MERIDIAN OIL

OIL CONSERVATION DIVISION
RECEIVED
91 APR 26 AM 9 28

April 16, 1991

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

Re: Thompson #9 MV/DK
900' FSL; 920' FWL
Section 28, T31N, R12W
San Juan County, New Mexico

Dear Mr. LeMay:

Meridian Oil Inc. is applying for an administrative downhole commingling order for the referenced well in the Blanco Mesaverde and Basin Dakota fields. The ownership of the zones to be commingled is common. The offset operator to the northwest, west, and southwest is Amoco Production Company with Meridian Oil Inc. having the remaining acreage surrounding the referenced well. The Bureau of Land Management and this offset operator will receive notification of this proposed downhole commingling.

A packer leakage test conducted in October, 1990 indicated that the two producing intervals in the subject well have communicated by either a tubing or packer leak.

This well has produced since 1966 as a dual well from the Mesaverde and Dakota. The well is presently not a good producer due to poor producing efficiency. It has a present producing capacity of only 28 MCF/D and 9 MCF/D, respectively, and both sides are listed as "marginal" in the State Proration Schedule. The cumulative production is 554 MMCF and 2577 BO from the Mesaverde and 210 MMCF and 6204 BO from the Dakota, as of December 31, 1990.

The Dakota production is currently being suppressed due to the presence of the well's production packer which limits the Dakota's ability to unload liquid with its small amount of gas volume.

We believe that the Mesaverde has the potential to produce 40 MCF/D and 1 BOPD. However, like the Dakota, the Mesaverde does not make sufficient gas to lift the produced liquid. This has resulted in the Mesaverde not producing to its full potential. The commingling of the subject well in the twilight of its producing life will result in better producing efficiency for both intervals. We believe that the combined gas volume will be sufficient to lift the produced liquids in the near future. A possible future artificial lift system such as a plunger will be much more efficient with the intervals commingled. Granting this application will be in the best interest of conservation, the prevention of waste, and the protection of correlative rights.

Meridian Oil Inc., 3535 East 30th St., P.O. Box 4289, Farmington, New Mexico 87499, Telephone 505-327-0251

Commingling should greatly enhance this well's producing life and its reserves from both producing intervals. We plan to commingle this well by pulling the tubing and packer seal assembly. The permanent packer will be extracted and a 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. The daily production will not exceed the limit of Rule 303c, Section 1a, Part 1. The shut-in pressures for the Mesaverde and Dakota are 584 psi and 949 psi, respectively. The Dakota and Mesaverde produce negligible amounts of water.

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

Using the well's production from 1977 and 1978, which was before the fluid loading problems developed in either producing interval and before the tubing or packer leak developed, we propose the following production allocation. See the attached calculations.

Mesaverde gas	67%	Dakota gas	33%
Mesaverde oil	43%	Dakota oil	57%

Included with this letter is a plat showing ownership of offsetting leases, a copy of the letter to the offset operator and BLM, production curves, wellbore diagrams both before and after commingling, pertinent data sheet, allocation calculation sheets, as well as a detailed fluids compatibility analysis.

Yours truly,

George T. Dunn
Regional Production Engineer

SHL:tt

attachments

cc: Frank T. Chavez/NMOCD

MERIDIAN OIL

Commingle Application for Mesaverde/Dakota

Thompson #9 MV/DK
Unit M, Section 28, T31N, R12W
San Juan County, New Mexico

Allocation Calculation

Mesaverde Production (before fluid loading and packer leak)

53 MCF/D 0.30 BOPD

Dakota Production (before fluid loading and packer leak)

26 MCF/D 0.39 BOPD

TOTAL: 79 MCF/D 0.69 BOPD

Mesaverde Gas Allocation = $\frac{53}{79}$ = 67%

Mesaverde Oil Allocation = $\frac{0.30}{0.69}$ = 43%

Dakota Gas Allocation = $\frac{26}{79}$ = 33%

Dakota Oil Allocation = $\frac{0.39}{0.69}$ = 57%

MERIDIAN OIL

April 17, 1991

Amoco Production Company
Attn: Mr. Larry Emmons
P.O. Box 800
Denver, Colorado 80201

Dear Mr. Emmons:

Meridian Oil Inc. is in the process of applying for a downhole commingling order for their Thompson #9 MV/DK well located 900' FSL, 920' FWL, Section 28, T31N, R12W, N.M.P.M., San Juan County, New Mexico, in the Blanco Mesaverde 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 this letter and returning it to our office.

Your prompt attention to this matter would be appreciated.

Yours truly,

George T. Dunn
Regional Production Engineer

The above downhole commingling request is hereby approved:

_____

Date: _____

Meridian Oil Inc., 3535 East 30th St., P.O. Box 4289, Farmington, New Mexico 87499, Telephone 505-327-0251

MERIDIAN OIL

April 17, 1991

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

Gentlemen:

Meridian Oil Inc. is in the process of applying for a downhole commingling order for their Thompson #9 MV/DK well located 900' FSL, 920' FWL, Section 28, T31N, R12W, N.M.P.M., San Juan County, New Mexico, in the Blanco Mesaverde 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 this letter and returning it to our office.

Your prompt attention to this matter would be appreciated.

Yours truly,

George T. Dunn
Regional Production Engineer

The above downhole commingling request is hereby approved:

_____

Date: _____

Meridian Oil Inc., 3535 East 30th St., P.O. Box 4289, Farmington, New Mexico 87499, Telephone 505-327-0251

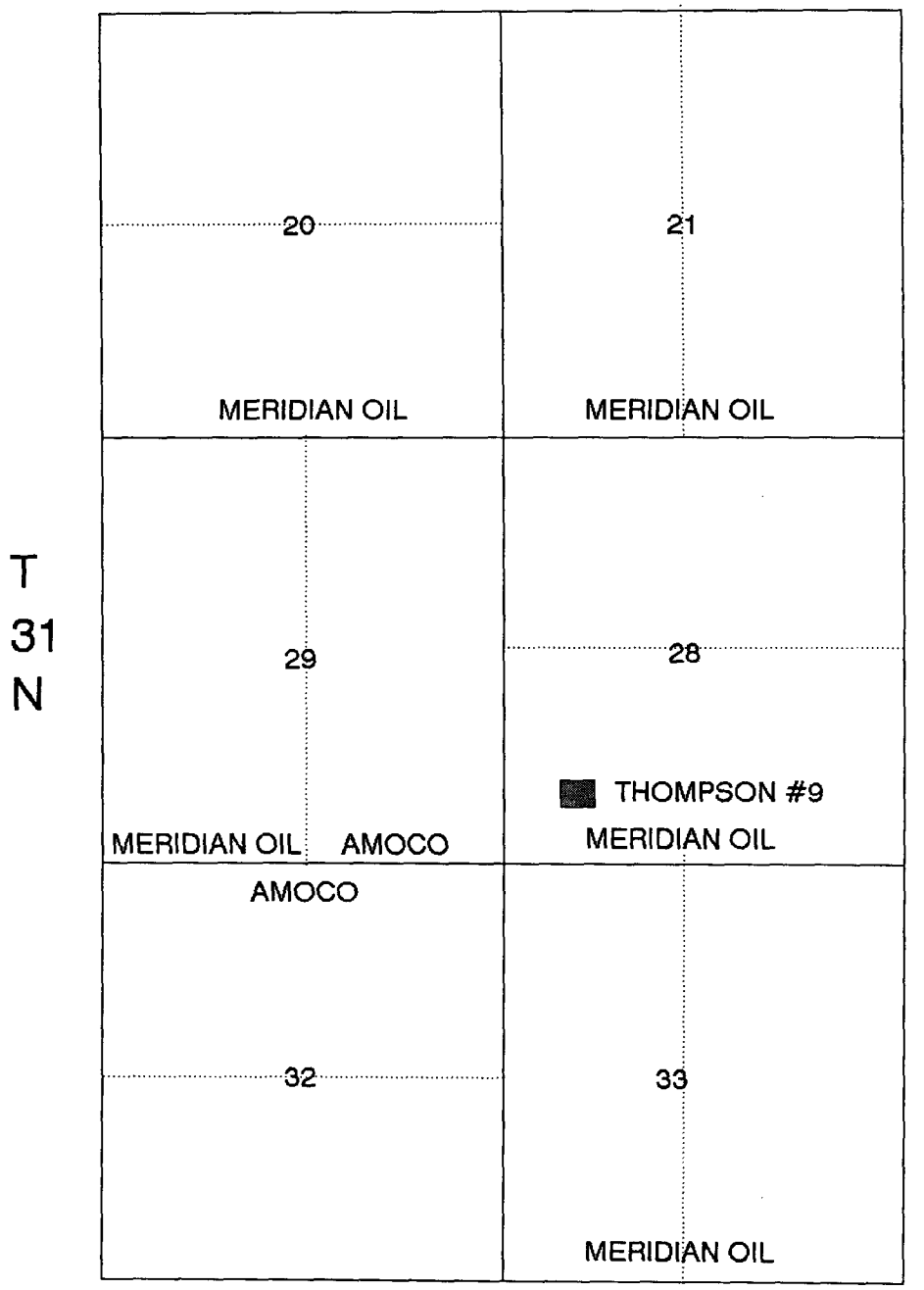
MERIDIAN OIL

COMMINGLE APPLICATION FOR MV/DK

THOMPSON #9 MV/DK

SAN JUAN COUNTY, NEW MEXICO

DAKOTA PRORATION UNIT



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R-12-W

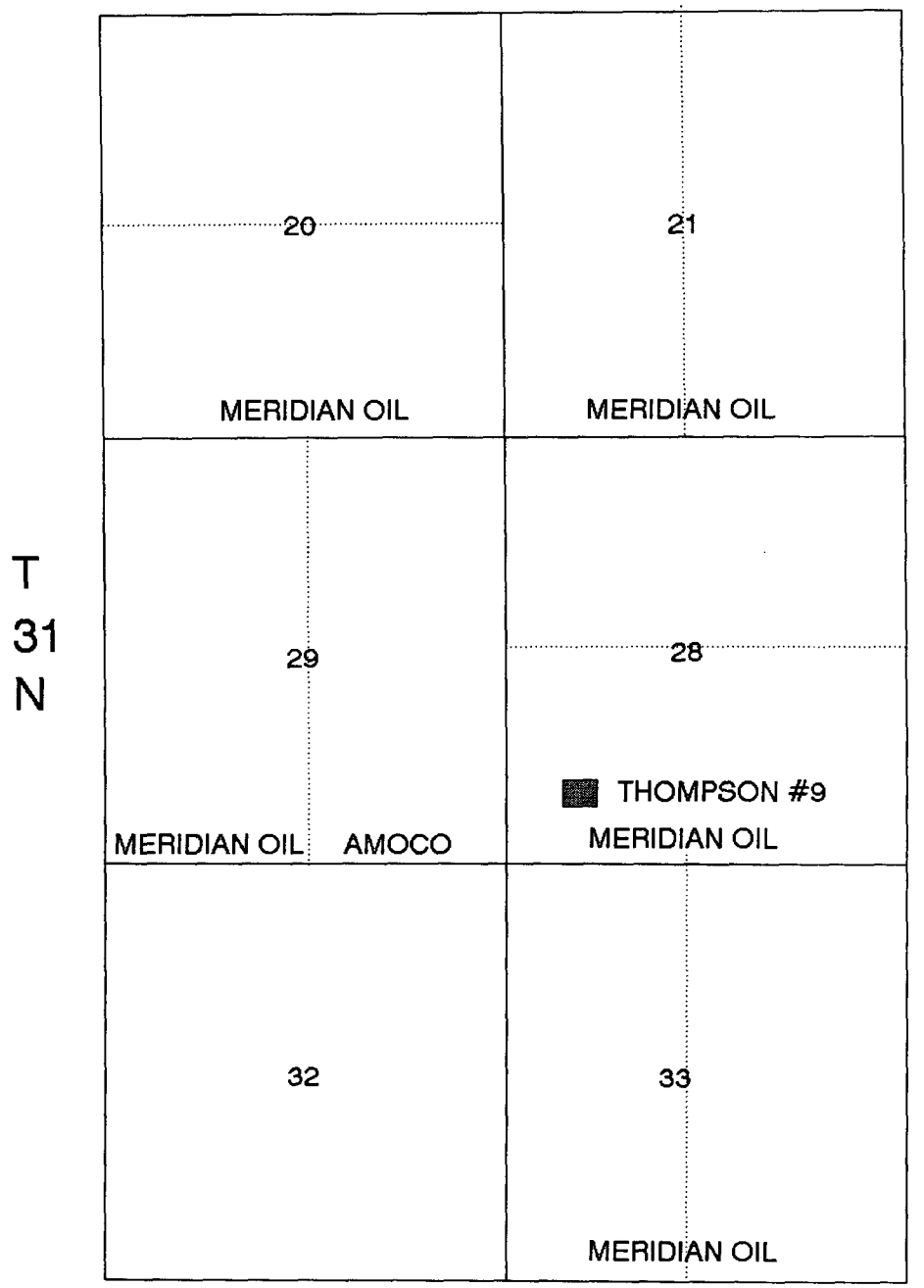
MERIDIAN OIL

COMMINGLE APPLICATION FOR MV/DK

THOMPSON #9 MV/DK

SAN JUAN COUNTY, NEW MEXICO

MESAVERDE PRORATION UNIT



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R-12-W

Pertinent Data Sheet - Thompson #9

Location: 990'FSL, 920'FWL, SEC.28 T31N-R12W San Juan County, New Mexico

Field: Blanco Mesaverde
Basin Dakota

Elevation: 6131'GR **TD:** 7196'
PBTD: 7145'

Completed: 5/3/66 **Initial Potential:** MV:1861 MCFGD CAOF
DK:1931 MCFGD CAOF

Casing Record:

Hole Size	Csg. Size	Wt. & Grade	Depth Set	Top/Cement
12.250"	8.625"	24.0# K-55	308'	SURFACE (Circ.)
7.875"	5.500"	15.0# J-55	7187'	3 STAGE (870 sx.) TOC 1470' (Calc.)

Tubing Record: 215 joints 1-1/2" 2.9# NU IJ tubing set @ 6920'. No grade available. Baker Model D packer set @ 6920'.

Formation Tops:

Pic. Cliffs	2455'
Cliff House	4022'
Pt. Lookout	4821'
Gallup	6098'
Dakota	7010'

Logging Record: ES, IND

Stimulation: DK: Perfed 7012-7150'. Fraced w/60,000# 20/40 and 39,000# 10/20 sand in 2586 bbls slickwater.
MV: Perfed 4822-5015'. Fraced w/60,000# 20/40 and 40,000# 10/20 sand in 2533 bbls slickwater.

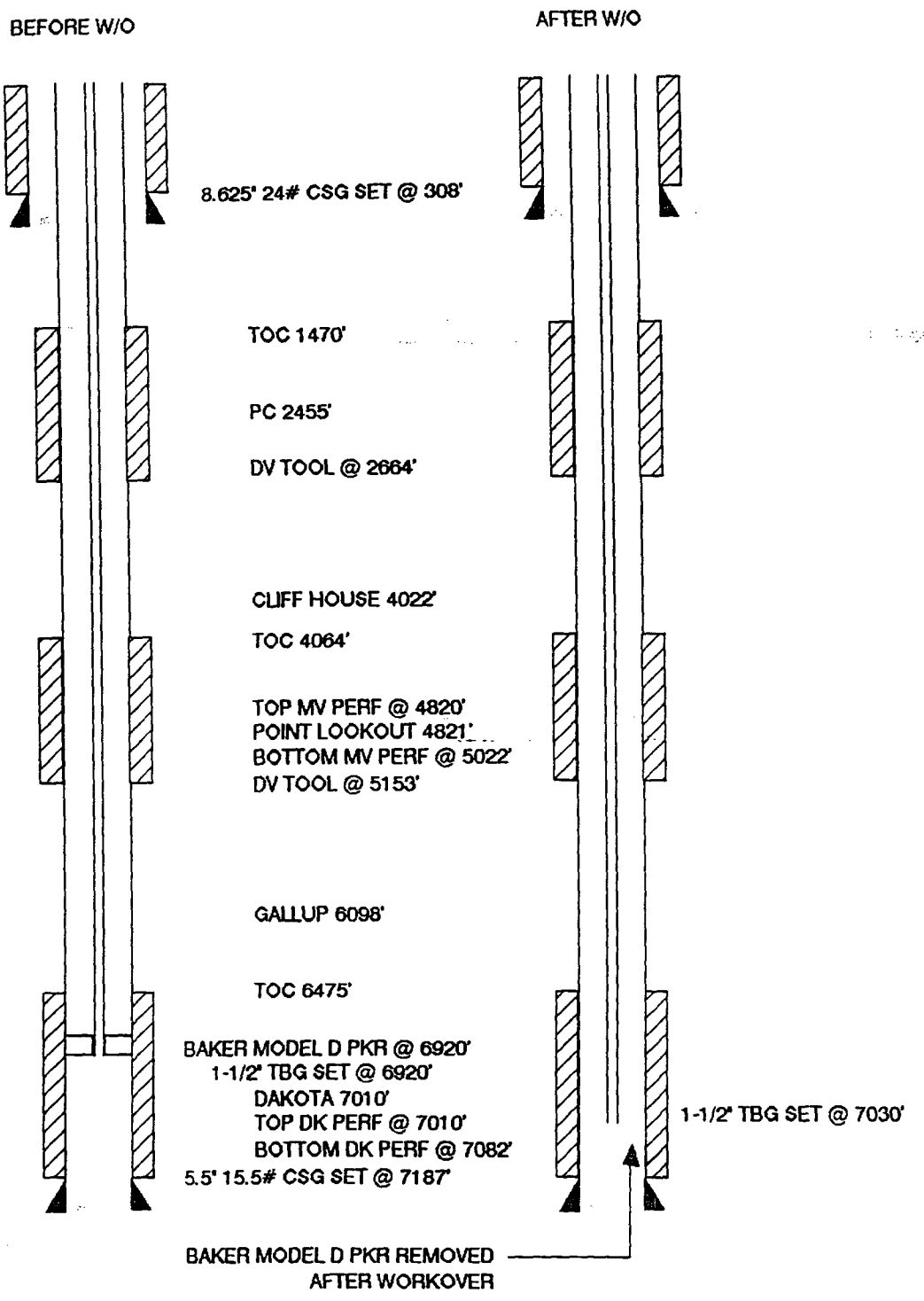
Workover History: 7/11/68: TOOH w/tbg. Set 5-1/2" pkr @ 6774'. Squeezed DK perfs (7012-7150') with 100 sx cmt. CO to 7145'. Perfed DK 7125-40'w/2 SPF. Sand-water fraced DK with 37,530 gal. water and 40,000# 20/40 sand. Squeezed 7125-40' with 50 sx cmt. CO to 7102'. Perfed DK 7010-7082' w/2 SPF. Sand-water fraced DK with 47,790 gal. water and 45,000# sand. Set BP @ 6910'. Reperfed MV 4820'-5022' w/2 SPF. Refraced MV with 45,700 gal. water and 57,000# sand. Set Baker Model D production packer @ 6920'. Baker sliding sleeve @ 6888'. Ran 215 joints 1-1/2" tbg. set @ 6920'.

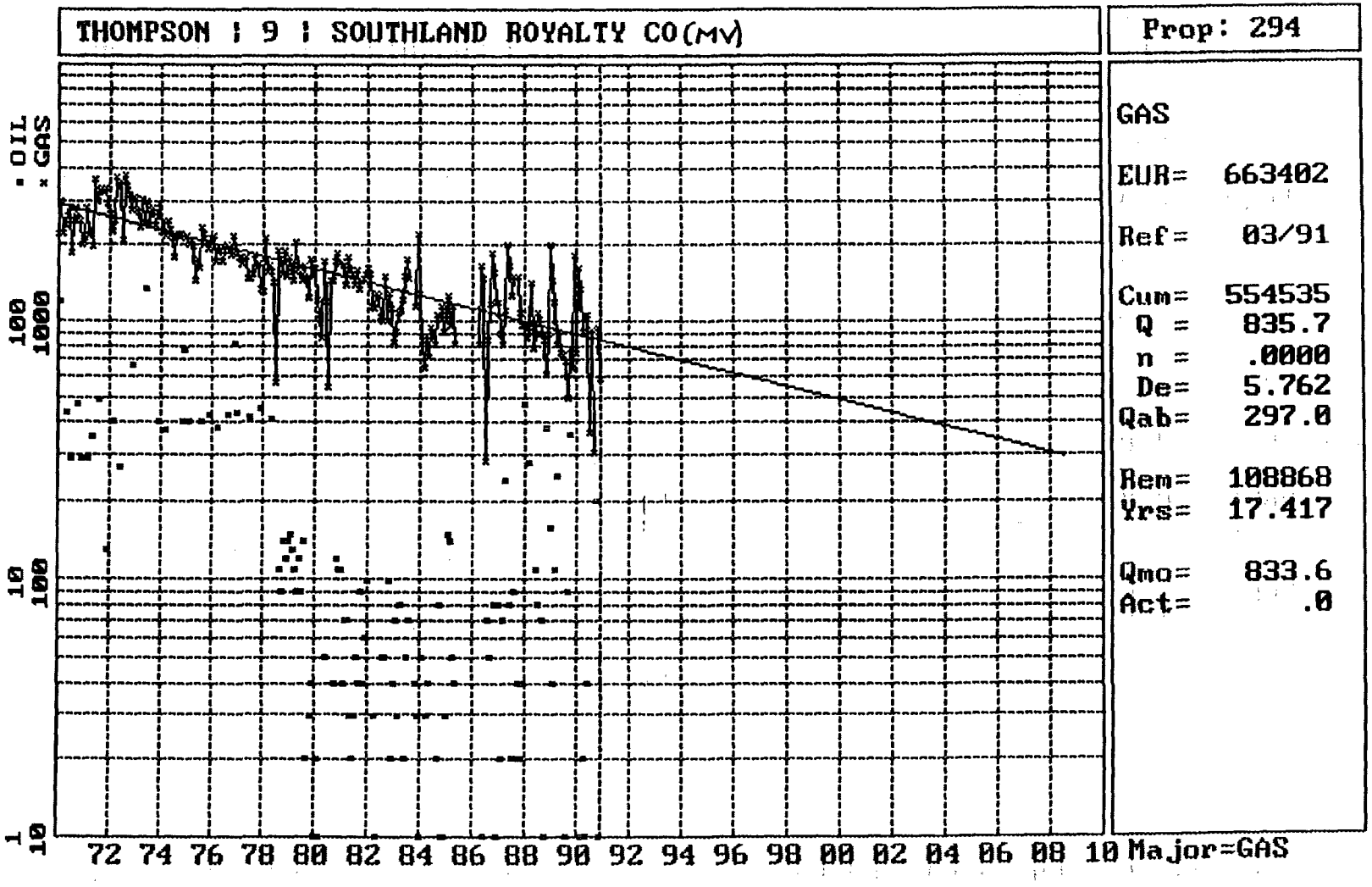
Production History: Cumulative production MV: 554 MMCFG 2577 BO
DK: 210 MMCFG 6204 BO

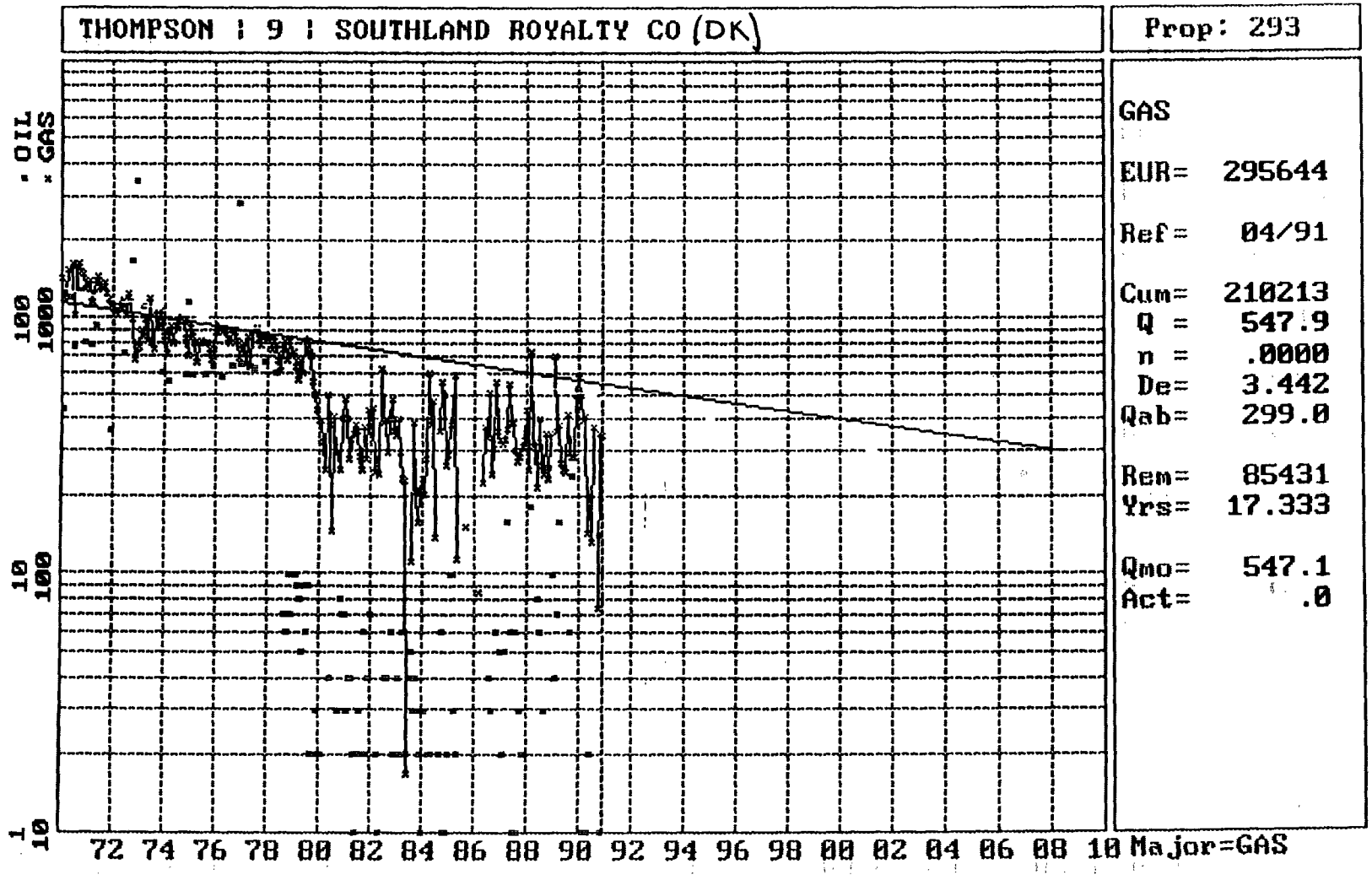
Transporter: Sunterra

THOMPSON #9

WELLBORE DIAGRAMS




THOMPSON ¦ 9 ¦ SOUTHLAND ROYALTY CO(MV)
Prop: 294
GAS
EUR= 663402
Ref= 03/91
Cum= 554535
Q = 835.7
n = .0000
De= 5.762
Qab= 297.0
Rem= 108868
Yrs= 17.417
Qmo= 833.6
Act= .0
OIL
GAS
1000
100
100
10
10
1
72 74 76 78 80 82 84 86 88 90 92 94 96 98 00 02 04 06 08 10
Major=GAS


THOMPSON | 9 | SOUTHLAND ROYALTY CO (DK)
Prop: 293
GAS
EUR= 295644
Ref= 04/91
Cum= 210213
Q = 547.9
n = .0000
De= 3.442
Qab= 299.0
Rem= 85431
Yrs= 17.333
Qmo= 547.1
Act= .0
Major=GAS
. OIL
* GAS
1000
100
100
10
10
1
72 74 76 78 80 82 84 86 88 90 92 94 96 98 00 02 04 06 08 10

MERIDIAN OIL
THOMPSON #9 - MESA VERDE
THOMPSON #9 - DAKOTA
LEASE FLUIDS

LABORATORY INVESTIGATION

OF

THOMPSON #9 MESA VERDE AND DAKOTA FLUIDS COMPATABILITY

APRIL 3, 1991

PREPARED FOR:

MERIDIAN OIL, INC
SCOTT LINDSAY
PRODUCTION ENGINEER

PREPARED BY:

BRIAN P. AULT
PETROLEUM ENGINEER
WESTERN COMPANY OF
NORTH AMERICA

SERVICE POINT
FARMINGTON, NEW MEXICO
505-327-6222

MERIDIAN OIL
THOMPSON #9 - MESA VERDE
THOMPSON #9 - DAKOTA
LEASE FLUIDS

SUMMARY OF RESULTS

1. No precipitation of materials was observed from either admixture of fluids.

2. Emulsion testing was performed. There should be no concern over the formation of a stabilized emulsion at well bore temperatures.

3. The cloud point of oil mixtures dropped upon mixing of fluids.

4. According to calculations not enough cool down from gas expansion will occur to alter paraffin deposition significantly.

MERIDIAN OIL
THOMPSON #9 - MESA VERDE
THOMPSON #9 - DAKOTA
LEASE FLUIDS

On Friday, March 21, 1991, a request for laboratory work was placed by Scott Lindsay, Production Engineer of Meridian Oil, Inc.

PURPOSE

Two oil samples were received of Mr. Lindsay with the request we investigate the concern of potentially detrimental effects due to commingling of Mesa Verde and Dakota fluids.

INVESTIGATION

1. Background information

   a. BHST Gradient: 1.375° F/100 ft.

   b. Current production problems are primarily due to paraffin deposition from surface down to more/less 1000' depth.

   c. Commingling Order Mixture Requirements:

      The commingling requests present the mixing of Thompson # 9 Mesa Verde fluids with Thompson #9 Dakota 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. 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.

2. Concerns to address in analysis:

   a. The precipitation of materials produced by the admixture of oils of potentially different constitution.

   b. Increased paraffin deposition by additive properties of oils.

   c. 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. Lindsay 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.

MERIDIAN OIL
THOMPSON #9 - MESA VERDE
THOMPSON #9 - DAKOTA
LEASE FLUIDS

DATA

SAMPLE #1 - THOMPSON #9

ZONE	MESA VERDE
API GRAVITY @ 60° F	64.8°
CLOUD POINT	16°F
POUR POINT	<10°F
PARAFFIN CONTENT	0.03%

SAMPLE #2 - THOMPSON #9

ZONE	DAKOTA
API GRAVITY @ 60° F	62.8°
CLOUD POINT	62°F
POUR POINT	<10°F
PARAFFIN CONTENT	0.10%

SAMPLE #3 50:50 MIX OF THOMPSON #9 FLUIDS

ZONE	50:50 MIX MV/DK
API GRAVITY @ 60° F	62.6°
CLOUD POINT	58°F
POUR POINT	<10°F
PARAFFIN CONTENT	0.06%

CALCULATIONS

Cool down effects due to gas expansion:

Reference: Perry's Handbook of Chemical Engineering

RE : Adiabatic Expansion of Ethane, Methane

$T_s + T_r (P_s/P_r) (K-1/K)$, where

T_s = Surface Temperature

T_r = Reservoir Temperature

P_s = Surface Pressure

P_r = Reservoir Pressure

K = Specific Heat at constant pressure/Specific heat at constant volume

Assumed values for maximum cool down due to gas expansion:

T_s = Unknown

T_r = 140°F

P_s = 500 psi

P_r = 1500 psi

K = 1.2

T_s = 140 (500/1500) 0.1667

T_s = 117°F

NOTE:

A total cooldown of 23°F would be expected

* These calculations are approximate due to the limited information on the well bore being studied.

Date 03-27-91

#91-10-91

Rocky Mountain Region

THE WESTERN COMPANY

Oil Analysis

Operator Meridian Oil Inc.
Well Thompson #9
Field S28 T31N R12W
Formation Mesa Verde
Depth
County
State

Date Sampled 03-21-91
Date Received 03-22-91
Submitted By
Worked By LLee
Sample Description 500mL clear oil ; no free H_2O

API Gravity 64.8 ° at 60°F
Paraffin Content .03 % by weight
Asphaltene Content — % by weight
Pour Point <10 °F
Cloud Point 16 °F

Comments:

Analyst LLee

Paraffin Content

wt. beaker + sample _____
- wt. beaker - 81.407 g
(wt. sample) 3.168 g

wt. Buchner funnel, watch glass, and filter papers 105.835 g

After filtering:

wt. beaker + paraffin residue 81.407 g
- wt. beaker (from above) 81.407 g
(wt. paraffin in beaker) 0

wt. funnel, glass, papers + paraffin residue 105.836 g
- wt. funnel, watch glass filter papers from above 105.835 g
(wt. paraffin in these) .001 g

Total wt. paraffin:

wt. paraffin in beaker 0
+ wt. paraffin in others .001
Total paraffin .001 grams

Paraffin content (%) =

$\frac{.001\ g}{3.168\ g}$ $\frac{\text{Total paraffin}}{\text{Sample wt.}}$ X 100 = .03 %

Asphaltene Content

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

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

Asphaltene content (%)

$\frac{\text{wt. residue}}{\text{wt. sample}}$ X 100 = _____

Specific Granty = $\frac{7.143}{9.984}$ @ 72°F = .7154

°API @ 72°F:

$\frac{141.5}{S.G.} - 131.5 = 66.29$ °API @ 72°F

Temperature correction: 60°API

66.29 − 1.526 = 64.764
or 64.8 °API
@ 60°F

Date 03-26-91

#91-09-91

Rocky Mountain Region

THE WESTERN COMPANY

Oil Analysis

Operator Meridian Oil Inc.

Well Thompson #9

Field S28 T31N R12W

Formation Dakota

Depth

County

State

Date Sampled 03-21-91

Date Received 03-22-91

Submitted By

Worked By LLee

Sample Description 500 ml clear oil ; no free H_2O

API Gravity 62.8 ° at 60°F

Paraffin Content .10 % by weight

Asphaltene Content — % by weight

Pour Point <10 °F

Cloud Point 62 °F

Comments:

Analyst LLee

P.O. Drawer 360 • Farmington, N.M. 87499

Paraffin Content

wt. beaker + sample _____
- wt. beaker -76.164 g
(wt. sample) 3.111 g

wt. Buchner funnel, watch glass, and filter papers 144.902g

After filtering:

wt. beaker + paraffin residue 76.164 g
- wt. beaker (from above) 76.164 g
(wt. paraffin in beaker) 0

wt. funnel, glass, papers + paraffin residue 144.905 g
- wt. funnel, watch glass filter papers from above 144.902 g
(wt. paraffin in these) .003 g

Total wt. paraffin:

wt. paraffin in beaker 0
+ wt. paraffin in others .003
Total paraffin .003 grams

.003 / 3.111 Paraffin content (%) = $\frac{\text{Total paraffin}}{\text{Sample wt.}} \times 100 =$ .10 %

Asphaltene Content

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

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

Asphaltene content (%)
$\frac{\text{wt. residue}}{\text{wt. sample}} \times 100 =$ _____

Specific Gravity = $\frac{7.207}{9.984}$ @ 74°F = .7219

°API @ 74°F:

$\frac{141.5}{5.6.} - 131.5 =$ 64.51 °API @ 74°F

Temperature Correction: 60°API

64.51 - 1.735 = 62.775

or 62.8 °API @ 60°F

Date 03-28-91
51-11-91

Rocky Mountain Region

THE WESTERN COMPANY

Oil Analysis

Operator Meridian Oil Inc.
Well Thompson #9
Field S28 T31N R12W
Formation Mesa Verde / Dakota
Depth
County
State

Date Sampled 03-21-91
Date Received 03-22-91
Submitted By
Worked By LLee
Sample Description 1:1 mix of Thompson #9 Mesa Verde Oil and Thompson #9 Dakota Oil.

API Gravity 62.6 ° at 60°F
Paraffin Content .06 % by weight
Asphaltene Content — % by weight
Pour Point <10 °F
Cloud Point 58 °F

Comments:

Analyst LLee

P.O. Drawer 360 • Farmington, N.M. 87499

Paraffin Content

wt. beaker + sample _____
- wt. beaker - 95.680 g
(wt. sample) 3.117 g

wt. Buchner funnel, watch glass, and filter papers 105.702 g

After filtering:

wt. beaker + paraffin residue 95.680 g
- wt. beaker (from above) 95.680 g
(wt. paraffin in beaker) 0

wt. funnel, glass, papers + paraffin residue 105.704 g
- wt. funnel, watch glass filter papers from above 105.702 g
(wt. paraffin in these) .002 g

Total wt. paraffin:

wt. paraffin in beaker 0
+ wt. paraffin in others .002 g
Total paraffin .002 grams

Paraffin content (%) =

$\frac{.002\ g}{3.117\ g}$ $\frac{\text{Total paraffin}}{\text{Sample wt.}}$ X 100 = .06 %

Asphaltene Content

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

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

Asphaltene content (%)

$\frac{\text{wt. residue}}{\text{wt. sample}}$ X 100 = _____

Specific Gravity $\frac{7.207}{9.984}$ @ 76°F = .7219

°API @ 76°F:

$\frac{141.5}{S.G.} - 131.5 = 64.51$ °API @ 76°F

Temperature Correction: 60°API

64.51 − 1.935 = 62.575

or 62.6 °API @ 60°F

STATE OF NEW MEXICO
ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
AZTEC DISTRICT OFFICE

OIL CONSERVATION DIVISION
RECEIVED
'91 MAY 3 AM 9 18

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

Date: 5/1/91

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

RE: Proposed MC_____ Proposed DHC X
Proposed NSL_____ Proposed SWD_____
Proposed WFX_____ Proposed PMX_____
Proposed NSP_____ Proposed DD_____

Gentlemen:

I have examined the application received on April 26, 1991
for the Meridian Oil Inc. (OPERATOR) Thompson #9 (LEASE & WELL NO.)
M-28-31N-12W (UL-S-T-R) and my recommendations are as follows:

Approve

Yours truly,

BJS