DHC 4/15/99

ENERGEN
RESOURCES

RECEIVED
MAR 2 6 1999
OIL CONSERVATION

2280

March 25, 1999

Ms. Lori Wrotenberry
New Mexico Oil Conservation Division
2040 South Pacheco Street
Santa Fe, New Mexico 87505

RE: Administrative Approval to Downhole Commingle
Energen Resources Corporation
San Juan 32-5 Unit #17R Well
1620' FNL, 1045' FWL, Sec. 26, T32N, R6W, N.M.P.M.
Rio Arriba County, New Mexico

Dear Ms. Wrotenberry:

Energen Resources Corporation requests administrative approval to downhole commingle the Blanco Mesaverde and Basin Dakota pools in the subject well.

The subject well is being proposed as a commingled well to economically recover gas from both zones of the underlying proration unit. As this is to be a newly drilled well, we propose the attached allocation method. Field rules and the San Juan 32-5 Unit Operating Agreement, to which this well is dedicated, provide for 320 acre spacing units for both the Blanco Mesaverde and Basin Dakota formations.

To comply with New Mexico Oil Conservation Rules, Energen Resources Corporation is submitting the following data for your approval of the proposed commingling:

1. For C107A - Application for Downhole Commingling
2. C-102 - Location plat showing each spacing unit and dedicated acreage
3. Offset operator plat
4. Well location plat.
5. Proposed Allocation Method
6. Technical and Economic Support Data

In accordance to New Mexico Oil Conservation Division Rule 303C, all offset operators, working interest and royalty owners are being notified of this application by certified mail.

If additional information is needed, please contact me.

Sincerely,

Gary W. Brink
Production Superintendent

GWB/mt

cc: NMOCD - Aztec, BLM-Farmington
PRODUCT\OCD\SJ32-5U17R 3-99.DOC

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

State of New Mexico
Energy, Minerals and Natural Resources Department

# OIL CONSERVATION DIVISION

2040 S. Pacheco
Santa Fe, New Mexico 875054-6429

Form C-107-A
New 3-12-96

APPROVAL PROCESS:
X Administrative ___ Hearing

EXISTING WELLBORE
___YES X NO

## APPLICATION FOR DOWNHOLE COMMINGLING

ENERGEN RESOURCES CORPORATION — Operator
2198 Bloomfield Highway, Farmington, NM 87401 — Address

San Juan 32-5 Unit — Lease
17R — Well No.
E 26 32N 6W — Unit Ltr. - Sec - Twp - Rge
Rio Arriba — County

OGRID NO. 162928 Property Code _____ API NO. _____ Spacing Unit Lease Types: (check 1 or more) Federal X, 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 | Blanco MV<br>72329 | | Basin DK<br>71599 |
| 2. Top and Bottom of Pay Section (Perforations) | 4260 - 6050' | | 7913 - 8065' |
| 3. Type of production (Oil or Gas) | Gas | | Gas |
| 4. Method of Production (Flowing or Artificial Lift) | Flowing | | Flowing |
| 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) Not Yet Drilled<br>b. (Original) 1125 Est. | a.<br>b. | a. Not Yet Drilled<br>b. 900 Est. |
| 6. Oil Gravity (°API) or Gas BTU Content) | 1000 BTU | | 974 BTU |
| 7. Producing or Shut-In? | Not Yet Drilled | | Not Yet Drilled |
| Production Marginal? (yes or no) | Yes (Dual Uneconomic) | | Yes (Dual Uneconomic) |
| * 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:<br>Rates: | Date:<br>Rates: | Date:<br>Rates: |
| * If Producing, give date and oil/gas/ water rates of recent test (within 60 days) | Date: N/A<br>Rates: | Date:<br>Rates: | Date: N/A<br>Rates: |
| 8. Fixed Percentage Allocation Formula -% for each zone | Oil: % Gas: See % | Oil: Proposed % Gas: Method % | Oil: % Gas: % |

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? ___Yes X No
If not, have all working, overriding, and royalty interests been notified by certified mail? X Yes ___No
Have all offset operators been given written notice of the proposed downhole commingling? X 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 in 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 all offset operators.
* 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 _____ TITLE Prod. Superintendent DATE 3/25/99

TYPE OR PRINT NAME Gary W. Brink TELEPHONE NO. ( 505 ) 325-6800

District I
PO Box 1980, Hobbs, NM 88241-1980
District II
811 South First, Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, NM 87505

Form C-102
Revised October 18, 1994
Instructions on back
Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies

☐ AMENDED REPORT

# WELL LOCATION AND ACREAGE DEDICATION PLAT

| 1 API Number | 2 Pool Code | 3 Pool Name |
|---|---|---|
| | 72329/71599 | Blanco Mesaverde/Basin Dakota |

| 4 Property Code | 5 Property Name | 6 Well Number |
|---|---|---|
| | SAN JUAN 32-5 | 17R |

| 7 OGRID No. | 8 Operator Name | 9 Elevation |
|---|---|---|
| 162928 | ENERGEN RESOURCES, INC. | 6404' |

## 10 Surface Location

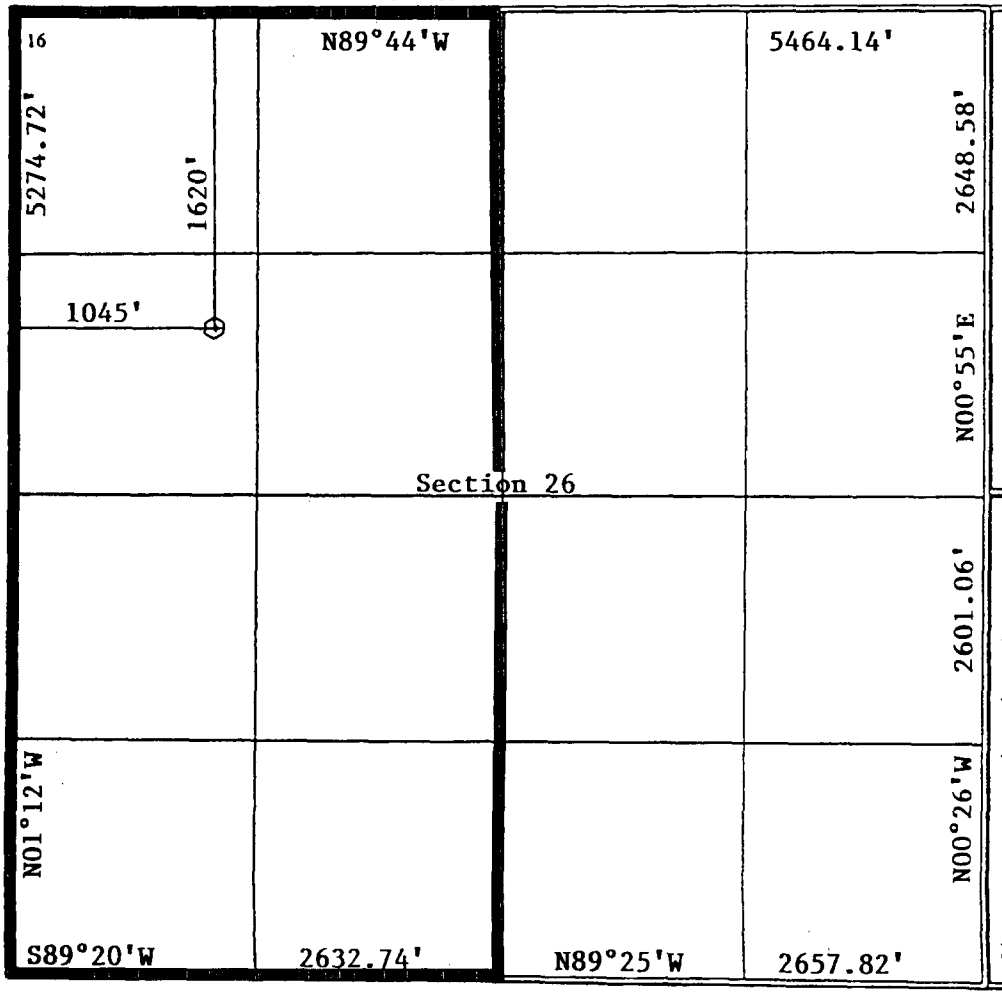
| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---|---|---|---|---|---|---|---|---|---|
| E | 26 | 32N | 6W | | 1620' | NORTH | 1045' | WEST | RIO ARRIBA |

## 11 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 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

| 12 Dedicated Acres | 13 Joint or Infill | 14 Consolidation Code | 15 Order No. |
|---|---|---|---|
| 320/320 | | | |

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




## 17 OPERATOR CERTIFICATION

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

Signature

Gary W. Brink

Printed Name

Production Superintendent

Title

3/24/99

Date

## 18 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 supervision, and that the same is true and correct to the best of my belief.*

02/22/99

Date of Survey

Signature and Seal of Professional Surveyer:

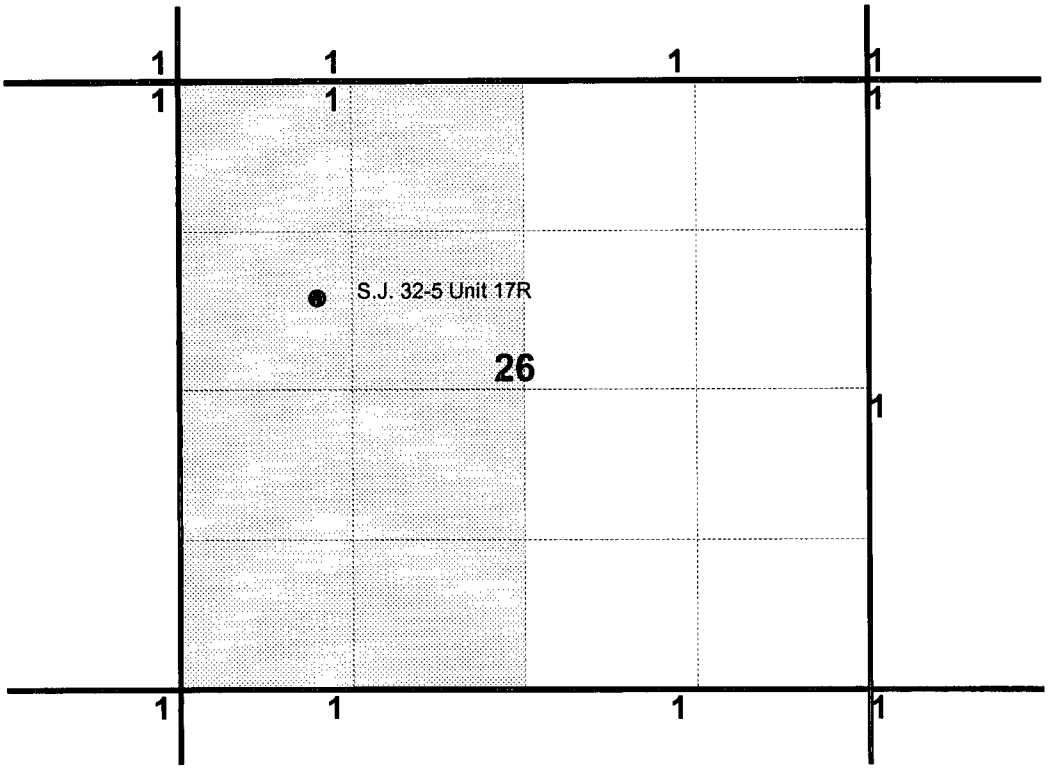
HENRY P. BROADHURST, JR. NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR

Certificate Number

# Energen Resources Corp.

**San Juan 32-5 Unit #17R**
**Offset Operator / Ownership Plat**
Blanco Mesa Verde/ Basin Dakota
Downhole Commingling

Township 32 N, Range 6 W

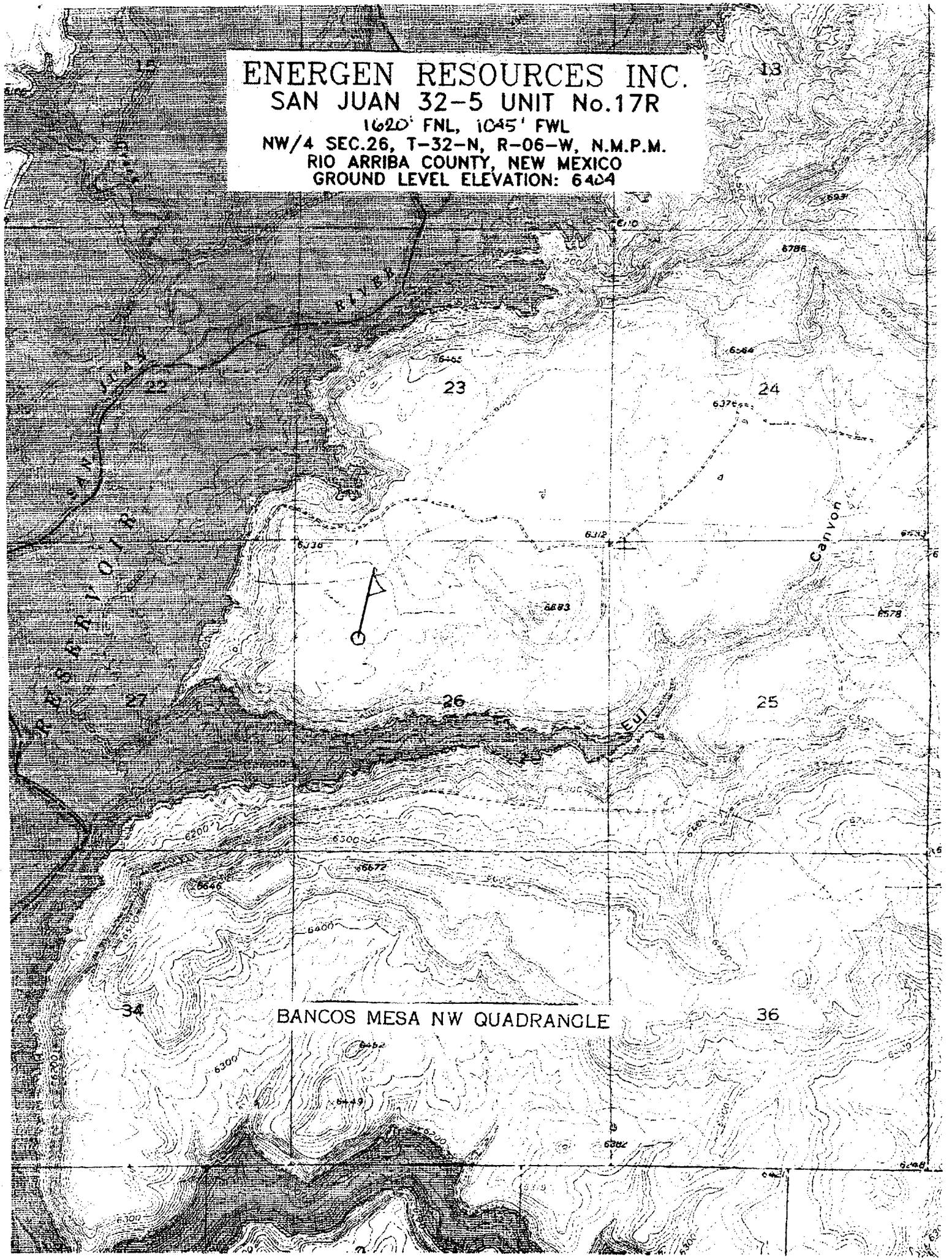



1) Energen Resources Corporation

# ENERGEN RESOURCES INC.

## SAN JUAN 32-5 UNIT No.17R

1620' FNL, 1045' FWL
NW/4 SEC.26, T-32-N, R-06-W, N.M.P.M.
RIO ARRIBA COUNTY, NEW MEXICO
GROUND LEVEL ELEVATION: 6404



# RECOMMENDED ALLOCATION METHOD

1. Complete both Mesa Verde and Dakota intervals.

2. Clean out well to total depth with air and test combined flowstream.

3. Run RBP and set above Dakota interval.flow test Mesa Verde Zone.

4. Remove RBP and finalize completion.

5. Report flow test data to NMOCD Aztec district office.

6. Allocate Production as follows:

MV = MV test rate / Total combined rate

Dk = Total combined rate - MV test rate / Total combined rate

| | | | | |
|---|---|---|---|---|
| | | | | |

ABOVE THIS LINE FOR DIVISION USE ONLY

# NEW MEXICO OIL CONSERVATION DIVISION

- Engineering Bureau -

## ADMINISTRATIVE APPLICATION COVERSHEET

THIS COVERSHEET IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS

**Application Acronyms:**

[NSP-Non-Standard Proration Unit] [NSL-Non-Standard Location]
[DD-Directional Drilling] [SD-Simultaneous Dedication]
[DHC-Downhole Commingling] [CTB-Lease Commingling] [PLC-Pool/Lease Commingling]
[PC-Pool Commingling] [OLS - Off-Lease Storage] [OLM-Off-Lease Measurement]
[WFX-Waterflood Expansion] [PMX-Pressure Maintenance Expansion]
[SWD-Salt Water Disposal] [IPI-Injection Pressure Increase]
[EOR-Qualified Enhanced Oil Recovery Certification] [PPR-Positive Production Response]

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OIL CONSERVATION DIV.

[1] TYPE OF APPLICATION - Check Those Which Apply for [A]

[A] Location - Spacing Unit - Directional Drilling
☐ NSL ☐ NSP ☐ DD ☐ SD

Check One Only for [B] or [C]

[B] Commingling - Storage - Measurement
☒ DHC ☐ CTB ☐ PLC ☐ PC ☐ OLS ☐ OLM

[C] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery
☐ WFX ☐ PMX ☐ SWD ☐ IPI ☐ EOR ☐ PPR

[2] NOTIFICATION REQUIRED TO: - Check Those W

[A] ☒ Working, Royalty or Overriding Roya

[B] ☒ Offset Operators, Leaseholders or Surf

[C] ☐ Application is One Which Requires Pul

[D] ☒ Notification and/or Concurrent Approva
U.S. Bureau of Land Management - Commissioner of P

[E] ☐ For all of the above, Proof of Notificatio

[F] ☐ Waivers are Attached

This bound package is a single unit.

Jwx-

[3] INFORMATION / DATA SUBMITTED IS COMPLET ...ment of Understanding

I hereby certify that I, or personnel under my supervision, have read and complied with all applicable Rules and Regulations of the Oil Conservation Division. Further, I assert that the attached application for administrative approval is accurate and complete to the best of my knowledge and where applicable, verify that all interest (WI, RI, ORRI) is common. I further verify that all applicable API Numbers are included. I understand that any omission of data, information or notification is cause to have the application package returned with no action taken.

Note: Statement must be completed by an individual with supervisory capacity.

| Gary W. Brink | | Production Supt. | 3/25/99 |
|---|---|---|---|
| Print or Type Name | Signature | Title | Date |

ENERGEN
RESOURCES

Memorandum

**Date:** March 12, 1999

**To:** FILE

**From:** Joe O'Leary J.O.

**Subject:** Fiscal 1999 Drilling Program - Supporting Documentation for Downhole Commingling Application in San Juan 32-5 Unit

This Memo to File serves to provide the required information and analytical process utilized to evaluate the Basin-Dakota and Blanco-Mesaverde gas pools. The final data provided within, should meet the requirements of the NMOCD in order to process the applications for downhole commingling for wells #8R, #17R, #11M, and #13R within the San Juan 32-5 Unit. A summary of the key reservoir parameters developed from this study is outlined on Exhibit #1.

Initial bottomhole pressure data was collected from Dwights production database. Where BHP data was not available, initial wellhead shut-in data was converted to BHP for both the Mesaverde and Dakota pools. The initial bottomhole pressures for both pools were mapped and attached on Exhibit #2. Current BHP was determined by two methods. The most reliable data came from a direct 15-month shut-in period due to a pipeline break ending in August, 1997. The wellhead pressures were converted to bottomhole pressures for five Mesaverde wells and two Dakota wells. Where sustained shut-in data was not available, current BHP values were calculated using P/Z analysis where sufficient production had taken place. Initial BHP data was utilized in conjunction with historic EUR data from decline curve analysis to generate a P/Z vs. cum plot. Abandonment pressures were assumed to equal line pressures for the area. A plot was generated using the initial pressure data and the expected EUR at abandonment pressure. Gathering the cumulative production at several other locations within the pools enabled us to estimate the current bottomhole pressures at several locations. Attached on Exhibit #3 is the current BHP for both the Mesaverde and Dakota pools. Exhibit 4 contains the supporting P/Z analysis where actual current BHP data was not available. Current BHP values for the proposed wells were estimated by evaluating the net pay and pressure depletion within each pool.

The projected initial gas rates and subsequent recoverable reserve estimates were determined by evaluating the offset production, net pay, and pressure depletion. Attached on Exhibit #5 are the cumulative production plots and the projected EUR values for the area by matching the historic hyperbolic decline and extending it to the well's economic limit. Wells that had mechanical failures such as casing leaks were extrapolated to a hypothetical EUR to enhance the credibility of the contours. Initial production rates and ultimate recoverable reserves are determined and dominated by the presence of natural fractures and, therefore, difficult to predict. The initial performance for the development wells was determined by extrapolating between the initial rates of each of the newer wells to the south in the Rosa Unit and the older existing wells within the 32-5 Unit. Rate-Time plots illustrating the production profiles on these wells are shown on Exhibit #7.

The development wells are expected to have an initial rate slightly higher than the current production rates for the offset wells and similar to the newer Rosa Unit wells to the south. BTU values from several offset wells were utilized to determine an average BTU value for each pool. All BTU values are shown on Exhibit #8 as dry samples at 60°F and 14.73 psi.

Well economics were run for both a commingled and dual completion to determine the economic viability for each scenario. Gross well costs were estimated for a Dakota/Mesaverde commingle and dual well. Well costs were estimated to be $685,000/well for a commingle completion and $795,000/well for a dual completion. Initial well costs were $110,000 greater per well on a dual completion due to increased hole size, casing size, additional tubulars, packers, and rig expense. The projected initial rate of 330 Mcfd for a commingled well was reduced by 30 for the dual well to account for additional wellbore restrictions and friction pressure associated with dual completions. Holding all other variables constant, the economic model yielded the following results:

- EUR is increased from 1.6 BCF to 1.8 BCF by utilizing a commingled completion.
- Economic well life is extended by one year by utilizing a commingled completion.
- Recovery of gas-in-place is maximized.
- IRR of the project is increased from 13.2% to 18.6%.

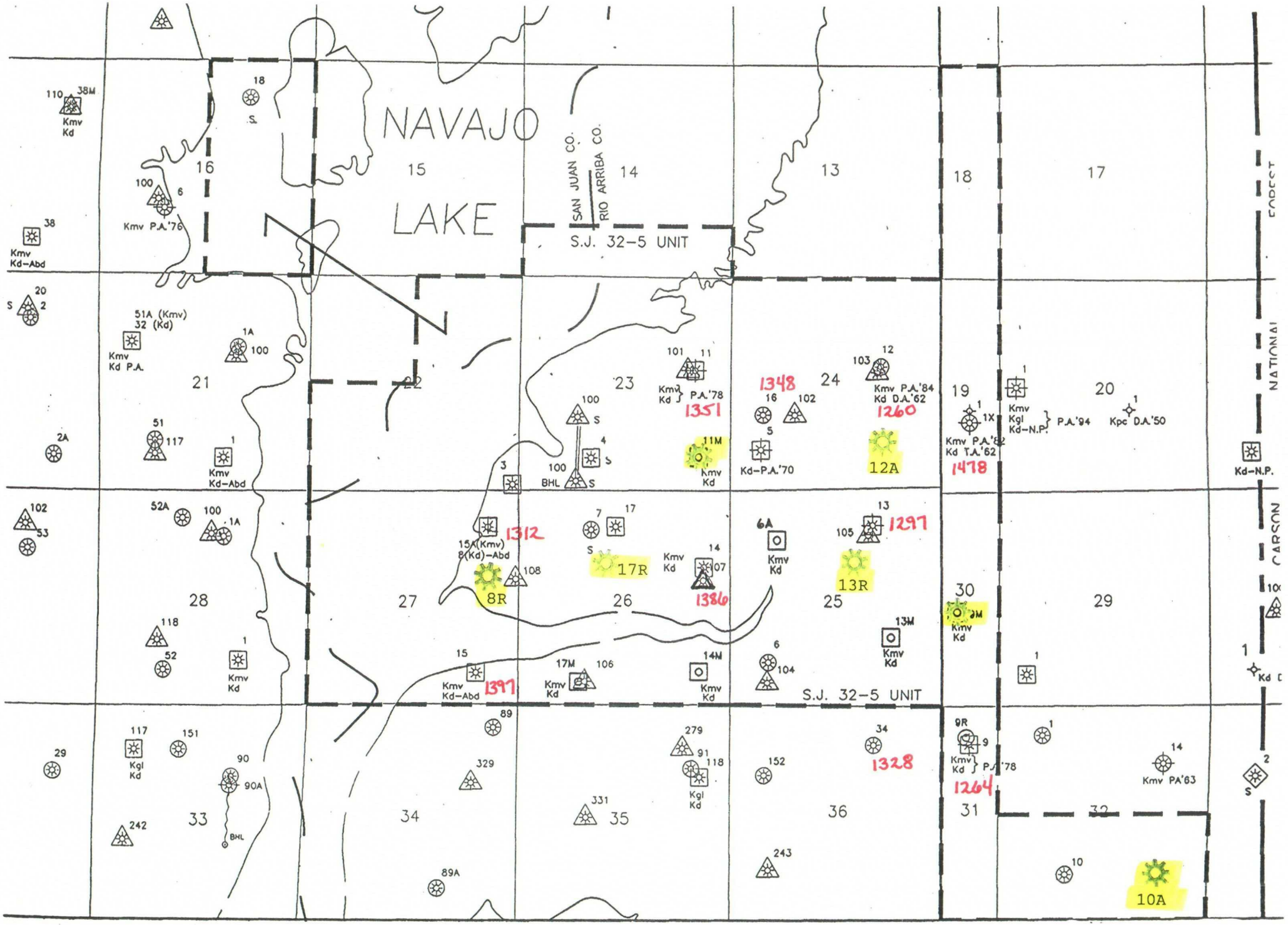
The project economics under a dual completion scenario are uneconomic and do not warrant development, whereas the commingled completion meets Taurus' economic threshold for project viability and maximizes the recovery of the gas-in-place. Attached on Exhibit #9 is a detailed economic analysis for each scenario, a summary sheet for each option, and production profiles for each well.

JMO/lcw

Cc: Joe Niederhofer
Gary Brink
Rich Corcoran
Paul Sparks
Jerry Saulsberry
Ron Tisdale

# EXHIBIT #1

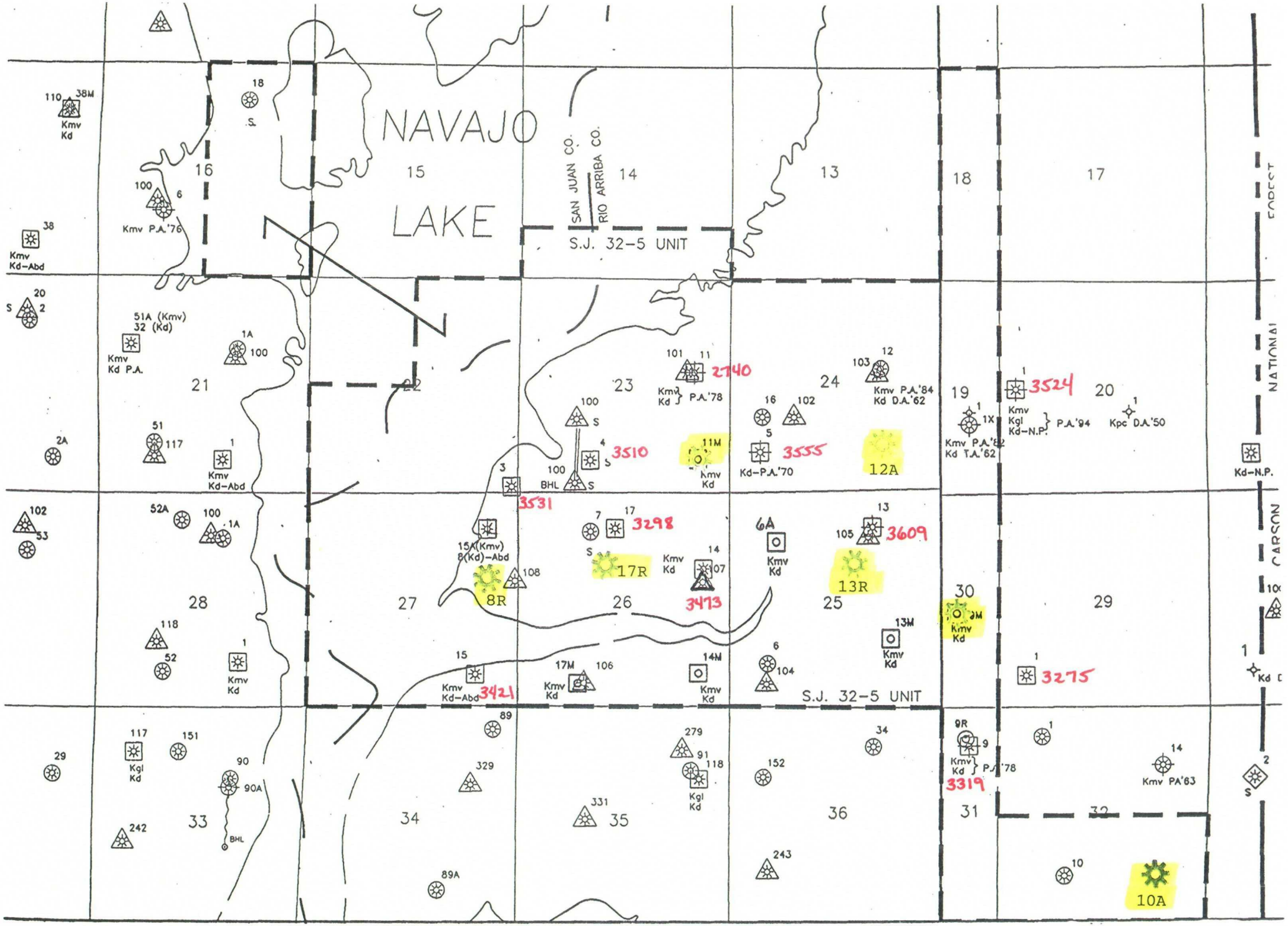
| EXPECTED RESERVOIR PARAMETERS | | | | | |
|---|---|---|---|---|---|
| WELL # | BTU | INITIAL PRESSURE ( PSI ) | CURRENT PRESSURE ( PSI ) | ULTIMATE RECOVERY ( BCF ) | INITIAL RATE ( MCFD ) |
| **MESAVERDE** | | | | | |
| 32 - 5 UNIT #8R | 1000 | 1342 | 1100 | 1.2 | 230 |
| 32 - 5 UNIT #17R | 1000 | 1342 | 1125 | 1.2 | 230 |
| 32 - 5 UNIT #11M | 1000 | 1342 | 1200 | 1.2 | 230 |
| 32 - 5 UNIT #13R | 1000 | 1342 | 1050 | 1.2 | 230 |
| | | | | | |
| **DAKOTA** | | | | | |
| 32 - 5 UNIT #8R | 974 | 3387 | 1100 | 0.6 | 100 |
| 32 - 5 UNIT #17R | 974 | 3387 | 900 | 0.6 | 100 |
| 32 - 5 UNIT #11M | 974 | 3387 | 950 | 0.6 | 100 |
| 32 - 5 UNIT #13R | 974 | 3387 | 1150 | 0.6 | 100 |
| | | | | | |



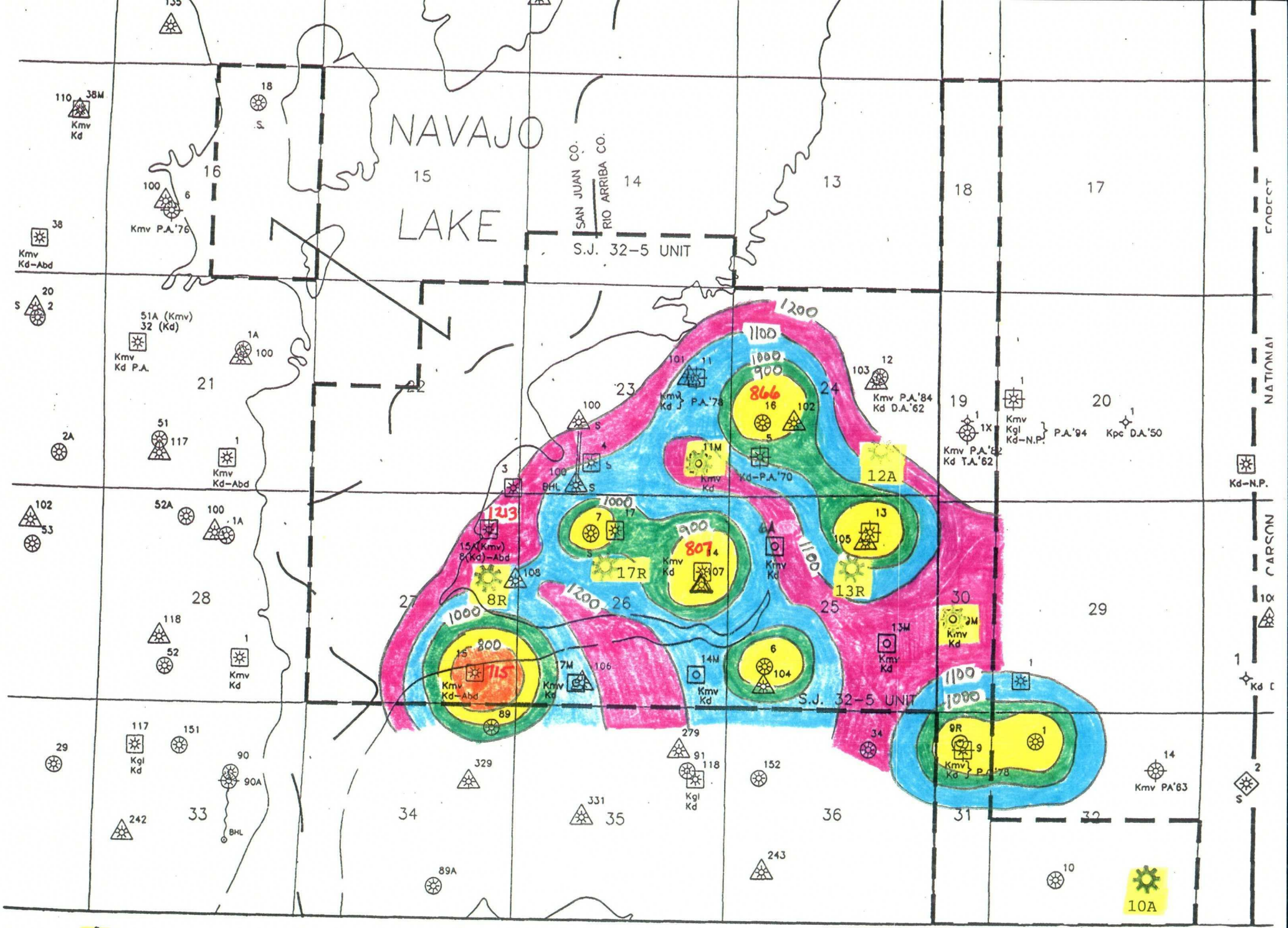

FISCAL 1999 DRILLING PROGRAM

MESAVERDE INITIAL BHP

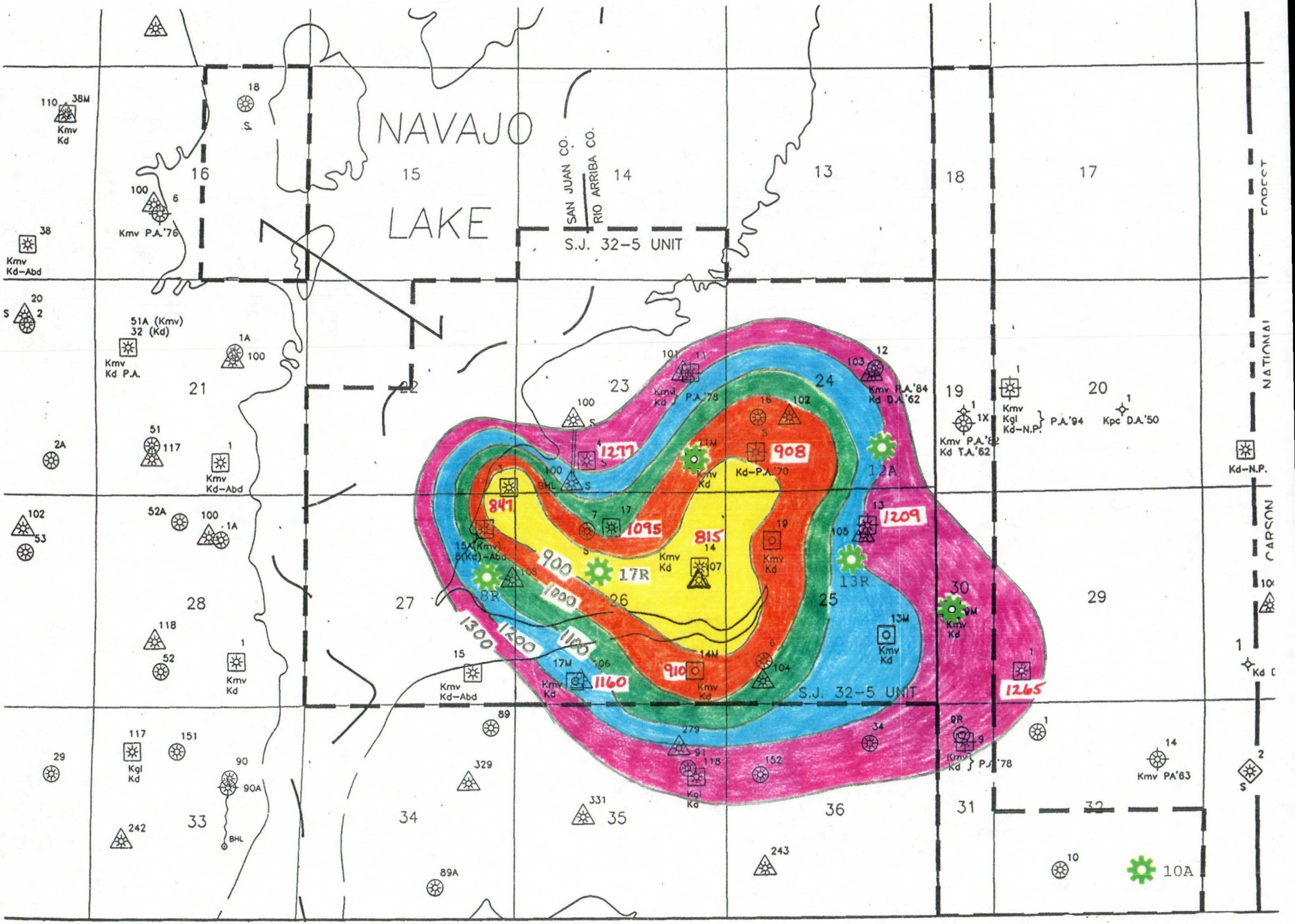
EXHIBIT 2




FISCAL 1999 DRILLING PROGRAM DAKOTA INITIAL BHP EXHIBIT 2




FISCAL 1999 DRILLING PROGRAM  MESAVERDE CURRENT BHP  EXHIBIT #3




FISCAL 1999 DRILLING PROGRAM

CURRENT DAKOTA BOTTOMHOLE PRESSURES

**BHP/Z vs cum gas calculation**


Version 5.0
26-Jun-98

| | | | | |
|---|---|---|---|---|
| Well Name | **Quintana Mesa #1** | | | |
| Gas gravity | **0.67** | SG | % N2: | **0.00** |
| Condensate (yes=1) | **1** | | % CO2: | **0.00** |
| Reservoir Temp | **190** | F | % H2S: | **0.00** |
| Surface temp | **70** | F | For manual Curve: | |
| Depth of zone | **8,288** | feet | Pi/Zi manual | **0** |
| Abandonment press | **300** | psia | GIP manual | **0** |

| | | |
|---|---|---|
| **Gas in place | 1,048,464 | Mcf |
| **Recoverable Gas | 962,656 | Mcf |

EST. CURRENT BHP

| Enter BHP if known | Cum Gas Mcf | Surf Pres psia | BHP psia | Z | BHP/Z |
|---|---|---|---|---|---|
| **0** | **0** | **2,633** | 3,275 | 0.8935 | 3,666 |
| **0** | **647,000** | **1,030** | 1,265 | 0.9014 | 1,404 |
| **0** | **928,000** | **331** | 398 | 0.9639 | 413 |

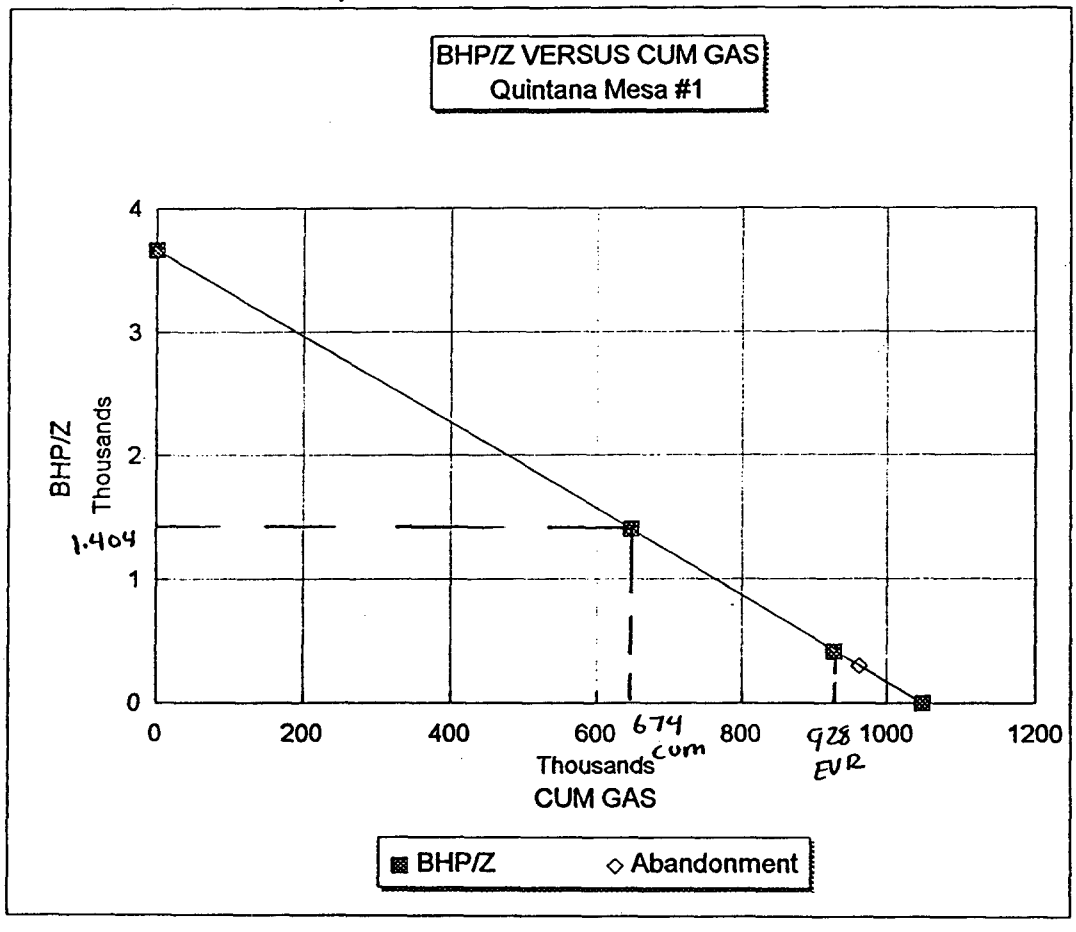



EXHIBIT 4A

**BHP/Z vs cum gas calculation**



Version 5.0
26-Jun-98

| | | | | |
|---|---|---|---|---|
| Well Name | 32-5 Unit #3 | | | |
| Gas gravity | 0.67 | SG | % N2: | 0.00 |
| Condensate (yes=1) | 1 | | % CO2: | 0.00 |
| Reservoir Temp | 190 | F | % H2S: | 0.00 |
| Surface temp | 70 | F | For manual Curve: | |
| Depth of zone | 8,044 | feet | Pi/Zi manual | 0 |
| Abandonment press | 300 | psia | GIP manual | 0 |

| | | |
|---|---|---|
| **Gas in place | 1,585,698 | Mcf |
| **Recoverable Gas | 1,463,802 | Mcf |

EST CURRENT BHP

| Enter BHP if known | Cum Gas Mcf | Surf Pres psia | BHP psia | Z | BHP/Z |
|---|---|---|---|---|---|
| 0 | 0 | 2,866 | 3,531 | 0.9049 | 3,903 |
| 0 | 1,215,000 | 700 | 847 | 0.9282 | 912 |
| 0 | 1,415,000 | 331 | 396 | 0.9641 | 411 |

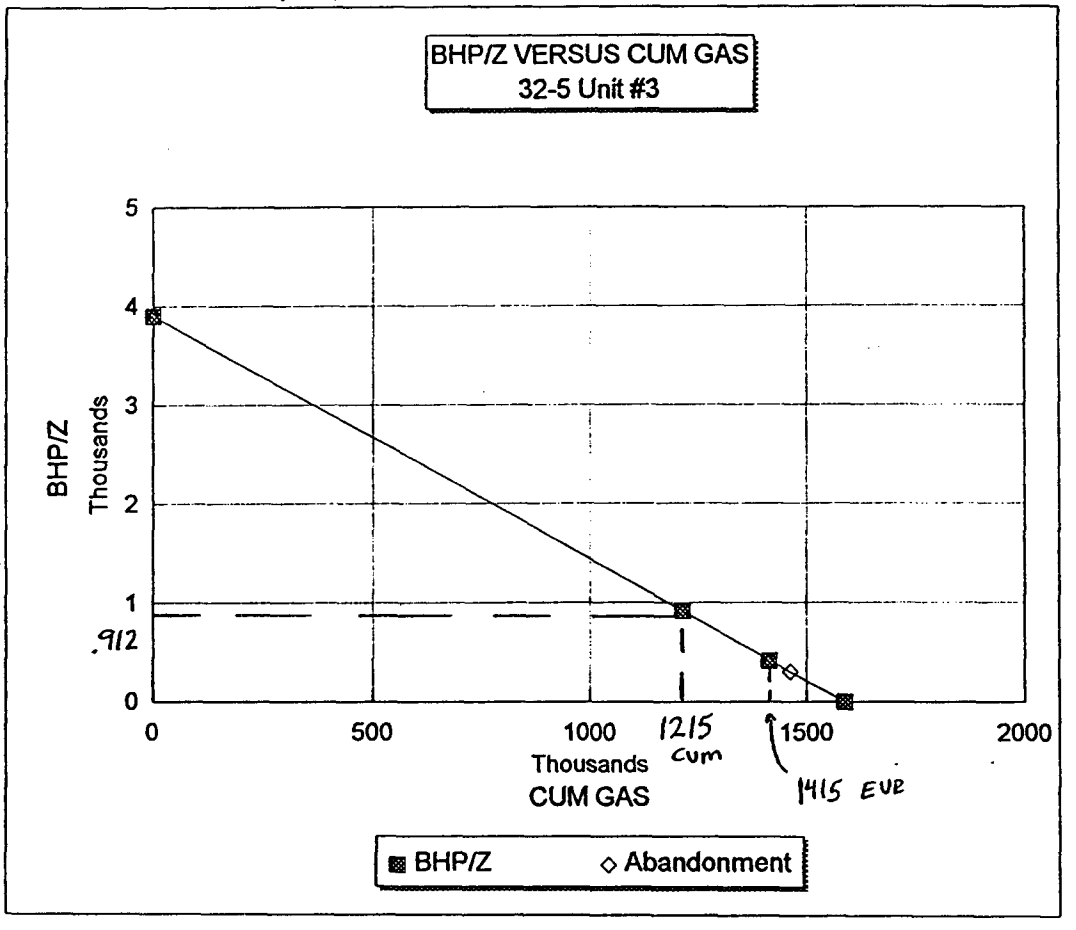



EXHIBIT 4B

**BHP/Z vs cum gas calculation**



Version 5.0
26-Jun-98

| | | | | |
|---|---|---|---|---|
| Well Name | **32-5 Unit #17** | | | |
| Gas gravity | **0.67** | SG | % N2: | **0.00** |
| Condensate (yes=1) | **1** | | % CO2: | **0.00** |
| Reservoir Temp | **190** | F | % H2S: | **0.00** |
| Surface temp | **70** | F | For manual Curve: | |
| Depth of zone | **8,038** | feet | Pi/Zi manual | **0** |
| Abandonment press | **300** | psia | GIP manual | **0** |

| | | | |
|---|---|---|---|
| **Gas in place | 2,924,627 | Mcf | |
| **Recoverable Gas | 2,686,695 | Mcf | |

EST CURRENT BHP

| Enter BHP if known | Cum Gas Mcf | Surf Pres psia | BHP psia | Z | BHP/Z |
|---|---|---|---|---|---|
| **0** | **0** | **2,670** | 3,298 | 0.8945 | 3,688 |
| **0** | **1,972,000** | **900** | 1,095 | 0.9114 | 1,201 |
| **0** | **2,585,000** | **331** | 396 | 0.9641 | 411 |

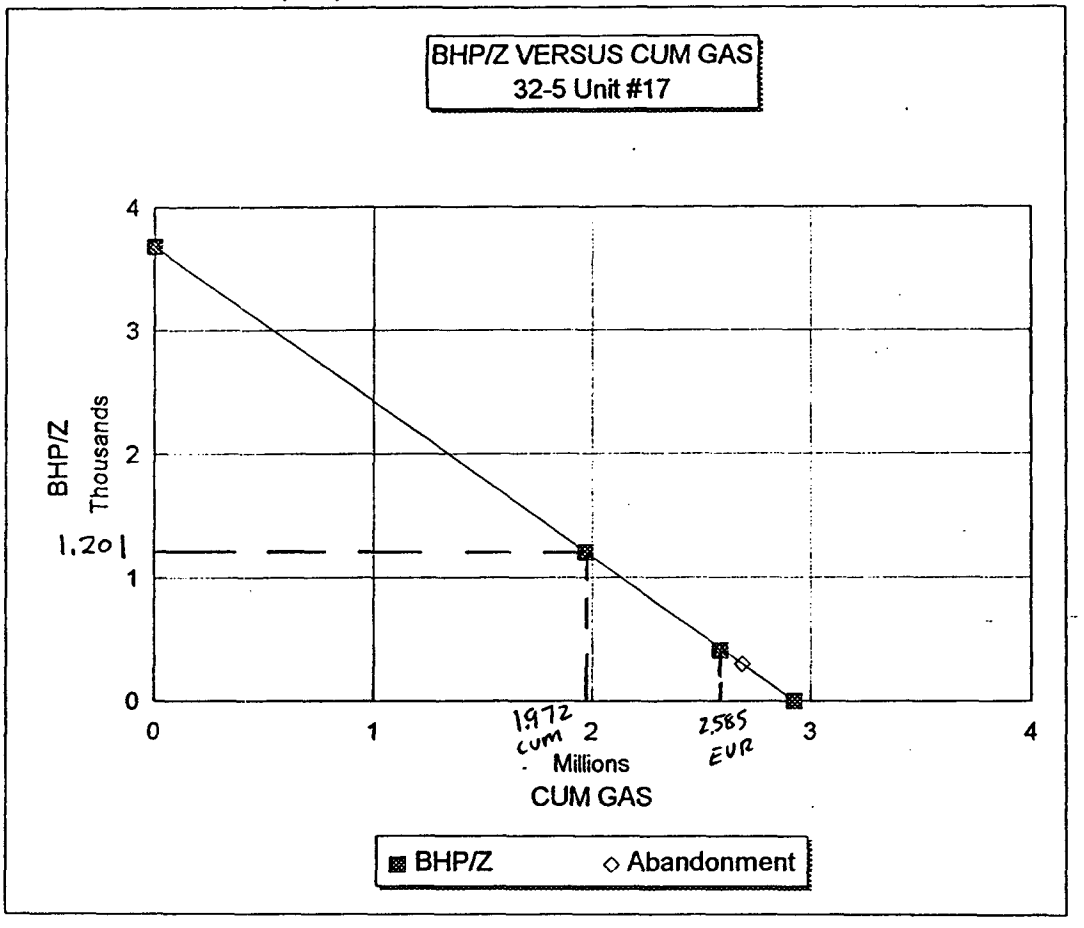



EXHIBIT 4C

**BHP/Z vs cum gas calculation**

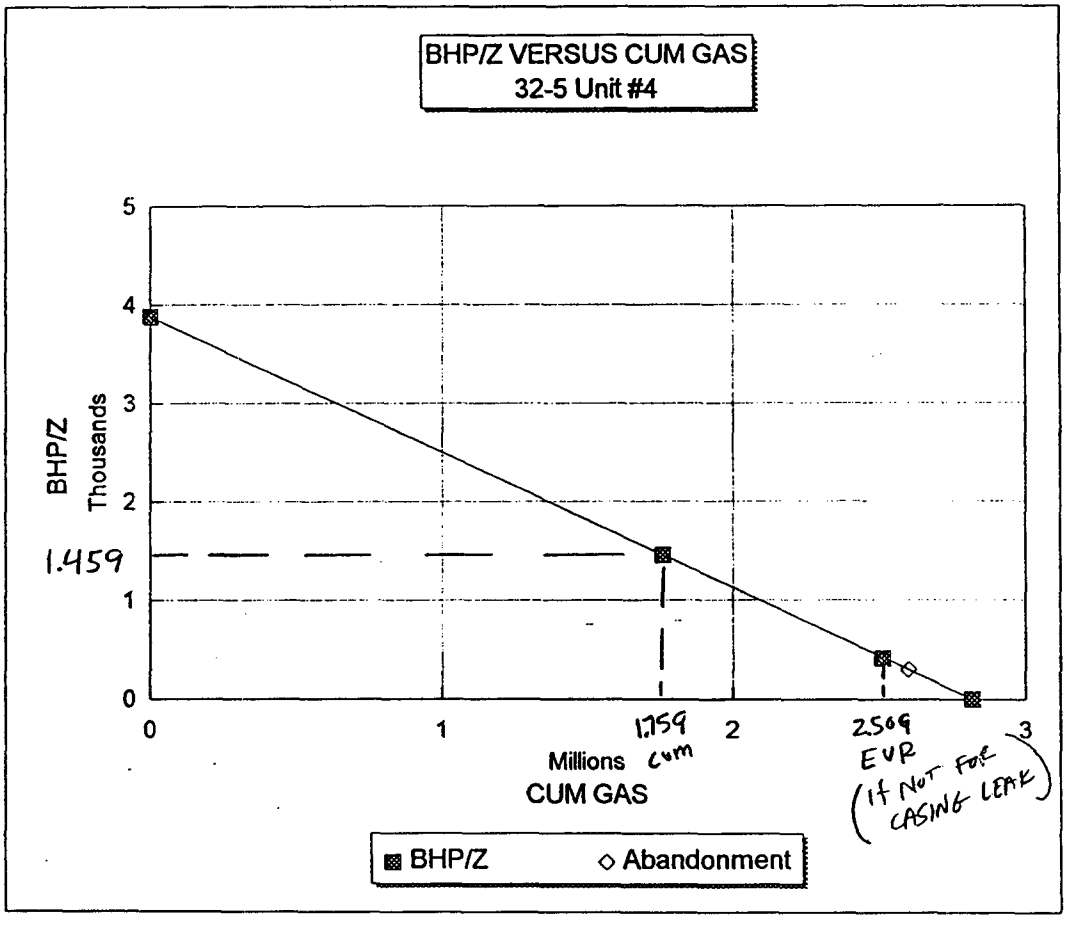

Version 5.0
26-Jun-98

| | | | | |
|---|---|---|---|---|
| Well Name | **32-5 Unit #4** | | | |
| Gas gravity | **0.67** | SG | % N2: | **0.00** |
| Condensate (yes=1) | **1** | | % CO2: | **0.00** |
| Reservoir Temp | **190** | F | % H2S: | **0.00** |
| Surface temp | **70** | F | For manual Curve: | |
| Depth of zone | **7,970** | feet | Pi/Zi manual | **0** |
| Abandonment press | **300** | psia | GIP manual | **0** |

| | | |
|---|---|---|
| **Gas in place | 2,817,866 | Mcf |
| **Recoverable Gas | 2,600,150 | Mcf |

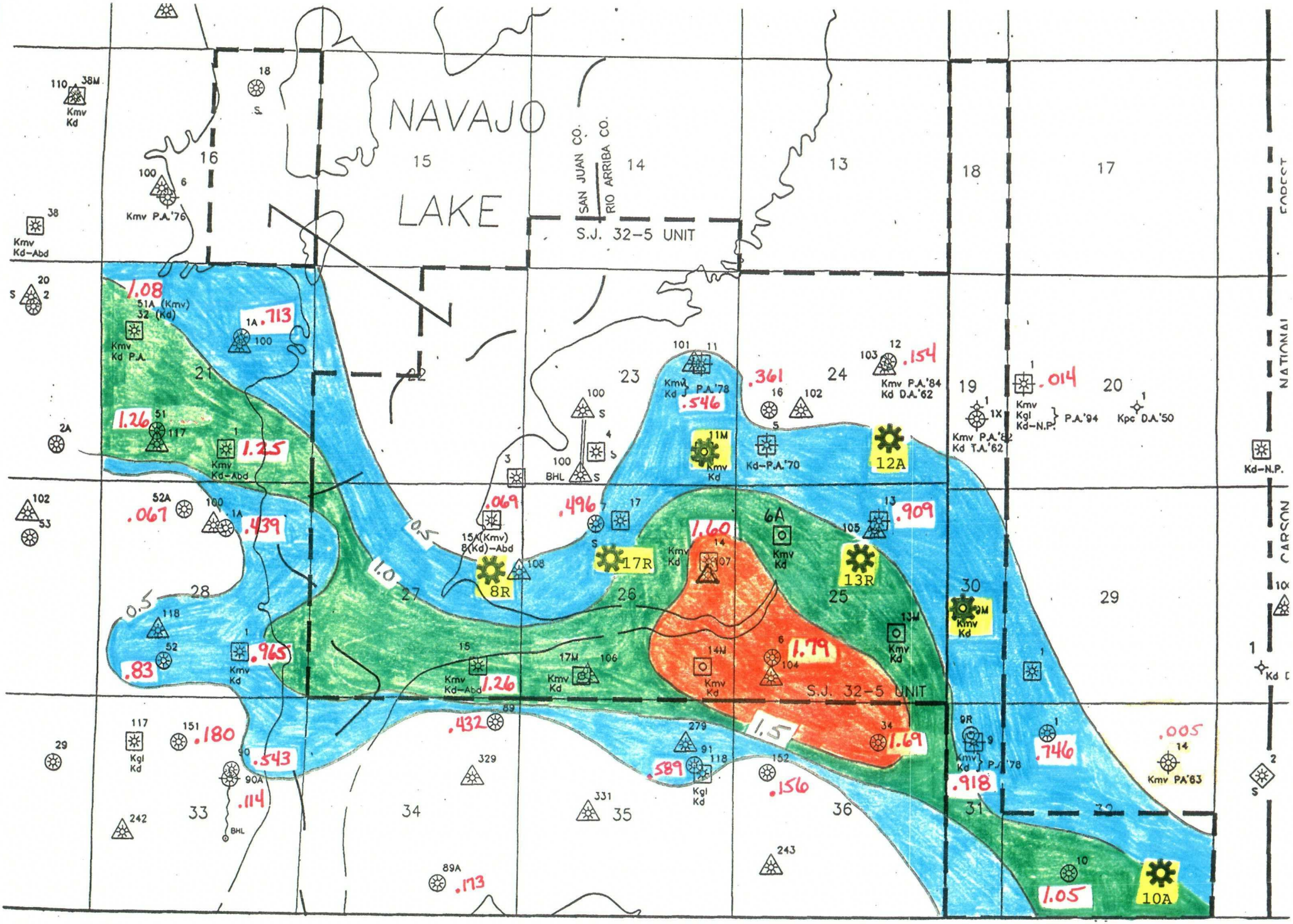
EST CURRENT BHP

| Enter BHP if known | Cum Gas Mcf | Surf Pres psia | BHP psia | Z | BHP/Z |
|---|---|---|---|---|---|
| **0** | **0** | **2,853** | 3,510 | 0.9039 | 3,883 |
| **0** | **1,759,000** | **1,075** | 1,312 | 0.8990 | 1,459 |
| **0** | **2,509,000** | **331** | 396 | 0.9641 | 410 |

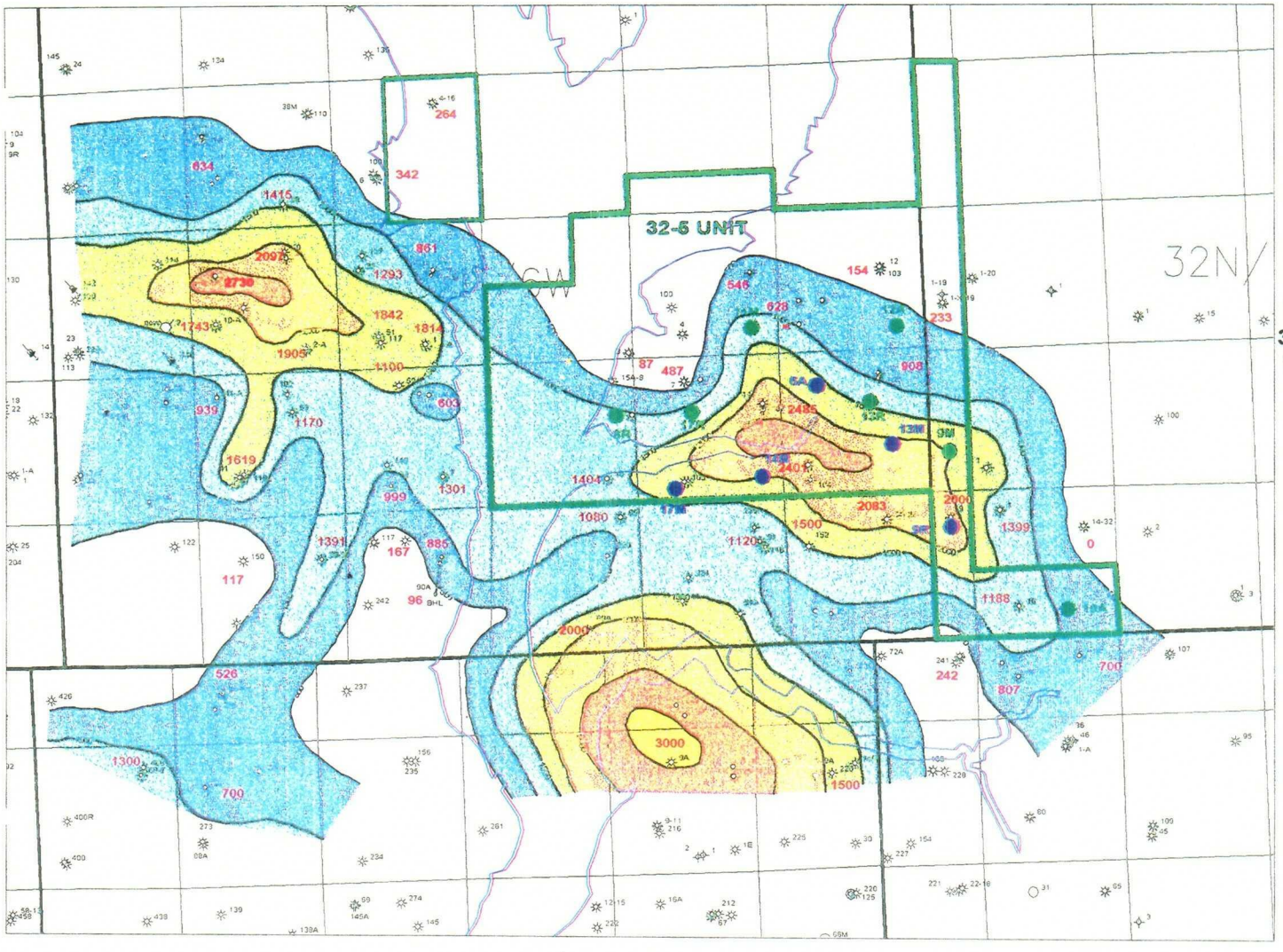



EXAMPLE CALCULATION SHOWING ACCURACY OF METHOD. MEASURED BHP OF 1277 PSI MATCHES CLOSELY WITH ESTIMATE OF 1312 PSI

EXHIBIT 4D


NAVAJO
LAKE
SAN JUAN CO.
RIO ARRIBA CO.
S.J. 32-5 UNIT
NATIONAL FOREST
CARSON
1.08
.713
1.26
1.25
.067
.439
.069
.496
.909
1.60
.361
.154
.546
.014
.965
.83
1.26
1.79
.180
.543
.432
.589
1.69
.156
.746
.005
.918
.114
.173
1.05
0.5
1.0
1.5
8R
17R
13R
12A
10A
FISCAL 1999 DRILLING PROGRAM
MESAVERDE CUMULATIVE PRODUCTION ( BCF )
EXHIBIT #5A

R 6 W EXHIBIT 5B R 5 W




N

LEGEND

- 1998 NEW DRILLS
- 1999 NEW DRILLS

ENERGEN RESOURCES

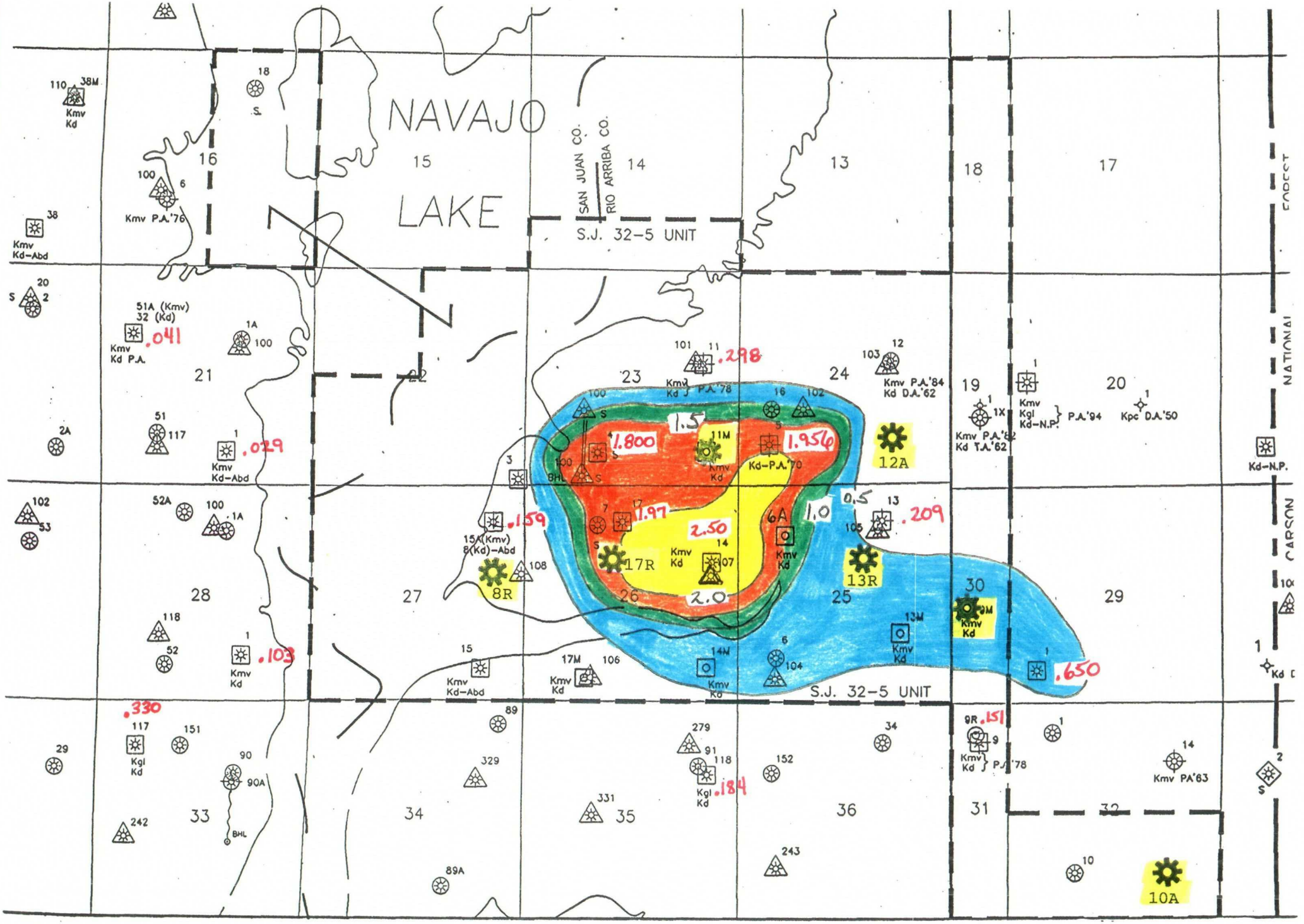
SAN JUAN 32-5 UNIT
GEOLOGY: G. JENNINGS

| | | |
|---|---|---|
| rfleeman | | 11/13/1999 |
| tk5me.gpf | Scale: 1:75000 | |

# Mesaverde EUR

# 32-5 Unit

## (mmcf)

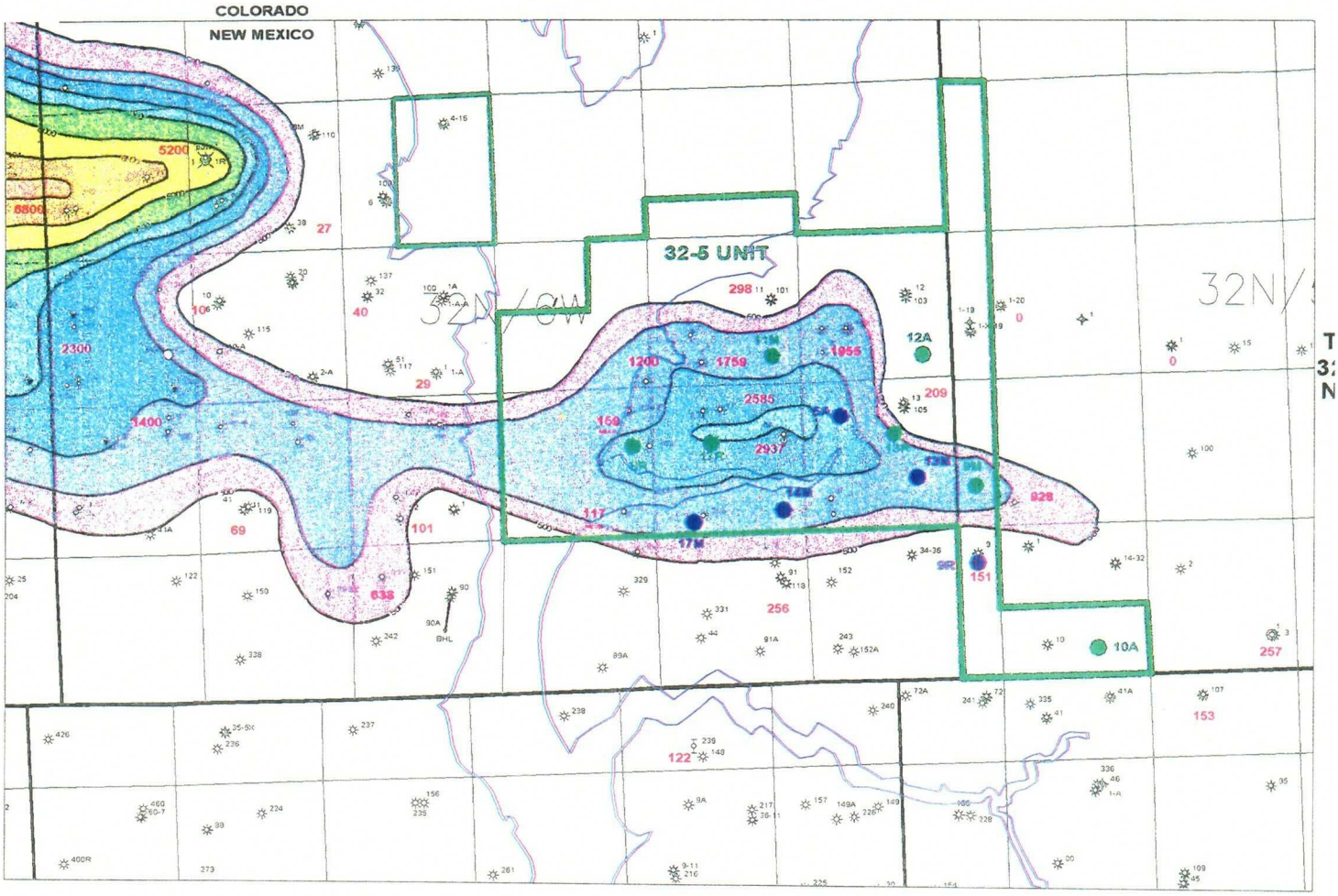



FISCAL 1999 DRILLING PROGRAM

DAKOTA CUMULATIVE PRODUCTION ( BCF )

EXHIBIT 5C

R 6 W EXHIBIT 5D R 5 W




N

LEGEND

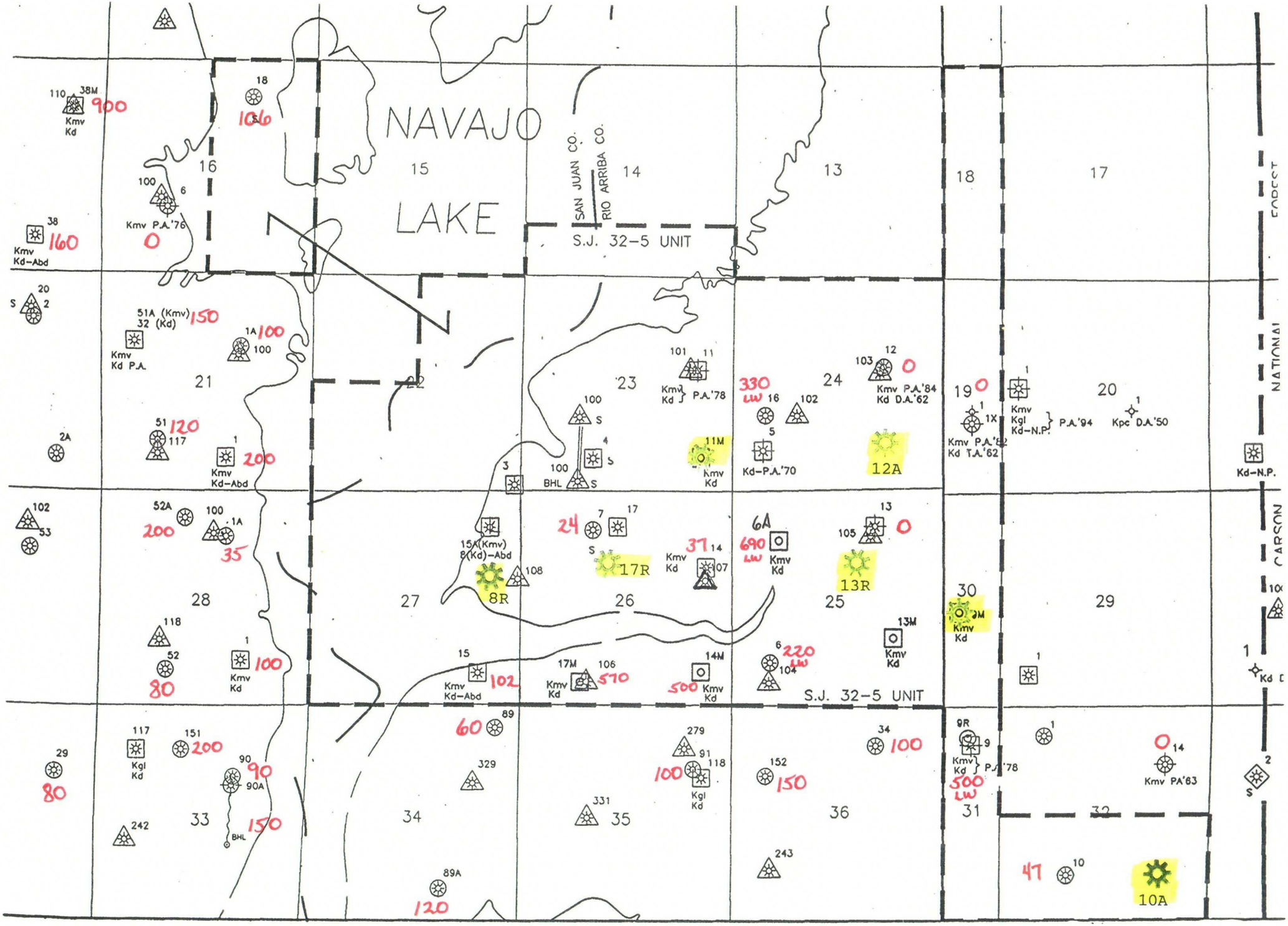
- 1998 NEW DRILLS
- 1999 NEW DRILLS

# DAKOTA EUR
# 32-5 UNIT
## (MMCF)

ENERGEN RESOURCES

SAN JUAN 32-5 UNIT
GEOLOGY: G. JENNINGS

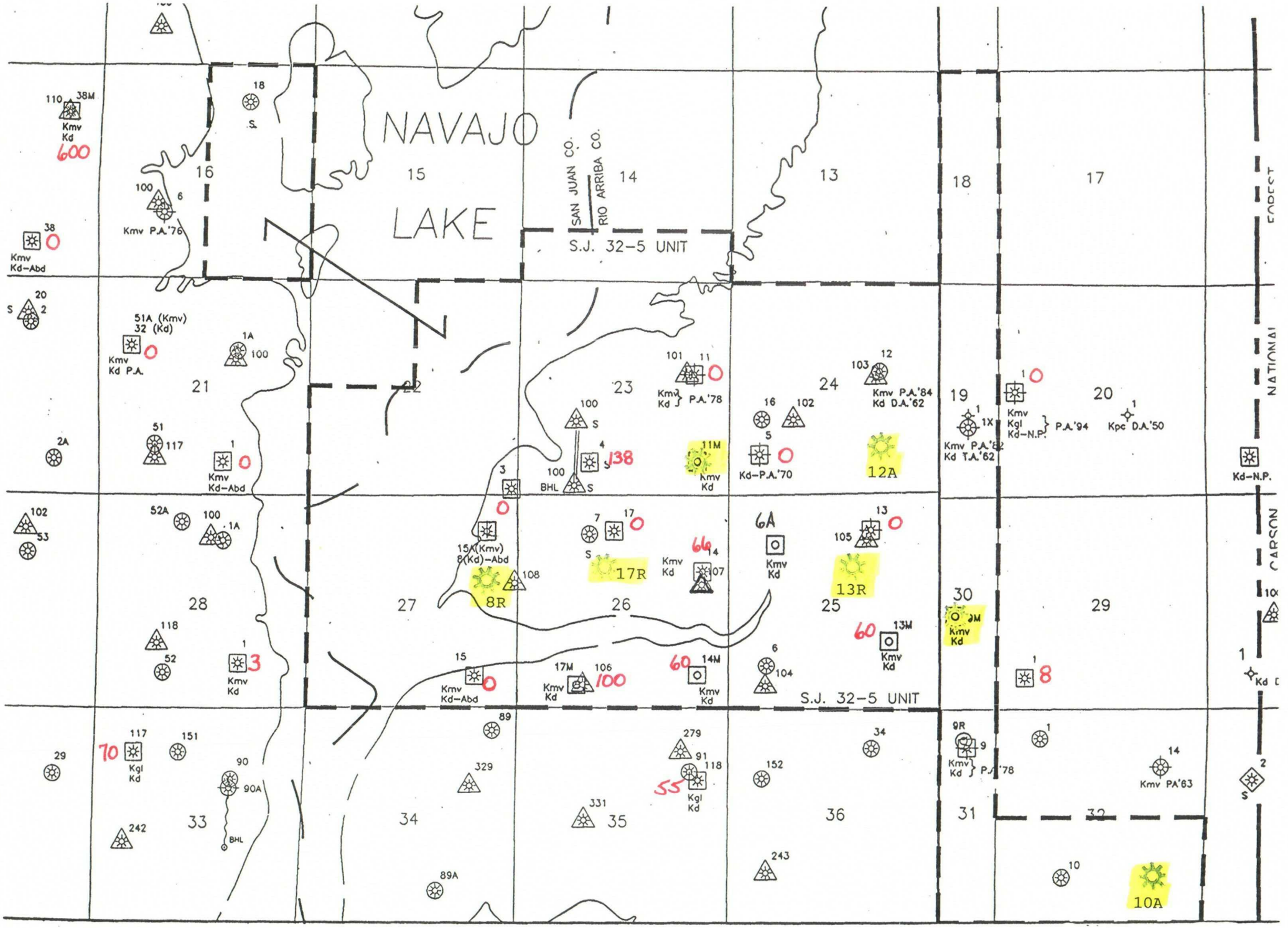
| | | |
|---|---|---|
| rfleenor | | [illegible] |
| [illegible]5e.grd | Scale: 1:750000. | |




FISCAL 1999 DRILLING PROGRAM

CURRENT MESAVERDE PRODUCTION RATES ( MCFD )

EXHIBIT 6A



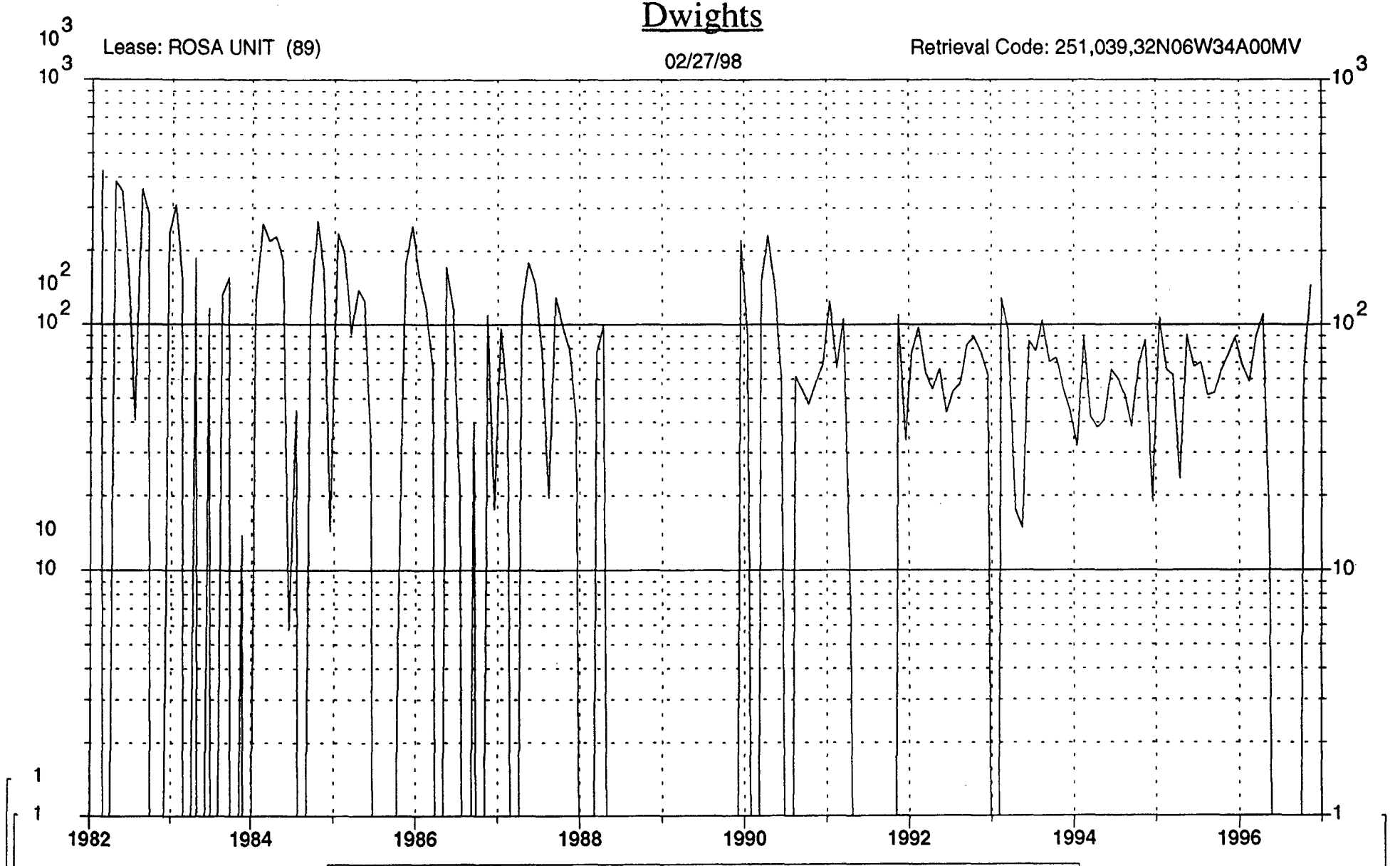

FISCAL 1999 DRILLING PROGRAM

CURRENT DAKOTA PRODUCTION RATES ( MCFD )

EXHIBIT 6B

EXHIBIT 7

# Dwights




Gas (mcf/day) ———

Water (bbl/day) - - - - - -

Oil (bbl/day) — — —

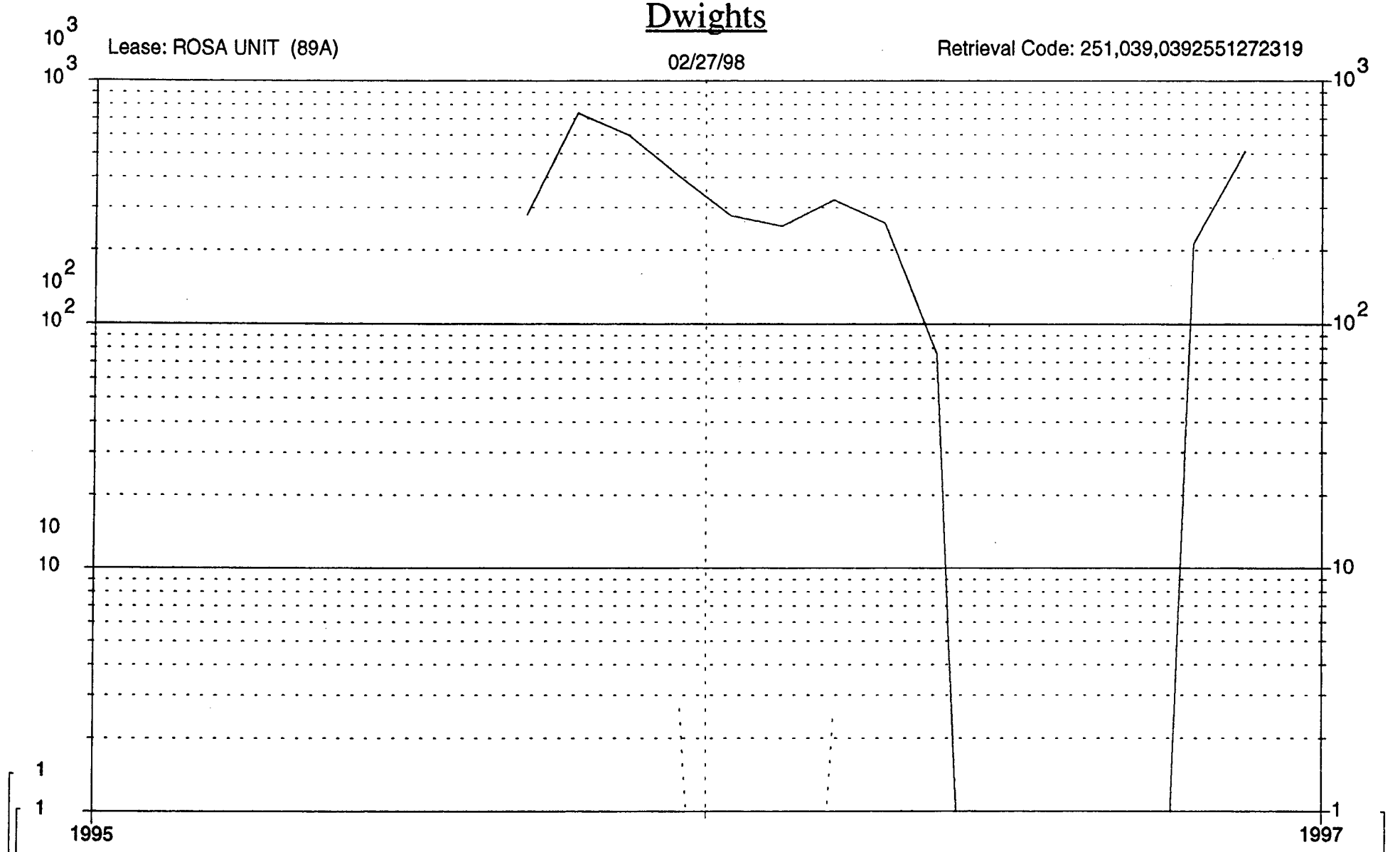
| | |
|---|---|
| County: RIO ARRIBA, NM | F.P. Date: 02/82 |
| Field: BLANCO (MESAVERDE) MV | Oil Cum: 0 bbl |
| Reservoir: MESAVERDE | Gas Cum: 408.3 mmcf |
| Operator: WILLIAMS PRODUCTION CO | Location: 34A 32N 6W |

# Dwights

Lease: ROSA UNIT (89A)

02/27/98

Retrieval Code: 251,039,0392551272319




Gas (mcf/day) ———

Water (bbl/day) - - - - - -

Oil (bbl/day) — — —

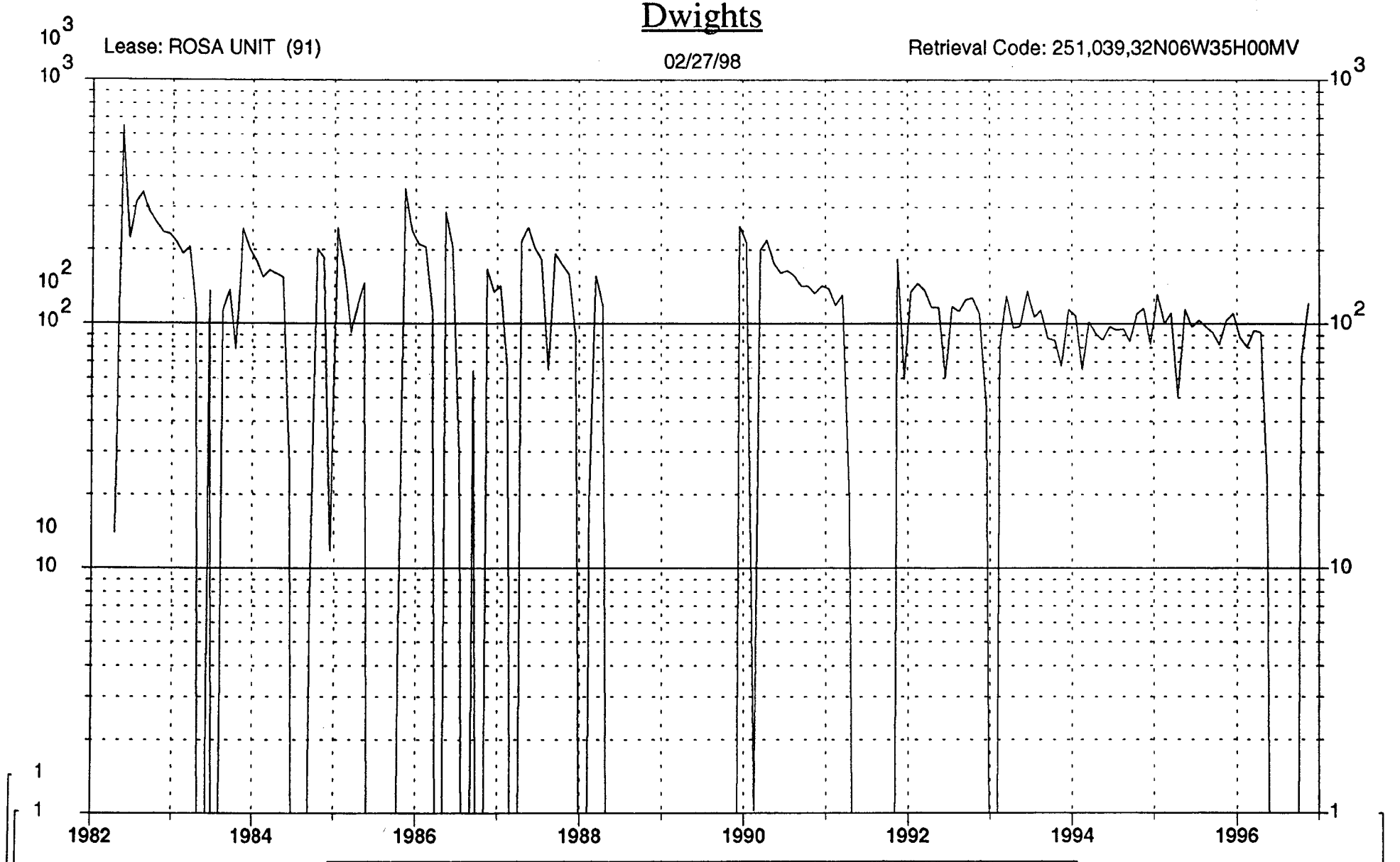
| | |
|---|---|
| County: RIO ARRIBA, NM | F.P. Date: 09/95 |
| Field: BLANCO (MESAVERDE) MV | Oil Cum: 0 bbl |
| Reservoir: MESAVERDE | Gas Cum: 119.0 mmcf |
| Operator: WILLIAMS PRODUCTION CO | Location: 34O 32N 6W |

# Dwights

Lease: ROSA UNIT (91)

02/27/98

Retrieval Code: 251,039,32N06W35H00MV




Gas (mcf/day) ———

Water (bbl/day) - - - - - -

Oil (bbl/day) — — —

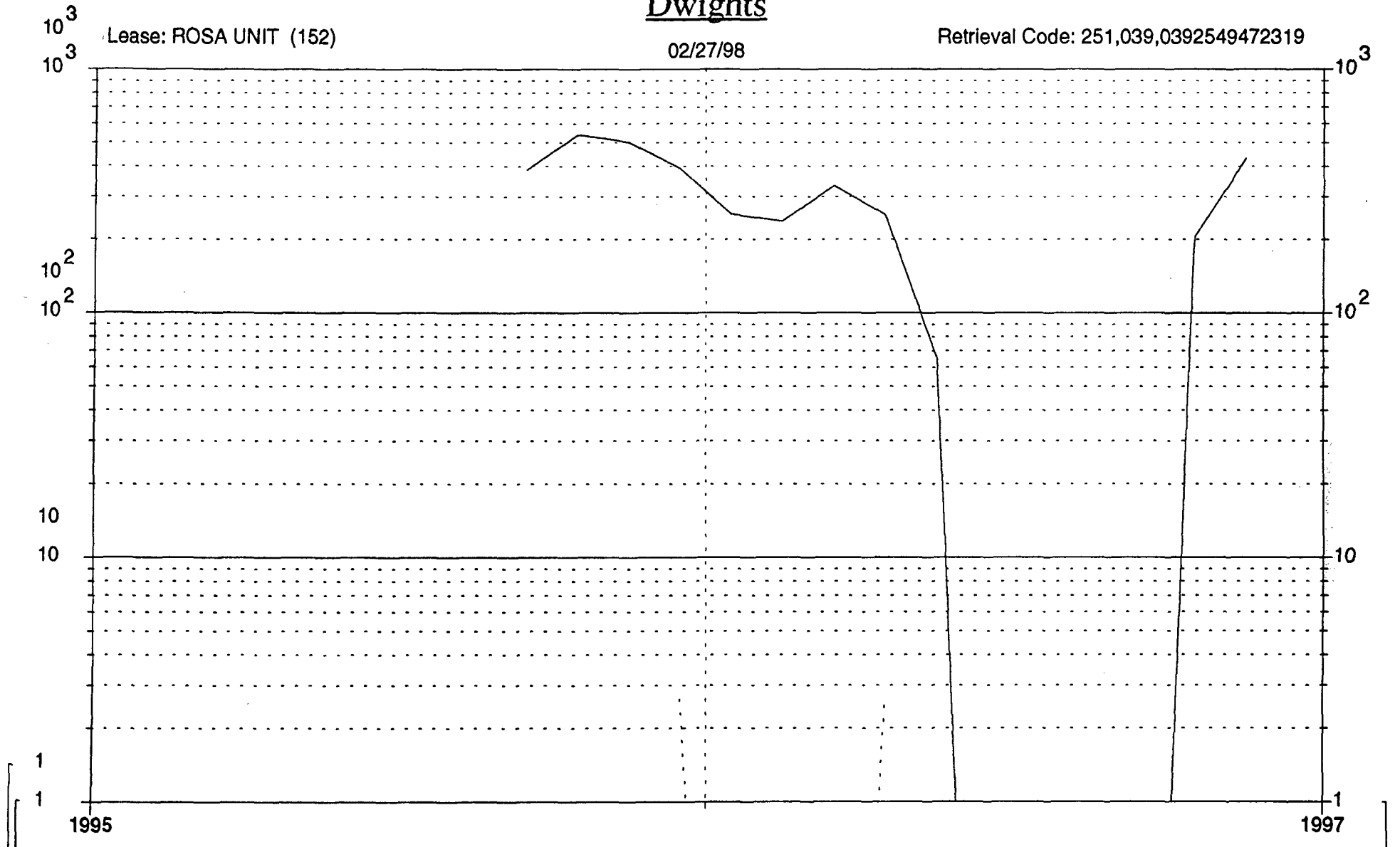
| | |
|---|---|
| County: RIO ARRIBA, NM | F.P. Date: 04/82 |
| Field: BLANCO (MESAVERDE) MV | Oil Cum: 0 bbl |
| Reservoir: MESAVERDE | Gas Cum: 558.4 mmcf |
| Operator: WILLIAMS PRODUCTION CO | Location: 35H 32N 6W |

# Dwights

Lease: ROSA UNIT (152)

02/27/98

Retrieval Code: 251,039,0392549472319




Gas (mcf/day) ———

Water (bbl/day) - - - - - -

Oil (bbl/day) — — —

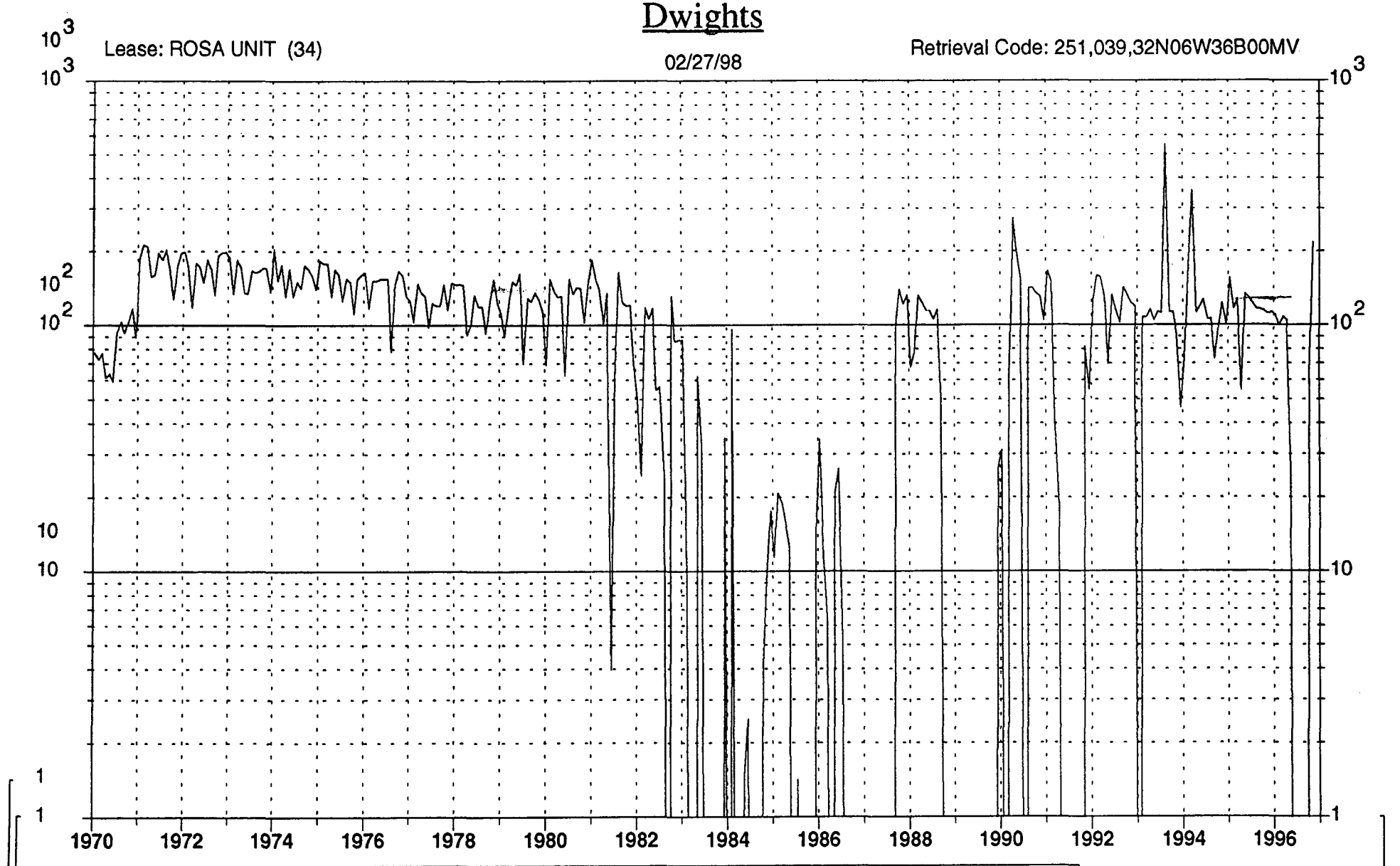
| | |
|---|---|
| County: RIO ARRIBA, NM | F.P. Date: 09/95 |
| Field: BLANCO (MESAVERDE) MV | Oil Cum: 0 bbl |
| Reservoir: MESAVERDE | Gas Cum: 109.0 mmcf |
| Operator: WILLIAMS PRODUCTION CO | Location: 36E 32N 6W |

# Dwights

Lease: ROSA UNIT (34)

02/27/98

Retrieval Code: 251,039,32N06W36B00MV




Gas (mcf/day) ———

Water (bbl/day) - - - - - -

Oil (bbl/day) — — —

County: RIO ARRIBA, NM

F.P. Date: 05/60

Field: BLANCO (MESAVERDE) MV

Oil Cum: 0 bbl

Reservoir: MESAVERDE

Gas Cum: 1659 mmcf

Operator: WILLIAMS PRODUCTION CO

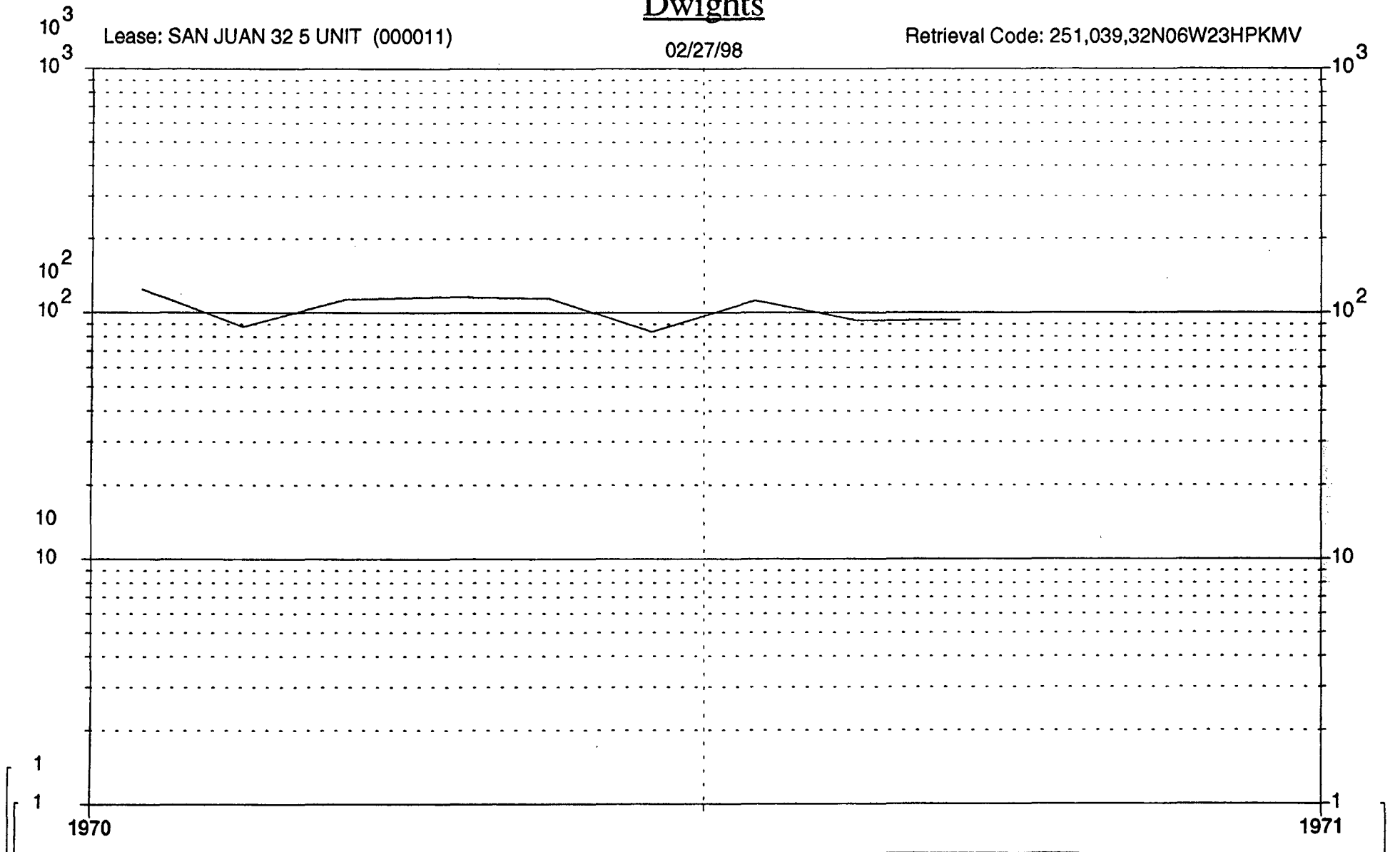
Location: 36B 32N 6W

# Dwights

Lease: SAN JUAN 32 5 UNIT (000011)

02/27/98

Retrieval Code: 251,039,32N06W23HPKMV




Gas (mcf/day) ———

Water (bbl/day) . . . . . .

Oil (bbl/day) — — —

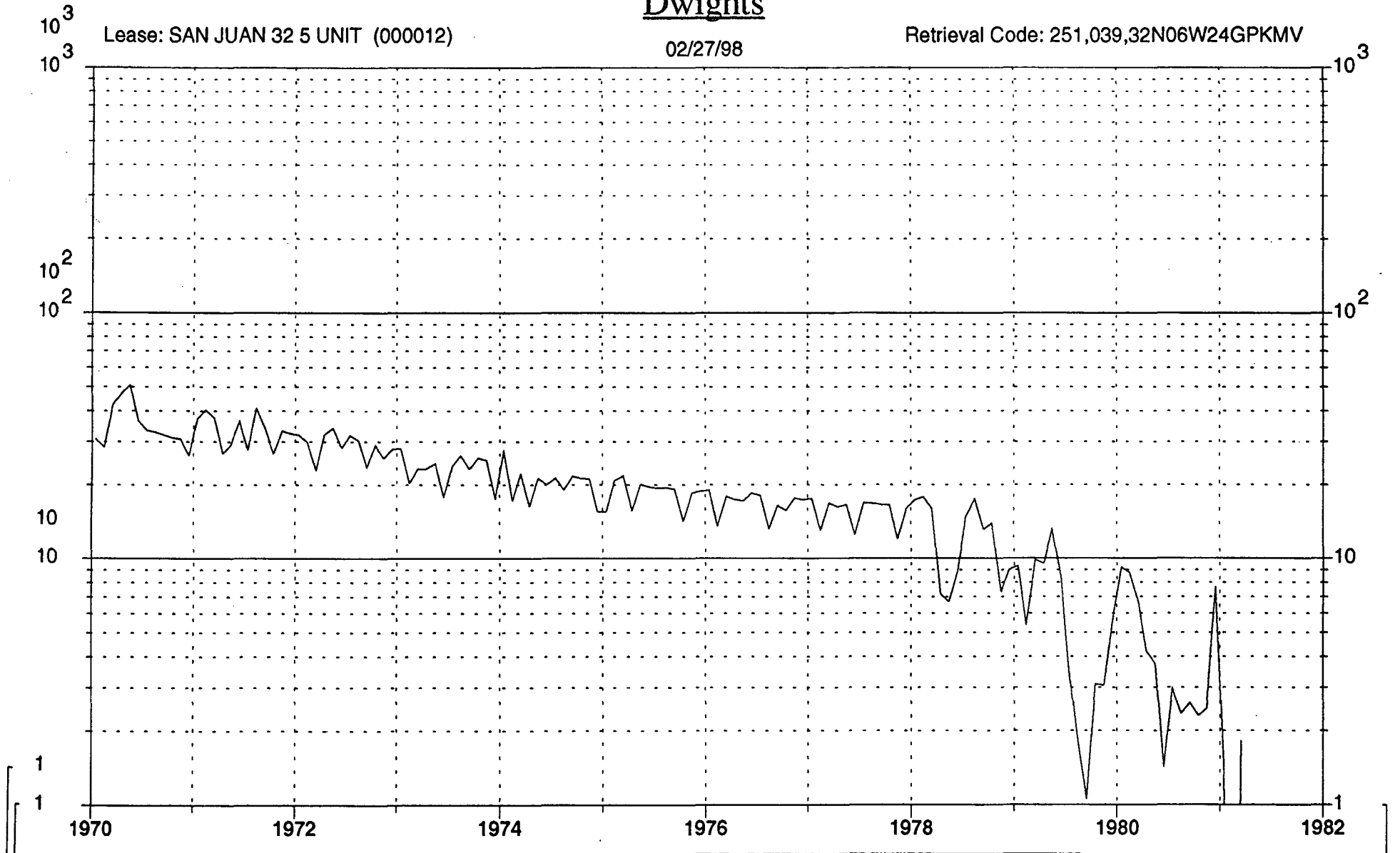
| | |
|---|---|
| County: RIO ARRIBA, NM | F.P. Date: 11/61 |
| Field: BLANCO (MESAVERDE) MV | Oil Cum: 0 bbl |
| Reservoir: MESAVERDE | Gas Cum: 546.8 mmcf |
| Operator: EL PASO NATURAL GAS CO | Location: 23H 32N 6W |

# Dwights

Lease: SAN JUAN 32 5 UNIT (000012)

02/27/98

Retrieval Code: 251,039,32N06W24GPKMV




Gas (mcf/day) ———

Water (bbl/day) - - - - -

Oil (bbl/day) — — —

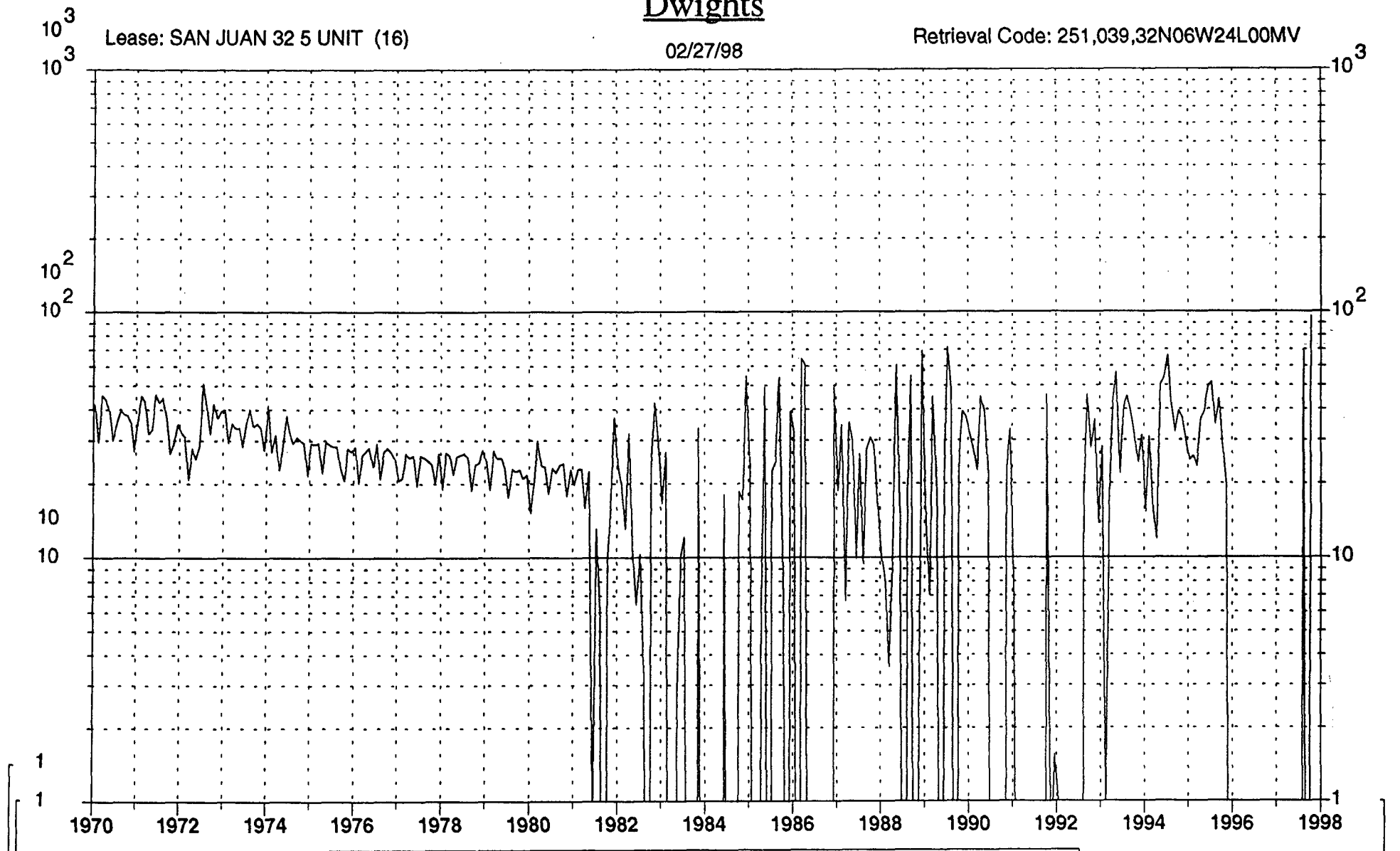
| | |
|---|---|
| County: RIO ARRIBA, NM | F.P. Date: 05/62 |
| Field: BLANCO (MESAVERDE) MV | Oil Cum: 0 bbl |
| Reservoir: MESAVERDE | Gas Cum: 154.1 mmcf |
| Operator: EL PASO NATURAL GAS CO | Location: 24G 32N 6W |

# Dwights

Lease: SAN JUAN 32 5 UNIT (16)

02/27/98

Retrieval Code: 251,039,32N06W24L00MV




Gas (mcf/day) ———

Water (bbl/day) - - - - - -

Oil (bbl/day) — — —

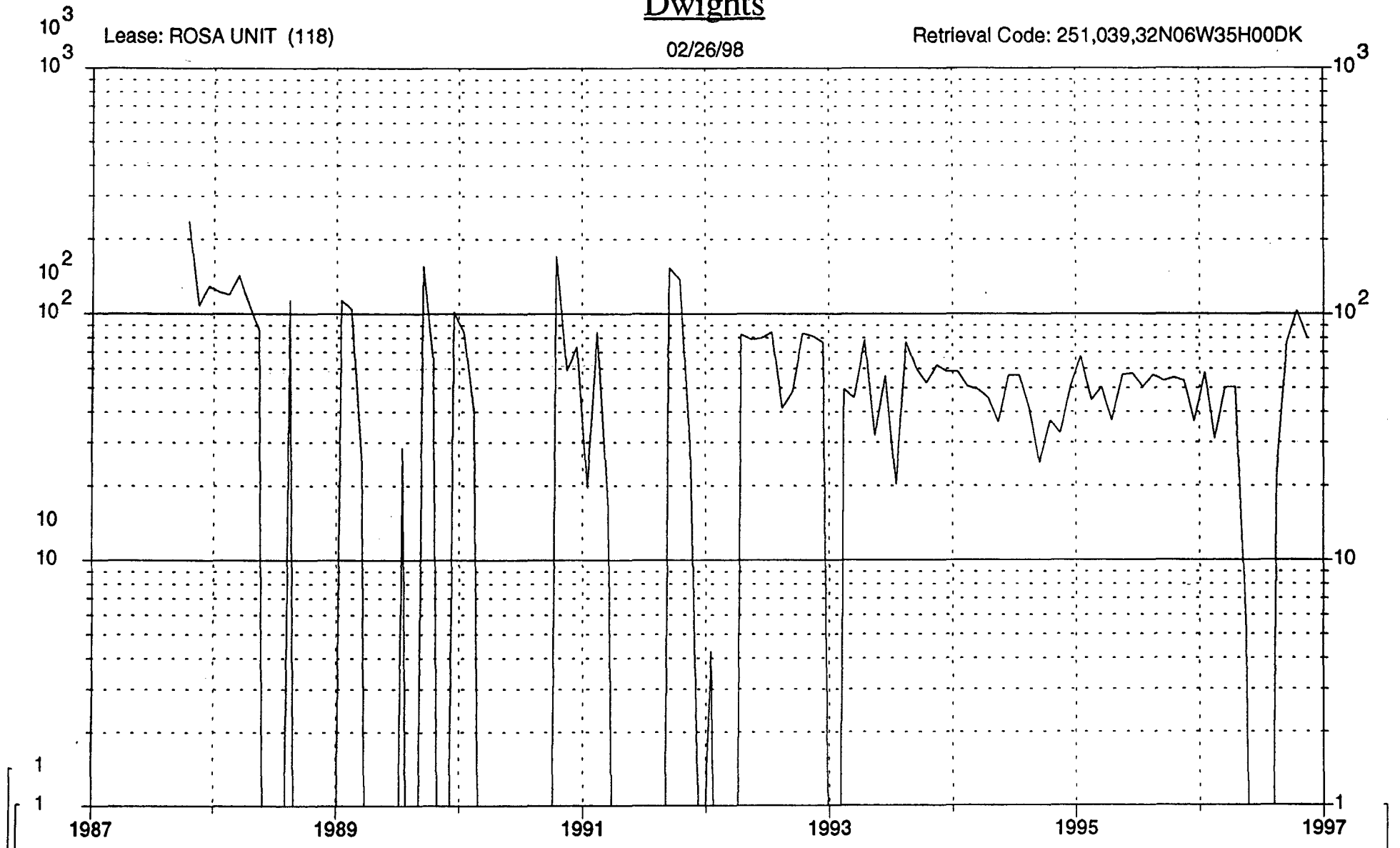
| | |
|---|---|
| County: RIO ARRIBA, NM | F.P. Date: 06/63 |
| Field: BLANCO (MESAVERDE) MV | Oil Cum: 0 bbl |
| Reservoir: MESAVERDE | Gas Cum: 348.3 mmcf |
| Operator: BURLINGTON RES O&G CO | Location: 24L 32N 6W |

# Dwights

Lease: ROSA UNIT (118)

02/26/98

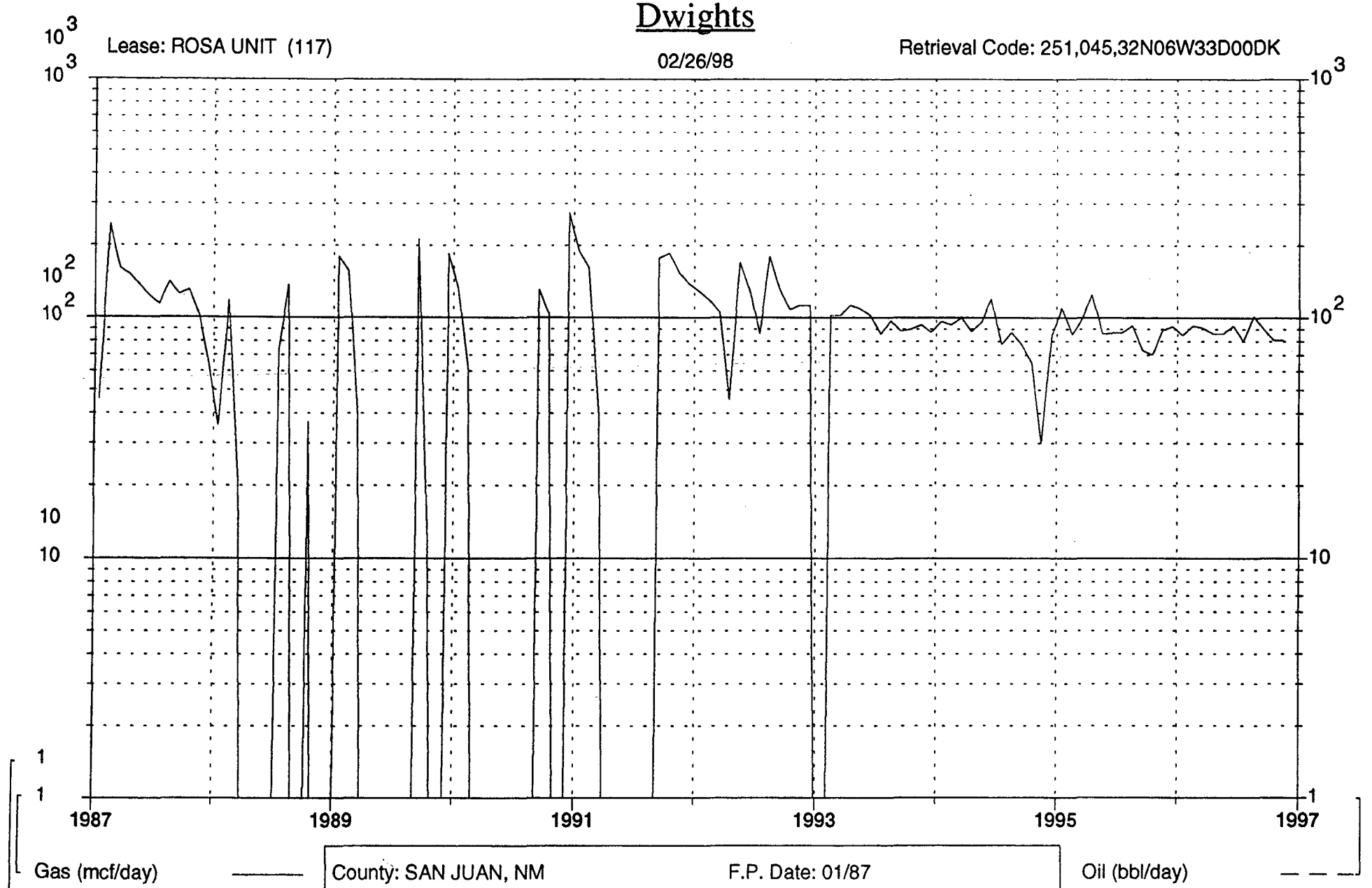
Retrieval Code: 251,039,32N06W35H00DK




Gas (mcf/day) ——— Water (bbl/day) - - - - - - Oil (bbl/day) — — —

| | |
|---|---|
| County: RIO ARRIBA, NM | F.P. Date: 10/87 |
| Field: BASIN (DAKOTA) DK | Oil Cum: 0 bbl |
| Reservoir: DAKOTA | Gas Cum: 167.8 mmcf |
| Operator: WILLIAMS PRODUCTION CO | Location: 35H 32N 6W |

# Dwights

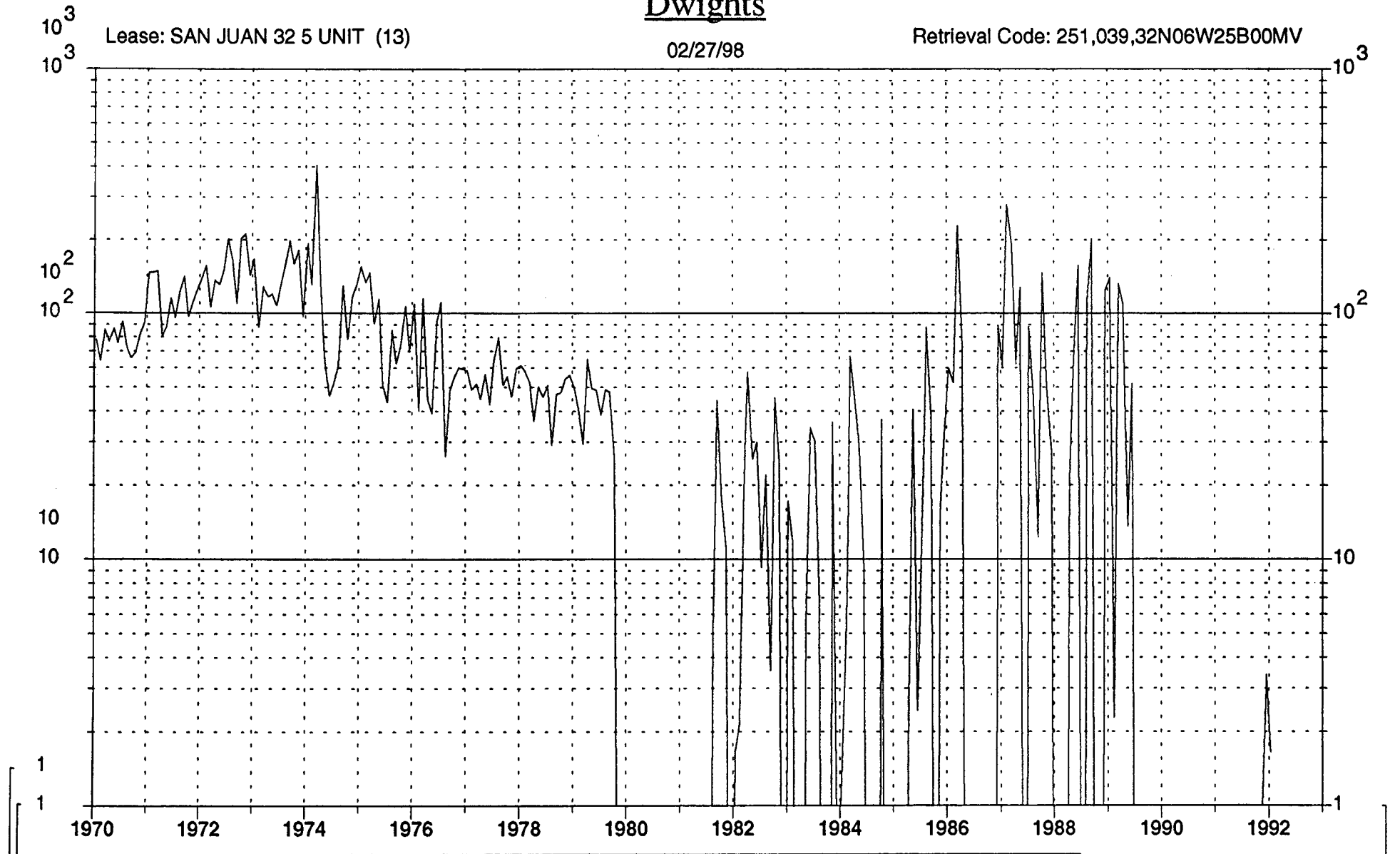

Lease: ROSA UNIT (117)
02/26/98
Retrieval Code: 251,045,32N06W33D00DK
10^3
10^2
10
1
1987
1989
1991
1993
1995
1997
Gas (mcf/day)
Water (bbl/day)
Oil (bbl/day)
County: SAN JUAN, NM
F.P. Date: 01/87
Field: BASIN (DAKOTA) DK
Oil Cum: 0 bbl
Reservoir: DAKOTA
Gas Cum: 305.8 mmcf
Operator: WILLIAMS PRODUCTION CO
Location: 33D 32N 6W

# Dwights

Lease: SAN JUAN 32 5 UNIT (13)

02/27/98

Retrieval Code: 251,039,32N06W25B00MV




Gas (mcf/day) ———

Water (bbl/day) - - - - - -

Oil (bbl/day) — — —

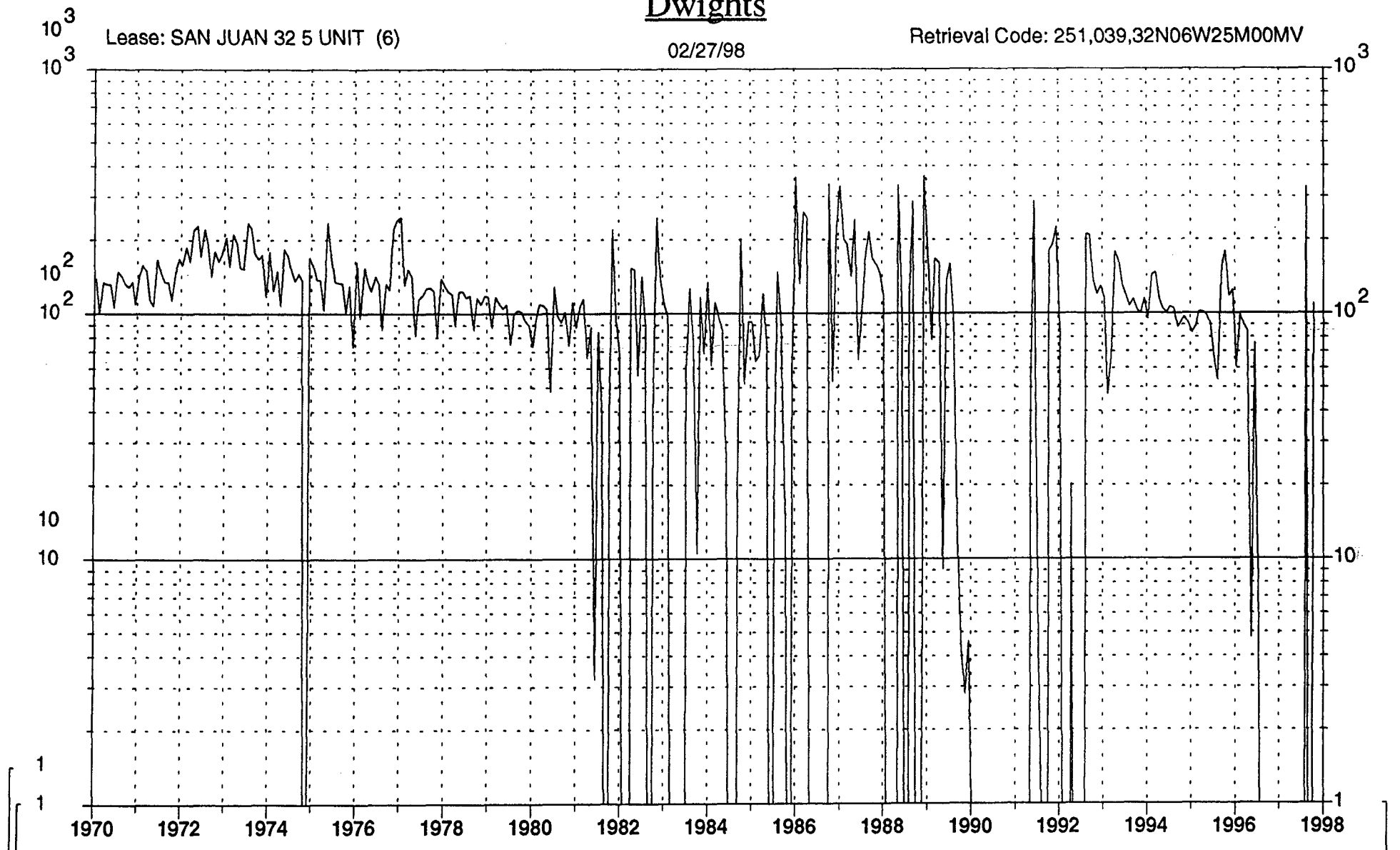
| | |
|---|---|
| County: RIO ARRIBA, NM | F.P. Date: 12/60 |
| Field: BLANCO (MESAVERDE) MV | Oil Cum: 0 bbl |
| Reservoir: MESAVERDE | Gas Cum: 908.6 mmcf |
| Operator: BURLINGTON RES O&G CO | Location: 25B 32N 6W |

# Dwights

Lease: SAN JUAN 32 5 UNIT (6)

02/27/98

Retrieval Code: 251,039,32N06W25M00MV




Gas (mcf/day) ———

Water (bbl/day) - - - - - -

Oil (bbl/day) — — —

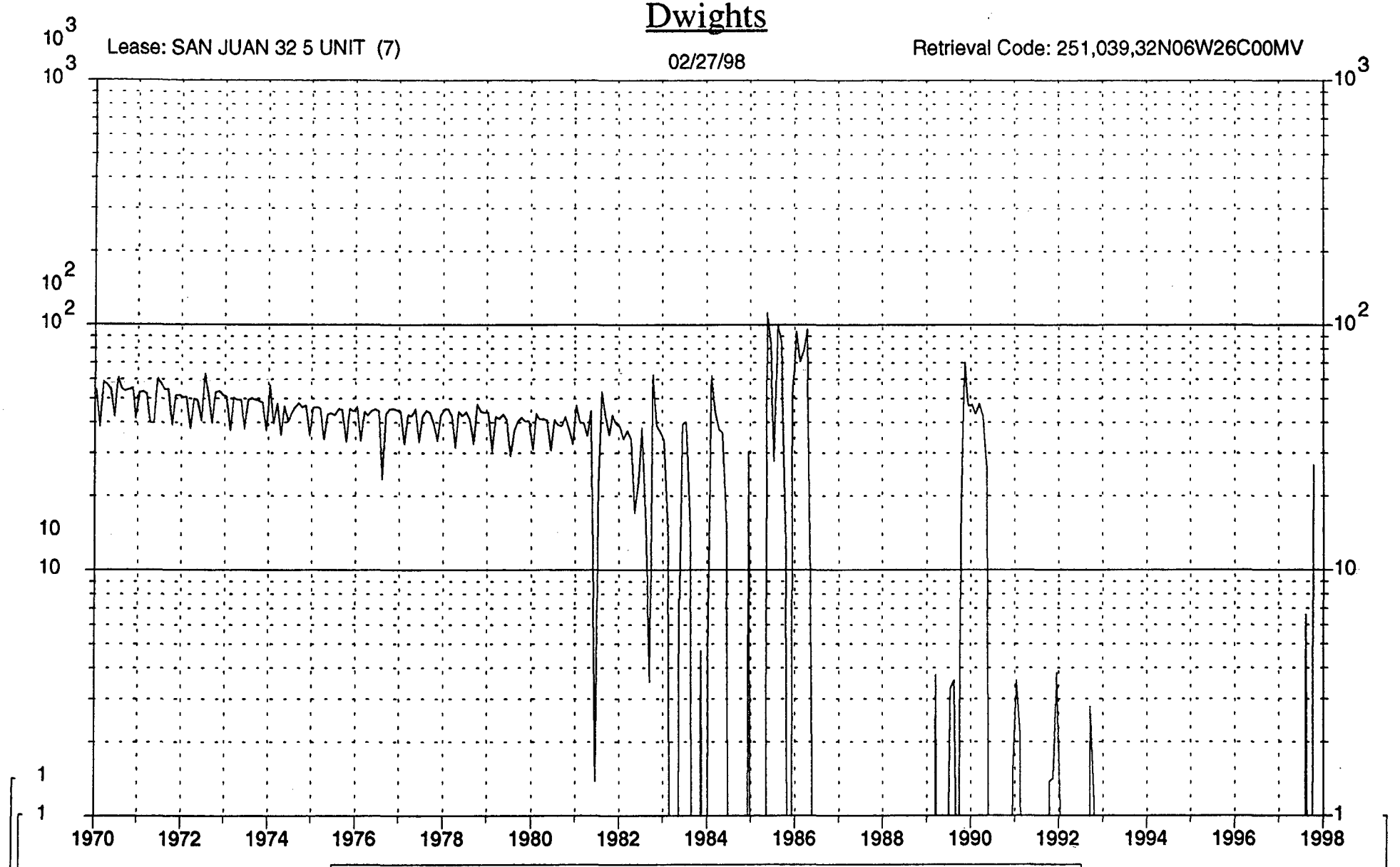
| | |
|---|---|
| County: RIO ARRIBA, NM | F.P. Date: 11/60 |
| Field: BLANCO (MESAVERDE) MV | Oil Cum: 0 bbl |
| Reservoir: MESAVERDE | Gas Cum: 1742 mmcf |
| Operator: BURLINGTON RES O&G CO | Location: 25M 32N 6W |

# Dwights

Lease: SAN JUAN 32 5 UNIT (7)

02/27/98

Retrieval Code: 251,039,32N06W26C00MV




Gas (mcf/day) ———

Water (bbl/day) - - - - - -

Oil (bbl/day) — — —

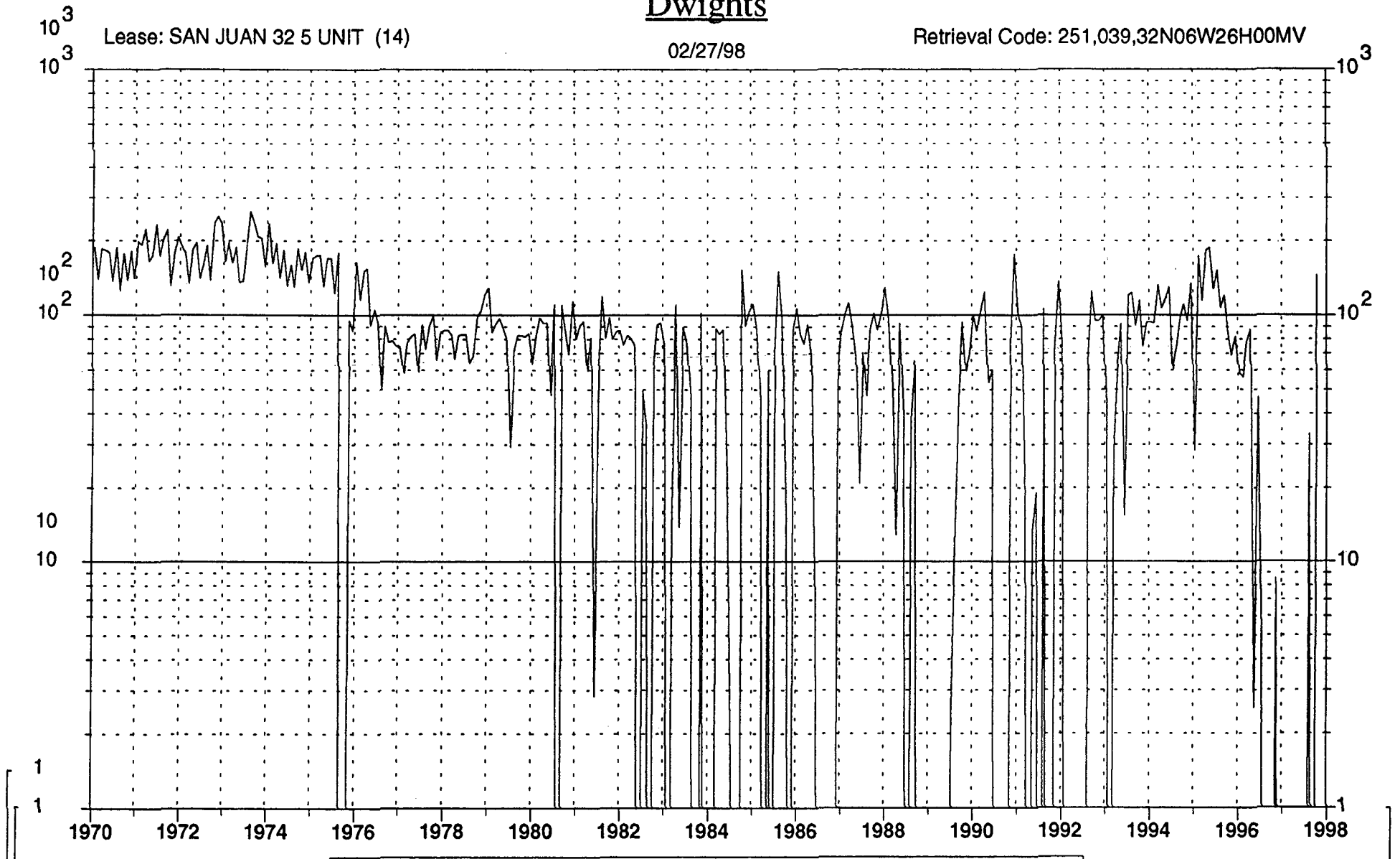
| | |
|---|---|
| County: RIO ARRIBA, NM | F.P. Date: 11/60 |
| Field: BLANCO (MESAVERDE) MV | Oil Cum: 0 bbl |
| Reservoir: MESAVERDE | Gas Cum: 488.1 mmcf |
| Operator: BURLINGTON RES O&G CO | Location: 26C 32N 6W |

# Dwights

Lease: SAN JUAN 32 5 UNIT (14)

02/27/98

Retrieval Code: 251,039,32N06W26H00MV




Gas (mcf/day) ———

Water (bbl/day) - - - - - -

Oil (bbl/day) — — —

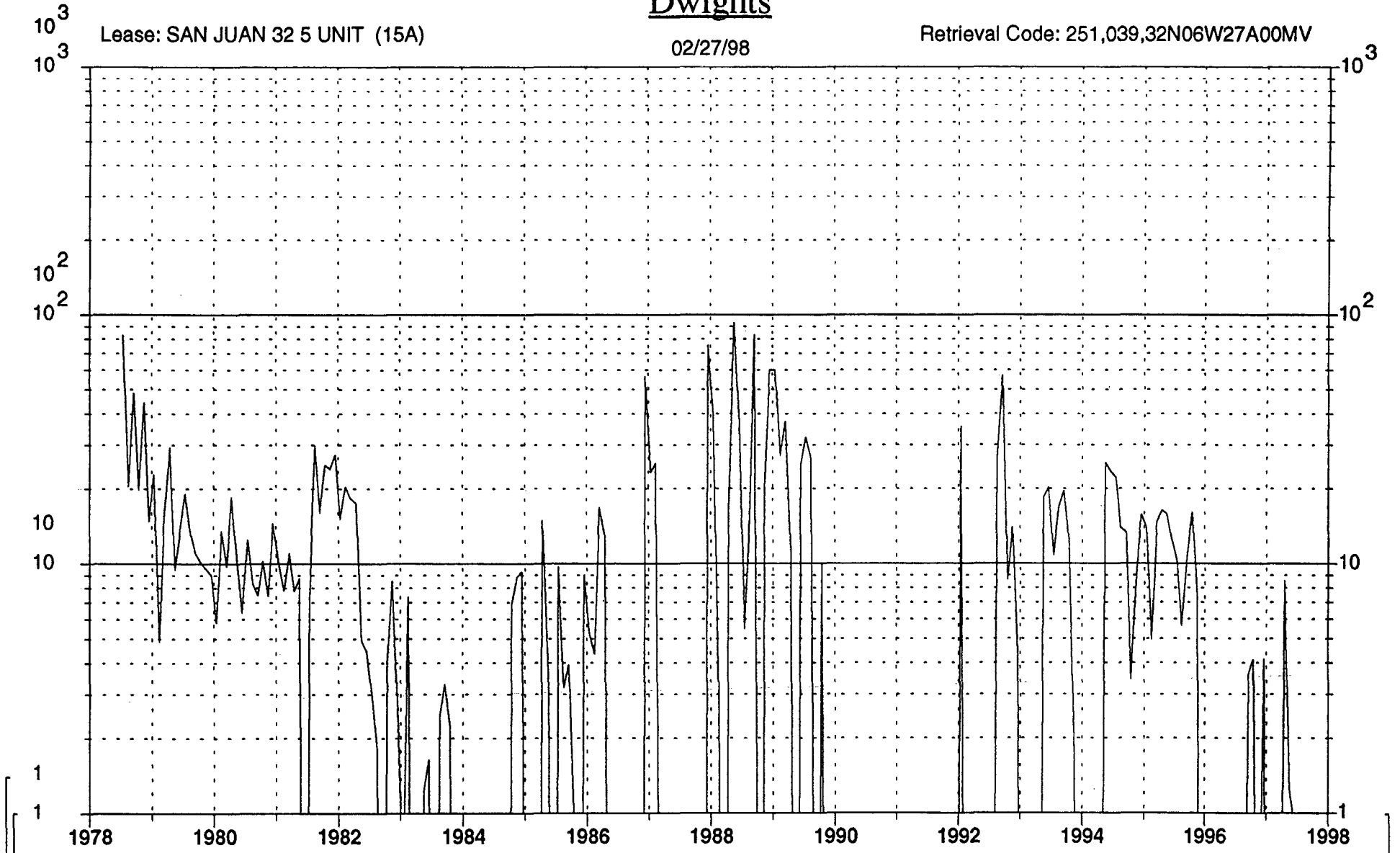
| | |
|---|---|
| County: RIO ARRIBA, NM | F.P. Date: 11/60 |
| Field: BLANCO (MESAVERDE) MV | Oil Cum: 0 bbl |
| Reservoir: MESAVERDE | Gas Cum: 1563 mmcf |
| Operator: BURLINGTON RES O&G CO | Location: 26H 32N 6W |

# Dwights

Lease: SAN JUAN 32 5 UNIT (15A)

02/27/98

Retrieval Code: 251,039,32N06W27A00MV




Gas (mcf/day) ———

Water (bbl/day) - - - - - -

Oil (bbl/day) — — —

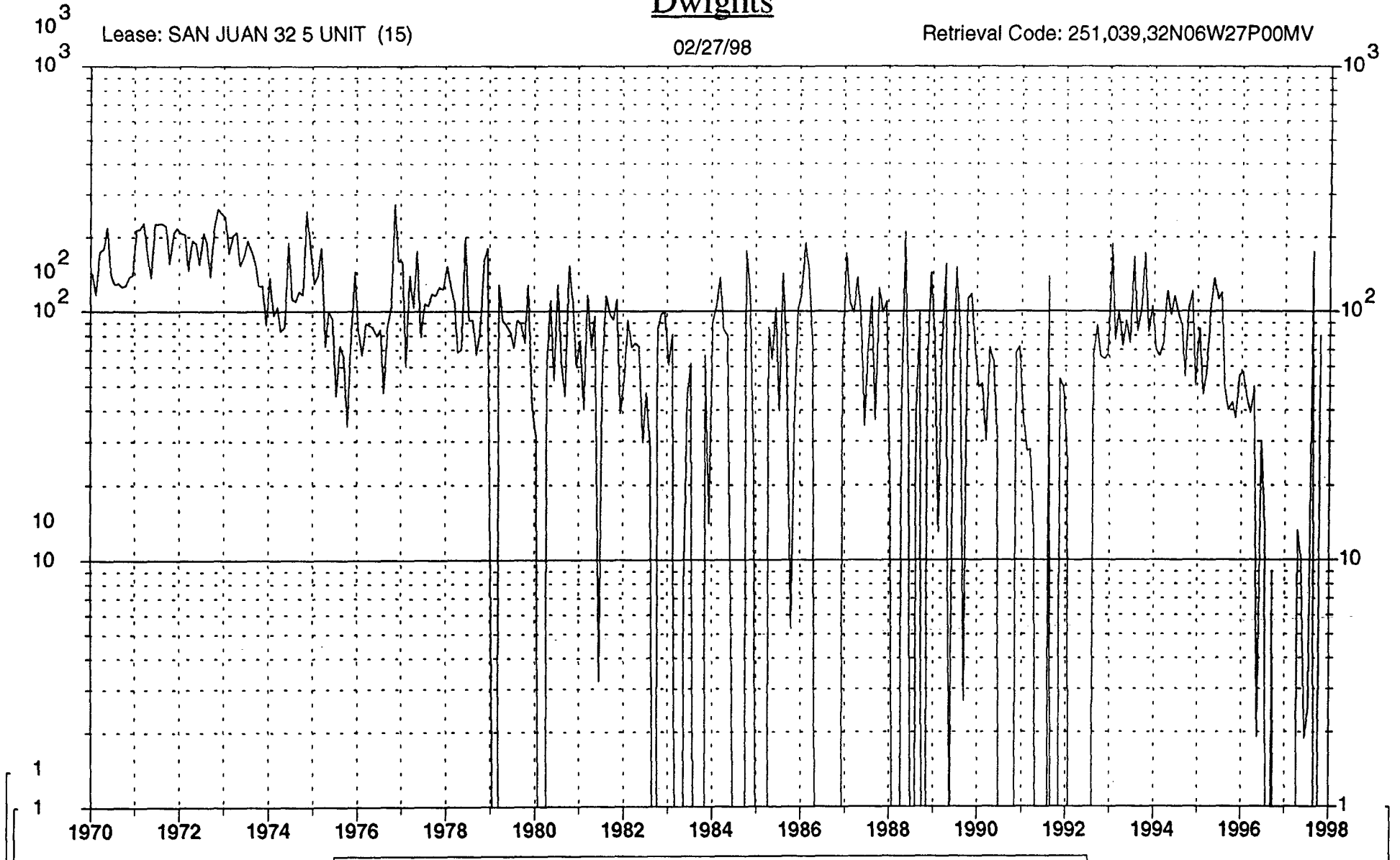
| | |
|---|---|
| County: RIO ARRIBA, NM | F.P. Date: 07/78 |
| Field: BLANCO (MESAVERDE) MV | Oil Cum: 0 bbl |
| Reservoir: MESAVERDE | Gas Cum: 67.81 mmcf |
| Operator: BURLINGTON RES O&G CO | Location: 27A 32N 6W |

# Dwights

Lease: SAN JUAN 32 5 UNIT (15)

02/27/98

Retrieval Code: 251,039,32N06W27P00MV




Gas (mcf/day) ———

Water (bbl/day) - - - - - -

Oil (bbl/day) — — —

County: RIO ARRIBA, NM

F.P. Date: 05/63

Field: BLANCO (MESAVERDE) MV

Oil Cum: 0 bbl

Reservoir: MESAVERDE

Gas Cum: 1227 mmcf

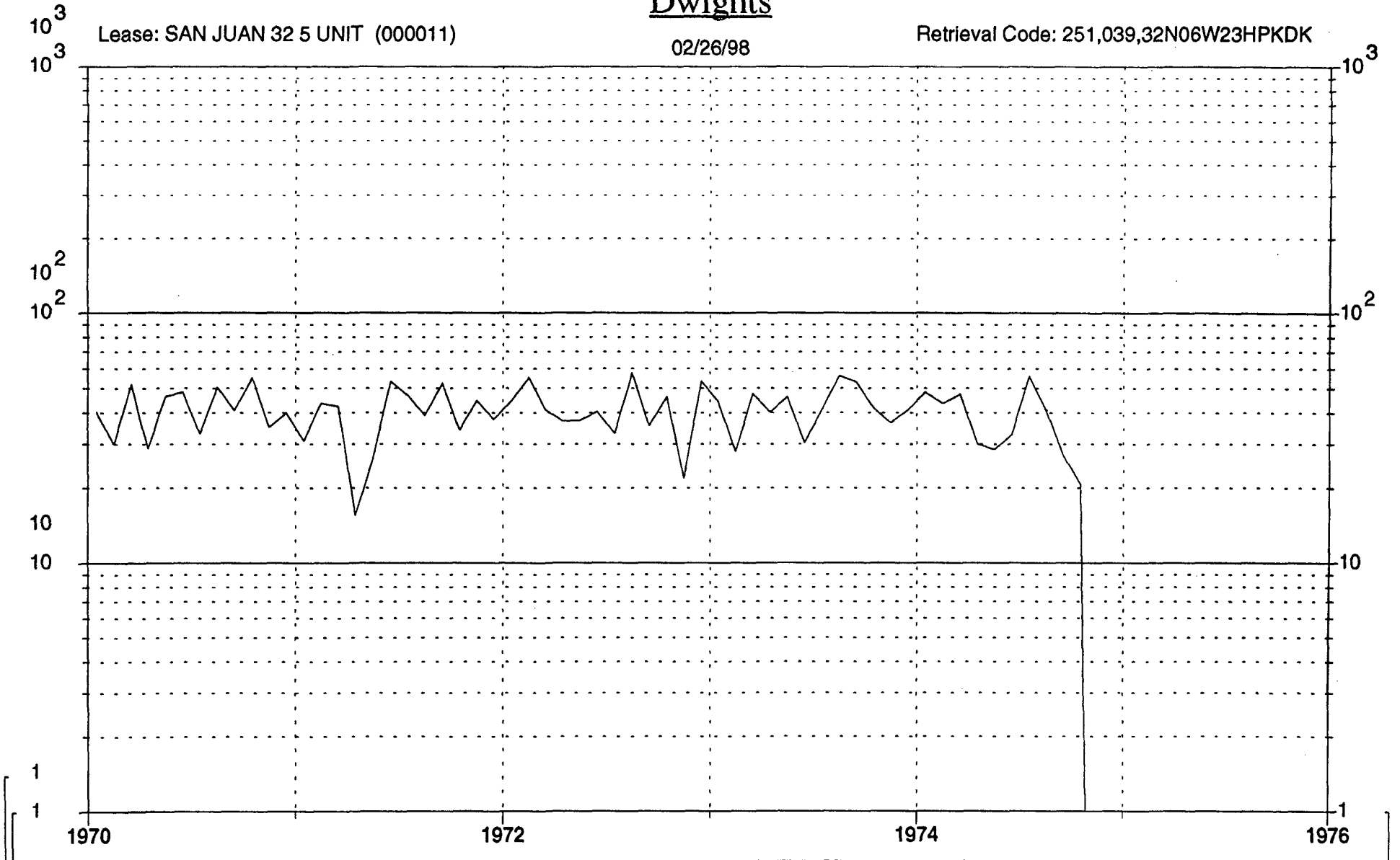
Operator: BURLINGTON RES O&G CO

# Dwights

Lease: SAN JUAN 32 5 UNIT (000011)

02/26/98

Retrieval Code: 251,039,32N06W23HPKDK




Gas (mcf/day) ———

Water (bbl/day) - - - - - -

Oil (bbl/day) — — —

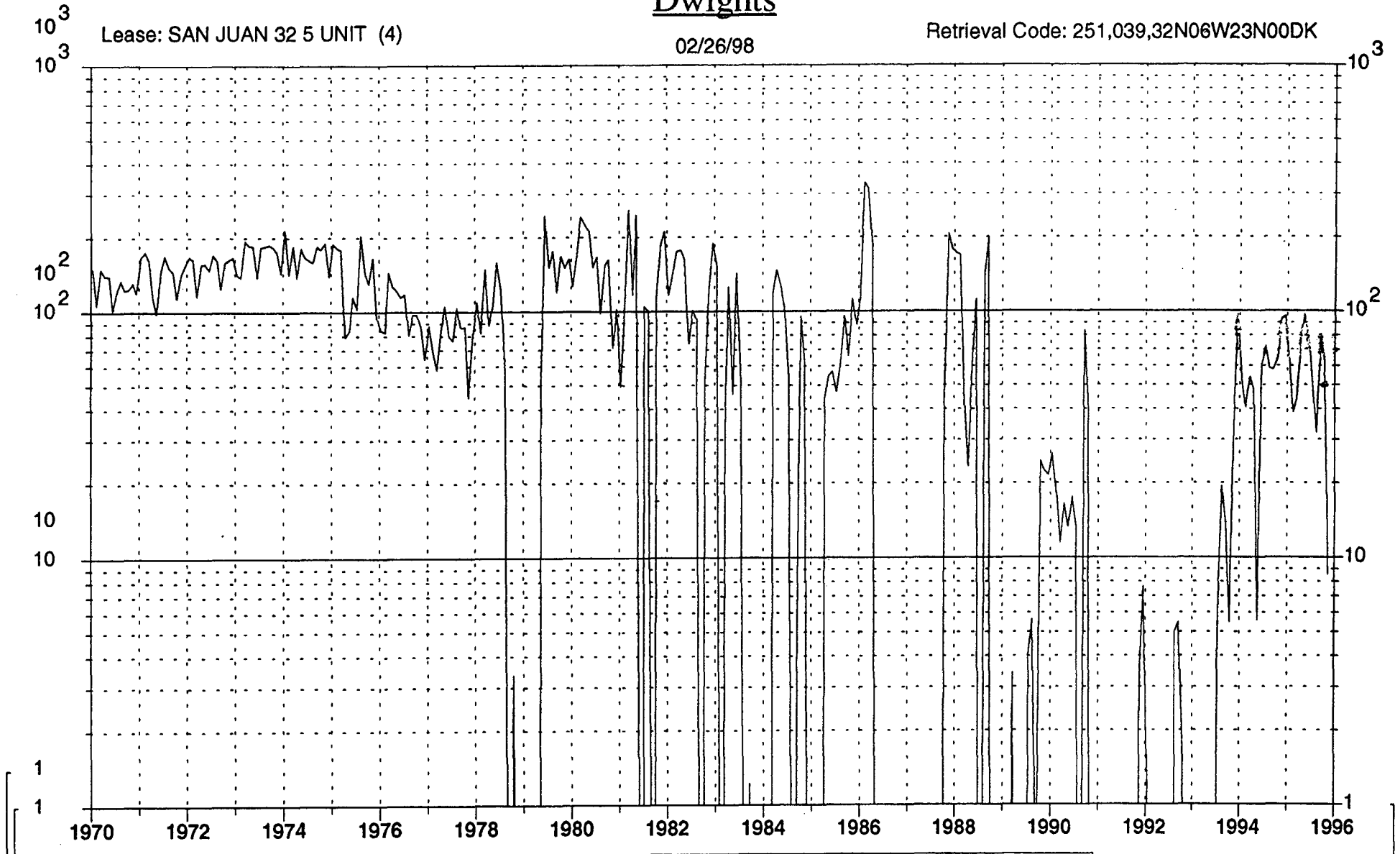
| | |
|---|---|
| County: RIO ARRIBA, NM | F.P. Date: 11/61 |
| Field: BASIN (DAKOTA) DK | Oil Cum: 0 bbl |
| Reservoir: DAKOTA | Gas Cum: 298.0 mmcf |
| Operator: EL PASO NATURAL GAS CO | Location: 23H 32N 6W |

# Dwights

Lease: SAN JUAN 32 5 UNIT (4)

02/26/98

Retrieval Code: 251,039,32N06W23N00DK




Gas (mcf/day) ——— Oil (bbl/day) — — —

Water (bbl/day) - - - - - -

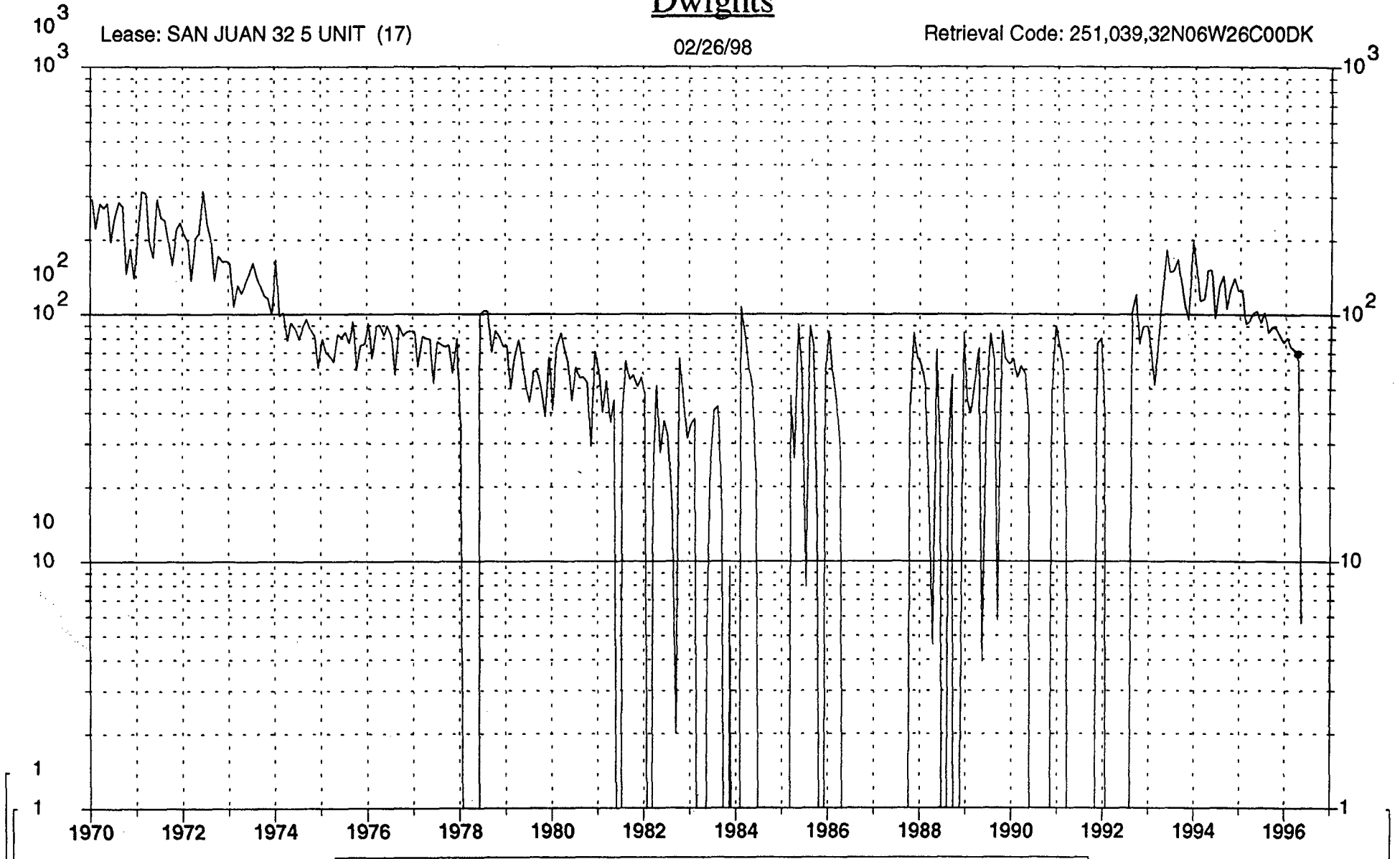
| | |
|---|---|
| County: RIO ARRIBA, NM | F.P. Date: 04/61 |
| Field: BASIN (DAKOTA) DK | Oil Cum: 0 bbl |
| Reservoir: DAKOTA | Gas Cum: 1759 mmcf |
| Operator: BURLINGTON RES O&G CO | Location: 23N 32N 6W |

# Dwights

Lease: SAN JUAN 32 5 UNIT (17)

02/26/98

Retrieval Code: 251,039,32N06W26C00DK




Gas (mcf/day) ——— Oil (bbl/day) — — —

Water (bbl/day) - - - - -

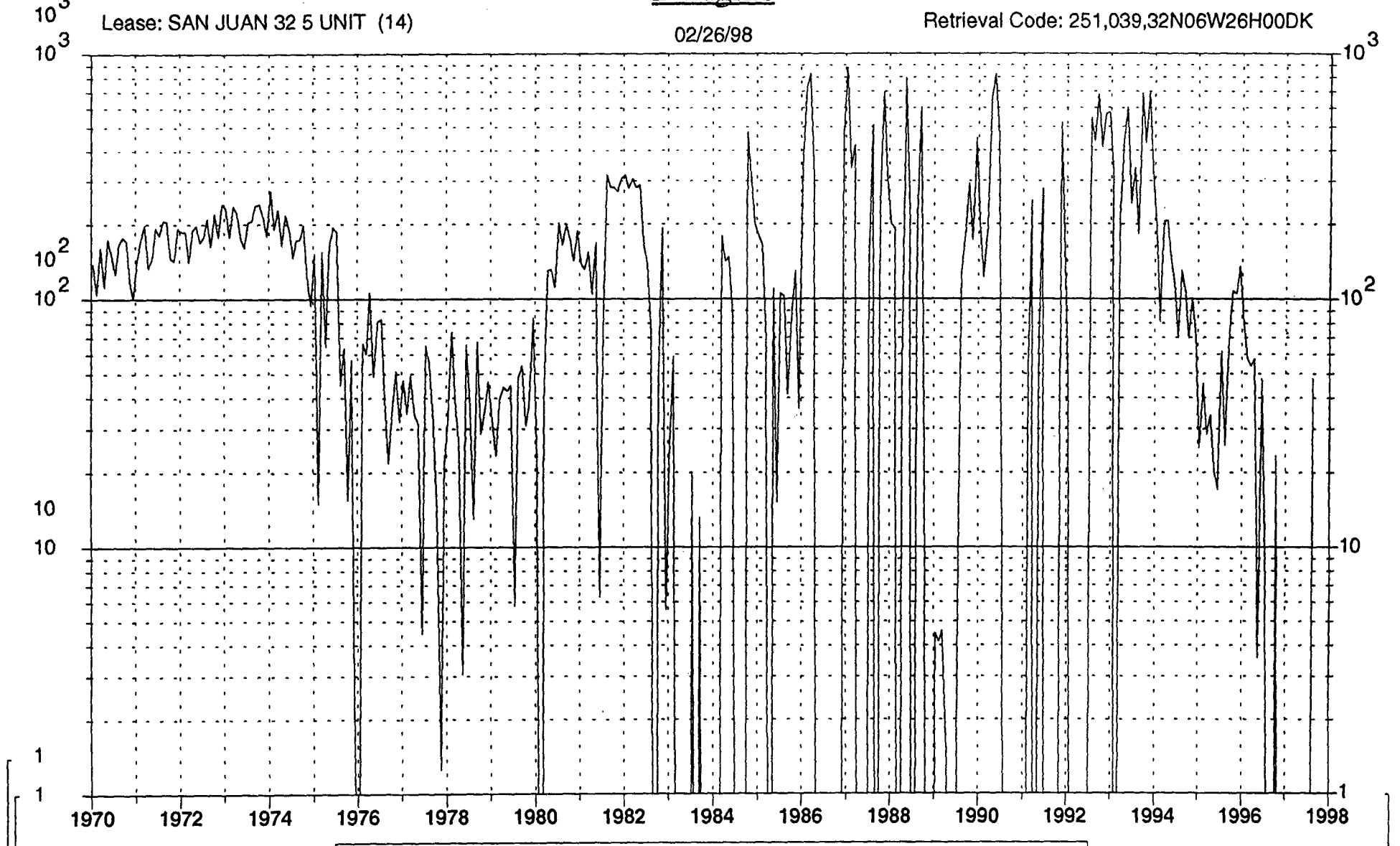
| | |
|---|---|
| County: RIO ARRIBA, NM | F.P. Date: 11/61 |
| Field: BASIN (DAKOTA) DK | Oil Cum: 0 bbl |
| Reservoir: DAKOTA | Gas Cum: 1972 mmcf |
| Operator: BURLINGTON RES O&G CO | Location: 26C 32N 6W |

# Dwights

Lease: SAN JUAN 32 5 UNIT (14)

02/26/98

Retrieval Code: 251,039,32N06W26H00DK




Gas (mcf/day) ———

Water (bbl/day) - - - - - -

Oil (bbl/day) — — —

County: RIO ARRIBA, NM

F.P. Date: 12/60

Field: BASIN (DAKOTA) DK

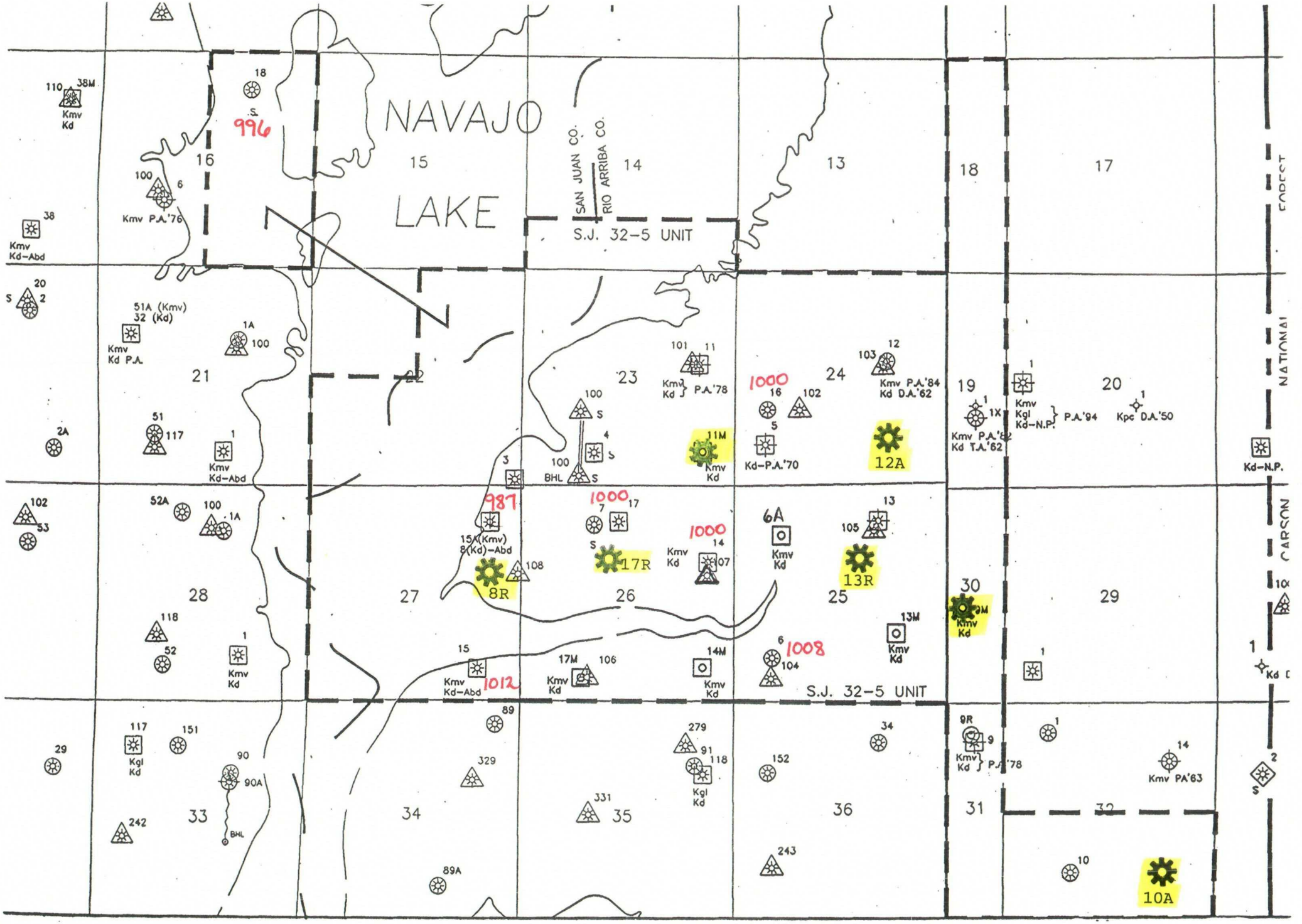
Oil Cum: 0 bbl

Reservoir: DAKOTA

Gas Cum: 2474 mmcf

Operator: BURLINGTON RES O&G CO

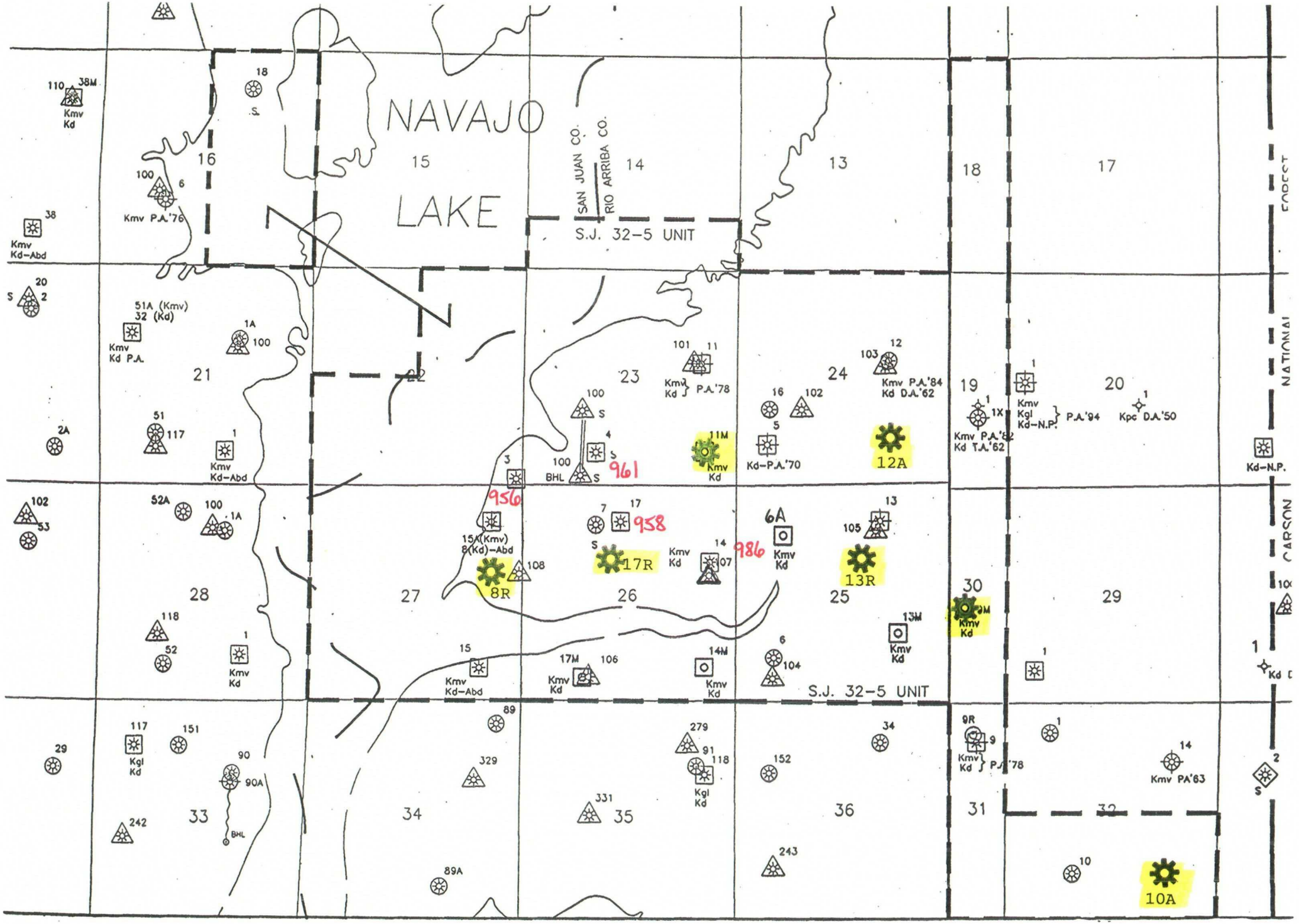
Location: 26H 32N 6W




FISCAL 1999 DRILLING PROGRAM

MESAVERDE BTU @ 14.73 DRY

EXHIBIT 8A




FISCAL 1999 DRILLING PROGRAM

DAKOTA BTU @ 14.73 DRY

EXHIBIT 8B

EXHIBIT #9

# SAN JUAN 32-5 UNIT ECONOMICS

| ASSUMPTIONS | COMMINGLE | DUAL |
|---|---|---|
| INITIAL WELL COSTS | $704,771 | $ 814,771 |
| INITIAL RATE | 330 MCFD | 300 MCFD |
| DECLINE RATE | 6 % | 6 % |
| OPERATING COST | $ 700 /MO | $ 700 /MO |
| WORKING INTEREST | 0.985 | 0.985 |
| NET REVENUE | 0.762 | 0.762 |
| BTU VALUE | 1180 | 1180 |
| GAS PRICE | $ 2.00 / MCF | $ 2.00 / MCF |
| PRICE DIFFERENTIAL | -$ 0.61/ MCF | -$ 0.61/ MCF |
| PROCESSING PLANT | IGNACIO | IGNACIO |
| LIQUID YIELD | 2.21 GAL / MCF | 2.21 GAL / MCF |
| LIQUID PRICE | $ 0.19 / GAL | $ 0.19 / GAL |
| RECOVERABLE RESERVES | 1.8 BCF | 1.6 BCF |
| **PROJECT IRR** | **18.6 %** | **13.2 %** |

EXHIBIT #9A

**Well Name: SAN JUAN UNIT 32 - 5 COMPLETION**
**Field Name: MESAVERDE / DAKOTA**
**Formation: MESAVERDE / DAKOTA**
**Date: 3/12/99**

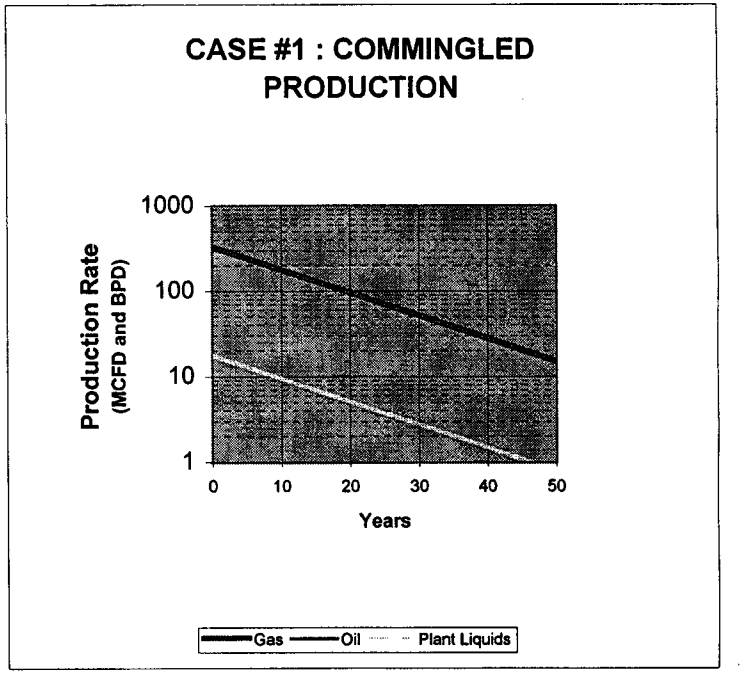
## CASE #1 : COMMINGLED PRODUCTION

| Main Input | MESAVERDE | DAKOTA | Reservoir 3 |
|---|---|---|---|
| Initial Gas Rate (MCFD) | 230 | 100 | 0 |
| Initial Gas Decline Rate (%/yr) | 6.00% | 6.00% | 0.00% |
| Minimum Gas Decline Rate (%/yr) | 6.00% | 6.00% | 0.00% |
| n Factor for Gas Decline | 1.7 | 1.7 | 0 |
| Initial Oil Rate (BPD) | 0 | 0 | 0 |
| Initial Oil Decline Rate (%/yr) | 0.00% | 0.00% | 0.00% |
| Minimum Oil Decline Rate (%/yr) | 0.00% | 0.00% | 0.00% |
| n Factor for Oil Decline | 0 | 0 | 0 |
| Investment Cost | | | $704,771 |
| Gas BTU Content (MMBTU) | | | 1180 |
| Operating Costs ($/Month) | | | 700 |
| Working Interest | | | 98.50% |
| Revenue Interest | | | 76.20% |
| Indian Land (Y or N) | | | N |
| Liquid Plant Code Number | | | 2 |
| NYMEX Gas Price ($/MCF) | | | $2.00 |
| NYMEX Oil Price ($/STB) | | | $14.00 |
| Discount Rate | | | 18.6% |
| Plant Liq. Price net of T&F ($/gal) | | | $0.19 |
| RESULTS | | | |
| Net Present Value = | | | $17 |
| Economic Life of Well (yrs) = | | | 39.7 |
| Rate of Return (%/yr) = | | | 18.6% |
| Gross Gas (MMCF) = | | | 1729 |
| Gross Oil (MSTB) = | | | 0 |
| Net Sales Gas (MMCF) = | | | 1197 |
| Net Oil (MSTB) = | | | 0 |
| Net Plant Liquids (Mgal) = | | | 3006 |

| Additional Input | |
|---|---|
| Gas Imbalance (MCF, See notes in comment section below) | 0 |
| Price for Imbalance Gas ($/MCF) | $1.53 |
| NYMEX Oil Price Cap (NGL price is capped at time of oil cap) | $30.00 |
| Gas & NGL Production Taxes for Non-Indian Land | 9.39% |
| Gas & NGL Production Taxes for Indian Land | 22.43% |
| Oil Production Taxes for Non-Indian Land | 8.54% |
| Oil Production Taxes for Indian Land | 17.74% |
| Gas Basis Differential ($/MCF) | -$0.61 |
| Gas Price Escalation | 3.0% |
| Price Cap on NYMEX Gas Price | $3.50 |
| Oil Basis Differential ($/STB) | -$1.50 |
| Oil and NGL Price Escalation | 3.0% |
| Operating Cost Esc. | 3.0% |

| Liquid Plant and Code Number | WH/Tailgate Gas Vol. Ratio | WH/Tailgate BTU Ratio | Yield - gal/MCF Based on WH |
|---|---|---|---|
| 1: Chaco/Blanco Plant | 0.809 | 0.862 | 3.05 |
| 2: Ignacio Plant | 0.8828 | 0.919 | 2.217 |
| 3: Williams Kutz Pant | 0.8271 | 0.8879 | 2.67 |
| 4: Lybrook Plant | 0.7863 | 0.86203 | 3.886 |

**Comments:** The n factor for oil or gas decline is the hyperbolic decline constant. For exponitial decline the n factor should be 0. A larger n factor causes the decline rate to flatten more rapidly. Set n = 1 for harmonic decline.
If Gas Imbalance is a positive number, value is added in the first year, a negative gas imbalance reduces $'s in first year. Gas Imbalance does not impact reserves.
Gas Basis differential is the difference between El Paso Price and the NYMEX gas price. For Lybrook there is an additional $.049/MMBTU charge for transportation
For Ignacio there is an additional charge of $.04/MMBTU
12 Month avg. for El Paso Basis differential as of Oct 88 is -$.27/MMBTU




| Year | Gross WH Gas MMCF | Gross Oil STB | Plant Liquid Mgal | Net WH Gas MCF | Net Sales Gas Vol. MCF | Gas Price $/MCF | BTU Adj. Gas Price $/MCF | Net Gas Sales $ | Oil Price $/STB | Net Oil Sales $ | Plt. Liq. Price $/gal. | Net Plt. Liq. Sales $ | Net O.C. $ | Net Prd. Tax $ | Net Income $ | Disc. Net Income $ | Cum. Disc. Net Income $ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 116.80 | 0 | 258.94 | 89001 | 78570 | $1.42 | $1.54 | $120,737 | $12.69 | $0 | $0.19 | $38,058 | $8,387 | $14,911 | -$558,703 | -$564,669 | -$564,669 |
| 2 | 109.79 | 0 | 243.41 | 83661 | 73856 | $1.48 | $1.60 | $118,363 | $13.12 | $0 | $0.20 | $36,974 | $8,639 | $14,586 | $132,112 | $102,453 | -$462,216 |
| 3 | 103.20 | 0 | 228.80 | 78641 | 69425 | $1.54 | $1.67 | $115,977 | $13.56 | $0 | $0.21 | $35,918 | $8,898 | $14,263 | $128,734 | $84,180 | -$378,036 |
| 4 | 97.01 | 0 | 215.07 | 73923 | 65259 | $1.61 | $1.74 | $113,584 | $14.01 | $0 | $0.21 | $34,888 | $9,165 | $13,941 | $125,365 | $69,124 | -$308,912 |
| 5 | 91.19 | 0 | 202.17 | 69487 | 61344 | $1.67 | $1.81 | $111,189 | $14.47 | $0 | $0.22 | $33,884 | $9,440 | $13,622 | $122,011 | $56,727 | -$252,185 |
| 6 | 85.72 | 0 | 190.04 | 65318 | 57663 | $1.74 | $1.89 | $108,798 | $14.95 | $0 | $0.23 | $32,905 | $9,723 | $13,306 | $118,674 | $46,525 | -$205,660 |
| 7 | 80.58 | 0 | 178.64 | 61399 | 54203 | $1.81 | $1.96 | $106,413 | $15.45 | $0 | $0.23 | $31,952 | $10,015 | $12,993 | $115,358 | $38,134 | -$167,526 |
| 8 | 75.74 | 0 | 167.92 | 57715 | 50951 | $1.88 | $2.04 | $104,041 | $15.95 | $0 | $0.24 | $31,023 | $10,315 | $12,683 | $112,066 | $31,238 | -$136,289 |
| 9 | 71.20 | 0 | 157.84 | 54252 | 47894 | $1.96 | $2.12 | $101,683 | $16.48 | $0 | $0.25 | $30,119 | $10,625 | $12,376 | $108,801 | $25,573 | -$110,716 |
| 10 | 66.93 | 0 | 148.37 | 50997 | 45020 | $2.04 | $2.21 | $99,342 | $17.02 | $0 | $0.26 | $29,239 | $10,943 | $12,074 | $105,564 | $20,922 | -$89,794 |
| 11 | 62.91 | 0 | 139.47 | 47937 | 42319 | $2.11 | $2.29 | $97,023 | $17.57 | $0 | $0.27 | $28,382 | $11,272 | $11,776 | $102,358 | $17,106 | -$72,689 |
| 12 | 59.14 | 0 | 131.10 | 45061 | 39780 | $2.20 | $2.38 | $94,727 | $18.14 | $0 | $0.28 | $27,547 | $11,610 | $11,482 | $99,183 | $13,976 | -$58,713 |
| 13 | 55.59 | 0 | 123.24 | 42357 | 37393 | $2.28 | $2.47 | $92,457 | $18.73 | $0 | $0.28 | $26,736 | $11,958 | $11,192 | $96,042 | $11,412 | -$47,301 |
| 14 | 52.25 | 0 | 115.84 | 39816 | 35150 | $2.37 | $2.57 | $90,214 | $19.34 | $0 | $0.29 | $25,946 | $12,317 | $10,907 | $92,936 | $9,311 | -$37,989 |
| 15 | 49.12 | 0 | 108.89 | 37427 | 33041 | $2.46 | $2.66 | $88,001 | $19.97 | $0 | $0.30 | $25,177 | $12,686 | $10,627 | $89,865 | $7,592 | -$30,397 |
| 16 | 46.17 | 0 | 102.36 | 35181 | 31058 | $2.55 | $2.76 | $85,819 | $20.61 | $0 | $0.31 | $24,430 | $13,067 | $10,352 | $86,830 | $6,186 | -$24,212 |
| 17 | 43.40 | 0 | 96.22 | 33070 | 29195 | $2.64 | $2.87 | $83,669 | $21.27 | $0 | $0.32 | $23,703 | $13,459 | $10,082 | $83,832 | $5,036 | -$19,176 |
| 18 | 40.80 | 0 | 90.44 | 31086 | 27443 | $2.74 | $2.97 | $81,553 | $21.96 | $0 | $0.33 | $22,997 | $13,863 | $9,817 | $80,870 | $4,096 | -$15,080 |
| 19 | 38.35 | 0 | 85.02 | 29221 | 25796 | $2.84 | $3.08 | $79,472 | $22.66 | $0 | $0.34 | $22,310 | $14,279 | $9,557 | $77,946 | $3,329 | -$11,751 |
| 20 | 36.05 | 0 | 79.92 | 27468 | 24249 | $2.89 | $3.13 | $75,994 | $23.38 | $0 | $0.36 | $21,642 | $14,707 | $9,168 | $73,761 | $2,658 | -$9,093 |
| 21 | 33.88 | 0 | 75.12 | 25820 | 22794 | $2.89 | $3.13 | $71,435 | $24.13 | $0 | $0.37 | $20,993 | $15,148 | $8,679 | $68,601 | $2,084 | -$7,009 |
| 22 | 31.85 | 0 | 70.61 | 24271 | 21426 | $2.89 | $3.13 | $67,149 | $24.90 | $0 | $0.38 | $20,362 | $15,603 | $8,217 | $63,691 | $1,632 | -$5,378 |
| 23 | 29.94 | 0 | 66.38 | 22814 | 20140 | $2.89 | $3.13 | $63,120 | $25.69 | $0 | $0.39 | $19,749 | $16,071 | $7,781 | $59,017 | $1,275 | -$4,103 |
| 24 | 28.14 | 0 | 62.39 | 21445 | 18932 | $2.89 | $3.13 | $59,333 | $26.51 | $0 | $0.40 | $19,154 | $16,553 | $7,370 | $54,564 | $994 | -$3,109 |

| Year | Gross WH Gas MMCF | Gross Oil STB | Plant Liquid Mgal | Net WH Gas MCF | Net Sales Gas Vol. MCF | Gas Price $/MCF | BTU Adj. Gas Price $/MCF | Net Gas Sales $ | Oil Price $/STB | Net Oil Sales $ | Plt. Liq. Price $/gal. | Net Plt. Liq. Sales $ | Net O.C. $ | Net Prd. Tax $ | Net Income $ | Disc. Net Income $ | Cum. Disc. Net Income $ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 26.46 | 0 | 58.65 | 20159 | 17796 | $2.89 | $3.13 | $55,773 | $27.35 | $0 | $0.42 | $18,575 | $17,049 | $6,981 | $50,317 | $773 | -$2,336 |
| 26 | 24.87 | 0 | 55.13 | 18949 | 16728 | $2.89 | $3.13 | $52,426 | $28.20 | $0 | $0.43 | $18,005 | $17,561 | $6,613 | $46,257 | $599 | -$1,737 |
| 27 | 23.38 | 0 | 51.82 | 17812 | 15725 | $2.89 | $3.13 | $49,281 | $28.50 | $0 | $0.43 | $17,107 | $18,088 | $6,234 | $42,066 | $460 | -$1,277 |
| 28 | 21.97 | 0 | 48.71 | 16744 | 14781 | $2.89 | $3.13 | $46,324 | $28.50 | $0 | $0.43 | $16,081 | $18,630 | $5,860 | $37,914 | $349 | -$928 |
| 29 | 20.65 | 0 | 45.79 | 15739 | 13894 | $2.89 | $3.13 | $43,544 | $28.50 | $0 | $0.43 | $15,116 | $19,189 | $5,508 | $33,963 | $264 | -$664 |
| 30 | 19.42 | 0 | 43.04 | 14795 | 13061 | $2.89 | $3.13 | $40,932 | $28.50 | $0 | $0.43 | $14,209 | $19,765 | $5,178 | $30,198 | $198 | -$466 |
| 31 | 18.25 | 0 | 40.46 | 13907 | 12277 | $2.89 | $3.13 | $38,476 | $28.50 | $0 | $0.43 | $13,356 | $20,358 | $4,867 | $26,607 | $147 | -$319 |
| 32 | 17.16 | 0 | 38.03 | 13072 | 11540 | $2.89 | $3.13 | $36,167 | $28.50 | $0 | $0.43 | $12,555 | $20,969 | $4,575 | $23,179 | $108 | -$211 |
| 33 | 16.13 | 0 | 35.75 | 12288 | 10848 | $2.89 | $3.13 | $33,997 | $28.50 | $0 | $0.43 | $11,802 | $21,598 | $4,301 | $19,901 | $78 | -$133 |
| 34 | 15.16 | 0 | 33.61 | 11551 | 10197 | $2.89 | $3.13 | $31,957 | $28.50 | $0 | $0.43 | $11,093 | $22,246 | $4,042 | $16,763 | $56 | -$77 |
| 35 | 14.25 | 0 | 31.59 | 10858 | 9585 | $2.89 | $3.13 | $30,040 | $28.50 | $0 | $0.43 | $10,428 | $22,913 | $3,800 | $13,755 | $38 | -$39 |
| 36 | 13.39 | 0 | 29.69 | 10206 | 9010 | $2.89 | $3.13 | $28,238 | $28.50 | $0 | $0.43 | $9,802 | $23,600 | $3,572 | $10,868 | $26 | -$13 |
| 37 | 12.59 | 0 | 27.91 | 9594 | 8470 | $2.89 | $3.13 | $26,543 | $28.50 | $0 | $0.43 | $9,214 | $24,308 | $3,358 | $8,091 | $16 | $3 |
| 38 | 11.84 | 0 | 26.24 | 9018 | 7961 | $2.89 | $3.13 | $24,951 | $28.50 | $0 | $0.43 | $8,661 | $25,038 | $3,156 | $5,418 | $9 | $12 |
| 39 | 11.12 | 0 | 24.66 | 8477 | 7484 | $2.89 | $3.13 | $23,454 | $28.50 | $0 | $0.43 | $8,142 | $25,789 | $2,967 | $2,840 | $4 | $16 |
| 40 | 7.04 | 0 | 15.61 | 5367 | 4738 | $2.89 | $3.13 | $14,849 | $28.50 | $0 | $0.43 | $5,154 | $17,621 | $1,878 | $504 | $1 | $17 |
| 41 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $17 |
| 42 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $17 |
| 43 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $17 |
| 44 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $17 |
| 45 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $17 |
| 46 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $17 |
| 47 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $17 |
| 48 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $17 |
| 49 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $17 |
| 50 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $17 |

**Well Name: SAN JUAN UNIT 32 - 5 COMPLETION**
**Field Name: MESAVERDE / DAKOTA**
**Formation: MESAVERDE / DAKOTA**
**Date:** 3/12/99

## CASE #2 : DUALED PRODUCTION

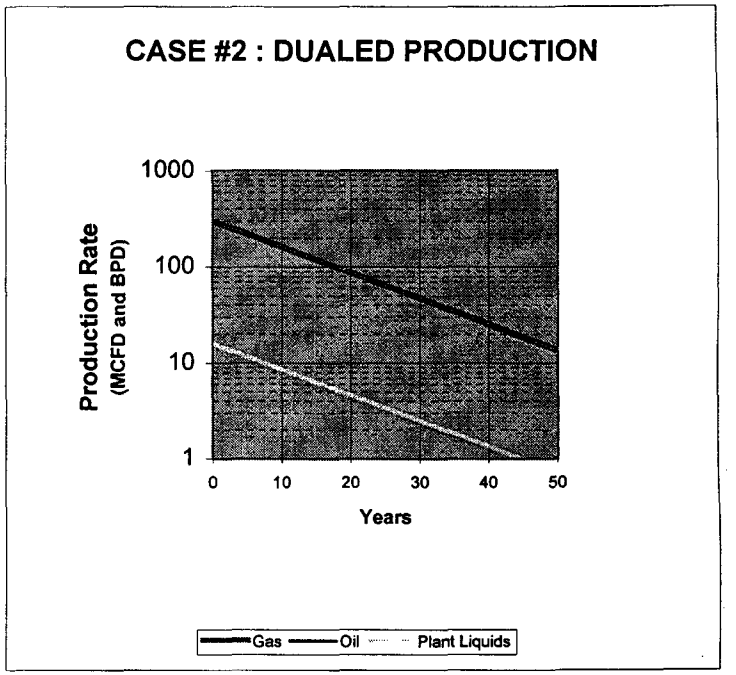
| Main Input | MESAVERDE | DAKOTA | Reservoir 3 |
|---|---|---|---|
| Initial Gas Rate (MCFD) | 210 | 90 | 0 |
| Initial Gas Decline Rate (%/yr) | 6.00% | 6.00% | 0.00% |
| Minimum Gas Decline Rate (%/yr) | 6.00% | 6.00% | 0.00% |
| n Factor for Gas Decline | 1.7 | 1.7 | 0 |
| Initial Oil Rate (BPD) | 0 | 0 | 0 |
| Initial Oil Decline Rate (%/yr) | 0.00% | 0.00% | 0.00% |
| Minimum Oil Decline Rate (%/yr) | 0.00% | 0.00% | 0.00% |
| n Factor for Oil Decline | 0 | 0 | 0 |
| Investment Cost | | | $814,771 |
| Gas BTU Content (MMBTU) | | | 1180 |
| Operating Costs ($/Month) | | | 700 |
| Working Interest | | | 98.50% |
| Revenue Interest | | | 76.20% |
| Indian Land (Y or N) | | | N |
| Liquid Plant Code Number | | | 2 |
| NYMEX Gas Price ($/MCF) | | | $2.00 |
| NYMEX Oil Price ($/STB) | | | $14.00 |
| Discount Rate | | | 13.2% |
| Plant Liq. Price net of T&F ($/gal) | | | $0.19 |

| RESULTS | |
|---|---|
| Net Present Value ($) = | $84 |
| Economic Life of Well (Yrs) = | 35.6 |
| Rate of Return (%/yr) = | 13.2% |
| Gross Gas (MMCF) = | 1607 |
| Gross Oil (MSTB) = | 0 |
| Net Sales Gas (MMCF) = | 1081 |
| Net Oil (MSTB) = | 0 |
| Net Plant Liquids (Mgal) = | 270.6 |

| Additional Input | |
|---|---|
| Gas Imbalance (MCF, See notes in comment section below) | 0 |
| Price for Imbalance Gas ($/MCF) | $1.53 |
| NYMEX Oil Price Cap (NGL price is capped at time of oil cap) | $30.00 |
| Gas & NGL Production Taxes for Non-Indian Land | 9.39% |
| Gas & NGL Production Taxes for Indian Land | 22.43% |
| Oil Production Taxes for Non-Indian Land | 8.54% |
| Oil Production Taxes for Indian Land | 17.74% |
| Gas Basis Differential ($/MCF) | -$0.61 |
| Gas Price Escalation | 3.0% |
| Price Cap on NYMEX Gas Price | $3.50 |
| Oil Basis Differential ($/STB) | -$1.50 |
| Oil and NGL Price Escalation | 3.0% |
| Operating Cost Esc. | 3.0% |

| Liquid Plant and Code Number | WH/Tailgate Gas Vol. Ratio | WH/Tailgate BTU Ratio | Yield - gal/MCF Based on WH |
|---|---|---|---|
| 1: Chaco/Blanco Plant | 0.809 | 0.862 | 3.05 |
| 2: Ignacio Plant | 0.8828 | 0.919 | 2.217 |
| 3: Williams Kutz Pant | 0.8271 | 0.8879 | 2.67 |
| 4: Lybrook Plant | 0.7863 | 0.86203 | 3.886 |

**Comments:** The n factor for oil or gas decline is the hyperbolic decline constant. For exponitial decline the n factor should be 0. A larger n factor causes the decline rate to flatten more rapidly. Set n = 1 for harmonic decline.
If Gas Imbalance is a positive number, value is added in the first year, a negative gas imbalance reduces $'s in first year. Gas Imbalance does not impact reserves.
Gas Basis differential is the difference between El Paso Price and the NYMEX gas price. For Lybrook there is an additional $.049/MMBTU charge for transportation
For Ignacio there is an additional charge of $.04/MMBTU
12 Month avg. for El Paso Basis differential as of Oct 88 is -$.27/MMBTU




| Year | Gross WH Gas MMCF | Gross Oil STB | Plant Liquid Mgal | Net WH Gas MCF | Net Sales Gas Vol. MCF | Gas Price $/MCF | BTU Adj. Gas Price $/MCF | Net Gas Sales $ | Oil Price $/STB | Net Oil Sales $ | Plt. Liq. Price $/gal. | Net Plt. Liq. Sales $ | Net O.C. $ | Net Prd. Tax $ | Net Income $ | Disc. Net Income $ | Cum. Disc. Net Income $ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 106.18 | 0 | 235.40 | 80910 | 71427 | $1.42 | $1.54 | $109,761 | $12.69 | $0 | $0.19 | $34,598 | $8,387 | $13,555 | -$680,133 | -$683,262 | -$683,262 |
| 2 | 99.81 | 0 | 221.28 | 76055 | 67142 | $1.48 | $1.60 | $107,603 | $13.12 | $0 | $0.20 | $33,613 | $8,639 | $13,260 | $119,317 | $99,105 | -$584,157 |
| 3 | 93.82 | 0 | 208.00 | 71492 | 63113 | $1.54 | $1.67 | $105,433 | $13.56 | $0 | $0.21 | $32,653 | $8,898 | $12,966 | $116,222 | $85,248 | -$498,909 |
| 4 | 88.19 | 0 | 195.52 | 67203 | 59326 | $1.61 | $1.74 | $103,258 | $14.01 | $0 | $0.21 | $31,716 | $9,165 | $12,674 | $113,135 | $73,282 | -$425,627 |
| 5 | 82.90 | 0 | 183.79 | 63170 | 55767 | $1.67 | $1.81 | $101,081 | $14.47 | $0 | $0.22 | $30,803 | $9,440 | $12,384 | $110,061 | $62,956 | -$362,671 |
| 6 | 77.93 | 0 | 172.76 | 59380 | 52421 | $1.74 | $1.89 | $98,907 | $14.95 | $0 | $0.23 | $29,914 | $9,723 | $12,096 | $107,001 | $54,050 | -$308,621 |
| 7 | 73.25 | 0 | 162.40 | 55817 | 49276 | $1.81 | $1.96 | $96,739 | $15.45 | $0 | $0.23 | $29,047 | $10,015 | $11,811 | $103,961 | $46,374 | -$262,247 |
| 8 | 68.86 | 0 | 152.65 | 52468 | 46319 | $1.88 | $2.04 | $94,582 | $15.95 | $0 | $0.24 | $28,203 | $10,315 | $11,530 | $100,941 | $39,763 | -$222,484 |
| 9 | 64.72 | 0 | 143.49 | 49320 | 43540 | $1.96 | $2.12 | $92,439 | $16.48 | $0 | $0.25 | $27,381 | $10,625 | $11,251 | $97,944 | $34,072 | -$188,412 |
| 10 | 60.84 | 0 | 134.89 | 46361 | 40928 | $2.04 | $2.21 | $90,311 | $17.02 | $0 | $0.26 | $26,581 | $10,943 | $10,976 | $94,972 | $29,175 | -$159,237 |
| 11 | 57.19 | 0 | 126.79 | 43579 | 38472 | $2.11 | $2.29 | $88,203 | $17.57 | $0 | $0.27 | $25,801 | $11,272 | $10,705 | $92,028 | $24,965 | -$134,271 |
| 12 | 53.76 | 0 | 119.18 | 40965 | 36164 | $2.20 | $2.38 | $86,116 | $18.14 | $0 | $0.28 | $25,043 | $11,610 | $10,438 | $89,111 | $21,348 | -$112,923 |
| 13 | 50.53 | 0 | 112.03 | 38507 | 33994 | $2.28 | $2.47 | $84,052 | $18.73 | $0 | $0.28 | $24,305 | $11,958 | $10,175 | $86,224 | $18,241 | -$94,682 |
| 14 | 47.50 | 0 | 105.31 | 36196 | 31954 | $2.37 | $2.57 | $82,013 | $19.34 | $0 | $0.29 | $23,587 | $12,317 | $9,916 | $83,367 | $15,575 | -$79,107 |
| 15 | 44.65 | 0 | 98.99 | 34025 | 30037 | $2.46 | $2.66 | $80,001 | $19.97 | $0 | $0.30 | $22,889 | $12,686 | $9,661 | $80,542 | $13,288 | -$65,819 |
| 16 | 41.97 | 0 | 93.05 | 31983 | 28235 | $2.55 | $2.76 | $78,017 | $20.61 | $0 | $0.31 | $22,209 | $13,067 | $9,411 | $77,748 | $11,327 | -$54,492 |
| 17 | 39.45 | 0 | 87.47 | 30064 | 26541 | $2.64 | $2.87 | $76,063 | $21.27 | $0 | $0.32 | $21,549 | $13,459 | $9,166 | $74,987 | $9,648 | -$44,844 |
| 18 | 37.09 | 0 | 82.22 | 28260 | 24948 | $2.74 | $2.97 | $74,139 | $21.96 | $0 | $0.33 | $20,906 | $13,863 | $8,925 | $72,258 | $8,210 | -$36,634 |
| 19 | 34.86 | 0 | 77.29 | 26565 | 23451 | $2.84 | $3.08 | $72,247 | $22.66 | $0 | $0.34 | $20,282 | $14,279 | $8,688 | $69,562 | $6,979 | -$29,654 |
| 20 | 32.77 | 0 | 72.65 | 24971 | 22044 | $2.89 | $3.13 | $69,086 | $23.38 | $0 | $0.36 | $19,675 | $14,707 | $8,335 | $65,719 | $5,825 | -$23,829 |
| 21 | 30.80 | 0 | 68.29 | 23473 | 20722 | $2.89 | $3.13 | $64,941 | $24.13 | $0 | $0.37 | $19,085 | $15,148 | $7,890 | $60,987 | $4,774 | -$19,056 |
| 22 | 28.96 | 0 | 64.19 | 22064 | 19478 | $2.89 | $3.13 | $61,044 | $24.90 | $0 | $0.38 | $18,511 | $15,603 | $7,470 | $56,483 | $3,904 | -$15,151 |
| 23 | 27.22 | 0 | 60.34 | 20740 | 18310 | $2.89 | $3.13 | $57,382 | $25.69 | $0 | $0.39 | $17,954 | $16,071 | $7,074 | $52,191 | $3,186 | -$11,966 |
| 24 | 25.59 | 0 | 56.72 | 19496 | 17211 | $2.89 | $3.13 | $53,939 | $26.51 | $0 | $0.40 | $17,413 | $16,553 | $6,700 | $48,099 | $2,593 | -$9,373 |

| Year | Gross WH Gas MMCF | Gross Oil STB | Plant Liquid Mgal | Net WH Gas MCF | Net Sales Gas Vol. MCF | Gas Price $/MCF | BTU Adj. Gas Price $/MCF | Net Gas Sales $ | Oil Price $/STB | Net Oil Sales $ | Plt. Liq. Price $/gal. | Net Plt. Liq. Sales $ | Net O.C. $ | Net Prd. Tax $ | Net Income $ | Disc. Net Income $ | Cum. Disc. Net Income $ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 24.05 | 0 | 53.32 | 18326 | 16178 | $2.89 | $3.13 | $50,702 | $27.35 | $0 | $0.42 | $16,887 | $17,049 | $6,347 | $44,193 | $2,104 | -$7,269 |
| 26 | 22.61 | 0 | 50.12 | 17227 | 15208 | $2.89 | $3.13 | $47,660 | $28.20 | $0 | $0.43 | $16,368 | $17,561 | $6,012 | $40,455 | $1,701 | -$5,568 |
| 27 | 21.25 | 0 | 47.11 | 16193 | 14295 | $2.89 | $3.13 | $44,801 | $28.50 | $0 | $0.43 | $15,552 | $18,088 | $5,667 | $36,598 | $1,359 | -$4,209 |
| 28 | 19.98 | 0 | 44.29 | 15221 | 13437 | $2.89 | $3.13 | $42,113 | $28.50 | $0 | $0.43 | $14,619 | $18,630 | $5,327 | $32,774 | $1,075 | -$3,134 |
| 29 | 18.78 | 0 | 41.63 | 14308 | 12631 | $2.89 | $3.13 | $39,586 | $28.50 | $0 | $0.43 | $13,742 | $19,189 | $5,007 | $29,131 | $844 | -$2,290 |
| 30 | 17.65 | 0 | 39.13 | 13450 | 11873 | $2.89 | $3.13 | $37,211 | $28.50 | $0 | $0.43 | $12,917 | $19,765 | $4,707 | $25,656 | $656 | -$1,634 |
| 31 | 16.59 | 0 | 36.78 | 12643 | 11161 | $2.89 | $3.13 | $34,978 | $28.50 | $0 | $0.43 | $12,142 | $20,358 | $4,425 | $22,338 | $505 | -$1,130 |
| 32 | 15.60 | 0 | 34.58 | 11884 | 10491 | $2.89 | $3.13 | $32,879 | $28.50 | $0 | $0.43 | $11,414 | $20,969 | $4,159 | $19,165 | $382 | -$747 |
| 33 | 14.66 | 0 | 32.50 | 11171 | 9862 | $2.89 | $3.13 | $30,907 | $28.50 | $0 | $0.43 | $10,729 | $21,598 | $3,910 | $16,128 | $284 | -$463 |
| 34 | 13.78 | 0 | 30.55 | 10501 | 9270 | $2.89 | $3.13 | $29,052 | $28.50 | $0 | $0.43 | $10,085 | $22,246 | $3,675 | $13,217 | $206 | -$257 |
| 35 | 12.95 | 0 | 28.72 | 9871 | 8714 | $2.89 | $3.13 | $27,309 | $28.50 | $0 | $0.43 | $9,480 | $22,913 | $3,454 | $10,422 | $143 | -$114 |
| 36 | 12.18 | 0 | 27.00 | 9278 | 8191 | $2.89 | $3.13 | $25,671 | $28.50 | $0 | $0.43 | $8,911 | $23,600 | $3,247 | $7,734 | $94 | -$20 |
| 37 | 11.45 | 0 | 25.38 | 8722 | 7700 | $2.89 | $3.13 | $24,130 | $28.50 | $0 | $0.43 | $8,376 | $24,308 | $3,052 | $5,146 | $55 | $35 |
| 38 | 10.76 | 0 | 23.85 | 8198 | 7238 | $2.89 | $3.13 | $22,682 | $28.50 | $0 | $0.43 | $7,874 | $25,038 | $2,869 | $2,650 | $25 | $61 |
| 39 | 5.98 | 0 | 13.25 | 4553 | 4020 | $2.89 | $3.13 | $12,598 | $28.50 | $0 | $0.43 | $4,373 | $14,951 | $1,594 | $426 | $4 | $64 |
| 40 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $64 |
| 41 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $64 |
| 42 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $64 |
| 43 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $64 |
| 44 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $64 |
| 45 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $64 |
| 46 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $64 |
| 47 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $64 |
| 48 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $64 |
| 49 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $64 |
| 50 | 0.00 | 0 | 0.00 | 0 | 0 | $0.00 | $0.00 | $0 | $0.00 | $0 | $0.00 | $0 | $0 | $0 | $0 | $0 | $64 |