

**MERIDIAN OIL**

OIL CONSERVATION DIVISION  
RECEIVED

October 23, 1995

10/23/95 8:52 AM

DHC 11-14-95  
1169

New Mexico Oil Conservation Division  
Attn: Mr. Bill Lemay  
2040 South Pacheco Street  
Santa Fe, New Mexico 87505

**RE: Harrington # 9**  
Unit J, Sec 31, T27N, R07W  
Downhole Commingle Application  
Basin Dakota / Largo Gallup Pools  
and Blanco Mesaverde / Otero Chacra Pools

Dear Mr. Lemay,

Meridian Oil Inc. requests administrative downhole commingle approval for several formations in the subject wellbore. This new well was spud October 20, 1995. Approval is sought to downhole commingle the Basin Dakota Pool and the Largo Gallup Pool consequently produced together. In addition, within the same wellbore, approval is sought to downhole commingle the Blanco Mesaverde Pool and the Otero Chacra Pool to be produced together. Meridian Oil believes this production configuration will maximize the production rates and ultimate recoveries from all pools. Interest in each of the subject pools in the proposed wellbore is common. This wellbore could be titled a "Dual-Downhole Commingle.

Each of the referenced pools is marginally economic for development upon a stand alone basis, Meridian Oil feels that combining several marginally economic opportunities within the same wellbore economic risk will be minimized and all interest owners will receive benefit.

The Basin Dakota Pool is undeveloped in the East half of section 31, as well as being undeveloped to the east in section 32. Reservoir stratigraphy of the Dakota is often complex with four (4) sandstone members prospective on the subject well location similar to that of the Miles Federal 6 # 32 located in the NE of section 06, T26N, R07W. Reserve estimation based upon engineering analysis indicates an ultimate gross recovery of 720 MMCFE in the Dakota at an initial production sales rate of 200 MCFD. An initial bottom hole reservoir pressure of 2295 psi is expected based upon a surface pressure of 2100 psi + (6500' \* .03 psi/ft).

The Largo Gallup Pool is also undeveloped on this lease. The Tocito member of the Gallup interval is the primary target with up to 12' of productive sand predicted. Reserve analysis of Gallup wells exhibiting similar sand indicate ultimate recovery of 375 MMCFE at an initial production sales rate of 120 MCFD. An initial bottom hole reservoir pressure of 1420 psi is expected based upon a surface pressure of 1300 psi + (6030' \* .02 psi/ft).

The Blanco Mesaverde Pool is developed in two additional wellbores on the subject lease, the Harrington # 6 (SW/4) and Harrington # 7 (NE/4). Mesaverde reserve estimates based upon analysis of seventeen (17) offset producers indicate potential of 775 MMCFE ultimate recovery at an initial rate of 250 MCFD. Only the Pt. Lookout sandstone member is productive in the area, while the Menefee and Cliffhouse intervals are deemed water productive. An initial bottom hole reservoir pressure of 1090 psi is expected based upon a surface pressure of 1000 psi + (4480' \* .02 psi/ft).

The Otero Chacra Pool, also undeveloped on the subject lease, is marginally prospective. Statistical averaging of nearby productive wellbores indicate potential of 494 MMCFE at an initial productive rate of 380 MCFD. An initial bottom hole reservoir pressure of 1062 psi is expected based upon a surface pressure of 1000 psi + (3100' \* .02 psi/ft).

Produced fluid characteristics in both the Basin Dakota and Largo Gallup pools should not result in formation of precipitates or hinder production in any manner. A produced water and produced oil sample will be obtained from each horizon during completion operations. Blanco Mesaverde and Otero Chacra pool produced fluid characteristics should likewise not cause any adverse production concerns.

Reservoir pressure similarity should minimize cross flow and ensure effective isolation among all commingled zones. The wellbore configuration will include a longstring of 5-1/2" casing cemented from total depth (6900') to surface in three stages. Two 1-1/2" tubing strings and a Model 'D' type permanent production packer will be utilized for production. Two (2) complete and separate surface facility installations will be located on the wellsite with oil production sold to Giant Transportation and gas production sold to El Paso Natural Gas.

Downhole commingle of multiple pools has been performed to the Northeast in the UNOCAL operated Rincon Unit (DHC-9893) T27N-R06W & R07W, and to the Southeast via multiple division orders in the Caulkins operated Caulkins Breech leases and the Meridian Oil operated Klein/Vaughn leasehold (DHC-10239) all in T26N-R06W.

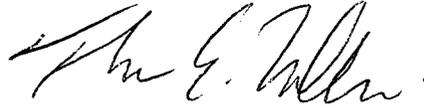
Conoco Inc., operator of the San Juan 28-7 Unit located to the North of the subject lease, has recently filed for unit wide downhole commingle approval.

Given the lower gas price environment and existence of multiple marginally economic stand-alone zones; A downhole commingle order allowing the Basin Dakota Pool and Largo Gallup Pool in conjunction with the Blanco Mesaverde Pool and the Otero Chacra Pool to be produced up a single wellbore, "Dual-Downhole Commingle", is the only economic alternative for full development of Harrington lease reserves per the Harrington # 9.

Harrington # 9 10-23-95  
Downhole Commingle Application  
page 2

Attached are some production plots detailed with reserve information and 9-section study plats in conjunction with the required offset operator plats. The actual wellbore diagram and production tubular configuration will be submitted after completion. Should you have any questions or concerns, please contact me by phone at (505) 326-9546.

Sincerely,



Thomas E. Mullins  
Reservoir Engineer

TEM

cc: Wellfile  
Peggy Bradfield  
Allan Alexander  
Bureau of Land Management

October 23, 1995

Amoco Production Company  
PO Box 800  
Denver, CO 80201

**RE: Harrington # 9**  
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Basin Dakota / Largo Gallup Pools  
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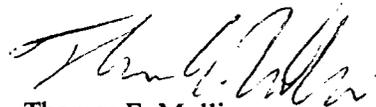
To Whom it May Concern:

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Each of the referenced pools is marginally economic for development upon a stand alone basis, Meridian Oil feels that combining several marginally economic opportunities within the same wellbore economic risk will be minimized and all interest owners will receive benefit. The purpose of this letter is to notify of such action. We would appreciate your signing this letter and returning it to this office indicating you have been notified.

Should you have concerns or questions regarding this commingle application, please contact me at (505) 326-9546.

Sincerely,



Thomas E. Mullins  
Reservoir Engineer

TEM:dlc

The addressee has been notified of this downhole commingling request:

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

October 23, 1995

Louis Dreyfus Gas Holdings Inc.  
400 Quail Springs Parkway, Suite 600  
Oklahoma City, OK 73134

**RE: Harrington # 9**  
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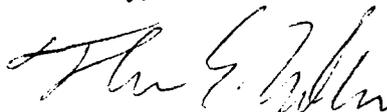
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Thomas E. Mullins  
Reservoir Engineer

TEM:dlc

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

October 23, 1995

Helen Harvey Hedrick  
c/o Nayland F. Smith  
3508 McNeil, Suite A  
Wichita Falls, TX 76308

**RE: Harrington # 9**  
Unit J, Sec 31, T27N, R07W  
Downhole Commingle Application  
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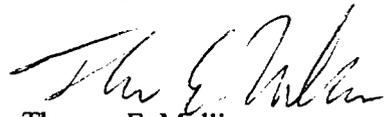
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Sincerely,



Thomas E. Mullins  
Reservoir Engineer

TEM:dlc

The addressee has been notified of this downhole commingling request:

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

October 23, 1995

Lively Exploration Company  
1300 Post Oak Blvd., Suite 1900  
Houston, TX 77056

**RE: Harrington # 9**  
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Thomas E. Mullins  
Reservoir Engineer

TEM:dlc

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

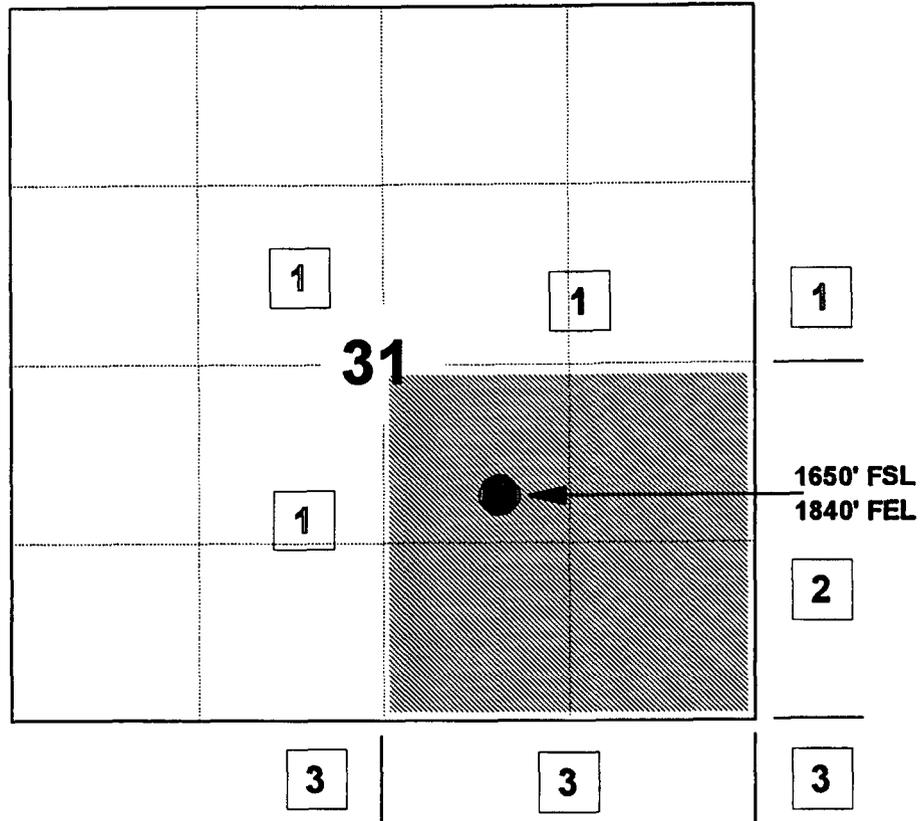
# MERIDIAN OIL INC

## HARRINGTON #9

### OFFSET OPERATOR \ OWNER PLAT

Mesaverde / Chacra Formations Commingle Well

Township 27 North, Range 7 West



✓1) Meridian Oil Inc.

✓2) Meridian Oil Inc &

✓ Helen Harvey Hedrick

c/o Nayland F. Smith, 3508 McNeil, Suite A, Wichita Falls, TX 76308

✓3) Louis Dreyfus Gas Holdings Inc.

400 Quail Springs Parkway, Suite 600, Oklahoma City, OK 73134

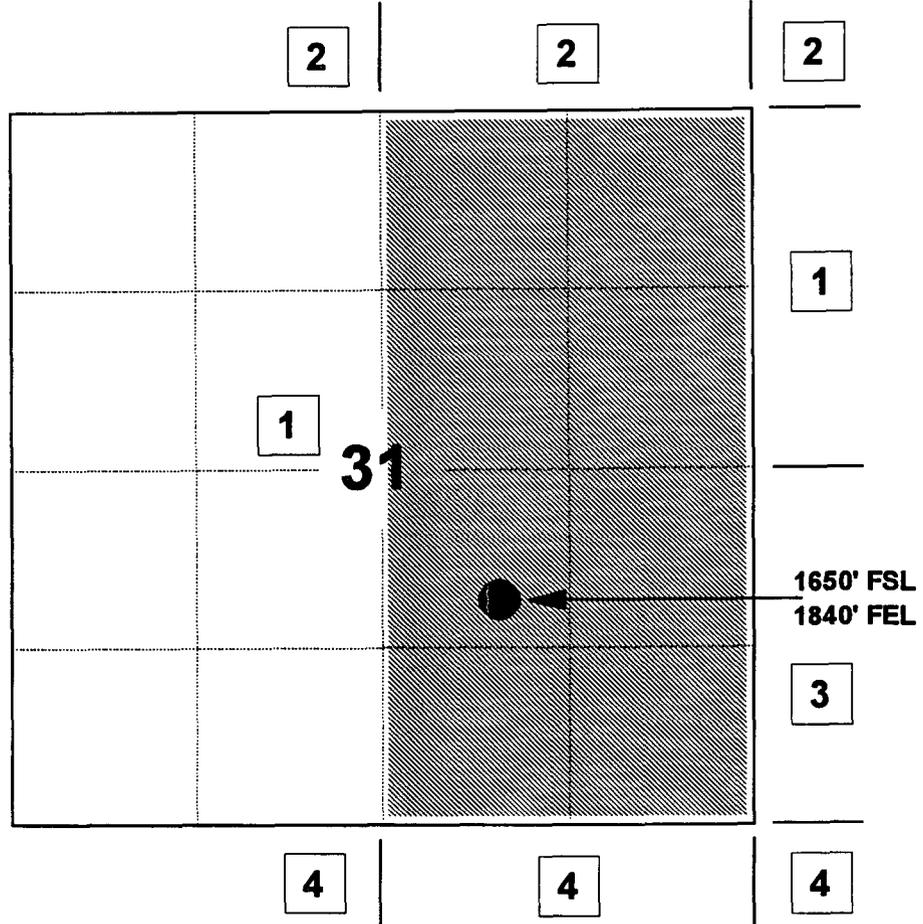
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PO Box 800, Denver, CO 80201

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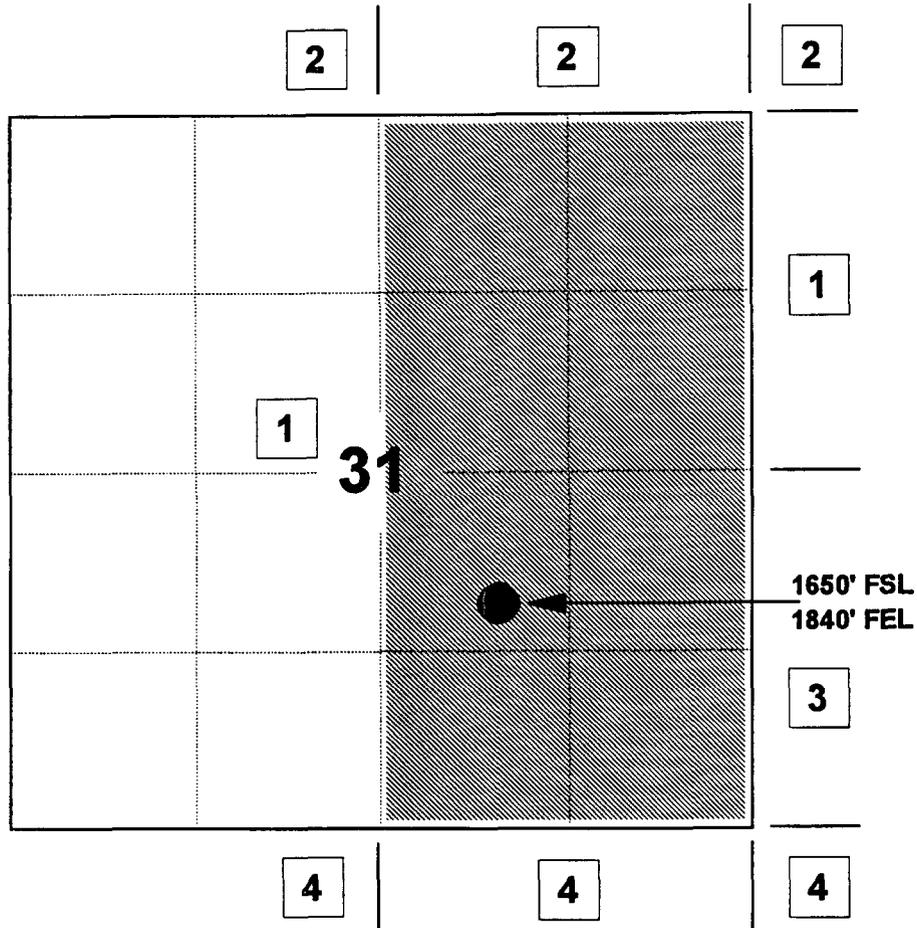
# MERIDIAN OIL INC

## HARRINGTON #9

### OFFSET OPERATOR \ OWNER PLAT

Gallup / Dakota Formations Commingle Well

Township 27 North, Range 7 West



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✓ 2) Amoco Production Company

PO Box 800, Denver, CO 80201

✓ 3) Meridian Oil Inc &

✓ Helen Harvey Hedrick

c/o Nayland F. Smith, 3508 McNeil, Suite A, Wichita Falls, TX 76308

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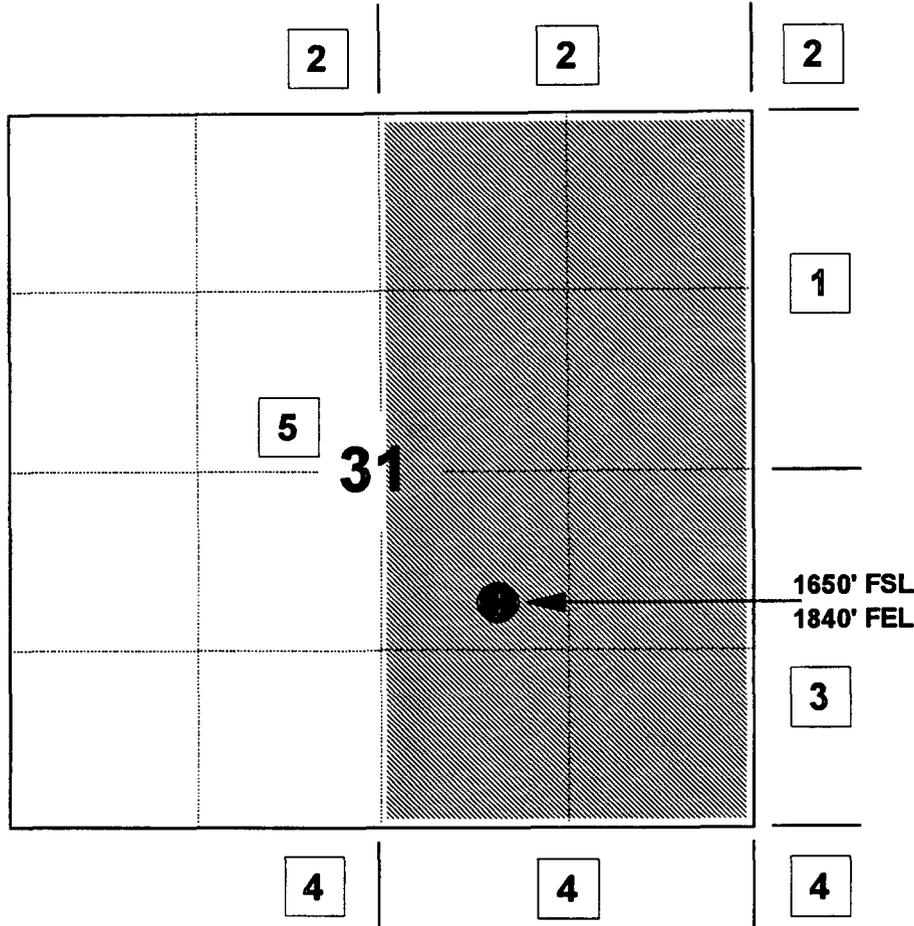
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## HARRINGTON #9

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Gallup / Dakota Formations Commingle Well

Township 27 North, Range 7 West



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PO Box 800, Denver, CO 80201

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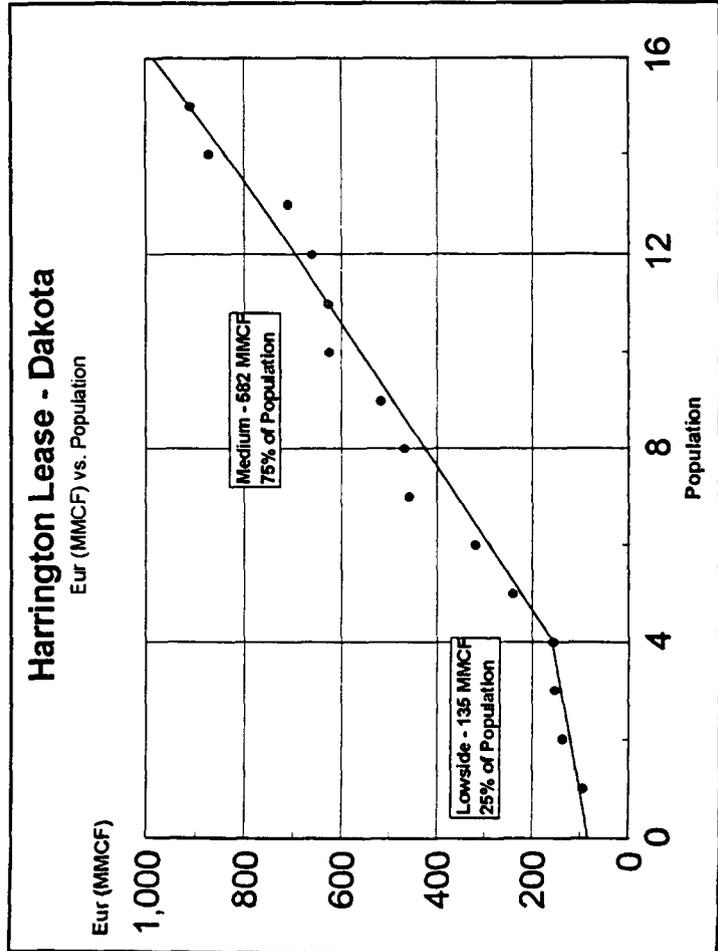
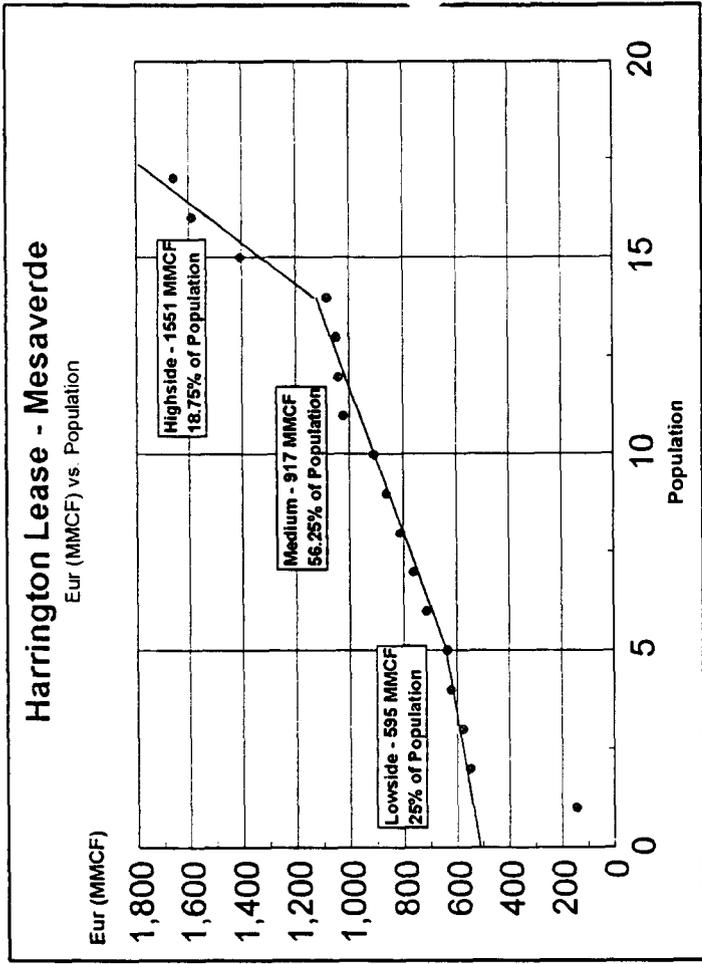
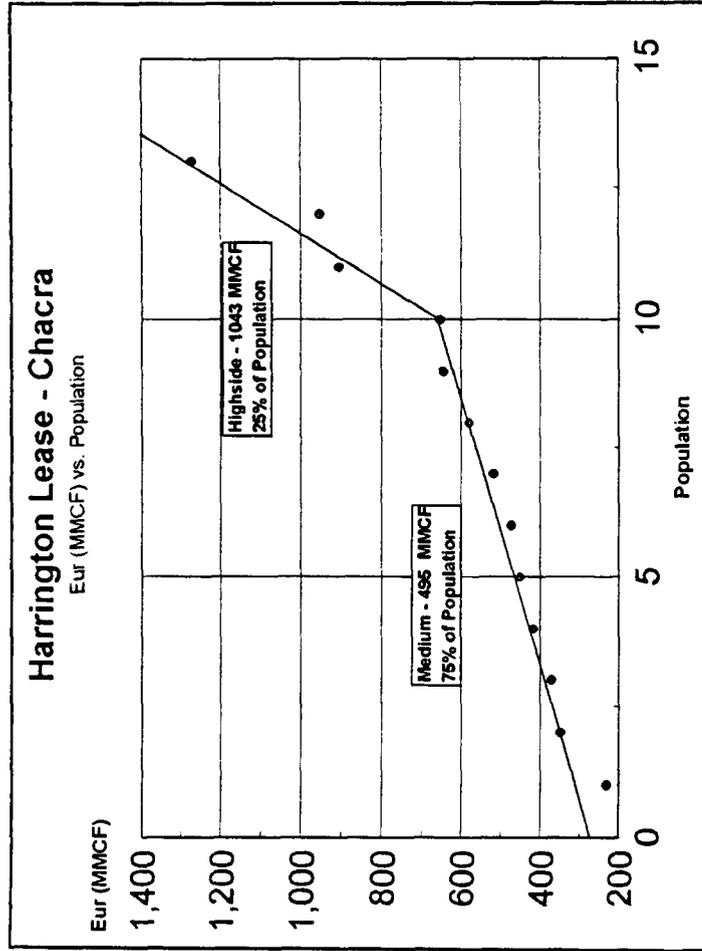
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✓ 5) Lively Exploration Company

1300 Post Oak Blvd., Suite 1900, Houston, TX 77056



## Statistical Evaluation of Developmental Horizons

Estimated reserves for developmental horizons (Chacra, Mesaverde, Upper Dakota) are based on an evaluation of EUR's for all wells in within a nine section area of the proposed new drill.

Graphed is EUR vs. population for analyzed wells. High, medium and low cases are based on grouping of well population.

## Chacra Formation Evaluation

The Chacra formation is in proven productive area. Estimated reserves are based upon offset production.

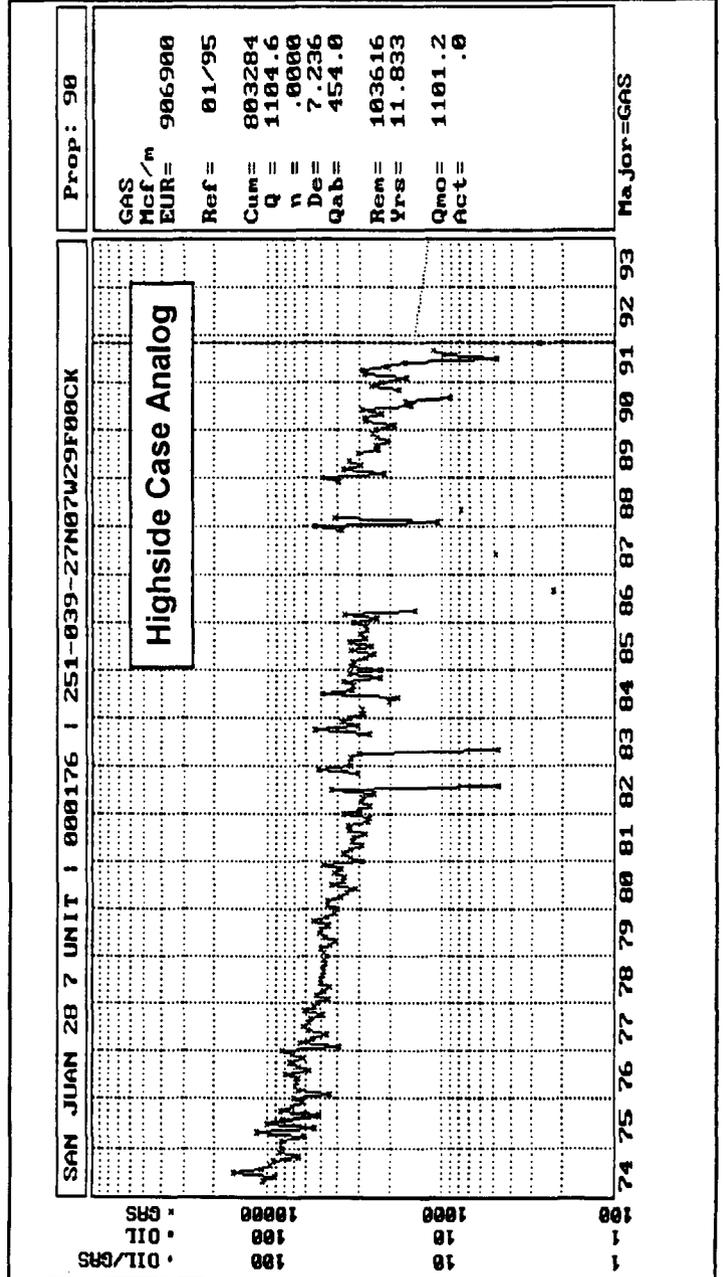
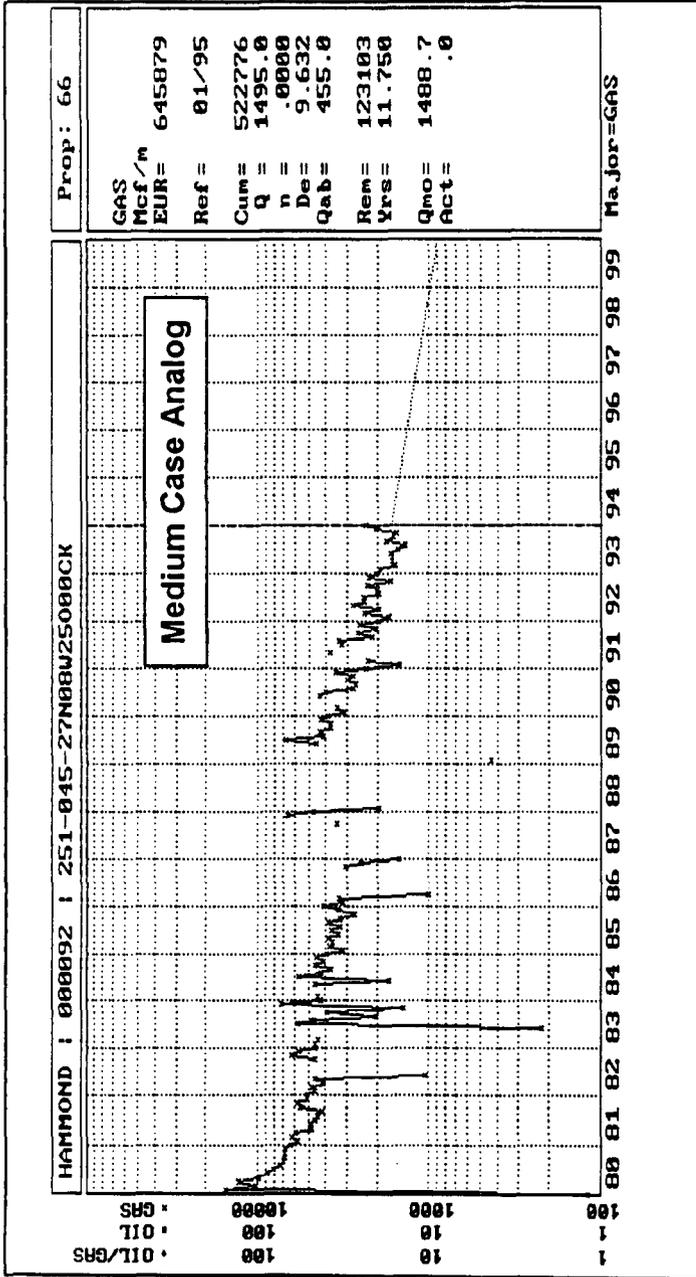
### Medium Case:

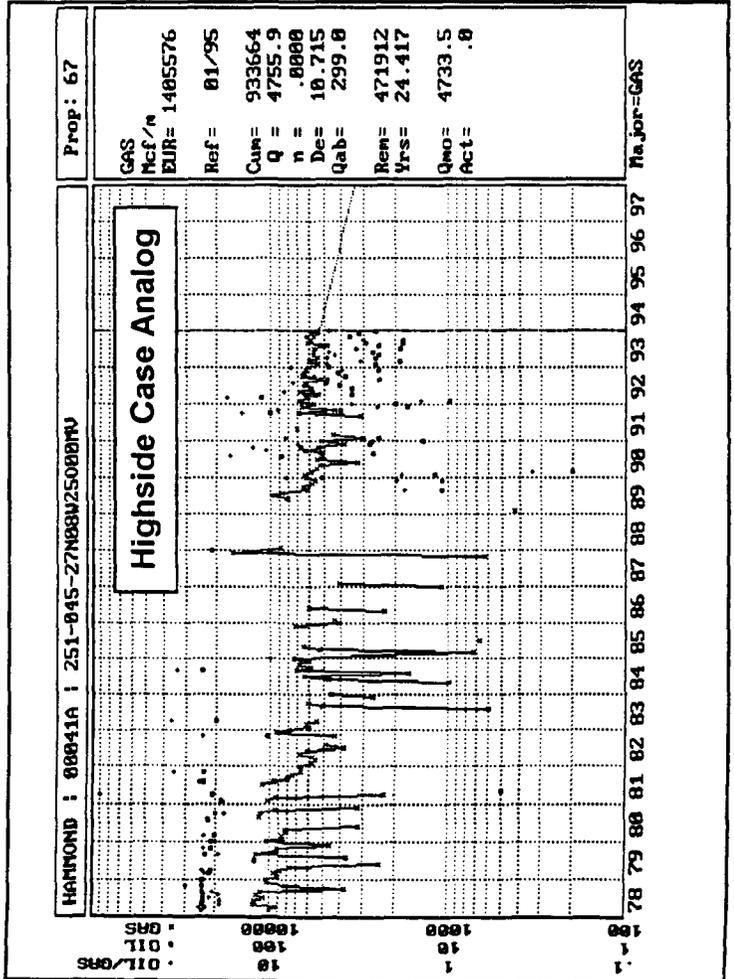
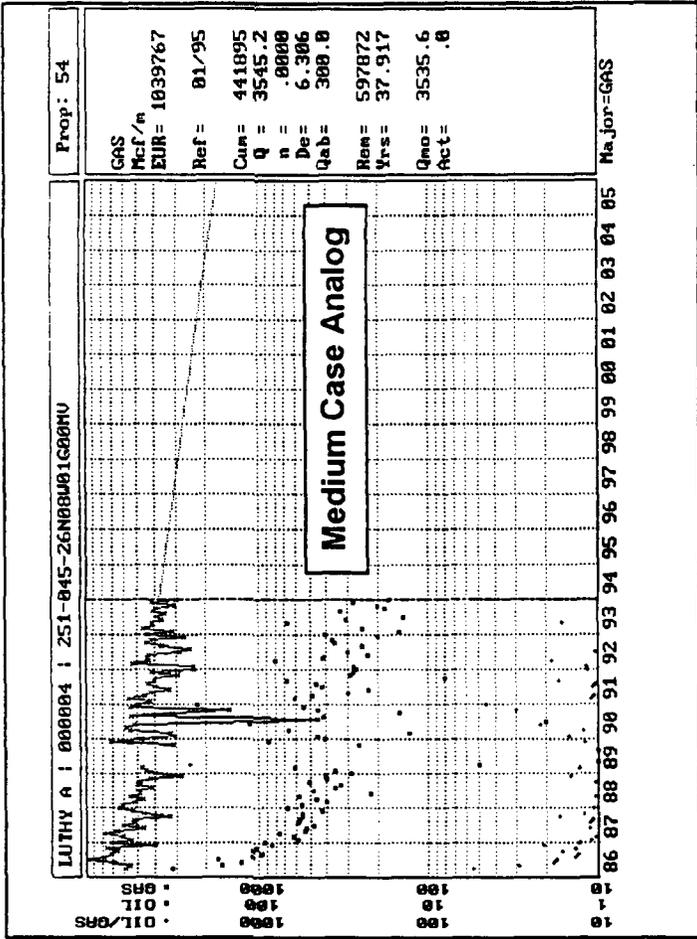
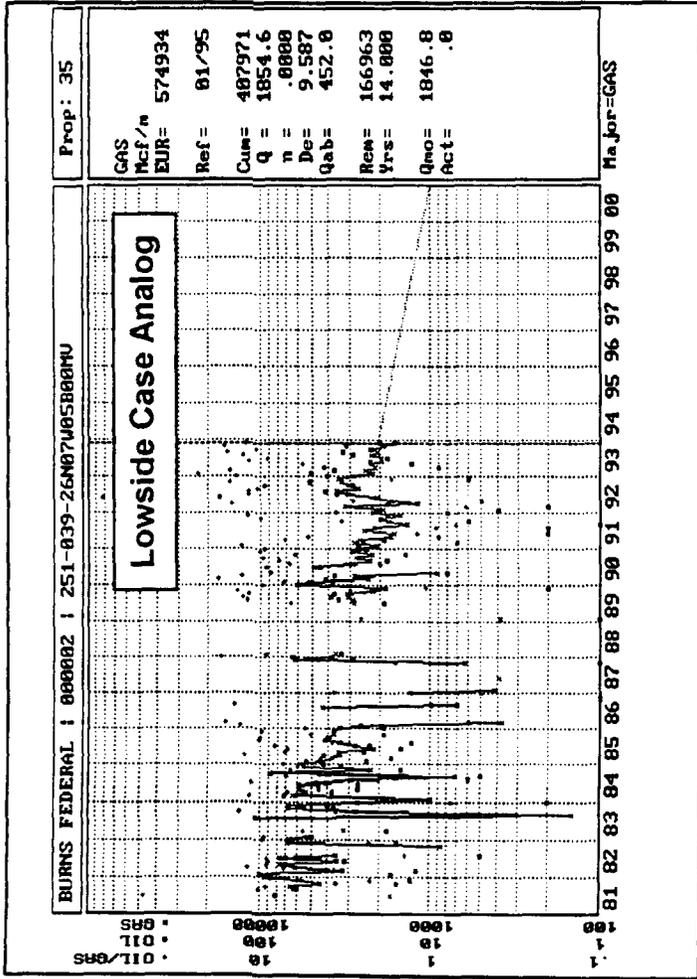
Initial Rate - 400 MCFD  
 Decline - hyperbolic  
 Initial decline - 90%  
 n coef - 1.65  
 EUR - 495 MMCF

### Highside Case:

Initial Rate - 400 MCFD  
 Decline - hyperbolic  
 Initial Decline - 47.5%  
 n coef - 1.65  
 EUR - 1040 MMCF

Based upon offset wells , drainage of acreage is not expected. An initial pressure of approx 1000 psi is predicted . The Chacra does not produce condensate in this area.



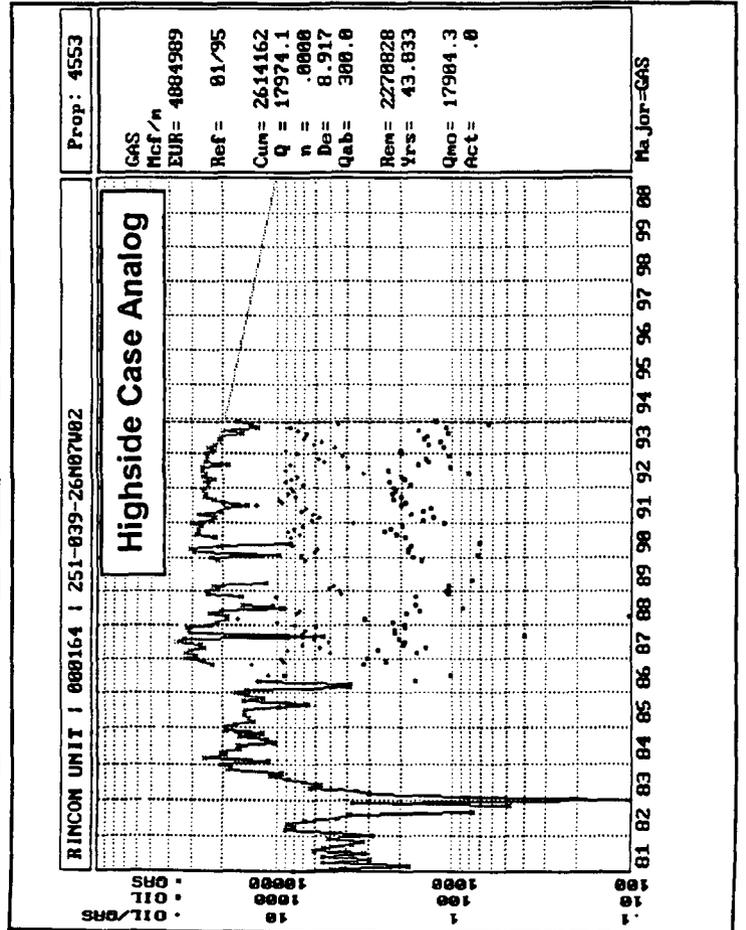
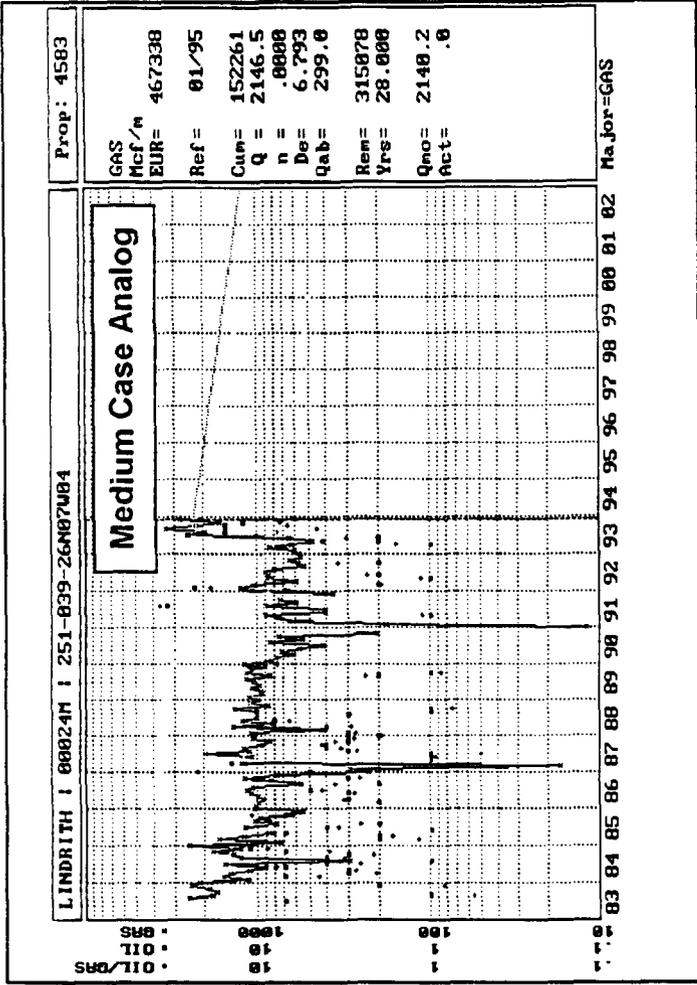
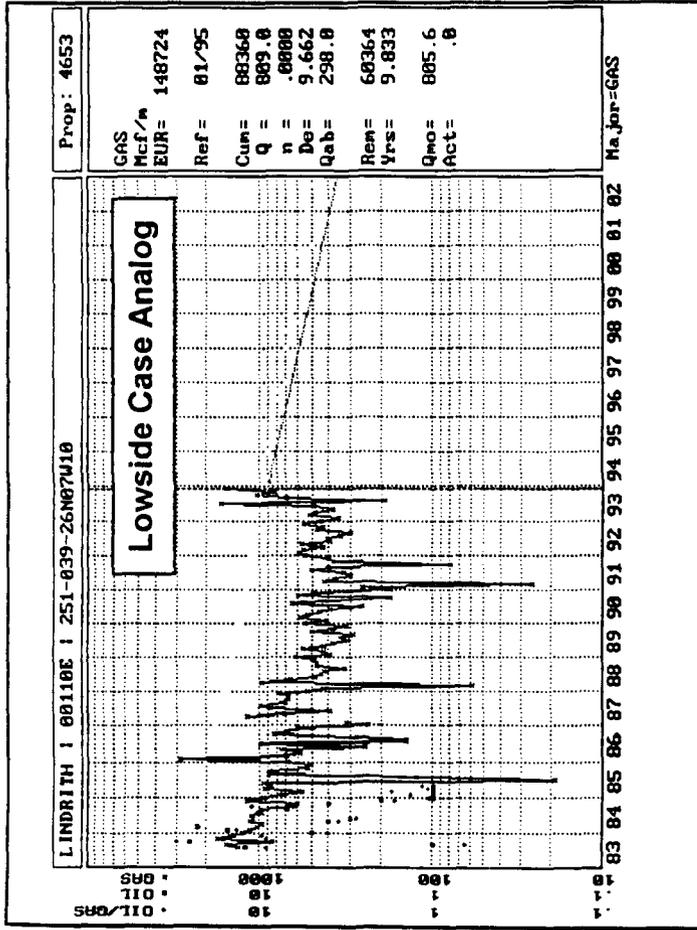


### Mesaverde Formation Evaluation

The Mesaverde formation is a proven productive area. Estimated reserves are based upon offset production. This location has booked PUD reserves of 630 MMCF. Offset analysis indicates this location is underbooked.

Case	Low	Med	High
Initial Rate (MCFD)	300	300	430
Initial decline (%)	50.0	50.0	9.25
Stab Rate (MCFD)	155	222	
Stab decline (%)	9.33	7.81	
EUR (MMCF)	573	917	1550

An initial reservoir pressure of 1050 psi is predicted.



### Gallup Formation Evaluation

Production from the Gallup interval is from the Tocito sandstone. Reserves are based on analogs located in this area. The lowside case reflects no effective pay present in the target well. The medium case reflects effective pay with drainage occurring. The highside case reflects undrained effective pay.

Case	Low	Med	High
Initial Rate (MCFD)	30	100	1000
Initial decline (%)	7.0	7.00	50.0
Stab Rate (MCFD)			500
Stab decline (%)			6.70
EUR (MMCF)	116	447	2800

## Dakota Formation Evaluation

The upper sands of the Dakota formation are in a proven productive area.

Estimated reserves are based on offset production (lowside and medium cases).

The Highside case is based on encountering productive pay in the lower Dakota sands (Encinal Canyon). The GLU #431 (T25NR07W14), which produces from the lower Dakota, was modeled as the highside case.

### Lowside Case

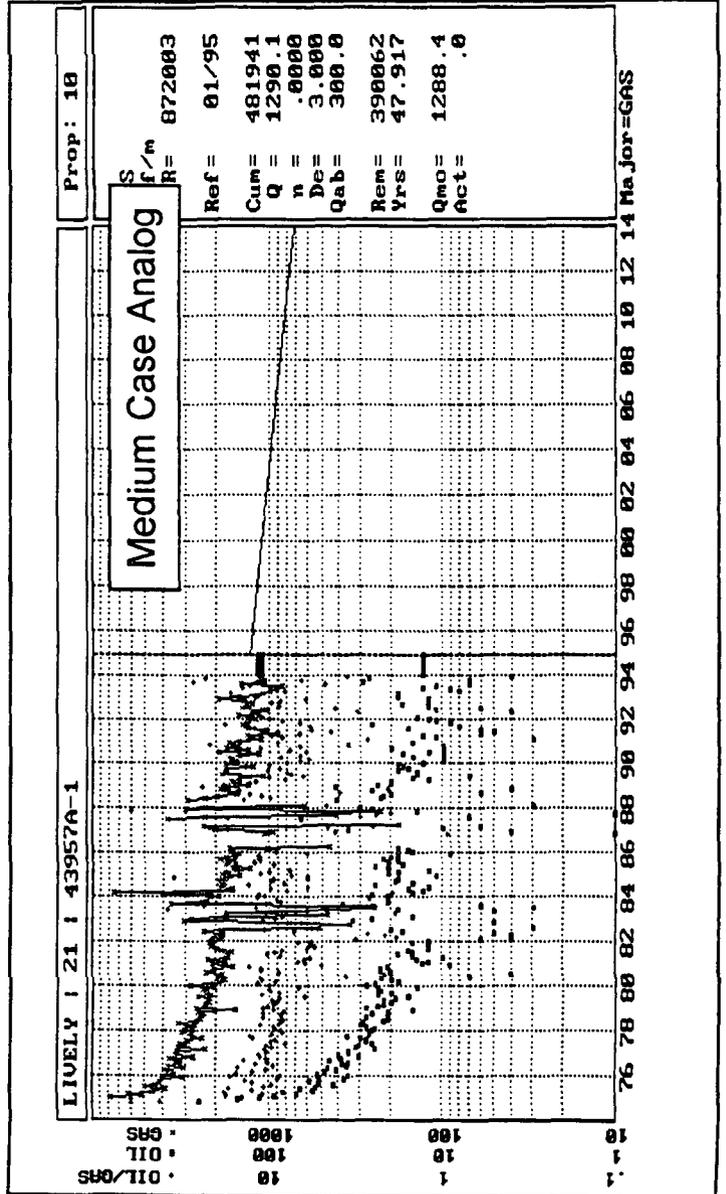
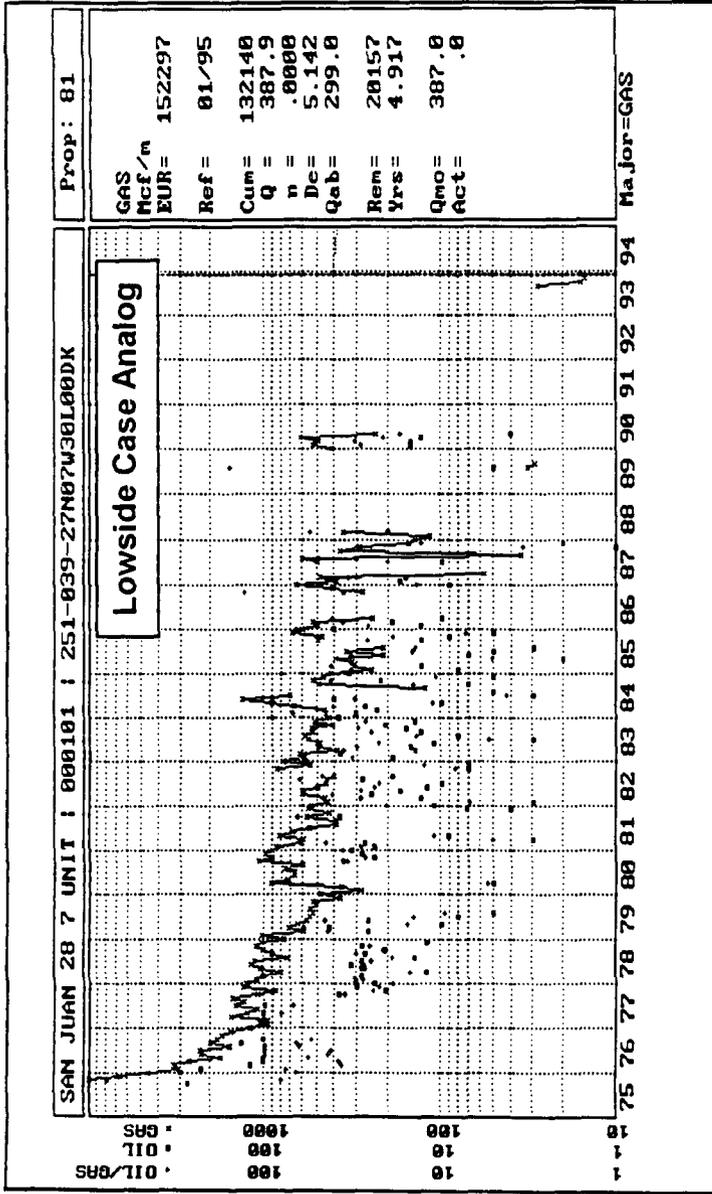
Initial Rate - 100 MCFD  
 Initial Decline - 21.34 %  
 Stab Rate -  
 Stab Decline -  
 EUR - 135 MMCF

### Medium Case

Initial Rate - 250 MCFD  
 Initial Decline - 50.0 %  
 Stab Rate - 175 MCFD  
 Stab Decline - 10.45 %  
 EUR - 582 MMCF

### Highside Case

Initial Rate - 500 MCFD  
 Initial Decline - 60.0 %  
 Stab Rate - 310 MCFD  
 Stab Decline - 5.56 %  
 EUR - 2000 MMCF



# Harrington #9 - Chacra Formation Reserve and Production Statistics

DATE: February 06, 1995

NAME:

FORM: Chacra

LOCATION:

UNIT:

SEC: 31

TWN: 27N

RNG: 7W

<p style="text-align: center;">Federal E #4 418 37 8/79 874</p> <p style="text-align: center;">Hammond #91 579 38 5/58 1027</p> <p style="text-align: center;">25</p> <p style="text-align: center;">Federal E #1 1272 96 4/72 1029</p> <p style="text-align: center;">Hammond #92 646 49 11/79 1000</p>	<p style="text-align: center;">SJ 28-7 #269 519 49 2/84 946</p> <p style="text-align: center;">30</p> <p style="text-align: center;">SJ 28-7 #177 952 48 4/74 1038</p> <p style="text-align: center;">Harrington PUD 442</p> <p style="text-align: center;">31</p> <p style="text-align: center;"></p> <p style="text-align: center;">Federal 6 #32 452 53 8/82 n/a</p> <p style="text-align: center;">6</p>	<p style="text-align: center;">SJ 28-7 #176 906 0 4/74 1036</p> <p style="text-align: center;">29</p> <p style="text-align: center;">SJ 28-7 #213 213 13 8/75 1062</p> <p style="text-align: center;">32</p> <p style="text-align: center;">Miles Fed #1A 452 53 8/82 n/a</p> <p style="text-align: center;">5</p> <p style="text-align: center;">Burns Fed #2 232 27 3/81 n/a</p> <p style="text-align: center;">MKL #16R 473 58 7/82 n/a</p>
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T 27  
N

T 26  
N

LEGEND

WELL NAME	
GAS EUR 95 Rate (MMCF)	58
Comp Initial Pressure (Date)	7/82

R-07-W

R-08-W

# Harrington #9 - Mesaverde Formation Reserve and Production Statistics

DATE: February 07, 1995  
 NAME:  
 FORM: Mesaverde  
 LOCATION  
 UNIT:  
 SEC: 31  
 TWIN: 27N  
 RNG: 7W

<p>Federal #1E 27 549 990 8/79</p> <p>Hammond #41R 1590 145 11/77 813</p> <p>Hammond #41 910 0 5/58 1030</p> <p style="text-align: center;">25</p> <p>Federal #1 44 1083 1037 4/72</p> <p>Hammond #41A 1406 156 11/77 1013</p>	<p style="text-align: center;">30</p> <p>PUD Harrington #6A 853</p> <p>Harrington #7 714 76 11/85 n/a</p> <p>PUD Harrington #7A 63</p> <p>Harrington #6 762 88 10/85 1120</p> <p>MKL #5 1658 100 3/52 n/a openhole</p> <p>MKL #17 43 1023 913 1/53 openhole</p> <p>MKL #5A 69 n/a</p>	<p style="text-align: center;">29</p> <p>SJ 28-7 #98 1394 74 3/59 985</p> <p style="text-align: center;">32</p> <p>Harvey A #3 1048 49 6/68 1057</p> <p>Miles Fed #1A 811 99 8/82 1000</p> <p>Burns Fed #2 575 61 3/81 n/a</p> <p>Miles Federal #1E 5 864 113 8/82 n/a</p> <p>MKL #1 67 145 975 12/52 openhole</p> <p>Burns Federal #1M 621 67 10/80 1100</p>
<p style="text-align: center;">36</p> <p>Brookhaven Com #7 Area 1 - 1995 Project</p> <p>Luthey A #4 1040 116 1/86 1041</p> <p style="text-align: center;">1</p>		

T  
27  
N

T  
26  
N

LEGEND	WELL NAME
GAS EUR 95 Rate	(MMCF)
Comp Initial Pressure	(Date)
(psi)	

R-07-W

R-08-W

# Harrington #9 - Gallup Formation Reserve and Production Statistics

DATE: February 06, 1995

NAME:

FORM: Gallup

LOCATION

UNIT:

SEC: 31

TWN: 27N

RNG: 7W

30	29	28
31 	32 Harvey A #3 GI tested @ 439 Mcfd P&A DK - 10/66	33
6	5 Miles Fed #1 19 0 3/65 1469	4 Lindrith #24 4572 35 11/62 1556 Lindrith #14 5687 81 10/62 1574 Lindrith #24M 416 62 5/83 1310

T 27  
N

T 26  
N

LEGEND

WELL NAME
GAS EUR 95 Rate
(MMCF)
(Date)
Comp
Initial Pressure
(psi)

# Harrington #9 - Dakota Formation Reserve and Production Statistics

DATE: February 06, 1995

NAME:

FORM: Dakota

LOCATION

UNIT:

SEC: 31

TWIN: 27N

RNG: 7W

<p>25</p>	<p>SJ 28-7 Unit #100 156 13 6/79 2287</p> <p>30</p> <p>SJ 28-7 Unit #101 152 13 7/75 2183</p>	<p>SJ 28-7 Unit #98 624 19 2/59 1825</p> <p>29</p> <p>SJ 28-7 Unit #99 627 42 6/79 1843</p>
<p>36</p>	<p>Lively #21E 19 8/81 1900</p> <p>31</p> <p>Lively #21 42 2/74 2193</p> 	<p>32</p> <p>Harvey A #3 upr DK test @ 96 mtdid lwr DK no test rpld P&amp;A DK - 10/66</p>
<p>1</p> <p>Lively #18E 41 95 3/81 2130 3/81 2930</p> <p>Lively #18 38 468 2/74 2398 2/74 27</p> <p>Lively #17E 11 2930</p> <p>Lively #17 27 n/a</p>	<p>Federal 6 #32 94 911 n/a 11/82</p> <p>6</p> <p>MKL #5A 25 137 n/a 11/82</p>	<p>Miles Fed #1 16 100 240 3404 3/65 7/64 2161 2546</p> <p>5</p> <p>Burns Fed #1M 61 1752 710 458 8/82 10/80 2102</p>

T 27  
N

T 26  
N

LEGEND

WELL NAME
GAS EUR 95 Rate
(MIMCF)
Comp Initial Pressure
(Date) (psi)

R-07-W

R-08-W