



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
AZTEC DISTRICT OFFICE

GARREY CARRUTHERS
GOVERNOR

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

Date: Dec 11, 1990

Oil Conservation Division
P.O. Box 2088
Santa Fe, NM 87504-2088

Re: Proposed MC _____
Proposed DHC ✓ _____
Proposed NSL _____
Proposed SWD _____
Proposed WFX _____
Proposed PMX _____

Gentlemen:

I have examined the application dated Dec 11, 1990
for the Operator Willie #1 Lease & Well No.

J-9-27A-11W and my recommendations are as follows:
Unit, S-T-R

Agree

Yours truly,

3.5.4



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P.O. Box 2088
Santa Fe, NM 87504-2088

Re: Proposed MC _____
Proposed DHC ✓
Proposed NSL _____
Proposed SWD _____
Proposed WFX _____
Proposed PMX _____

Gentlemen:

I have examined the application dated Dec 4, 1990
for the McIlwain Well #1
Operator Lease & Well No.

J-9-27N-11W and my recommendations are as follows:
Unit, S-T-R

Agree

Yours truly,

J. G.

MERIDIAN OIL

November 12, 1990

Mr William J. LeMay
N. M. Oil Conservation Division
P. O. Box 2088
Santa Fe, N.M. 87501-2088

RECEIVED

DEC 4 1990

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

Re: Hillside #1 Gal/Dk
2310' FSL; 1650' FEL
Section 9, T27N R11W
San Juan County, N. M.

Dear Mr. LeMay:

Meridian Oil Inc. is applying for an administrative downhole commingling order for the referenced well in the Kutz Gallup and Basin Dakota fields. The ownership of the zones to be commingled is common. The offset operator to the northeast and east is Arco Oil and Gas Company, to the southeast and south is Marathon Oil Company, with Meridian Oil having acreage to the north, west and southwest. The Bureau of Land Management and these offset operators will receive notification of this proposed downhole commingling.

This well has produced since 1970 from the Gallup and Dakota intervals. The Gallup has not produced consistently since January 1987 when the well experienced an apparent pumping failure. The Gallup was recently pump tested for a current producing capacity of 30 MCF/D & 2.0 BOPD. It has a cumulative production of 270 MMCF & 3,505 BO as of August 1, 1990. The Gallup can not produce alone without a pumping unit.

The Dakota experienced a normal production decline through 1985, but over the last four years has seen a very rapid decline to 60 MCF/D & 0.1 BOPD. The Dakota is listed as "marginal" in the State Proration Schedule, and its cumulative production is 1,471 MMCF & 10,461 BO as of August 1, 1990.

We believe that the rapid production decline experienced by the Dakota is the result of poor producing efficiency caused by the presence of the production packer in the hole which limits the Dakota's annular volume. (The packer is located only 35' above the top Dakota perf). The Gallup side presently could not economically pay for a pulling job at its present producing rate. However, commingled, this well could produce economically for many more years. The commingling of the subject well in the twilight of its producing life should result in better producing efficiency, a longer life, and more

reserves from both zones. Granting this application will be in the best interest of conservation, the prevention of waste, and the protection of correlative rights.

We plan to commingle this well by pulling the pump, rods, Gallup tubing, and the Dakota tubing and packer seal assembly. The permanent packer will be extracted and a single string of tubing run to the lower producing interval.

The reservoir characteristics of each of the subject zones are such that underground waste would not be caused by the proposed downhole commingling. The fluids from each zone are compatible and no precipitates will be formed to cause damage to either reservoir. See the attached fluid analyses. The daily production will not exceed the limit of Rule 303c, Section 1a, Part 1.

The shut-in pressure for the Gallup and Dakota are 367 psi and 370 psi, respectively. The Dakota makes no water, and the Gallup produces only about 0.5 gallon of water per day.

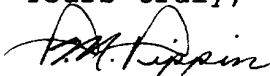
The District Office in Aztec will be notified anytime the commingled well is shut-in for seven (7) consecutive days.

Using the well's Gallup production from 1986 (before its pump failure) and Dakota production from 1985 (before its rapid decline started), we propose the following production allocation. See the attached calculations.

Gallup gas	17%	Dakota gas	83%
Gallup oil	71%	Dakota oil	29%

Included with this letter is a plat showing ownership of offsetting leases, a copy of the letter to the offset operators and BLM, wellbore diagrams both before and after commingling, production curves, pertinent data sheet, the allocation calculation sheet, and a detailed report of fluid compatibility.

Yours truly,



P. M. Pippin
Sr. Production Engineer

PMP:pmp
attachments

cc: Frank Chavez - OCD

MERIDIAN OIL

November 16, 1990

Marathon Oil Company
Production Engineering
P.O. Box 269
Littleton, CO 80160

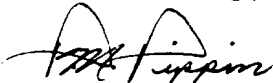
Gentlemen:

Meridian Oil, Inc. is in the process of applying for a downhole commingling order for their Hillside #1 GAL/DK well located 2310' FSL 1650' FEL, Section 09 T27N R11W, N.M.P.M., San Juan County, New Mexico, in the Kutz Gallup and Basin Dakota.

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 the attached copy of this letter and returning it to this office.

Your prompt attention to this matter would be appreciated.

Yours truly,



P. M. Pippin
Sr. Production Engineer

PMP:pmp

The above downhole commingling request is hereby approved:

Date: _____

MERIDIAN OIL

November 16, 1990

Arco Oil and Gas Company
P.O. Box 20309
Midland, Texas 79702

Gentlemen:

Meridian Oil, Inc. is in the process of applying for a downhole commingling order for their Hillside #1 GAL/DK well located 2310' FSL 1650' FEL, Section 09 T27N R11W, N.M.P.M., San Juan County, New Mexico, in the Kutz Gallup and Basin Dakota.

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 the attached copy of this letter and returning it to this office.

Your prompt attention to this matter would be appreciated.

Yours truly,



P. M. Pippin
Sr. Production Engineer

PMP:pmp

The above downhole commingling request is hereby approved:

Date: _____

MERIDIAN OIL

November 16, 1990

Bureau of Land Management
1235 La Plata Hwy.
Farmington, N. M. 87401


Gentlemen:

Meridian Oil, Inc. is in the process of applying for a downhole commingling order for their Hillside #1 GAL/DK well located 2310' FSL 1650' FEL, Section 9 T27N R11W, N.M.P.M., San Juan County, New Mexico, in the Kutz Gallup and Basin Dakota.

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 the attached copy of this letter and returning it to this office.

Your prompt attention to this matter would be appreciated.

Yours truly,



P. M. Pippin
Sr. Production Engineer

PMP:pmp

The above downhole commingling request is hereby approved:

Date: _____

MERIDIAN OIL

Commingle Application for Gallup/Dakota
Hillside #1 Gal/Dk

Unit J Section 9 T27N R11W
San Juan County, N. M.

T
27
N

4 Meridian Oil	3 Arco
9 Hillside #1 Gal/Dk Meridian Oil	10 Arco
16 Meridian Oil	15 Marathon Oil

R 11 W

DISTRICT :
 STATE :
 COUNTY :
 PROJECT NAME :

FARMINGTON
 NEW MEXICO
 SAN JUAN

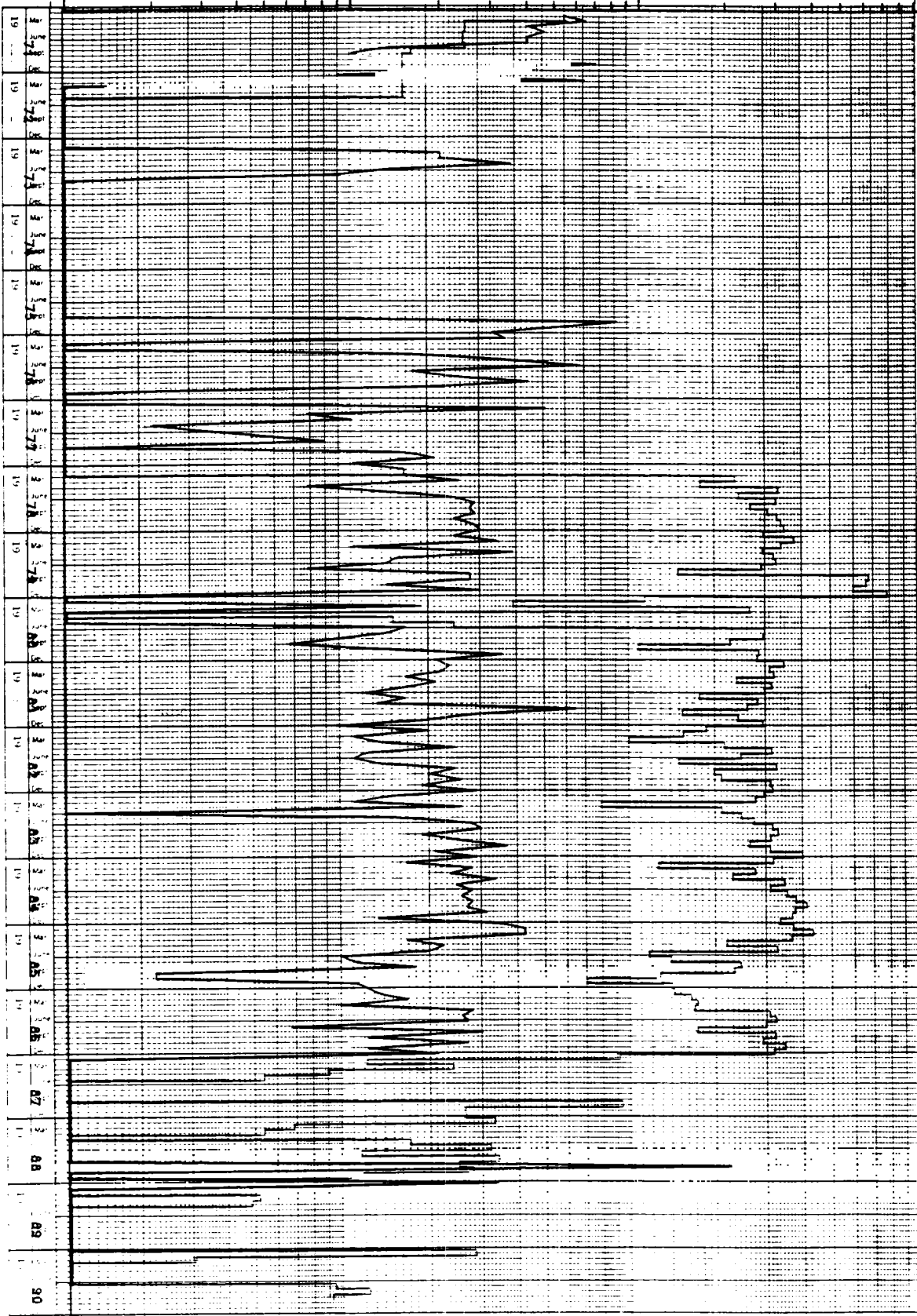
DP-NO : 28156
 WELL NAME & NO : HILLSIDE
 FIELD NAME : KUTZ GALLUP
 OPERATOR : SOUTHLAND ROYALTY COMPANY
 PAGE NUMBER : 0000001-A

MERIDIAN OIL

GROSS OIL (BBL/M)

(LINEAR)

10⁰ 2 3 4 5 6 7 8 9 10¹ 2 3 4 5 6 7 8 9 10² 2 3 4 5 6 7 8 9 10³



SELECTIONS:
 CIL BY MONTH

GAS BY MONTH

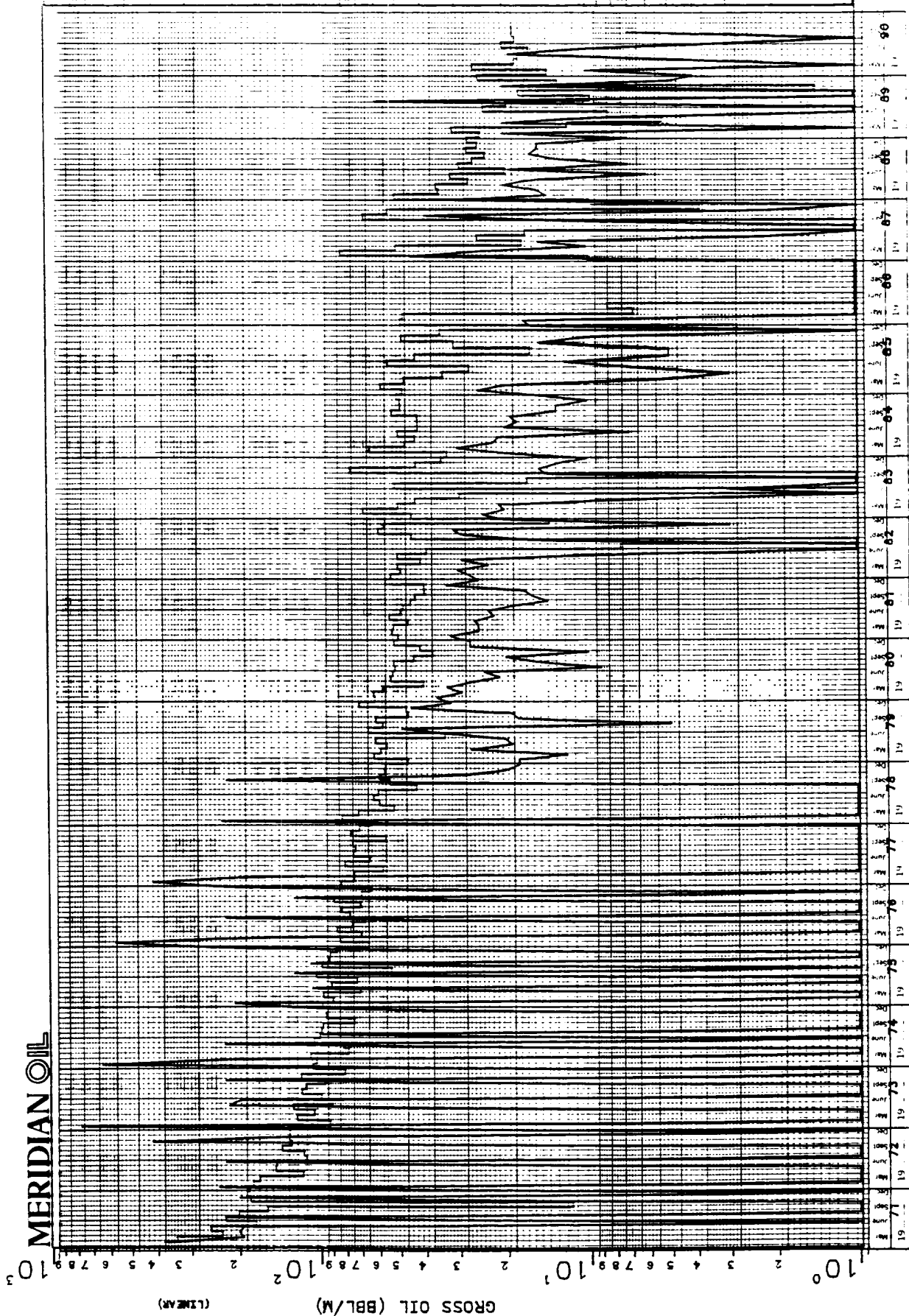
1510379AM

GROSS OIL (BBL/M)

DISTRICT : FARMINGTON
 STATE : NEW MEXICO
 COUNTY : SAN JUAN
 PROJECT NAME :

DP-NO : 28185
 WELL NAME & NO : HILLSIDE
 FIELD NAME : BASIN DAKOTA (PRORATED GAS)
 OPERATOR : SOUTHLAND ROYALTY COMPANY
 PAGE NUMBER : 0000001-A

MERIDIAN OIL



ELECTIONS:
 IL BY MONTH

GAS BY MONTH

MERIDIAN OIL

Commingle Application for Gallup/Dakota
Hillside #1 GL/DK

J 9 27 11

San Juan County, N.M.

Allocation Calculation

See attached decline curves

Gallup Production	(Recent test results)
30 MCF/D	2.0 BOPD

Dakota Production 1985 (before rapid decline started)	
148 MCF/D	0.8 BOPD

Total	178 MCF/D	2.8 BOPD
-------	-----------	----------

Gallup Gas Allocation = $\frac{30}{178} = 17\%$

Gallup Oil Allocation = $\frac{2.0}{2.8} = 71\%$

Dakota Gas Allocation = $\frac{148}{178} = 83\%$

Dakota Oil Allocation = $\frac{0.8}{2.8} = 29\%$

HILLSIDE #1 GAL/DK

UNIT J SECTION 9 T27N R11W
SAN JUAN COUNTY, NEW MEXICO

AFTER COMMINGUNG

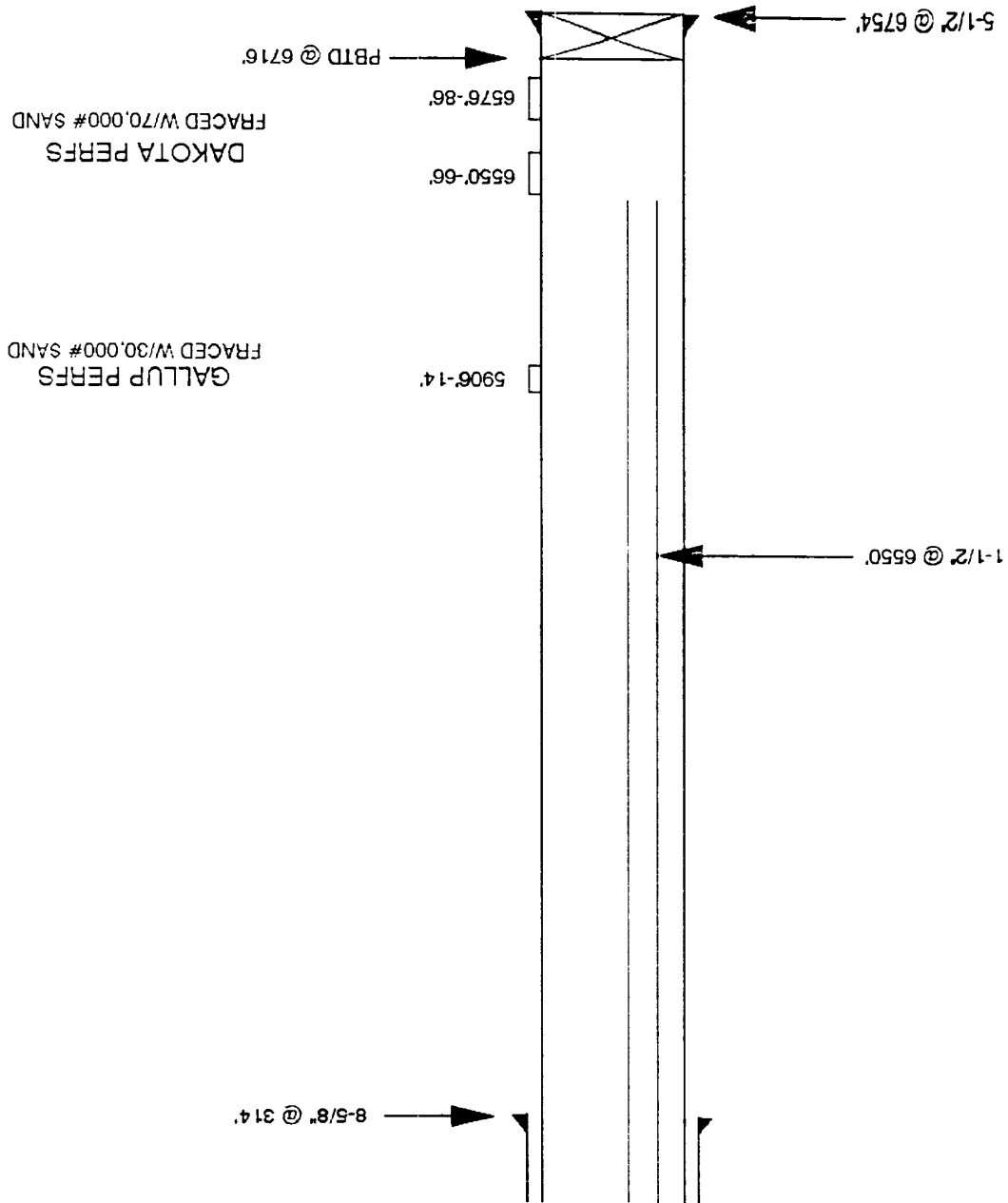


FIGURE 2

HILLSIDE #1 GAL/DK

UNIT J SECTION 9 T27N R11W
SAN JUAN COUNTY, NEW MEXICO

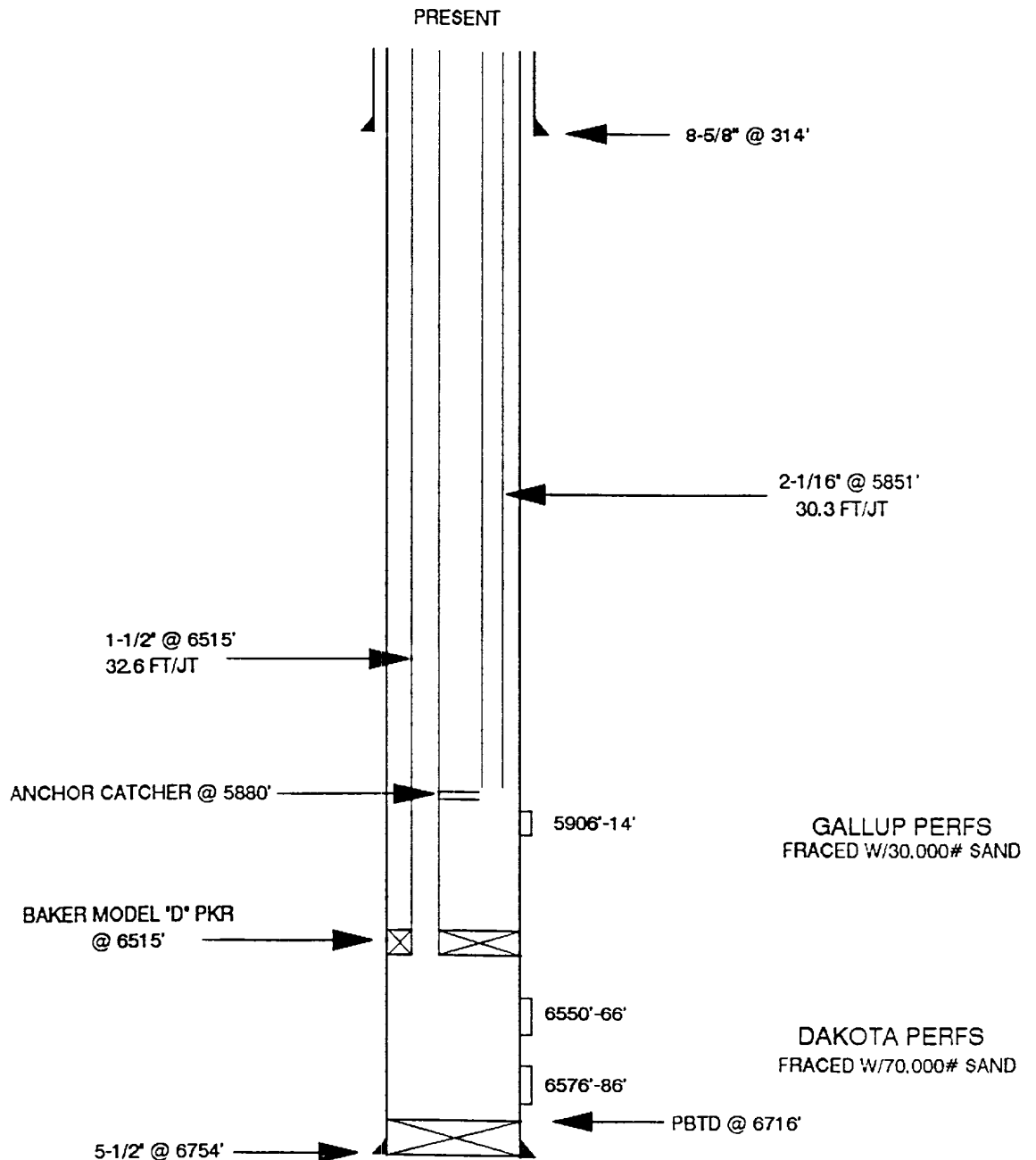


FIGURE 1

Pertinent Data Sheet - HILLSIDE #1 GAL/DK

Location: 2310' FSL 1650' FEL, SEC. 9, T27N R11W, SAN JUAN COUNTY, N.M.

Field: Basin Dakota
Kutz Gallup

Elevation: 6223' GL
12' KB

TD: 6754'
PBTD: 6716'

Completed: 10-29-70

GWI:
NRI:

Initial Potential:

DK: SITP= 1531 psi, AOF=4612 MCF/D, Q=3251 MCF/D
GAL: Pumping 32 BOPD, 118 MCF/D, GOR=3688

Casing Record:

<u>Hole Size</u>	<u>Csg. Size</u>	<u>Wt. & Grade</u>	<u>Depth Set</u>	<u>Cement</u>	<u>Top/Cmt.</u>
12-1/4"	8-5/8"	24#	314'	200 sx	circ. cmt
7-7/8"	5-1/2"	14#	6754'	200 sx	
			Stg tool @ 4905'	200 sx	

Tubing Record: 1-1/2" EUE 10rd 6515' (203 jts)
F nipple@6483' Prod. Mod "D" pkr @ 6515'
Anchor Catcher @ 5880'
2-1/16" 3.25# IJ X-LINE 5851' (190 jts) Buttress
S.N. @ 5845' GST Streamline

Formation Tops:

Kirtland	958'	Gallup	5558'
Fruitland	1665'	Greenhorn	6392'
Pictured Cliffs	1968'	Graneros	6450'
Mesaverde	2900'	Dakota	6547'
Point Lookout	4448'		
Mancos	4713'		

Logging Record: Induction, Density

Stimulation: DAKOTA. Perfed Dk w/4/spf @ 6550'-66' & 6576'-86' & fraced w/70,000# sand in water.

GALLUP. Perfed Gal @ 5906'-14' & fraced w/30,000# sand in water.

Workover History: 3-25-85. Stripped tbg & rods out of hole. TIH Could not J into parallel anchor. Landed 2-1/16" tbg @ 5851'.

Production History: First delivered to EPNG on 12-23-70. DK cum = 1,471 MMCF & 10,461 BO. Gallup cum = 3,505 BO & 270 MMCF. See attached production curves. This well is cathodically protected.



MERIDIAN OIL
HILLSIDE #1 - GALLUP
HILLSIDE #1 - DAKOTA
LEASE FLUIDS

LABORATORY INVESTIGATION
OF
HILLSIDE DAKOTA AND GALLUP FLUIDS COMPATIBILITY
OCTOBER 25, 1990

PREPARED FOR:

MERIDIAN OIL, INC
MIKE PIPPIN
PETROLEUM ENGINEER

PREPARED BY:

BRIAN P. AULT
PETROLEUM ENGINEER
WESTERN COMPANY OF
NORTH AMERICA

SERVICE POINT
FARMINGTON, NEW MEXICO
505-327-6222

MERLABINV

SUMMARY OF RESULTS

1. No precipitation of materials was observed from either admixture of fluids.
2. Emulsion testing was performed. There should be no serious concern over the formation of a stabilized emulsion at well bore temperatures.
3. The cloud point of oil mixtures dropped or remained the same upon mixing of fluids.
4. According to calculations not enough cool down from gas expansion will occur to alter paraffin deposition significantly.

MERIDIAN OIL
HILLSIDE #1 - GALLUP
HILLSIDE #1 - DAKOTA
LEASE FLUIDS

On Thursday, October 25, 1990, a request for laboratory work was placed by Mike Pippin, Petroleum Engineer of Meridian Oil, Inc.

PURPOSE

Two oil samples were received of Mr. Pippin with the request we investigate the concern of potentially detrimental effects due to commingling of Gallup and Dakota fluids in the Hillside #1 wellbore.

INVESTIGATION

1. Background information - current wellbore.

- a. Figure 1
- b. Figure 2
- c. BHST Gradient: 1.375° f/100 ft.
- d. Current production problems are primarily due to paraffin deposition from surface down to more/less 1000' depth.
- e. Commingling Order Mixture Requirements:

The commingling requests present the mixing of Hillside #1 Dakota fluids with Hillside #1 Gallup fluids.

The tests performed simulated the mixture of fluids that may result from this commingling action. Each oil component was analyzed for API gravity, paraffin, pour point and cloud point. Each water component was analyzed for dissolved solids, pH, specific gravity and resistivity. The mixture of oils addressed the potential increase in precipitation of materials and the potential increase in paraffin content by a synergistic effect of mixing oils of different constitution. Emulsion tests simulated the mixing environment of the wellbore where the water component of a fluid could be tied up in a resulting emulsion without the ability to break out and allow separation of the oil and water constituents. The emulsion test results

present the number of ml (% of mixture) of water breakout at listed time intervals. The volume of test sample (mixture) used in the emulsion tests is 100 ml.

2. Concerns to address in analysis:

- a. The precipitation of materials produced by the admixture of oils of potentially different constitution.
- b. The creation of emulsions due to the admixture of different fluids.
- c. Increased paraffin deposition by additive properties of oils.
- d. Increased paraffin deposition due to the reduction of temperature accompanying gas expansion.

3. Steps taken in analysis

- a. API Analysis of oils including: API Gravity
 Pour Point
 Cloud Point
 Paraffin Content
- b. Discussion with Mr. Pippen regarding the well bore production environment, e.g., mode of hydrocarbon production, pump type and operation, water components of production fluids, current paraffin problems, etc.
- c. Mixing of oils in appropriate cases with additional cloud point testing to determine resulting fluid characteristics.
- d. API Water Analysis
- e. Emulsion tendency testing via mixing of fluids in appropriate cases.

MERIDIAN OIL
HILLSIDE #1 - GALLUP
HILLSIDE #1 - DAKOTA
LEASE FLUIDS

DATA

SAMPLE #1 - HILLSIDE #1

ZONE	GALLUP
API GRAVITY @ 60° F	34.59°
CLOUD POINT	>40D F*
POUR POINT	40D F
PARAFFIN CONTENT	3.95%

SAMPLE #2 - HILLSIDE #1

ZONE	DAKOTA
API GRAVITY @ 60° F	58.02°
CLOUD POINT	28° F
POUR POINT	<23° F
PARAFFIN CONTENT	0%

SAMPLE #3 50:50 MIX OF HILLSIDE #1 FLUIDS

ZONE	50:50 MIX GAL/DK
API GRAVITY @ 60° F	39.94°
CLOUD POINT	>17°**
POUR POINT	<17° F
PARAFFIN CONTENT	1.94%

*UNABLE TO ACCURATELY DETERMINE DUE TO THE DARK COLOR OF THE SAMPLE.

**UNABLE TO ACCURATELY DETERMINE DUE TO THE RESULTING DARK MIX

MERIDIAN OIL
HILLSIDE #1 - GALLUP
HILLSIDE #1 - DAKOTA
LEASE FLUIDS

CALCULATIONS

Cool down effects due to gas expansion:

Reference: Perry's Handbook of Chemical Engineering

RE: Adiabatic Expansion of Ethane, Methane

$$T_s = T_r \left(\frac{P_s}{P_r} \right)^{\frac{K-1}{K}}, \text{ where}$$

T_s = Surface Temperature

T_r = Reservoir Temperature

P_s = Surface Pressure

P_r = Reservoir Pressure

$K = \frac{\text{Specific heat at constant pressure}}{\text{Specific heat at constant volume}}$

Assumed values for maximum cool down due to gas expansion:

T_s = Unknown

$T_r = 160^\circ \text{ F}$

$P_s = 500 \text{ psi}$

$P_r = 2000 \text{ psi}$

$K = 1.2$

$T_s = 160 \left(\frac{500}{2000} \right)^{0.1667}$

$T_s = 127^\circ \text{ F}$

NOTE:

A total cooldown of 33° F would be expected

ANALYSIS NO. 54-11-90

FIELD RECEIPT NO. _____

API FORM 45-1

API WATER ANALYSIS REPORT FORM

Company <u>Meridian Oil</u>		Sample No.		Date Sampled <u>10-24-90</u>	
Field <u>BASIN DAK / Kutz GALLUP</u>		Legal Description <u>Sec 9, T27N, R11W</u>		County or Parish <u>San Juan</u> State <u>NM</u>	
Lease or Unit		Well <u>Hillside 1</u>	Depth <u>5550 GAL 6550 DAK</u>	Formation <u>Dakota</u>	Water, B/D
Type of Water (Produced, Supply, etc.) <u>Produced</u>			Sampling Point		Sampled By <u>M. Pippin</u>

DISSOLVED SOLIDS

CATIONS	mg/l	me/l
Sodium, Na (calc.)	<u>606</u>	<u>26.33</u>
Calcium, Ca	<u>16</u>	<u>.80</u>
Magnesium, Mg	<u>3</u>	<u>.22</u>
Barium, Ba	<u>—</u>	<u>—</u>
Potassium, K ⁺	<u>11</u>	<u>.28</u>

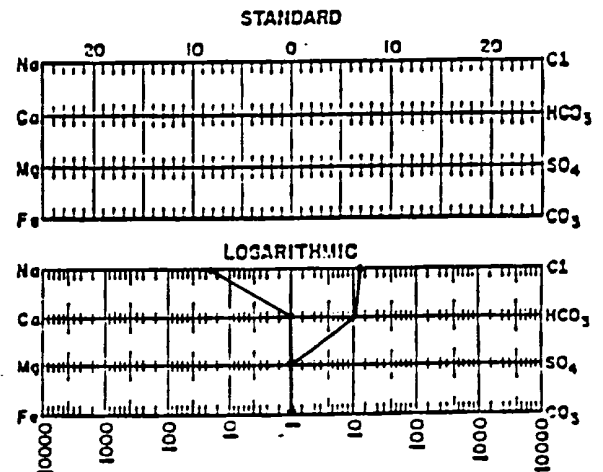
ANIONS	mg/l	me/l
Chloride, Cl	<u>554</u>	<u>15.63</u>
Sulfate, SO ₄	<u>27</u>	<u>.56</u>
Carbonate, CO ₃	<u>0</u>	<u>0</u>
Bicarbonate, HCO ₃	<u>698</u>	<u>11.44</u>
<u>OH</u>	<u>0</u>	<u>0</u>

Total Dissolved Solids (calc.) 1915
 Iron, Fe (total) #, ## 0.0 ppm
 Sulfide, as H₂S neg

OTHER PROPERTIES

pH	<u>7.33</u>
Specific Gravity, 60/60 F.	<u>1.001</u>
Resistivity (ohm-meters) <u>76 F.</u>	<u>3.9</u>
Total hardness	<u>51</u>

WATER PATTERNS — me/l



REMARKS & RECOMMENDATIONS:

ANALYST: Lee
 THE WESTERN COMPANY OF
 NORTH AMERICA, FARMINGTON, NM
 (505) 327-6222
Please refer any questions to: **BRIAN AULT** . District Engineer

ANALYSIS NO. 54-12-90

FIELD RECEIPT NO. _____

API FORM 45-1

API WATER ANALYSIS REPORT FORM

Company <u>Meridian Oil</u>		Sample No.		Date Sampled <u>10-24-90</u>	
Field <u>Basin Dakota / Kutz Gallup</u>		Legal Description <u>Sec 9, T27N, R11W</u>		County or Parish <u>San Juan</u> State <u>NM</u>	
Lease or Unit		Well <u>Hillside 1</u>	Depth <u>5558</u>	Formation <u>Gallup</u>	Water, B/D
Type of Water (Produced, Supply, etc.) <u>Produced</u>			Sampling Point		Sampled By <u>M. Papp</u>

DISSOLVED SOLIDS

CATIONS	mg/l	me/l
Sodium, Na (calc.)	<u>1398</u>	<u>60.78</u>
Calcium, Ca	<u>33</u>	<u>1.64</u>
Magnesium, Mg	<u>12</u>	<u>.96</u>
Barium, Ba	<u>—</u>	<u>—</u>
Potassium, K ⁺	<u>151</u>	<u>3.86</u>

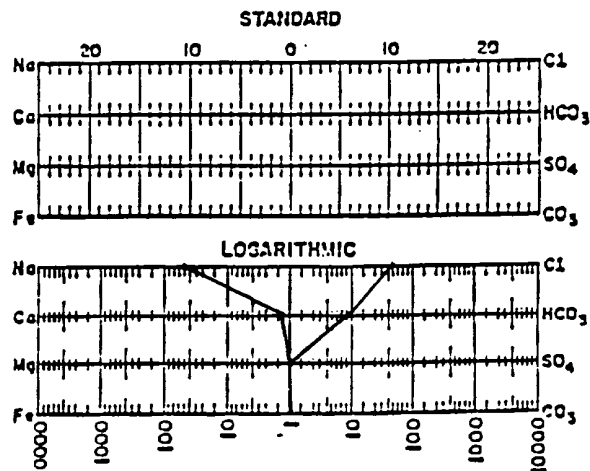
OTHER PROPERTIES

pH	<u>7.10</u>
Specific Gravity, 60/60 F.	<u>1.005</u>
Resistivity (ohm-meters) <u>76 F.</u>	<u>1.49</u>
Total hardness	<u>130</u>

ANIONS

	mg/l	me/l
Chloride, Cl	<u>2058</u>	<u>58.04</u>
Sulfate, SO ₄	<u>0</u>	<u>0</u>
Carbonate, CO ₃	<u>0</u>	<u>0</u>
Bicarbonate, HCO ₃	<u>561</u>	<u>9.20</u>
<u>OH</u>	<u>0</u>	<u>0</u>

WATER PATTERNS — me/l

Total Dissolved Solids (calc.) 4,213Iron, Fe (total) #, # 0,0 ppm
Sulfide, as H₂S neg

REMARKS & RECOMMENDATIONS:

ANALYST: LeeTHE WESTERN COMPANY OF
NORTH AMERICA, FARMINGTON, NM
(505) 327-6222Please refer any questions to: **BRIAN AULT**, District Engineer

Analysis No. 54-03-90
Date 10-26-90

The Western Company

Oil Analysis

Operator <u>Meridian Oil</u>	Date Sampled <u>10-24-90</u>
Well <u>Hillside 1</u>	Date Received <u>10-25-90</u>
Field <u>Kutz Gallup</u>	Submitted By <u>Mike Pippin</u>
Formation <u>Gallup</u>	Worked By <u>Llee</u>
Depth <u>5550'</u>	Sample Description <u>300 ml sample</u>
County <u>San Juan</u>	<u>w/ 17% free H₂O +</u>
State <u>NM</u>	<u>83% brown oil.</u>

API Gravity 34.59° at 60°F
*Paraffin Content 3.95 % by weight
*Asphaltene Content — % by weight
Pour Point 40 °F
Cloud Point >40 °F

Comments:

Unable to determine cloud point due to dark color of sample.

Analyst Llee

*Report calculations and data on back.

Paraffin Content

wt. beaker + sample _____
 - wt. beaker - _____
 (wt. sample) 2.0268 g

wt. Buchner funnel, watch glass, and filter papers 148.07 g

After filtering:

wt. beaker + paraffin residue 98.16
 - wt. beaker (from above) 98.16 g
 (wt. paraffin in beaker) 0

wt. funnel, glass, papers + paraffin residue 148.15
 - wt. funnel, watch glass filter papers from above 148.07 g
 (wt. paraffin in these) .08

Total wt. paraffin:

wt. paraffin in beaker 0
 + wt. paraffin in others .08
 Total paraffin .08 grams

Paraffin content (%) =

$$\frac{.08}{2.0268} \times 100 = \frac{\text{Total paraffin}}{\text{Sample wt.}} = \underline{3.95} \%$$

Asphaltene Content

wt. tube + sample _____
 - wt. tube - _____
 (wt. sample) _____

 wt. tube & residue _____
 - wt. tube - _____
 (wt. residue) _____

Asphaltene content (%)

$$\frac{\text{wt. residue}}{\text{wt. sample}} \times 100 = \underline{\hspace{2cm}}$$

Analysis No. 54-02-90
Date 10-26-90

The Western Company

Oil Analysis

Operator <u>Meridian Oil</u>	Date Sampled <u>10-24-90</u>
Well <u>Hillside 1</u>	Date Received <u>10-25-90</u>
Field <u>Basin DAKOTA</u>	Submitted By <u>Mike Pippin</u>
Formation <u>Dakota</u>	Worked By <u>hee</u>
Depth <u>6550'</u>	Sample Description <u>425 ml sample</u>
County <u>San Juan</u>	<u>w / 4% free H₂O + 96%</u>
State <u>NM</u>	<u>clear yellowish brown oil.</u>

API Gravity 58.02° at 60°F

*Paraffin Content 0 % by weight.

*Asphaltene Content — % by weight

Pour Point 423 °F

Cloud Point 28 °F

Comments:

Analyst hee

*Report calculations and data on back.

Paraffin Content

wt. beaker + sample _____
 - wt. beaker _____
 (wt. sample) 2.013 g

wt. Buchner funnel, watch glass, and filter papers 187.02 g

After filtering:

wt. beaker + paraffin residue 95.68 g
 - wt. beaker (from above) 95.68 g
 (wt. paraffin in beaker) 0

wt. funnel, glass, papers + paraffin residue 187.02 g
 - wt. funnel, watch glass filter papers from above 187.02 g
 (wt. paraffin in these) 0

Total wt. paraffin:

wt. paraffin in beaker 0
 + wt. paraffin in others 0
 Total paraffin 0 grams

Paraffin content (%) =

$$\frac{\text{Total paraffin}}{\text{Sample wt.}} \times 100 = \underline{0} \%$$

Asphaltene Content

wt. tube + sample _____
 - wt. tube _____
 (wt. sample) _____

wt. tube & residue _____
 - wt. tube _____
 (wt. residue) _____

Asphaltene content (%)

$$\frac{\text{wt. residue}}{\text{wt. sample}} \times 100 = \underline{\hspace{2cm}}$$

Analysis No. 54-04-90
Date 10-29-90

The Western Company

Oil Analysis

Operator Meridian Oil Date Sampled 10-24-90
Well Hillside 1 Date Received 10-25-90
Field Kutz Gallup/Basin DAK. Submitted By Mike Pippin
Formation Gallup / Dakota Worked By Lee
Depth 5550' - 6550' Sample Description 50/50 mix
County San Juan of Hillside 1 Gallup oil
State NM + Hillside 1 Dakota oil.

API Gravity 39.94 ° at 60°F

*Paraffin Content 1.94 % by weight

*Asphaltene Content — % by weight

Pour Point <17 °F

Cloud Point >17 °F

Comments:

Unable to determine cloud point due to dark color of sample.

Analyst Lee

*Report calculations and data on back.

Paraffin Content

wt. beaker + sample _____
 - wt. beaker - 98.16
 (wt. sample) 2.0600 g

wt. Buchner funnel, watch glass, and filter papers 187.02

After filtering:

wt. beaker + paraffin residue 98.16
 - wt. beaker (from above) 98.16
 (wt. paraffin in beaker) 0
 wt. funnel, glass, papers + paraffin residue 187.06
 - wt. funnel, watch glass filter papers from above 187.02
 (wt. paraffin in these) .04

Total wt. paraffin:

wt. paraffin in beaker 0
 + wt. paraffin in others .04
 Total paraffin .04 grams

Paraffin content (%) =

$$\frac{.04}{2.0600} \times 100 = \frac{1.94}{\text{Sample wt.}} \%$$

Asphaltene Content

wt. tube + sample _____
 - wt. tube - _____
 (wt. sample) _____
 wt. tube & residue _____
 - wt. tube - _____
 (wt. residue) _____

Asphaltene content (%)

$$\frac{\text{wt. residue}}{\text{wt. sample}} \times 100 = \underline{\hspace{2cm}}$$

ANALYSIS #
DATE: 10-29-90

water
Fig. 1
OIL-EMULSION TESTS DATA SHEET

OPERATOR: Meridian Oil
WELL: Hillside 1
FIELD: Basin Dakota/Kutz Gallup
FORMATION: Gallup/Dakota
DEPTH: 5550 - 6550'
COUNTY: San Juan

SUBMITTED BY: Mike Pippin
SOURCE OF SAMPLE: Produced
DATE SAMPLED: 10-24-90
DATE RECEIVED: 10-25-90
API GRAVITY OF OIL: 39.9

TYPE & CONC. OF FLUID: 50/50 mix of Gallup/
Dakota Fluids
~~TYPE & CONC. OF EMULSION:~~ Hillside 1 oil and
~~TYPE & CONC. OF SOLIDS:~~ water
TEST TEMPERATURE: 78°F
~~OIL/TREATMENT FLUID RATIO:~~
ANALYSIS BY: Lee

water
PERCENTAGE OF ORIGINAL ~~AGE~~ SEPARATED AT VARIOUS TIME INTERVALS AFTER EMULSIFYING

Test Number	1															
Additives & Concentration, Gal/1000 Gal	25ml 6 H ₂ O 25 ml D H ₂ O 25 ml 6 oil 25 ml 8 oil															
Elapsed Time	Time	Vol	Time	Vol	Time	Vol	Time	Vol	Time	Vol	Time	Vol	Time	Vol	Time	Vol
1 min	1	50	2		3		4		5		6		7		8	
2	2		3		4		5		6		7		8		9	
3	3		4		5		6		7		8		9		10	
4	4		5		6		7		8		9		10		11	
5	5		6		7		8		9		10		11		12	
6	6		7		8		9		10		11		12		13	
7	7		8		9		10		11		12		13		14	
8	8		9		10		11		12		13		14		15	
9	9		10		11		12		13		14		15		16	
10	10		11		12		13		14		15		16		17	
20	20		21		22		23		24		25		26		27	
30	30		31		32		33		34		35		36		37	
Total Vol (ml)	50															
Vol. Emulsion / Sludge	0															
Solids*	—															
Interface**	—															
Vol. Sediment	—															

REMARKS:

* Preferential wetting of solids: OB=oil-wet bottom; OO=oil-wet oil phase; WB=water-wet bottom; WO=water-wet oil phase
OI=oil-wet interface; WI=water-wet interface
** Interface: F=Fluid; S=Solid; V=Viscous

25 ml Hillside 1 Gallup oil + 25 ml Hillside 1 Dakota oil + 25 ml Hillside 1 Gallup water + 25 ml Hillside 1 Dakota water.

* 50 ml of the 50 ml water separated in 1 minute @ 78°F.
Approximately 2 ml of the 50 ml oil adhered to the side of glass in the water phase.

1. The first part of the document is a list of names and addresses of the members of the committee.

2. The second part of the document is a list of names and addresses of the members of the committee.