

# MERIDIAN OIL

September 16, 1994

New Mexico Oil Conservation Division  
Attn: Mr. Bill LeMay  
P.O. Box 2088  
310 Old Santa Fe Trail  
Santa Fe, New Mexico, 87501

RE: Jicarilla 447 Lease  
• Jicarilla 447 #1A Unit O, Section 19, T27N, R03W  
• Jicarilla 447 #2 Unit F, Section 19, T27N, R03W  
• Jicarilla 447 #3 Unit N, Section 18, T27N, R03W

Rio Arriba County, New Mexico  
Downhole Commingling Request

Dear Mr. LeMay:

Meridian Oil Inc. is applying for an administrative downhole commingling order for the referenced wells in the Gavilan Pictured Cliffs and the Blanco Mesaverde fields. The ownership of the zones to be commingled is common. All offset interest owners shown on the attached plats and the Bureau of Land Management will receive notice of this commingling application.

The Mesaverde and Pictured Cliffs wells in this area are marginal economic producers based on current rates of 10-90 MCFD for each zone. The projects are economic when commingled due to savings realized on surface facilities and tubulars. The only economical way to recover the Mesaverde and Pictured Cliffs reserves identified on the lease is to downhole commingle production from both zones in the wells proposed.

It is proposed to complete the Mesaverde formation and test its production. It is then proposed to set a bridge plug above the Mesaverde, perforate and stimulate the Pictured Cliffs, and test its production. The bridge plug will then be removed, and both zones produced through a single string of tubing. The reservoir characteristics of each of the subject zones are such that underground waste will not be caused by the proposed commingling. The fluids in the two reservoirs are compatible and no precipitates will be formed to cause damage to either reservoir (see attached fluid analyses and compatibility tests, completed for prior commingling on the adjacent Jicarilla 94 and 95 leases). The shut-in pressure for the Mesaverde and Pictured Cliffs in this area are 550 and 490 psi, respectively.

The allocation of the commingled production will be calculated using flow tests from the Mesaverde and Pictured Cliffs during completion operations, and the surrounding production history from both producing intervals. Meridian will consult with the district supervisor of the Aztec NMOC office for approval of the allocation.

Approval of this commingling application will allow for the prevention of wasted resources and the protection of correlative rights. The Mesaverde and Pictured Cliffs are commingled in nine other wells in this township as per NMOCD Order #'s R-5350 (01/17/77), R-6004 (05/02/79), DHC-924 and DHC-925 (09/27/93), DHC-984, 985, 986, 987, 988 (2/18/94). Two of these wells (DHC-924, 925) are completed, waiting on hook-up while seven (R-5350, -6004, DHC-984, 985, 986, 987, 988) are producing with no adverse affects from the commingling. Included with this letter are plats showing ownership of offsetting leases for both formations, copies of letters to offset operators and the Bureau of Land Management, and a detailed report of fluid compatibility.

Sincerely,

A handwritten signature in black ink, appearing to read "B. P. Ault".

Brian P. Ault  
Production Engineer

BPA/rjp

Attachments

xc: Frank T. Chavez - NMOCD/Aztec

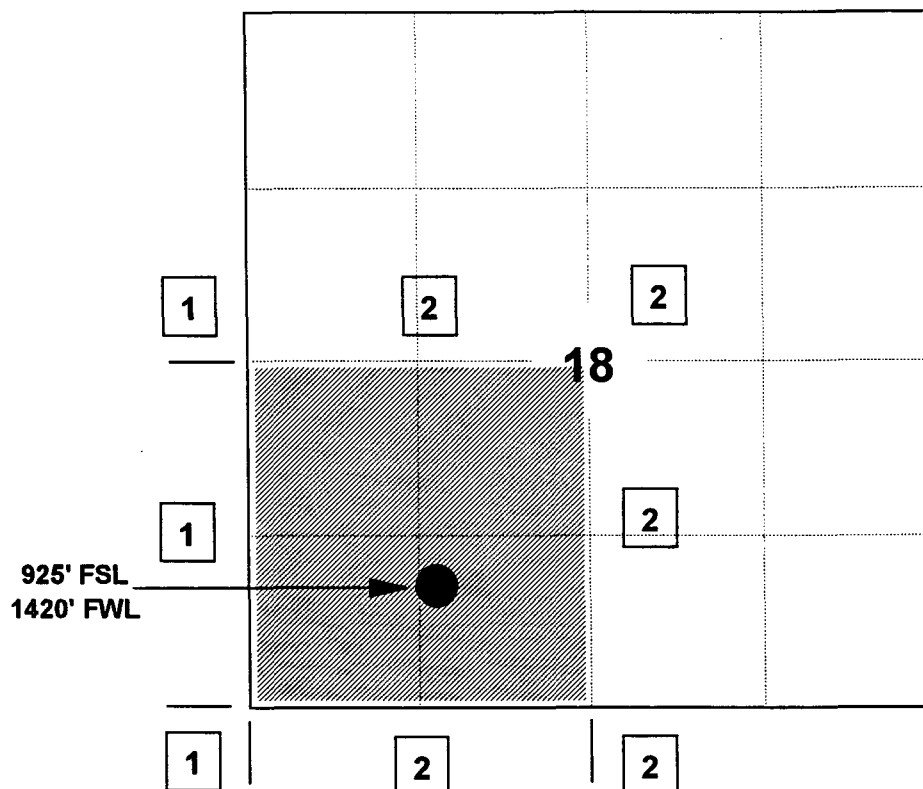
# MERIDIAN OIL INC

## JICARILLA 447 #3

### OFFSET OPERATOR PLAT

Mesaverde \ Pictured Cliffs Comingle

Township 27 North, Range 3 West



1) Meridian Oil Inc

2) Southland Royalty Company

Pictured Cliffs Formation

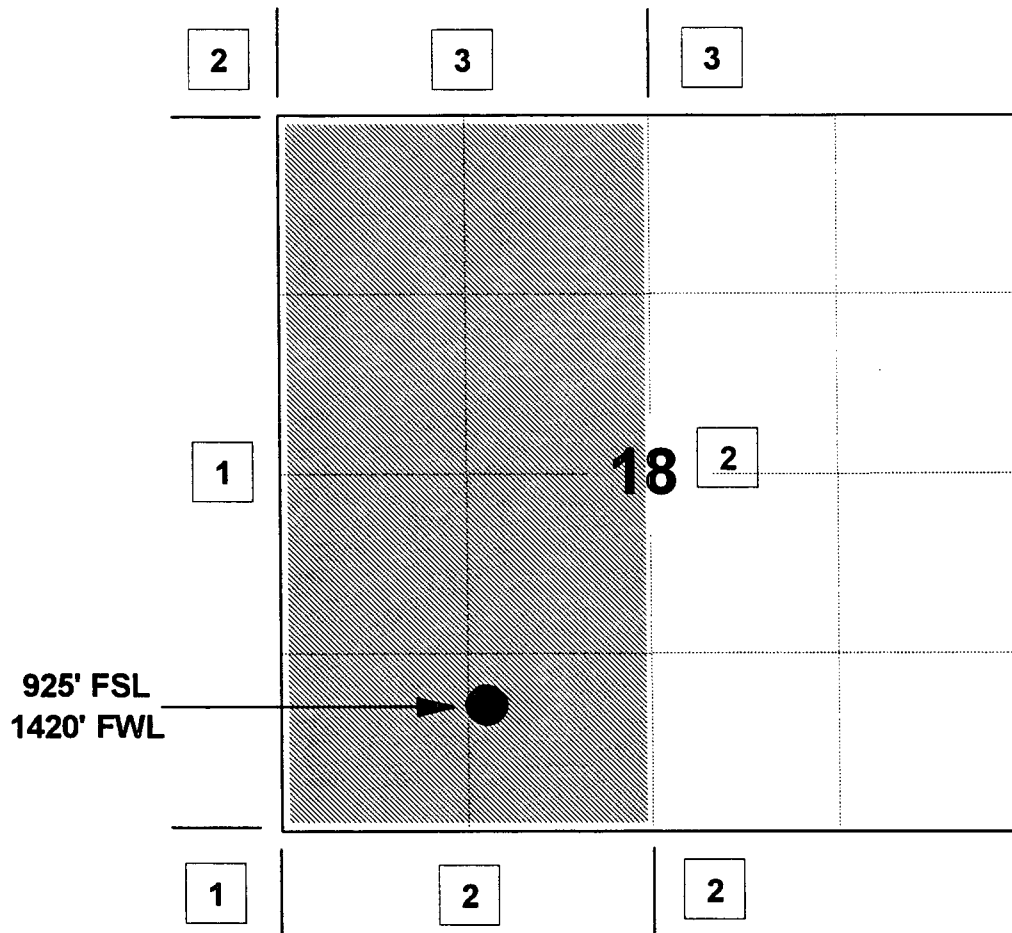
# MERIDIAN OIL INC

## JICARILLA 447 #3

OFFSET OPERATOR \ OWNER PLAT

Mesaverde / Pictured Cliffs Commingle Well

Township 27 North, Range 3 West



1) Meridian Oil Inc

2) Southland Royalty Company

3) Southland Royalty Company &

Jicarilla Apache Tribe

PO Box 167, Dulce, NM 87528

Mesaverde Formation

# **MERIDIAN OIL**

**JICARILLA 98 AND 96 LEASE**

**RIO ARriba COUNTY, NM**

**MESA VERDE/PICTURED CLIFFS FORMATION**



**The Western Company**

## **LABORATORY INVESTIGATION**

**PREPARED FOR**

**MR. BRIAN AULT  
PRODUCTION ENGINEER**

**SERVICE POINT  
FARMINGTON, NM  
(505) 327-6222**

**PREPARED BY  
LOREN DIEDER / DAVE COLESON  
DISTRICT ENGINEER  
FARMINGTON**

**MARCH 25, 1993**

**FM020658**

March 25, 1993

Meridian Oil  
Jicarilla 96 #2  
Jicarilla 98 #5

Three samples from Jicarilla 96 #2 (1 oil, 2 water) and two samples from Jicarilla 98 #5 (2 condensates) were submitted for analysis on March 19, 1993 by Mr. Lesley K. Smith, Senior Reservoir Engineer for Meridian Oil.

These samples were to be analyzed to determine if commingling of each of the well products would have adverse effects on well production.

Samples submitted were:

1. Jicarilla 96 #2
  - a. Mesa Verde oil
  - b. Mesa Verde water
  - c. Pictured Cliffs water
2. Jicarilla 98 #5
  - a. Mesa Verde condensate
  - b. Pictured Cliffs condensate

Lab analysis performed:

1. Oil, condensate analysis
  - a. API gravity
  - b. Pour point
  - c. Cloud point
2. Water analysis
  - a. API water analysis
3. Observation and analysis of commingled oil, condensate and water as applicable for well.

Meridian Oil  
Jicarilla 96 #2

Result of Analysis:

Pictured Cliffs produced water

|             |   |      |
|-------------|---|------|
| ph          | : | 7.12 |
| Resistivity | : | 1.65 |
| Sp. Gr.     | : | 1.00 |

Cations

|                    |                    |
|--------------------|--------------------|
| Sodium & Potassium | 1601 mg/ 1 (calc.) |
| Calcium            | 48 mg/ 1           |
| Magnesium          | 5 mg/ 1 (calc.)    |

Anions

|             |             |
|-------------|-------------|
| Chloride    | 2061 mg / 1 |
| Sulfate     | 0 mg / 1    |
| Bicarbonate | 976 mg / 1  |

Total dissolved solids 4691

Mesa Verde produced water

|             |   |       |
|-------------|---|-------|
| ph          | : | 6.52  |
| Resistivity | : | 3.70  |
| Sp. Gr.     | : | 1.005 |

Cations

|                    |                   |
|--------------------|-------------------|
| Sodium & Potassium | 922 mg/ 1 (calc.) |
| Calcium            | 40 mg/ 1          |
| Magnesium          | 5 mg/ 1 (calc.)   |

Anions

|             |             |
|-------------|-------------|
| Chloride    | 1649 mg / 1 |
| Sulfate     | 0 mg / 1    |
| Bicarbonate | 850 mg / 1  |

Total dissolved solids 3466

Meridian Oil  
Jicarilla 96 #2

Mesa Verde produced oil

|                            |   |                  |
|----------------------------|---|------------------|
| Appearance                 | : | Light, amber oil |
| API gravity @ 60 degrees F | : | 58.2             |
| Cloud point                | : | 0 degrees C      |
| Pour point                 | : | < -10 degrees C  |

Pictured Cliffs / Mesa Verde produced water  
Combined (using high shear) with Mesa Verde produced oil (50:50  
mix of waters and oil).

|                   |   |                                 |
|-------------------|---|---------------------------------|
| Appearance        | : | Cloudy, amber emulsion          |
| Separation        | : | Beginning on cessation of shear |
| Precipitation     | : | None observed                   |
| Separation @ time | : | At 1 hour - complete            |

Summary of results:

No precipitation or other observed adverse reaction from  
combined waters or from combination of the oil and waters.

Analysis forms follow.

Analysis done by: \_\_\_\_\_  
Dave Coleson





# The Western Company of North America

3250 South Side River Road  
Farmington, New Mexico 87401  
Phone (505)327-6222  
Fax (505)327-5766

## API WATER ANALYSIS

Company Meridian Sample No. 811393 Date Sampled 3/8/93  
Field \_\_\_\_\_ Legal Description T26N R03W, Sec 2 County or Parish Lincoln State NM  
Lease or Unit A Well 1C 96 # 2 Depth \_\_\_\_\_ Formation PC Water: B/D \_\_\_\_\_  
Type of Water (Produced, Supply, ect.) PRODUCED Sampling Point \_\_\_\_\_ Sampled By \_\_\_\_\_

### DISSOLVED SOLIDS

#### CATIONS

|               | mg/l        | me/l         |
|---------------|-------------|--------------|
| Sodium, Na    | <u>1601</u> | <u>169.6</u> |
| Calcium, Ca   | <u>48</u>   | <u>2.4</u>   |
| Magnesium, Mg | <u>5</u>    | <u>0.4</u>   |
| Barium, Ba    | _____       | _____        |
| _____         | _____       | _____        |
| _____         | _____       | _____        |

#### ANIONS

|                               |             |           |
|-------------------------------|-------------|-----------|
| Chloride, Cl                  | <u>2061</u> | <u>58</u> |
| Sulfate, SO <sub>4</sub>      | _____       | _____     |
| Carbonate, CO <sub>3</sub>    | _____       | _____     |
| Bicarbonate, HCO <sub>3</sub> | <u>976</u>  | <u>16</u> |
| Hydroxide, OH                 | _____       | _____     |
| _____                         | _____       | _____     |

Total Dissolved Solids (calc.) 4691

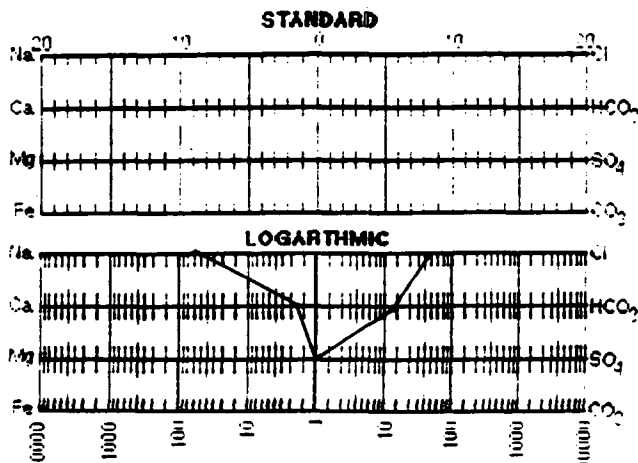
Iron, Fe (total) \_\_\_\_\_  
Sulfide, as H<sub>2</sub>S \_\_\_\_\_

Remarks & Recommendations:

### OTHER PROPERTIES

|                                     |             |
|-------------------------------------|-------------|
| pH                                  | <u>7.12</u> |
| Specific Gravity, 60/60 F           | <u>1.00</u> |
| Resistivity (ohm-meter) <u>75°C</u> | <u>1.65</u> |
| Total Hardness                      | <u>140</u>  |
| _____                               | _____       |
| _____                               | _____       |

### WATER PATTERNS-me/l



Analyst: DC



# The Western Company of North America

3250 South Side River Road  
Farmington, New Mexico 87401  
Phone (505)327-6222  
Fax (505)327-5766

## API WATER ANALYSIS

Company Meridian Sample No. 21493 Date Sampled 3/8/93  
Field \_\_\_\_\_ Legal Description T26N R03W, S02 County or Parish De Baca State NM  
Lease or Unit A Well 1c 96 # 2 Depth \_\_\_\_\_ Formation MV Water E/D \_\_\_\_\_  
Type of Water (Produced, Supply, ect.) Produced Sampling Point \_\_\_\_\_ Sampled By \_\_\_\_\_

### DISSOLVED SOLIDS

#### CATIONS

|               | mg/l        | me/l       |
|---------------|-------------|------------|
| Sodium, Na    | <u>1014</u> | <u>44</u>  |
| Calcium, Ca   | <u>40</u>   | <u>20</u>  |
| Magnesium, Mg | <u>2</u>    | <u>0.4</u> |
| Barium, Ba    | _____       | _____      |
| _____         | _____       | _____      |
| _____         | _____       | _____      |

#### ANIONS

|                               |             |             |
|-------------------------------|-------------|-------------|
| Chloride, Cl                  | <u>1649</u> | <u>46.5</u> |
| Sulfate, SO <sub>4</sub>      | _____       | _____       |
| Carbonate, CO <sub>3</sub>    | _____       | _____       |
| Bicarbonate, HCO <sub>3</sub> | <u>1096</u> | <u>18</u>   |
| Hydroxide, OH                 | _____       | _____       |
| _____                         | _____       | _____       |
| _____                         | _____       | _____       |

Total Dissolved Solids (calc.) 3804

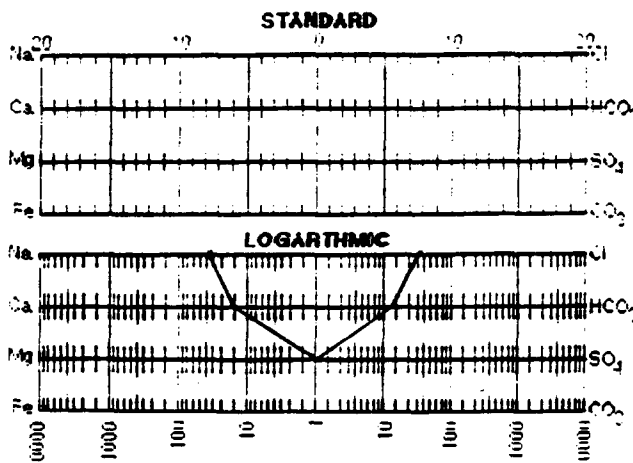
Iron, Fe (total) \_\_\_\_\_  
Sulfide, as H<sub>2</sub>S \_\_\_\_\_

Remarks & Recommendations:

### OTHER PROPERTIES

|                                       |              |
|---------------------------------------|--------------|
| pH                                    | <u>6.52</u>  |
| Specific Gravity, 60/60 F             | <u>1.002</u> |
| Resistivity (ohm-meters) <u>44</u> °C | <u>3.7</u>   |
| Total Hardness                        | <u>120</u>   |
| _____                                 | _____        |
| _____                                 | _____        |

### WATER PATTERNS-me/l



Analyst: TD



# The Western Company of North America

3250 South Side River Road  
Farmington, New Mexico 87401  
Phone (505)327-6222  
Fax (505)327-5766

## API WATER ANALYSIS

Company MERIDIAN Sample No. 21593 Date Sampled 3/8/93  
Field \_\_\_\_\_ Legal Description T26N R03W, SEC 2 County or Parish Doña Ana State NM  
Lease or Unit A Well IC 96 # 2 Depth \_\_\_\_\_ Formation ECMU Water: B/D \_\_\_\_\_  
Type of Water (Produced, Supply, ect.) PRODUCED Sampling Point \_\_\_\_\_ Sampled By \_\_\_\_\_

### DISSOLVED SOLIDS

#### CATIONS

|               | mg/l       | me/l       |
|---------------|------------|------------|
| Sodium, Na    | <u>922</u> | <u>40</u>  |
| Calcium, Ca   | <u>40</u>  | <u>20</u>  |
| Magnesium, Mg | <u>5</u>   | <u>0.4</u> |
| Barium, Ba    | _____      | _____      |
| _____         | _____      | _____      |
| _____         | _____      | _____      |

#### ANIONS

|                               |             |             |
|-------------------------------|-------------|-------------|
| Chloride, Cl                  | <u>1649</u> | <u>46.5</u> |
| Sulfate, SO <sub>4</sub>      | _____       | _____       |
| Carbonate, CO <sub>3</sub>    | _____       | _____       |
| Bicarbonate, HCO <sub>3</sub> | <u>800</u>  | <u>14</u>   |
| Hydroxide, OH                 | _____       | _____       |
| _____                         | _____       | _____       |
| _____                         | _____       | _____       |

Total Dissolved Solids (calc.) 3466

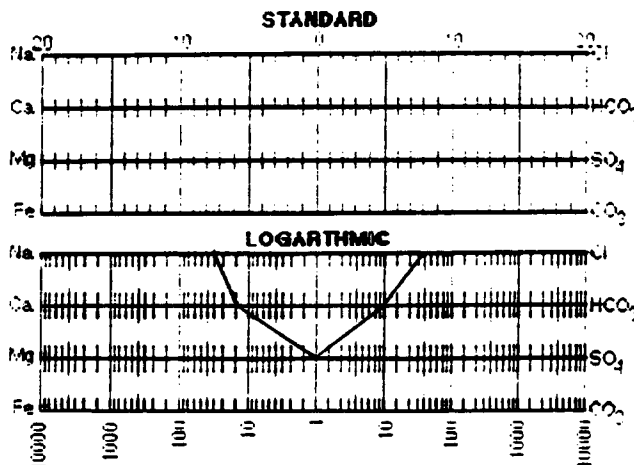
Iron, Fe (total) —  
Sulfide, as H<sub>2</sub>S —

Remarks & Recommendations:

### OTHER PROPERTIES

|                                       |              |
|---------------------------------------|--------------|
| pH                                    | <u>7.29</u>  |
| Specific Gravity, 60/60 F             | <u>1.005</u> |
| Resistivity (ohm-meters) <u>70</u> °C | <u>2.2</u>   |
| Total Hardness                        | <u>180</u>   |
| _____                                 | _____        |
| _____                                 | _____        |

### WATER PATTERNS-me/l



Analyst: DC



Date 3/22/93  
M13193

Rocky Mountain Region

THE WESTERN COMPANY

Oil Analysis

|                             |                                |
|-----------------------------|--------------------------------|
| Operator <u>Meridian</u>    | Date Sampled _____             |
| Well <u>SLC 96 #2</u>       | Date Received <u>MAR 18/93</u> |
| Field _____                 | Submitted By _____             |
| Formation <u>MESA VERDE</u> | Worked By <u>DC</u>            |
| Depth _____                 | Sample Description _____       |
| County <u>RO ARRIOLA</u>    | <u>LIGHT, AMBER LIQUID</u>     |
| State <u>N.M.</u>           | _____                          |

API Gravity 58.2 ° at 60°F

Paraffin Content \_\_\_\_\_ % by weight

Asphaltene Content \_\_\_\_\_ % by weight

Pour Point \_\_\_\_\_ °F

Cloud Point \_\_\_\_\_ °F

Comments:

56.8 @ 40 ° F

Analyst DC

Meridian Oil  
Jicarilla 98 #5

Results of analysis:  
Pictured Cliffs produced condensate:

|                            |   |                     |
|----------------------------|---|---------------------|
| Appearance                 | : | Light, clear oil    |
| API gravity @ 60 degrees F | : | 61.3 @ 60 degrees F |
| Cloud point                | : | < -8 degree C       |
| Pour point                 | : | < -8 degrees C      |

Mesa Verde produced condensate:

|                            |   |                     |
|----------------------------|---|---------------------|
| Appearance                 | : | Light, clear liquid |
| API gravity @ 60 degrees F | : | 62.6 @ 60 degrees F |
| Cloud point                | : | < -8 degree C       |
| Pour point                 | : | < -8 degrees C      |

Commingled Pictured Cliffs and Mesa Verde condensates:

|                            |   |                     |
|----------------------------|---|---------------------|
| Appearance                 | : | Light, clear liquid |
| API gravity @ 60 degrees F | : | 59.6 @ 60 degrees F |
| Cloud point                | : | < -8 degree C       |
| Pour point                 | : | < -8 degrees C      |

Summary of results:

The mixture of the two condensates displayed no adverse reaction regarding precipitation of solids.

Analysis forms follow:

Analysis done by: \_\_\_\_\_  
Dave Coleson



Date 3/22/93  
11/30/93

Rocky Mountain Region

THE WESTERN COMPANY

Oil Analysis

|                             |                              |
|-----------------------------|------------------------------|
| Operator <u>MERIDIAN</u>    | Date Sampled <u>3/8/93</u>   |
| Well <u>he 98-5</u>         | Date Received <u>3/19/93</u> |
| Field _____                 | Submitted By _____           |
| Formation <u>MESA VERDE</u> | Worked By <u>DC</u>          |
| Depth _____                 | Sample Description _____     |
| County <u>RIO ARriba</u>    | <u>CLEAR LIQUID</u>          |
| State <u>NM</u>             | _____                        |

API Gravity 62.6 ° at 60°F

Paraffin Content \_\_\_\_\_ % by weight

Asphaltene Content \_\_\_\_\_ % by weight

Pour Point \_\_\_\_\_ °F

Cloud Point \_\_\_\_\_ °F

Comments:

61 @ 46°F

Analyst DC



Date 3/24/93  
MI 32 43

Rocky Mountain Region

THE WESTERN COMPANY

Oil Analysis

|                          |                               |
|--------------------------|-------------------------------|
| Operator <u>MERIDIAN</u> | Date Sampled <u>3/8/93</u>    |
| Well <u>Cic 98-5</u>     | Date Received _____           |
| Field _____              | Submitted By _____            |
| Formation <u>MD/PC</u>   | Worked By <u>DC</u>           |
| Depth _____              | Sample Description _____      |
| County <u>RO ARRIANA</u> | <u>BOTH CLEAR &amp; LIGHT</u> |
| State <u>NM</u>          | _____                         |

API Gravity 56.6° at 60°F

Paraffin Content \_\_\_\_\_ % by weight

Asphaltene Content \_\_\_\_\_ % by weight

Pour Point \_\_\_\_\_ °F

Cloud Point \_\_\_\_\_ °F

Comments:

60.5 @ 68°F

CLEAR LIQUID - REMAINED CLEAR @ NO PRECIP.

Analyst DC



Date 3/22/93  
113493

Rocky Mountain Region

THE WESTERN COMPANY

Oil Analysis

|                                  |                              |
|----------------------------------|------------------------------|
| Operator <u>MERIDIAN</u>         | Date Sampled <u>3/8/93</u>   |
| Well _____                       | Date Received <u>3/19/93</u> |
| Field _____                      | Submitted By _____           |
| Formation <u>PICTURED CLIFFS</u> | Worked By <u>DC</u>          |
| Depth _____                      | Sample Description _____     |
| County <u>RIO ARriba</u>         | <u>CLEAR, LIGHT LIQUID</u>   |
| State <u>NM</u>                  | _____                        |

API Gravity 61.3° at 60°F

Paraffin Content \_\_\_\_\_ % by weight

Asphaltene Content \_\_\_\_\_ % by weight

Pour Point \_\_\_\_\_ °F

Cloud Point \_\_\_\_\_ °F

Comments:

59.9 @ 44°

Analyst DC



# MERIDIAN OIL

September 16, 1994

Bureau of Land Management  
Robert Kent  
435 Montano NE  
Albuquerque, NM 87107

RE: Jicarilla 447 Lease  
• Jicarilla 447 #1A Unit O, Section 19, T27N, R03W  
• Jicarilla 447 #2 Unit F, Section 19, T27N, R03W  
• Jicarilla 447 #3 Unit N, Section 18, T27N, R03W

Rio Arriba County, New Mexico  
Downhole Commingling Request

Gentlemen:

Meridian Oil, Inc. is in the process of applying for a downhole commingling order for the referenced wells in Rio Arriba County, New Mexico, in the Tapacito Pictured Cliffs and the Blanco Mesaverde fields.

The purpose of this letter is to notify you of such action. If you have no objections to the proposed commingling order, we would appreciate your signing this letter and returning it to this office.

Your prompt attention to this matter would be appreciated.

Sincerely,



Brian P. Ault  
Production Engineering

BPA/rjp

The above downhole commingling request is hereby approved:

\_\_\_\_\_  
Date: \_\_\_\_\_

# MERIDIAN OIL

September 16, 1994

Williams Production Company  
P.O. Box 58900  
Salt Lake City, UT 84158-0900

RE: Jicarilla 447 Lease  
• Jicarilla 447 #1A Unit O, Section 19, T27N, R03W  
• Jicarilla 447 #2 Unit F, Section 19, T27N, R03W  
• Jicarilla 447 #3 Unit N, Section 18, T27N, R03W

Rio Arriba County, New Mexico  
Downhole Commingling Request

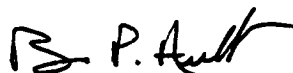
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Sincerely,



Brian P. Ault  
Production Engineering

BPA/rjp

The above downhole commingling request is hereby approved:

\_\_\_\_\_  
Date: \_\_\_\_\_

# MERIDIAN OIL

September 16, 1994

Snyder Oil Corporation  
777 Main, Suite 2500  
Fort Worth, TX 76102

RE: Jicarilla 447 Lease  
• Jicarilla 447 #1A Unit O, Section 19, T27N, R03W  
• Jicarilla 447 #2 Unit F, Section 19, T27N, R03W  
• Jicarilla 447 #3 Unit N, Section 18, T27N, R03W

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Sincerely,



Brian P. Ault  
Production Engineering

BPA/rjp

The above downhole commingling request is hereby approved:

\_\_\_\_\_  
Date: \_\_\_\_\_

# MERIDIAN OIL

September 16, 1994

Jicarilla Apache Tribe  
P.O. Box 167  
Dulce, NM 87528

RE: Jicarilla 447 Lease  
• Jicarilla 447 #1A Unit O, Section 19, T27N, R03W  
• Jicarilla 447 #2 Unit F, Section 19, T27N, R03W  
• Jicarilla 447 #3 Unit N, Section 18, T27N, R03W

Rio Arriba County, New Mexico  
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Sincerely,



Brian P. Ault  
Production Engineering

BPA/rjp

The above downhole commingling request is hereby approved:

\_\_\_\_\_  
Date: \_\_\_\_\_