

# SPiRiT ENERGY 76

New Name. Same Spirit  
A Business Unit of Unocal

January 24, 1998

RECEIVED  
JAN 27 1998

OIL CON. DIV.  
DIST. 3

New Mexico Oil Conservation Division  
Attn.: David Catanach  
2040 S. Pacheco Street  
Santa Fe, NM 87505

Re: Supplemental data for Rincon Unit  
November 28<sup>th</sup>, 1998 Down Hole  
Commingling Applications.

Dear Mr. Catanach,

Union Oil Company of California d.b.a. UNOCAL is providing a revised C-107-A with attachments, for the following Rincon Unit wells, Rio Arriba County, New Mexico.

| Well                   | Lease   | Legal Location                             |
|------------------------|---------|--------------------------------------------|
| <i>Rincon UT</i> ✓ 139 | Federal | 1650' FSL, 1650' FWL, SW Sec 25, T27N, R7W |
| 168                    | State   | 1190' FNL, 1190' FEL, NE Sec 36, T27N, R7W |
| 181                    | Federal | 1550' FNL, 1750' FEL, NE Sec 22, T27N, R6W |

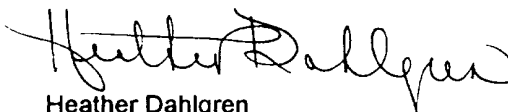
As per our phone conversation Friday, January 23<sup>rd</sup>, 1998, the issues of current and original bottom hole pressure, existing formation allocation methods and interests have been addressed. The enclosed attachments are supplements to data submitted November 28<sup>th</sup>, 1997. The Commissioner of Public Lands will be receiving these supplements as well as data from the original submission. Approval to down-hole commingle the above wells in the Basin Dakota and Blanco Mesaverde formations has already been granted by the Bureau of Land Management. They will, however, be provided with a copy of the enclosed attachments.

As provided by Order No. R-9893, administrative approval may be granted without notice and hearing.

If you have any questions please contact Heather Dahlgren at 915/685-7665. Thank you for your prompt attention to this matter.

Sincerely,

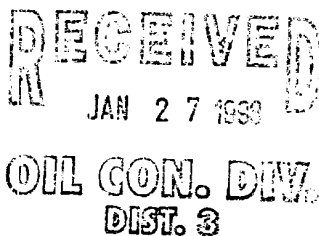
Spirit Energy 76  
A Business Unit of UNOCAL



Heather Dahlgren  
Engineering Technician

cc: New Mexico Oil Conservation Division/Aztec, NM  
Commissioner of Public Lands/Santa Fe, NM  
Bureau of Land Management/Farmington, NM

1004 North Big Spring • Post Office Box 3100 • Midland, Texas 79702



January 24, 1998

**Supplemental Data for C-107-A, Rincon Unit Well No. 139**

Union Oil Company of California d.b.a. UNOCAL requests approval to down-hole commingle hydrocarbon production from the Blanco Mesa Verde and Basin Dakota formations in the following Rincon Unit well, Rio Arriba County, New Mexico.

| Well | Lease   | Legal Location                             |
|------|---------|--------------------------------------------|
| 139  | Federal | 1650' FSL, 1650' FWL, SW Sec 25, T27N, R7W |

A revised C-107-A is attached.

As provided by Order No. R-9893, administrative approval may be granted without notice and hearing.

**Well History:** This well was drilled and completed with 4-1/2" casing, in December 1962, in the Dakota formation. Estimated Mesaverde completion date is January 27<sup>th</sup>, 1998. The Dakota is shut-in, the Mesaverde is cleaning up following the stimulation treatment on January 19<sup>th</sup>, 1998.

**Production History:** Average Dakota production prior to commingling was 114 Mcfd with trace oil and water production. Based on actual IP's and production from recent Mesaverde recompletions on the Rincon Unit, an estimated initial rate for the first 30 days of Mesaverde production is 338 Mcfd and 4 Bopd.

**Pressure Data:** Bottom hole pressures were obtained from surface shut-in casing pressure measurements. Please see attachments 1a. through 1c. for the bottom hole calculation, date and duration of each test. The pressures measured in this well are consistent with bottom hole pressure measurements that have been taken in new and existing Mesaverde and Dakota formations on the Rincon Unit and should accurately reflect current reservoir pressures.

**Allocation of Production:** Unocal proposes to use an allocation method based on an established Dakota annual decline rate of 3.8%. Dakota production will be extrapolated monthly using Bureau of Land Management recommended allocation methods with the remainder of the commingled production being allocated to the Mesaverde formation. See attachments 2a. and 2b. for the Dakota forecast. Tabular data has been provided for the first five years of the Dakota forecast. Please note that initial flush production volumes have been added to the Dakota forecast due to the extended shut-in period. We anticipate being able to convert to a fixed allocation factor within 12 to 24 months of commingled production. Unocal also proposes to use a yield factor for allocating liquid production. This factor represents the average yield for oil and water production over the last two years of actual production. Please see attachment 3. for 24 months of forecasted liquid volumes.

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 87410-1893

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  
New 3-12-96

APPROVAL PROCESS:

☒ Administrative ☐ Hearing

EXISTING WELLBORE

☒ YES ☐ NO

APPLICATION FOR DOWNHOLE COMMINGLING

UNION OIL COMPANY OF CALIFORNIA 1004 N. BIG SPRING, MIDLAND TX 79702  
Operator Address  
RINCON UNIT 139 K 25 T27N R7W RIO ARRIBA  
Lease Well No. Unit Ltr. - Sec - Twp - Rge County  
OGRID NO. 023708 Property Code 011510 API NO. 30-039-06890 Spacing Unit Lease Types. (check 1 or more)  
Federal ☒ State ☐ Land/On Fee ☐

| The following facts are submitted in support of downhole commingling:                                                                                                                                                                                                                     | Upper Zone                                                              | Intermediate Zone | Lower Zone                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------|-----------------------------------------------------|
| 1. Pool Name and Pool Code                                                                                                                                                                                                                                                                | BLANCO MESAVERDE<br>72319                                               |                   | BASIN DAKOTA<br>71599                               |
| 2. Top and Bottom of Pay Section (Perforations)                                                                                                                                                                                                                                           | 5341 - 5431                                                             |                   | 7352 - 7537                                         |
| 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:<br>Gas & Oil - Flowing:<br>All Gas Zones:<br>Estimated Current<br>Measured Current<br>Estimated Or Measured Original                                                                                                               | a. (Current) 1-23-98<br>1063 psia<br>b. (Original) 1-23-98<br>1063 psia | a.<br>b.          | a. 7-29-97<br>597 psia<br>b. 12-28-62<br>3147 psia  |
| 6. Oil Gravity (°API) or Gas BTU Content                                                                                                                                                                                                                                                  | 1184 BTU                                                                |                   | 1193 BTU                                            |
| 7. Producing or Shut-In?                                                                                                                                                                                                                                                                  | (Cleaning up) SI                                                        |                   | SHUT IN                                             |
| Production Marginal? (yes or no)                                                                                                                                                                                                                                                          | YES                                                                     |                   | YES                                                 |
| * 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<br>* If Producing, give date and oil/gas/water rates of recent test (within 60 days) | Date:<br>Rates:<br>NEW COMPLETION                                       | Date:<br>Rates:   | Date: 10-97<br>Rates: 168 mcf/d, .3 bopd<br>.3 bwpd |
| 8. Fixed Percentage Allocation Formula - % for each zone                                                                                                                                                                                                                                  | Oil: % Gas: %                                                           | Oil: % Gas: %     | 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 ☒ No ☐  
If not, have all working, overriding, and royalty interests been notified by certified mail? R-9893 Yes ☐ No ☒  
Have all offset operators been given written notice of the proposed downhole commingling? ☒ Yes ☐ No
11. Will cross-flow occur? Yes ☐ 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? Yes ☒ No ☐
13. Will the value of production be decreased by commingling? Yes ☐ 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. Yes ☒ No ☐
15. NMOCD Reference Cases for Rule 303(D) Exceptions: ORDER NO(S). SEE ATTACHED
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 Heather Dahlgren TITLE Eng. Technician DATE 1-24-98  
TYPE OR PRINT NAME HEATHER DAHLGREN TELEPHONE NO. ( 915 ) 685 7665

--BHPCALC--

Calculated BHP and Z-factor from surface shut-in pressure

TEST DATE: 07/29/97

WELL NAME : Rincon Unit 139 DK (Current Pressure)

|                     |           |       |          |
|---------------------|-----------|-------|----------|
| GAS GRAVITY:        | 0.69      | % N2  | 0.20     |
| CONDENSATE (YES=1): | 1         | % CO2 | 1.17 %   |
| RESERVOIR TEMP:     | 195 F     | % H2S | 0.00 %   |
| SURFACE TEMP:       | 60 F      | Pc =  | 670.13 % |
| DEPTH OF ZONE:      | 7444 Foot | Tc =  | 379.92   |

|              |      |        |       |
|--------------|------|--------|-------|
| SURFACE PRES | BHP  | Z      | BHP/Z |
| psia         | psia |        | psia  |
| 500          | 597  | 0.9479 | 630   |

Current pressure obtained after 7 day shut-in during  
El Paso plant maintenance shut down.

ATTACHMENT 1a.

--BHPCALC--

Calculated BHP and Z-factor from surface shut-in pressure

TEST DATE: 12/28/62

WELL NAME : Rincon Unit 139 DK (Original Pressure)

|                     |           |       |          |
|---------------------|-----------|-------|----------|
| GAS GRAVITY:        | 0.69      | % N2  | 0.20     |
| CONDENSATE (YES=1): | 1         | % CO2 | 1.17 %   |
| RESERVOIR TEMP:     | 195 F     | % H2S | 0.00 %   |
| SURFACE TEMP:       | 60 F      | Pc =  | 670.13 % |
| DEPTH OF ZONE:      | 7444 Foot | Tc =  | 379.92   |

|              |       |        |       |
|--------------|-------|--------|-------|
| SURFACE PRES | BHP   | Z      | BHP/Z |
| Psia         | psia  |        | psia  |
| 2560         | 3,147 | 0.8901 | 3,535 |

Initial pressure obtained after 10 day shut-in following completion of well.

ATTACHMENT 1b.

--BHPCALC--

Calculated BHP and Z-factor from surface shut-in pressure

TEST DATE: 01/24/98

WELL NAME : Rincon Unit 139 MV (Initial & Current)

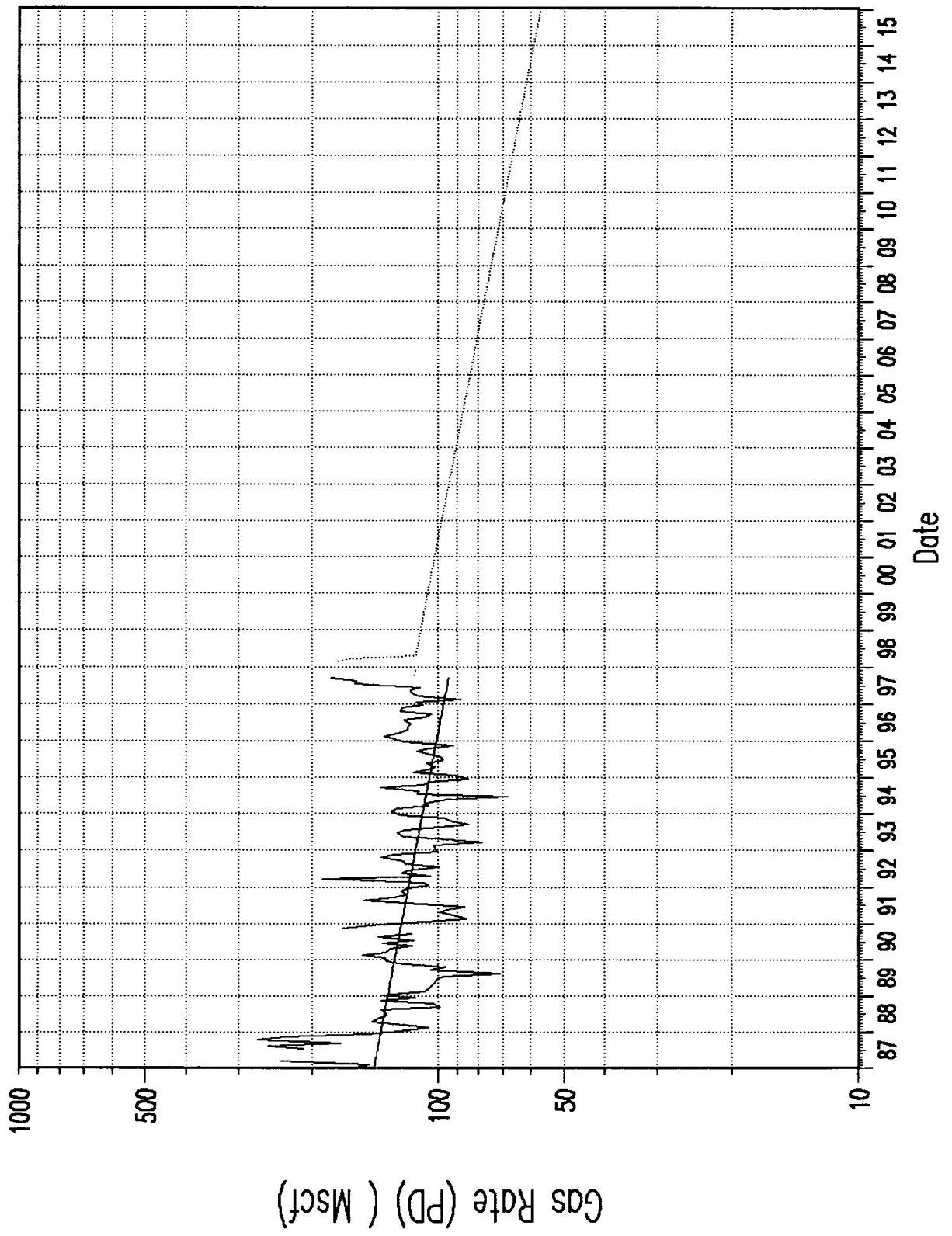
GAS GRAVITY: 0.69 % N2 0.28  
CONDENSATE (YES=1): 1 % CO2 1.10 %  
RESERVOIR TEMP: 145 F % H2S 0.00 %  
SURFACE TEMP: 60 F Pc = 670.05 %  
DEPTH OF ZONE: 5386 Foot Tc = 378.61

| SURFACE PRES | BHP   | Z      | BHP/Z |
|--------------|-------|--------|-------|
| psia         | psia  |        | psia  |
| 920          | 1,063 | 0.8849 | 1,201 |

Initial and Current pressure - 36 hour shut-in measured after 3 days of clean up and flow back of MV following stimulation.

ATTACHMENT 1c.

WELL: RINCON UNIT 139:DK  
LOCATION : N027 W007 25 NESW  
COUNTY : RIO ARriba STATE : NMEX



WELL: RINCON UNIT 139:DK

|                                     |            |      |
|-------------------------------------|------------|------|
| Cum. Gas Production:                | 1829954.00 | Mscf |
| Remaining Recoverable Gas Reserves: | 698506.92  | Mscf |
| Ultimate Recoverable Gas Reserves:  | 2528460.92 | Mscf |

## SCHEDULE 1

|                                 |            |      |
|---------------------------------|------------|------|
| Qi:                             | 274.33     | Mscf |
| Di:                             | 0.003228   |      |
| Hyperbolic B:                   | 0.0000     |      |
| Start Date:                     | 1997/10    |      |
| Monthly Nominal Decline (Dn):   | 0.003228   |      |
| Monthly Effective Decline (De): | 0.003223   |      |
| Yearly Effective Decline (De):  | 0.038000   |      |
| Initial Forecast Rate:          | 114.00     | Mscf |
| Economic Limit:                 | 25.00      | Mscf |
| Cumulative Produced:            | 1829954.00 | Mscf |
| Total Forecasted Reserves:      | 10437.39   | Mscf |
| Total Recovered Reserves:       | 1840391.39 | Mscf |

## SCHEDULE 2

|                                 |                 |      |
|---------------------------------|-----------------|------|
| Qi:                             | 255795735545.53 | Mscf |
| Di:                             | 0.076358        |      |
| Hyperbolic B:                   | 0.0000          |      |
| Start Date:                     | 1998/02         |      |
| Monthly Nominal Decline (Dn):   | 0.076358        |      |
| Monthly Effective Decline (De): | 0.073515        |      |
| Yearly Effective Decline (De):  | 0.600000        |      |
| Initial Forecast Rate:          | 180.00          | Mscf |
| Economic Limit:                 | 25.00           | Mscf |
| Cumulative Produced:            | 1829954.00      | Mscf |
| Total Forecasted Reserves:      | 20267.11        | Mscf |
| Total Recovered Reserves:       | 1850221.11      | Mscf |

## SCHEDULE 3

|                                 |            |      |
|---------------------------------|------------|------|
| Qi:                             | 276.99     | Mscf |
| Di:                             | 0.003228   |      |
| Hyperbolic B:                   | 0.0000     |      |
| Start Date:                     | 1998/04    |      |
| Monthly Nominal Decline (Dn):   | 0.003228   |      |
| Monthly Effective Decline (De): | 0.003223   |      |
| Yearly Effective Decline (De):  | 0.038000   |      |
| Initial Forecast Rate:          | 112.90     | Mscf |
| Economic Limit:                 | 25.00      | Mscf |
| Cumulative Produced:            | 1829954.00 | Mscf |
| Total Forecasted Reserves:      | 698506.92  | Mscf |
| Total Recovered Reserves:       | 2528460.92 | Mscf |

| DATE    | AVERAGE<br>DAILY<br>RATE<br>Mscf | MONTHLY<br>FORECAST<br>PROD.<br>Mscf | CUM.<br>PROD.<br>Mscf | REMAINING<br>RECOV.<br>RESERVES<br>Mscf |
|---------|----------------------------------|--------------------------------------|-----------------------|-----------------------------------------|
| 1998/01 | 0.00                             | 0.00                                 | 1840391.38            | 688069.56                               |
| 1998/02 | 173.30                           | 4852.38                              | 1845243.75            | 683217.19                               |
| 1998/03 | 160.56                           | 4977.34                              | 1850221.13            | 678239.81                               |
| 1998/04 | 112.72                           | 3381.54                              | 1853602.63            | 674858.31                               |
| 1998/05 | 112.35                           | 3482.98                              | 1857085.63            | 671375.31                               |
| 1998/06 | 111.99                           | 3359.78                              | 1860445.38            | 668015.50                               |
| 1998/07 | 111.63                           | 3460.56                              | 1863906.00            | 664555.00                               |
| 1998/08 | 111.27                           | 3449.43                              | 1867355.38            | 661105.56                               |
| 1998/09 | 110.91                           | 3327.45                              | 1870682.88            | 657778.13                               |
| 1998/10 | 110.56                           | 3427.23                              | 1874110.13            | 654350.88                               |
| 1998/11 | 110.20                           | 3305.96                              | 1877416.00            | 651044.88                               |
| 1998/12 | 109.84                           | 3405.18                              | 1880821.25            | 647639.75                               |
| 1999/01 | 109.49                           | 3394.19                              | 1884215.38            | 644245.56                               |
| 1999/02 | 109.14                           | 3055.79                              | 1887271.25            | 641189.75                               |
| 1999/03 | 108.79                           | 3372.36                              | 1890643.50            | 637817.38                               |
| 1999/04 | 108.44                           | 3253.08                              | 1893896.63            | 634564.31                               |
| 1999/05 | 108.08                           | 3350.60                              | 1897247.25            | 631213.69                               |
| 1999/06 | 107.74                           | 3232.09                              | 1900479.25            | 627981.63                               |
| 1999/07 | 107.39                           | 3329.13                              | 1903808.50            | 624652.50                               |
| 1999/08 | 107.04                           | 3318.30                              | 1907126.75            | 621334.19                               |
| 1999/09 | 106.70                           | 3200.97                              | 1910327.75            | 618133.25                               |
| 1999/10 | 106.35                           | 3296.97                              | 1913624.63            | 614836.25                               |
| 1999/11 | 106.01                           | 3180.34                              | 1916805.00            | 611655.94                               |
| 1999/12 | 105.67                           | 3275.80                              | 1920080.88            | 608380.13                               |
| 2000/01 | 105.33                           | 3265.17                              | 1923346.00            | 605114.94                               |
| 2000/02 | 104.99                           | 3044.72                              | 1926390.75            | 602070.25                               |
| 2000/03 | 104.65                           | 3244.23                              | 1929635.00            | 598826.00                               |
| 2000/04 | 104.31                           | 3129.44                              | 1932764.38            | 595696.56                               |
| 2000/05 | 103.98                           | 3223.27                              | 1935987.63            | 592473.31                               |
| 2000/06 | 103.64                           | 3109.30                              | 1939097.00            | 589364.00                               |
| 2000/07 | 103.31                           | 3202.54                              | 1942299.50            | 586161.44                               |
| 2000/08 | 102.98                           | 3192.29                              | 1945491.75            | 582969.19                               |
| 2000/09 | 102.64                           | 3079.30                              | 1948571.13            | 579889.88                               |
| 2000/10 | 102.31                           | 3171.70                              | 1951742.75            | 576718.13                               |
| 2000/11 | 101.98                           | 3059.53                              | 1954802.25            | 573658.63                               |
| 2000/12 | 101.65                           | 3151.26                              | 1957953.63            | 570507.38                               |
| 2001/01 | 101.33                           | 3141.15                              | 1961094.75            | 567366.25                               |
| 2001/02 | 101.00                           | 2827.97                              | 1963922.75            | 564538.25                               |
| 2001/03 | 100.68                           | 3120.92                              | 1967043.63            | 561417.31                               |
| 2001/04 | 100.35                           | 3010.55                              | 1970054.13            | 558406.75                               |
| 2001/05 | 100.03                           | 3100.78                              | 1973155.00            | 555306.00                               |
| 2001/06 | 99.71                            | 2991.19                              | 1976146.13            | 552314.81                               |
| 2001/07 | 99.38                            | 3080.86                              | 1979227.00            | 549233.94                               |
| 2001/08 | 99.06                            | 3070.89                              | 1982297.88            | 546163.06                               |
| 2001/09 | 98.74                            | 2962.33                              | 1985260.25            | 543200.75                               |
| 2001/10 | 98.43                            | 3051.19                              | 1988311.38            | 540149.56                               |
| 2001/11 | 98.11                            | 2943.27                              | 1991254.63            | 537206.25                               |
| 2001/12 | 97.79                            | 3031.48                              | 1994286.13            | 534174.81                               |
| 2002/01 | 97.48                            | 3021.80                              | 1997308.00            | 531153.00                               |
| 2002/02 | 97.16                            | 2720.52                              | 2000028.50            | 528432.50                               |
| 2002/03 | 96.85                            | 3002.33                              | 2003030.75            | 525430.13                               |
| 2002/04 | 96.54                            | 2896.11                              | 2005926.88            | 522534.06                               |
| 2002/05 | 96.23                            | 2982.98                              | 2008909.88            | 519551.06                               |
| 2002/06 | 95.92                            | 2877.47                              | 2011787.38            | 516673.59                               |
| 2002/07 | 95.61                            | 2963.86                              | 2014751.25            | 513709.75                               |

|         |       |         |            |           |
|---------|-------|---------|------------|-----------|
| 2002/08 | 95.30 | 2954.19 | 2017705.38 | 510755.56 |
| 2002/09 | 94.99 | 2849.75 | 2020555.13 | 507905.81 |
| 2002/10 | 94.68 | 2935.22 | 2023490.38 | 504970.56 |
| 2002/11 | 94.38 | 2831.45 | 2026321.75 | 502139.13 |
| 2002/12 | 94.07 | 2916.31 | 2029238.13 | 499222.81 |

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RU 139 Forecast

Well

Existing Completion Prior to DHC

Annual Decline

Monthly Decline Factor (Annual / 12)

Average 3 month volume (Mcf) prior to DHC

Average Yield (bbls/mcf) Oil

Average Yield (bbls/mcf) Water

Volume Prior to DHC (Mcf)

|        |
|--------|
| RU 139 |
| DK     |
| 3.80%  |
| 0.3166 |
| 3420   |
| 0.003  |
| 0.0017 |
| 3358   |

Full Months Prod Apr - Jun 97  
96-97 annual average  
96-97 annual average

\* Forecasted volumes to be adjusted for actual days on production

| Month | DK Forecast<br>(Mcf) | DK Forecast<br>(Bbls-Oil) | DK Forecast<br>(Bbls-Water) |  |
|-------|----------------------|---------------------------|-----------------------------|--|
| 1     | 4852                 | 14.6                      | 8.2                         |  |
| 2     | 4977                 | 14.9                      | 8.5                         |  |
| 3     | 3381                 | 10.1                      | 5.7                         |  |
| 4     | 3370                 | 10.1                      | 5.7                         |  |
| 5     | 3360                 | 10.1                      | 5.7                         |  |
| 6     | 3349                 | 10.0                      | 5.7                         |  |
| 7     | 3338                 | 10.0                      | 5.7                         |  |
| 8     | 3328                 | 10.0                      | 5.7                         |  |
| 9     | 3317                 | 10.0                      | 5.6                         |  |
| 10    | 3307                 | 9.9                       | 5.6                         |  |
| 11    | 3296                 | 9.9                       | 5.6                         |  |
| 12    | 3286                 | 9.9                       | 5.6                         |  |
| 13    | 3275                 | 9.8                       | 5.6                         |  |
| 14    | 3265                 | 9.8                       | 5.6                         |  |
| 15    | 3255                 | 9.8                       | 5.5                         |  |
| 16    | 3244                 | 9.7                       | 5.5                         |  |
| 17    | 3234                 | 9.7                       | 5.5                         |  |
| 18    | 3224                 | 9.7                       | 5.5                         |  |
| 19    | 3214                 | 9.6                       | 5.5                         |  |
| 20    | 3204                 | 9.6                       | 5.4                         |  |
| 21    | 3193                 | 9.6                       | 5.4                         |  |
| 22    | 3183                 | 9.5                       | 5.4                         |  |
| 23    | 3173                 | 9.5                       | 5.4                         |  |
| 24    | 3163                 | 9.5                       | 5.4                         |  |

+ DK flush volume  
+ DK flush volume

ATTACHMENT 3.