_m)^2 (1000)$<br>.0087 | $R^2 = (1 - e^{-n}) (F_c Q_m)^2 (1000)$<br>.0010 | $P_t^2$<br>183184 | $P_w^2 = P_t^2 + R^2$<br>183184 | $P_w = \sqrt{P_w^2}$<br>428 |
|------------------------|-------------------------------|--------------------------------------------------|-------------------|---------------------------------|-----------------------------|

## DELIVERABILITY CALCULATION

|                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------|
| $D = Q \left[ \frac{P_c^2 - P_d^2}{P_c^2 - P_w^2} \right]^n = 2 \left[ \frac{133468}{186480} \right]^n = \frac{.7157}{.7525} = 2$ MCF/D |
|-----------------------------------------------------------------------------------------------------------------------------------------|

REMARKS:

## SUMMARY

|        |     |       |
|--------|-----|-------|
| Item h | 428 | Psia  |
| $P_c$  | 608 | Psia  |
| Q      | 2   | MCF/D |
| $P_w$  | 428 | Psia  |
| $P_d$  | 486 | Psia  |
| D      | 2   | MCF/D |

Southland Royalty Company

Company \_\_\_\_\_  
 By R. E. Fields  
 Title District Manager  
 Witnessed By \_\_\_\_\_  
 Company \_\_\_\_\_

SEP 24 1984

**NEW MEXICO OIL CONSERVATION COMMISSION**  
**WELL DELIVERABILITY TEST REPORT FOR 19 84**

Form C122-A  
 Revised 8-77

|                               |                              |                                     |                           |
|-------------------------------|------------------------------|-------------------------------------|---------------------------|
| POOL NAME<br><b>BLANCO PC</b> | POOL SLOPE<br><b>n = .85</b> | FORMATION<br><b>PICTURED CLIFFS</b> | COUNTY<br><b>SAN JUAN</b> |
|-------------------------------|------------------------------|-------------------------------------|---------------------------|

|                                                              |                                       |                                               |                                                   |                                                        |                                          |
|--------------------------------------------------------------|---------------------------------------|-----------------------------------------------|---------------------------------------------------|--------------------------------------------------------|------------------------------------------|
| COMPANY<br><b>SOUTHLAND ROYALTY</b>                          |                                       |                                               | WELL NAME AND NUMBER<br><b>HILLSTROM 3</b>        |                                                        |                                          |
| UNIT LETTER<br><b>D</b>                                      | SECTION<br><b>35</b>                  | TOWNSHIP<br><b>32N</b>                        | RANGE<br><b>12W</b>                               | PURCHASING PIPELINE<br><b>SOUTHERN UNION GATHERING</b> |                                          |
| CASING O.D. - INCHES<br><b>4.5000</b>                        | CASING I.D. - INCHES<br><b>4.0520</b> | SET AT DEPTH - FEET<br><b>2999</b>            | TUBING O.D. - INCHES<br><b>1.9000</b>             | TUBING I.D. - INCHES<br><b>1.6100</b>                  | TOP - TUBING PERF. - FEET<br><b>2838</b> |
| GAS PAY ZONE<br>FROM <b>2694</b> TO <b>2873</b>              |                                       | WELL PRODUCING THRU<br>CASING TUBING <b>X</b> |                                                   | GAS GRAVITY<br><b>.662</b>                             | GRAVITY X LENGTH<br><b>1879</b>          |
| DATE OF FLOW TEST<br>FROM <b>06/12/84</b> TO <b>06/19/84</b> |                                       |                                               | DATE SHUT-IN PRESSURE MEASURED<br><b>06/26/84</b> |                                                        |                                          |

**PRESSURE DATA - ALL PRESSURES IN PSIA**

|                                                  |                                                      |                                                |                                                 |                                                      |                                                    |                                                                            |
|--------------------------------------------------|------------------------------------------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------------|----------------------------------------------------|----------------------------------------------------------------------------|
| (a) Flowing Casing Pressure (DWt)<br><b>00</b>   | (b) Flowing Tubing Pressure (DWt)<br><b>451</b>      | (c) Flowing Meter Pressure (DWt)<br><b>449</b> | (d) Flow Chart Static Reading<br><b>451</b>     | (e) Meter Error (Item c - Item d)<br><b>2-</b>       | (f) Friction Loss (a-c) or (b-c)<br><b>2+</b>      | (g) Average Meter Pressure (Integr.)<br><b>444</b>                         |
| (h) Corrected Meter Pressure (g+e)<br><b>442</b> | (i) Avg. Wellhead Press. $P_i = (h+f)$<br><b>444</b> | (j) Shut-in Casing Pressure (DWt)<br><b>00</b> | (k) Shut-in Tubing Pressure (DWt)<br><b>610</b> | (l) $P_c$ = higher value of (i) or (k)<br><b>610</b> | (m) Del. Pressure $P_d = 80$ x $P_c$<br><b>488</b> | (n) Separator or Dehydrator Pr. (DWt) for critical flow only<br><b>---</b> |

**FLOW RATE CORRECTION (METER ERROR)**

|                                        |                                                                   |                                                              |                                         |
|----------------------------------------|-------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------|
| Integrated Volume - MCF/D<br><b>42</b> | Quotient of $\frac{\text{Item c}}{\text{Item d}}$<br><b>.9955</b> | $\sqrt{\frac{\text{Item c}}{\text{Item d}}}$<br><b>.9977</b> | Corrected Volume<br><b>Q = 42 MCF/D</b> |
|----------------------------------------|-------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------|

**WORKING PRESSURE CALCULATION**

|                             |                                    |                                                      |                           |                                         |                                    |
|-----------------------------|------------------------------------|------------------------------------------------------|---------------------------|-----------------------------------------|------------------------------------|
| $(1-e^{-3})$<br><b>.128</b> | $(F_c Q_m)^2 (1000)$<br><b>478</b> | $R^2 = - (1-e^{-3}) (F_c Q_m)^2 (1000)$<br><b>61</b> | $P_i^2$<br><b>197,136</b> | $P_w^2 = P_i^2 + R^2$<br><b>USE PT2</b> | $P_w = \sqrt{P_w^2}$<br><b>444</b> |
|-----------------------------|------------------------------------|------------------------------------------------------|---------------------------|-----------------------------------------|------------------------------------|

**DELIVERABILITY CALCULATION**

$$D = Q \left[ \frac{P_c^2 - P_d^2}{P_c^2 - P_w^2} \right]^n = \frac{42}{\left( \frac{133,956}{174,964} \right)^n} = \frac{.7656}{.7969} = 33 \text{ MCF/D}$$

REMARKS:

SUMMARY

Item h **442** Psia  
 $P_c$  **610** Psia  
 $Q$  **42** MCF/D  
 $P_w$  **444** Psia  
 $P_d$  **488** Psia  
 $D$  **33** MCF/D

Company **SOUTHLAND ROYALTY**  
 By **R. E. Fiddle**  
 Title **DISTRICT PRODUCTION MANAGER**  
 Witnessed By \_\_\_\_\_  
 Company \_\_\_\_\_

**SEP 24 1984**





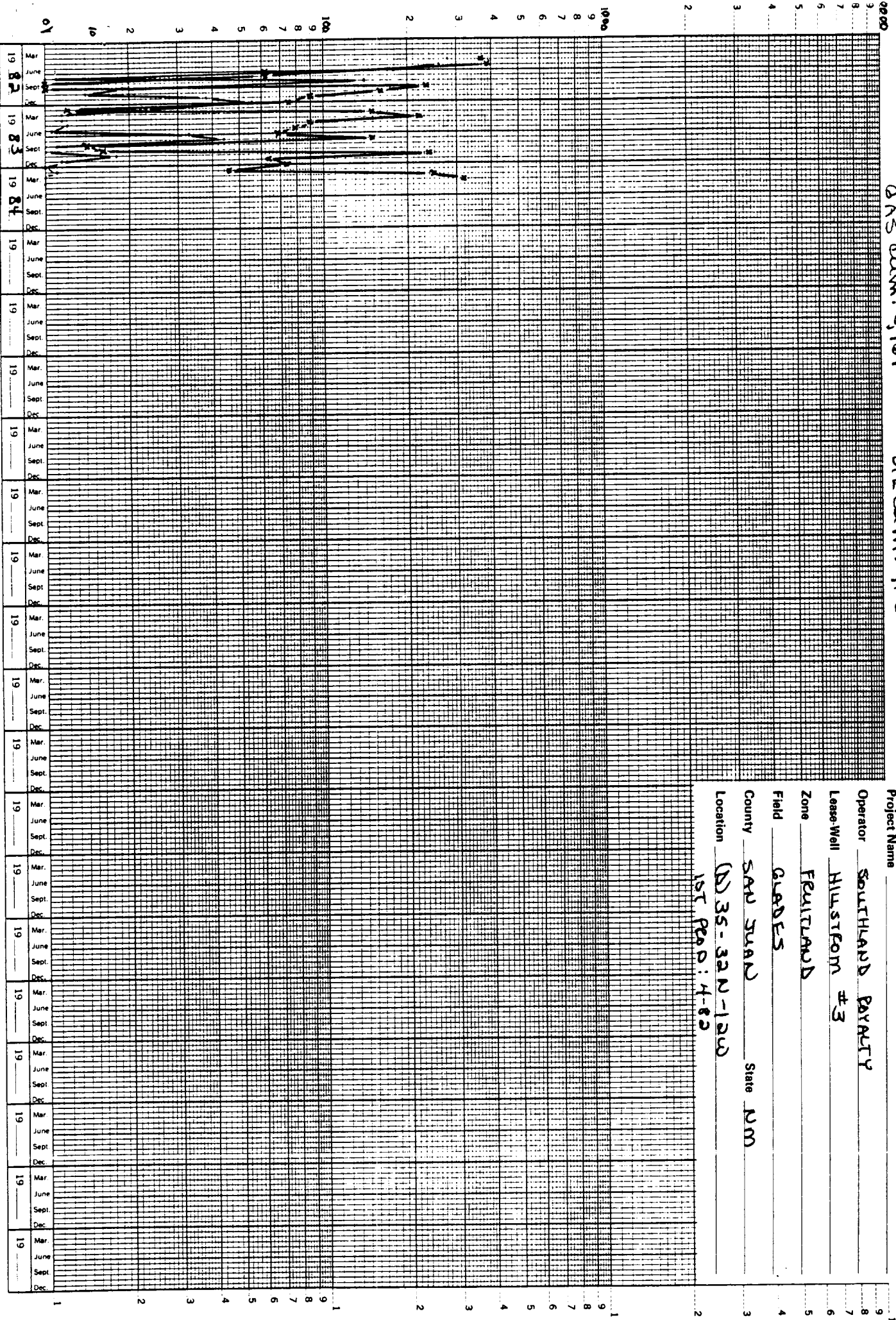
# Southland Royalty Company

X—X GAS  
— OIL

GAS cum: 3,161

OIL cum: 1,100

Project Name \_\_\_\_\_  
Operator SOUTHLAND ROYALTY  
Lease Well HUSTON #3  
Zone FRUITLAND  
Field GARDEN  
County SAN JUAN State NM  
Location (N) 35-32N-12W  
15T 2600: 4-82





# Southland Royalty Company

Gas cum: 83,162

Project Name \_\_\_\_\_

Operator SOUTHLAND ROYALTY

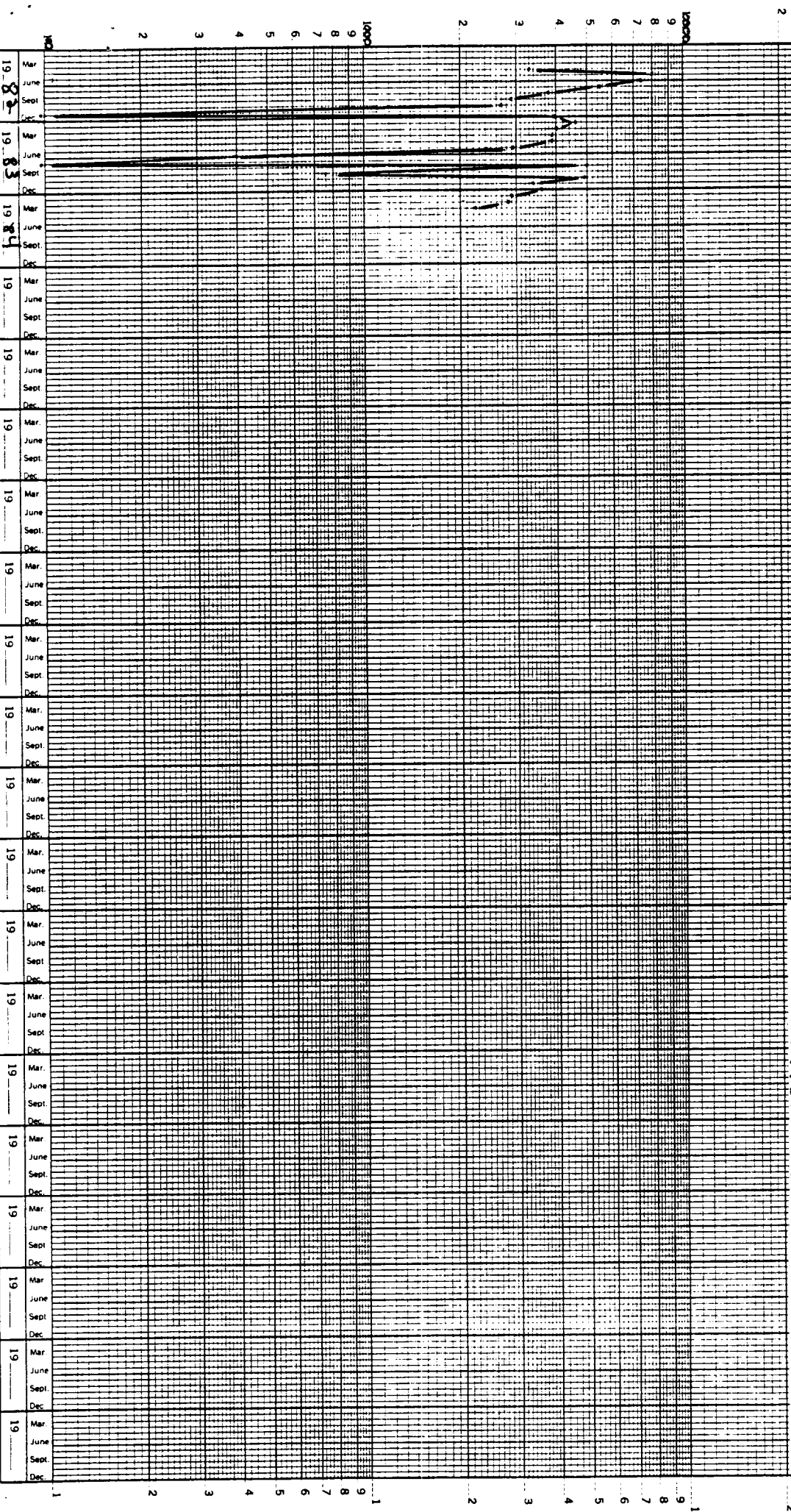
Lease-Well HILSTROM #3

Zone PICTURED CREEKS

Field BLANCO

County SAN JUAN State NM

Location (N) 35-32N-12W  
15T R600.4-82

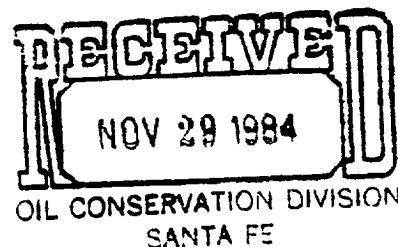




**Southland Royalty Company**

November 27, 1984

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



Re: Downhole Commingling  
SRC - Hillstrom #3 and Chamberlain #2  
San Juan County, New Mexico  
Fruitland/Pictured Cliffs

---

Dear Dave,

As per our telephone conversation on 11-16-84, a five day production test was run on the subject wells and is attached. If you need any more information, please feel free to contact me on this matter.

Thank you,

  
D. R. Harris  
Area Engineer

DRH/bgw

# 5 Day Deliverability Test

Hillstrom #3 - Blanco Pictured Cliffs

"D" 35-32-12

|          |           |                 |
|----------|-----------|-----------------|
| 11-17-84 | 94 MCF/D  | 79%             |
| 11-18-84 | 97 MCF/D  | 73%             |
| 11-19-84 | 131 MCF/D | 72%             |
| 11-20-84 | 65 MCF/D  | 65%             |
| 11-21-84 | 99 MCF/D  | 67%             |
|          |           | <u>71%</u> Avg. |

Hillstrom #3 - Glades Fruitland

"D" 35-32-12

|          |          |                 |
|----------|----------|-----------------|
| 11-17-84 | 24 MCF/D | 21%             |
| 11-18-84 | 33 MCF/D | 27%             |
| 11-19-84 | 52 MCF/D | 28%             |
| 11-20-84 | 35 MCF/D | 35%             |
| 11-21-84 | 49 MCF/D | 33%             |
|          |          | <u>29%</u> Avg. |

Chamberlain #2 - Blanco Pictured Cliffs

"A" 14-32-12

|          |           |                   |
|----------|-----------|-------------------|
| 11-17-84 | 73 MCF/D  | N/A               |
| 11-18-84 | 159 MCF/D | 79%               |
| 11-19-84 | 131 MCF/D | 81%               |
| 11-20-84 | 94 MCF/D  | 85%               |
| 11-21-84 | 104 MCF/D | 85%               |
|          |           | <u>82.5%</u> Avg. |

Chamberlain #2 - Undesignated Fruitland

"A" 14-32-12

|          |          |                   |
|----------|----------|-------------------|
| 11-17-84 | 0 MCF/D  | N/A               |
| 11-18-84 | 42 MCF/D | 21%               |
| 11-19-84 | 30 MCF/D | 19%               |
| 11-20-84 | 17 MCF/D | 15%               |
| 11-21-84 | 17 MCF/D | 15%               |
|          |          | <u>17.5%</u> Avg. |