

RELEASE 7-13-93

MERIDIAN OIL

August 17, 1993

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 98 Lease
Jicarilla 98 #5A NW/4, Section 20, T26N, R03W
Jicarilla 98 #10 SW/4, Section 17, T26N, R03W
Jicarilla 98 #10A SE/4, Section 17, T26N, R03W
Jicarilla 98 #11 NE/4, Section 18, T26N, R03W
Jicarilla 98 #11A NW/4, Section 18, T26N, R03W
Jicarilla 98 #12 SE/4, Section 18, T26N, 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 Tapacito 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 plat 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 20-80 MCFD for each zone. A reserve study in the area predicts an ultimate recovery of 775 MMCF for the Mesaverde and 700 MMCF for the Pictured Cliffs wells. These reserves and the low current producing rates are uneconomic as separate zone projects. 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). The shut-in pressure for the Mesaverde and Pictured Cliffs are 565 and 496 psi, respectively.

New Mexico Oil Conservation Division
Mr. Bill LeMay
Jicarilla 96 #3A
Downhole Commingling Request
Page Two

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 NMOCD 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 two other wells in this township as per NMOCD Order #'s R-5350 and R-6004, dated January 17, 1977 and May 2, 1979, respectively. Both of these wells 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,



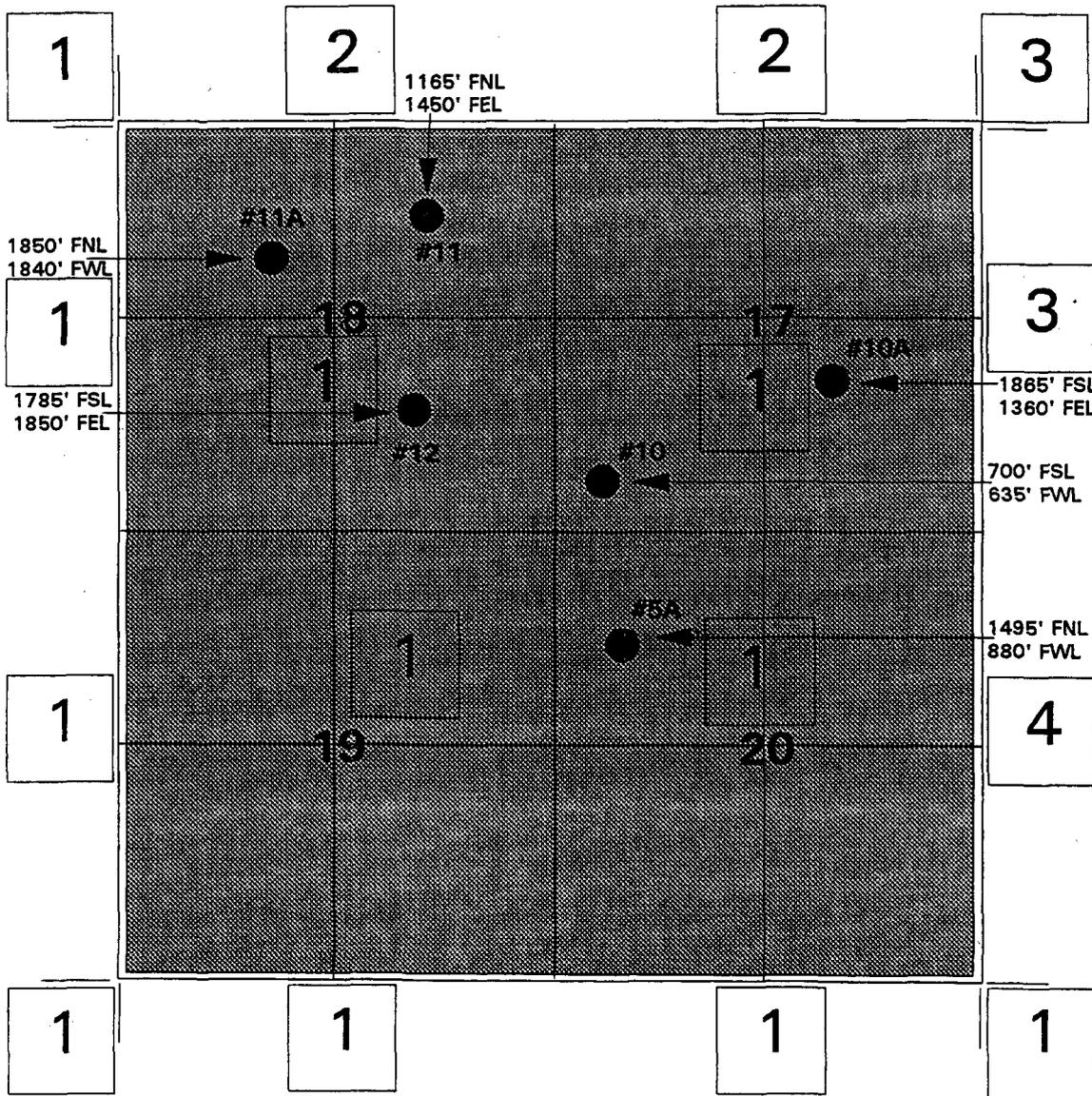
Arden L. Walker, Jr.
Regional Production Engineer

LKS:tg
Attachments

cc: Frank T. Chavez - NMOCD/Aztec

MERIDIAN OIL INC.

OFFSET OPERATOR/OWNER PLAT Pictured Cliffs/Mesaverde Commingle Township 26 North, Range 3 West Rio Arriba County, New Mexico



See Attached List

**Pictured Cliffs/Mesaverde Commingle
Township 26 North, Range 3 West
Offset Operators**

1. **Meridian Oil Inc.**
P.O. Box 4289
Farmington, NM 87499-4289

 2. **Consolidated Oil & Gas Corp.**
419 17th Street, Suite 400
Denver, CO 80202-4410

 3. **Jerome P. McHugh**
650 S. Cherry Street, Suite 1225
Denver, CO 80222

 4. **Jerome P. McHugh**
650 S. Cherry Street, Suite 1225
Denver, CO 80222
- Dugan Production Corp.**
P.O. Box 420
Farmington, NM 87499-0402

MERIDIAN OIL

RECEIVED
BLM

93 AUG 26 AM 11:35

August 17, 1993

070 FARMINGTON, NM

Bureau of Land Management
1235 La Plata Highway
Farmington, New Mexico 87401

RE: Jicarilla 98 Lease
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Rio Arriba County, New Mexico
Downhole Commingling Request

MINERALS DIVISION	
AREA	<i>130</i>
SECTION	
SOLIDS	
FLUIDS	<i>2</i>
HEADWORK	
FLUIDS TO BE	
ERS	
ALL SUPV.	
FILES	

Gentlemen:

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

Yours truly,

Les K. Smith
Les K. Smith
Reservoir Engineering

RECEIVED
DEC - 6 1993
OIL CON. DIV.
DIST. 3

LKS/tg

The above downhole commingling request is hereby approved:

(Original Signed) HECTOR A. VILLALOBOS

Date: DEC 2 1993

MERIDIAN OIL

August 17, 1993

Bureau of Land Management
1235 La Plata Highway
Farmington, New Mexico 87401

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Denver, Colorado 80202-4410

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650 S. Cherry Street, Suite 1225
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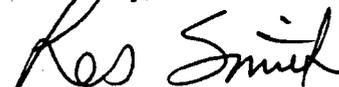
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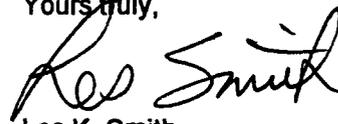
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Les K. Smith
Reservoir Engineering

LKS/tg

The above downhole commingling request is hereby approved:

Date: _____

MERIDIAN OIL

JICARILLA 98 AND 96 LEASE

RIO ARRIBA COUNTY, NM

MESA VERDE/PICTURED CLIFFS FORMATION



The Western Company

LABORATORY INVESTIGATION

PREPARED FOR

**LESLEY K. SMITH
SR. RESERVOIR ENGINEER**

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

**PREPARED BY
LOREN DIEDE / DAVE COLESON**

FARMINGTON

MARCH 25, 1993

FM020658

March 25, 1993

Meridian Oil
Jicarilla 96 #2
Jicarilla 95 #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/ l (calc.)
Calcium 48 mg/ l
Magnesium 5 mg/ l (calc.)

Anions
Chloride 2061 mg / l
Sulfate 0 mg / l
Bicarbonate 976 mg / l

Total dissolved solids 4691

Mesa Verde produced water
ph : 6.52
Resistivity : 3.70
Sp. Gr. : 1.005

Cations
Sodium & Potassium 922 mg/ l (calc.)
Calcium 40 mg/ l
Magnesium 5 mg/ l (calc.)

Anions
Chloride 1649 mg / l
Sulfate 0 mg / l
Bicarbonate 850 mg / l

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

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

ANALYSIS NO. 511393FIELD RECEIPT NO. 2/22/93

PI FORM 45-1

API WATER ANALYSIS REPORT FORM

Company <u>MERIDIAN</u>		Sample No.	Date Sampled <u>2/8/93</u>	
Field	Legal Description <u>TRUNK RD N. SEC 2 T10 R13P</u>	County or Parish	State <u>VMA</u>	
Lease or Unit <u>H</u>	Well <u>WIC 96 #1</u>	Depth	Formation <u>FRACTURED LIFTS</u>	Water. B/D
Type of Water (Produced, Supply, etc.) <u>PRODUCED</u>	Sampling Point	Sampled By		

DISSOLVED SOLIDS

IONS	mg/l	me/l
Sodium, Na (calc.)	<u>601</u>	<u>29.6</u>
Calcium, Ca	<u>48</u>	<u>2.4</u>
Magnesium, Mg	<u>5</u>	<u>0.4</u>
Strontium, Sr		

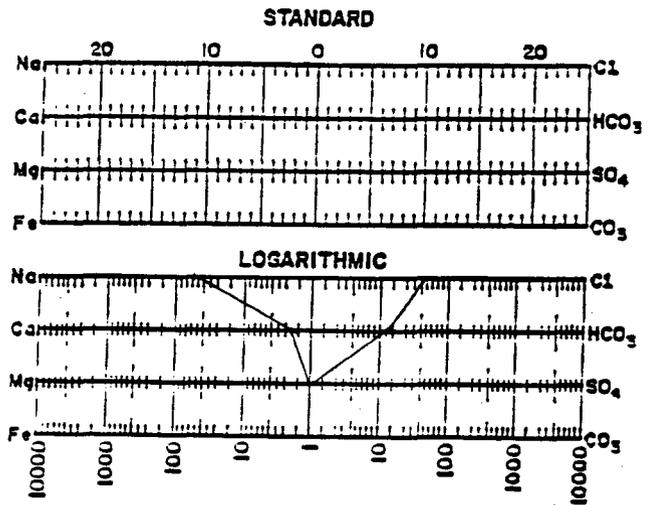
OTHER PROPERTIES

pH	<u>7.12</u>
Specific Gravity, 60/60 F.	<u>1.00</u>
Resistivity (ohm-meters) <u>750</u>	<u>1165</u>
<u>TOTAL HARDNESSES</u>	<u>140</u>

ANIONS

IONS	mg/l	me/l
Chloride, Cl	<u>2061</u>	<u>58</u>
Sulfate, SO ₄		
Bicarbonate, CO ₃		
Carbonate, HCO ₃	<u>176</u>	<u>6</u>

WATER PATTERNS — me/l



Total Dissolved Solids (calc.)	<u>4691</u>
Iron, Fe (total)	<u>—</u>
Sulfide, as H ₂ S	<u>—</u>

ANALYST: DC

REMARKS & RECOMMENDATIONS:

PLEASE REFER ANY QUESTIONS TO:

WESTERN CO. OF NORTH AMERICA
 WINSTON-SALEM, N.M.
 JOHN L. DIEDE
 (910) 327-6222



ANALYSIS NO. 511445

FIELD RECEIPT NO. _____

PI FORM 45-1

API WATER ANALYSIS REPORT FORM

Company <u>HELDIAN</u>		Sample No.	Date Sampled <u>3/8/93</u>	
Field	Legal Description <u>TRENORW SEC 2</u>	County or Parish <u>KIO HARIBA</u>	State <u>NM</u>	
Lease or Unit <u>A</u>	Well <u>LIC 912-2</u>	Depth	Formation <u>MESA VERDE</u>	Water. B/D
Type of Water (Produced, Supply, etc.) <u>PRODUCED</u>	Sampling Point		Sampled By	

DISSOLVED SOLIDS

CATIONS	mg/l	me/l
Sodium, Na (calc.)	<u>1014</u>	<u>44</u>
Calcium, Ca	<u>40</u>	<u>20</u>
Magnesium, Mg	<u>2</u>	<u>12</u>
Barium, Ba		

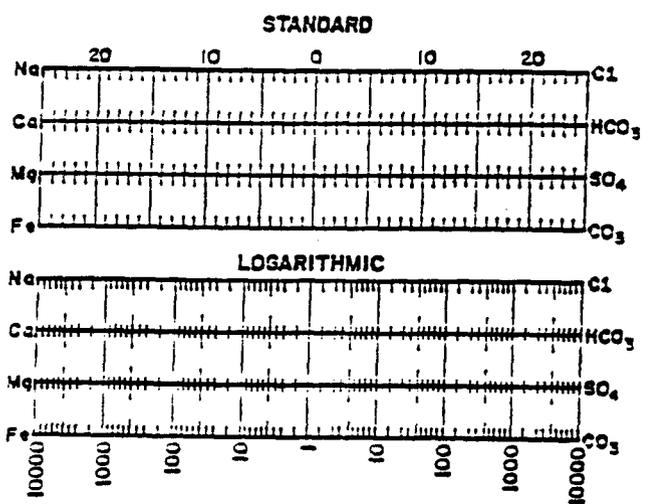
OTHER PROPERTIES

pH	<u>6.52</u>
Specific Gravity, 60/60 F.	<u>1.002</u>
Resistivity (ohm-meters) <u>140</u> F.	<u>3.7</u>
<u>TOTAL HARDNESS</u>	<u>120</u>

ANIONS

Chloride, Cl	<u>1240</u>	<u>1240</u>
Sulfate, SO ₄		
Carbonate, CO ₃		
Bicarbonate, HCO ₃	<u>1040</u>	<u>17</u>

WATER PATTERNS — me/l



Total Dissolved Solids (calc.)	<u>3804</u>
Iron, Fe (total)	
Sulfide, as H ₂ S	

REMARKS & RECOMMENDATIONS:

ANALYST: DC

PLEASE REFER ANY QUESTIONS TO:

THE WESTERN CO. OF NORTH AMERICA
 ARMINGTON, N.M.
 GOREN L. DIEDE
 (505) 327-6222



ANALYSIS NO. 51 15 23

FIELD RECEIPT NO. 5/2-100

PI FORM 45-1

API WATER ANALYSIS REPORT FORM

Company <u>MEXIDIAN</u>		Sample No.	Date Sampled <u>3/8/93</u>	
Field	Legal Description <u>260N R031W, SEC 2</u>	County or Parish <u>KIO MEXIA</u>	State <u>NM</u>	
Lease or Unit	Well <u>LIC 210-2</u>	Depth	Formation <u>DC/MV</u>	Water. B/D
Type of Water (Produced, Supply, etc.)		Sampling Point	Sampled By	

DISSOLVED SOLIDS

IONS	mg/l	me/l
Sodium, Na (calc.)	<u>22</u>	<u>41</u>
Calcium, Ca	<u>40</u>	<u>20</u>
Magnesium, Mg	<u>—</u>	<u>—</u>
Barium, Ba	<u>—</u>	<u>—</u>

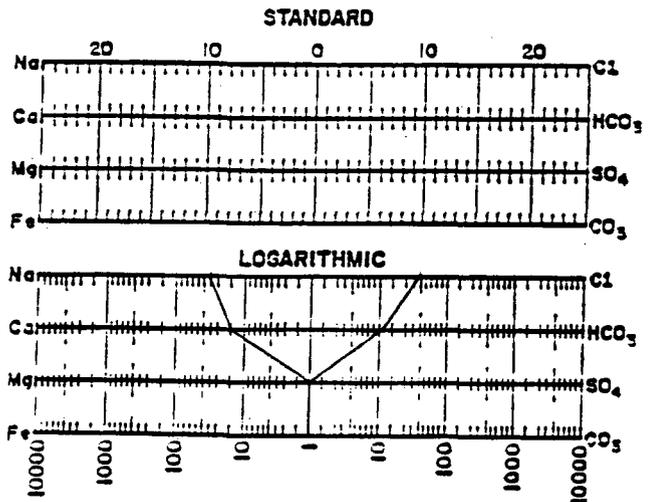
OTHER PROPERTIES

pH	<u>7.29</u>
Specific Gravity, 60/60 F.	<u>1.005</u>
Resistivity (ohm-meters) <u>70° F.</u>	<u>2.2</u>
TOTAL HARDNESS	<u>120</u>

ANIONS

IONS	mg/l	me/l
Chloride, Cl	<u>—</u>	<u>—</u>
Sulfate, SO ₄	<u>—</u>	<u>—</u>
Carbonate, CO ₃	<u>—</u>	<u>—</u>
Bicarbonate, HCO ₃	<u>—</u>	<u>—</u>

WATER PATTERNS — me/l



Total Dissolved Solids (calc.)	<u>3460</u>
Iron, Fe (total)	<u>—</u>
Sulfide, as H ₂ S	<u>—</u>

ANALYST: DC

REMARKS & RECOMMENDATIONS:

EASE REFER ANY QUESTIONS TO:

WESTERN CO. OF NORTH AMERICA
 ALBUQUERQUE, N.M.
 JOHN L. DIEDE
 (505) 327-6222



Date 3/22/93
III 31 93

Rocky Mountain Region

THE WESTERN COMPANY
Oil Analysis

Operator _____	Date Sampled <u>3/18/93</u>
Well <u>Jic 96-02</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>CO ARAPA</u>	<u>LIGHT, AMBER LIQUID</u>
State <u>WV</u>	_____

API Gravity 58.2 ° at 60°F

Paraffin Content _____ % by weight

Asphaltene Content _____ % by weight

Pour Point _____ °F

Cloud Point _____ °F

Comments:

56.2 @ 46 °F

Analyst _____



Date 3/22/93
MI 3093

Rocky Mountain Region

THE WESTERN COMPANY
Oil Analysis

Operator _____	Date Sampled <u>3/8/93</u>
Well <u>Wic 98-5</u>	Date Received <u>3/19/93</u>
Field _____	Submitted By _____
Formation <u>DETURSED CLIFFS</u>	Worked By <u>RC</u>
Depth _____	Sample Description _____
County <u>RIO ARIZONA</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 (2) 44³

Analyst _____



Date 3/22/93
M13093

Rocky Mountain Region

THE WESTERN COMPANY

Oil Analysis

Operator _____	Date Sampled <u>3/2/93</u>
Well <u>JIC 98 -5</u>	Date Received <u>3/19/93</u>
Field _____	Submitted By _____
Formation <u>MESA VERDE</u>	Worked By <u>TC</u>
Depth _____	Sample Description _____
County <u>RIO ARRIBA</u>	<u>CLEAR LIQUID</u>
State <u>NM</u>	_____

API Gravity 62.60 ° at 60°F

Paraffin Content _____ % by weight

Asphaltene Content _____ % by weight

Pour Point _____ °F

Cloud Point _____ °F

Comments:

61 @ 46° F

Analyst _____



Date 3/24/93
1113293

Rocky Mountain Region

THE WESTERN COMPANY

Oil Analysis

Operator MERIDIAN Date Sampled 3/8/93
Well 11C98-5 Date Received _____
Field _____ Submitted By _____
Formation 11U/PC Worked By [Signature]
Depth _____ Sample Description _____
County RIO ARIZONA TOTALLY CLEAR & LIGHT
State 11U _____

API Gravity 29.6° 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 PRECIPITATION

Analyst _____