STATE OF NEW MEXICO

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION

AZTEC DISTRICT OFFICE

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

OIL CONSERVATION DIVISION
BOX 2088
SANTA FE, NEW MEXICO 87501

DATE Oct. 31, 1985

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

Gentlemen:

I have examined the application dated Oct 28, 1985

for the Amerada Hess (Operator) Jic. Apache A #9 (Lease and Well No.) O-36-25N-5W (Unit, S-T-R)

and my recommendations are as follows:

Approve

AMERADA HESS CORPORATION

P. O. DRAWER "D"
MONUMENT, NEW MEXICO 88265
(505) 393-2144

October 25, 1985

State of New Mexico
Energy and Minerals Department
Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

Re: Jicarilla Apache "A" #9
Sec. 36, T-25N, R-5W
Request to downhole commingle the
Otero Gallup and Basin Dakota Formations

Dear Sir:

Amerada Hess Corporation is requesting approval for an exception to Rule 303-C to permit the downhole commingling of the Gallup and Dakota zones in the Jicarilla Apache "A" #9. The Gallup formation in this well was recently completed in 9/85 and the Dakota has been producing since 1977.

To aid in the removal of formation fluids, the Gallup and Dakota will be operated with a plunger lift installation if approval to downhole commingle is granted. Since the Gallup does not have enough bottom hole pressure to effectively carry fluid to the surface, a dual completion would necessitate the installation of a beam unit. Therefore, downhole commingling of the production would streamline operations.

To calculate the bottom hole pressure of each zone, surface pressure readings were used in conjunction with fluid levels. The BHP's were corrected to a common datum (See attached BHP calculations). Results show the formation pressures between zones to be as follows:

Gallup SBHP @ 7,328' = 1,183 psia

Dakota SBHP @ 7,328' = 1,123 psia

In 1977, Amerada Hess Corporation's Jicarilla Apache "A" #7 was downhole commingled in the Gallup and Dakota by Administrative Order R-5158. This well is located 1/2 mile to the northwest of the J. Apache "A" #9 on the same lease. To date, there have been no indications of fluid incompatibility between the zones and therefore expect no problems of this nature if the J. Apache "A" #9 is downhole commingled.

The ownership of the zones to be commingled is common with respect to working interest, royalty and overriding royalty.

Presently, Amerada Hess is receiving $2.51/MCF for the gas from the J. Apache "A" nos. 7 and 9 and the #7 well is a downhole commingled Gallup/Dakota producer. Therefore, the value of the commingled production will not be less than the sum of the values of the individual streams.

Attached with this proposal is data showing the production allocation to each zone. Decline curves were used to get annual decline rates and these were used with an algebraic derivation to calculate allocation percentages. It was assumed the decline rate for the Gallup oil zone in the J. Apache "F" #9 would be the same as the decline rate in the J. Apache "A" #5, a former Gallup producer. Since the Gallup is a solution gas drive reservoir the gas decline rate chosen was the same as that for oil. The allocation percentages are:

Gallup Oil	64%
Dakota Condensate	36%
Gallup Gas	13%
Dakota Gas	87%

All offset operators as well as the Bureau of Land Management in Farmington, New Mexico have been notified of this proposal by receipt of this recommendation. If you have questions concerning this matter, please contact me.

Respectfully,

D. W. Holmes

D. W. Holmes
Sr. Petroleum Engineer

DWH/db

xc: Division Director (5)
District Office (1)
Offset Operators (1)
Bureau of Land Management (6)

Calculation Of
Static Bottom-Hole Pressures

Equation used to calculate the hydrostatic pressure in the annulus due to the gas column:

$$P_{sfs} = P_{whs} \times e^{C/\bar{z}} \qquad \text{Where: } C = \frac{(\gamma g)(TVD)}{53.34\ \bar{T}}$$

P_{sfs} = static sandface pressure, psia

P_{whs} = static wellhead pressure, psia

e = 2.7183

γg = gas gravity

TVD = true vertical depth, feet

$\bar{T}$ = average temperature, °R

$\bar{z}$ = average compressibility factor

Jicarilla Apache "A" #9
Gallup Zone:

perforations: 6380' to 6400'
static fluid level: 6169' (76 hrs.)
static wellhead pressure: 900 psig (76 hrs.)

$$\frac{(.70)(6169')}{53.34(546)} \Big/ 0.90$$

P_{sfs} = 900 x e

P_{sfs} = 1,061 psig = pressure @ 6169' due to gas pressure in the annulus.

hydrostatic pressure due to fluid from 6169' to mid-perfs @ 6390'

static fluid column: 221'
oil gravity: 42 °API
oil gradient: 0.36 psi./ft.

P = 221 (.36) = 80 psi = hydrostatic fluid pressure

Therefore:

SBHP of Gallup = 1,061 + 80

= 1,141 psig

SBHP = 1,154 psia @ 6390'

Jicarilla Apache "A" #9
Dakota Zone:

perforations: 7302' to 7353'
static fluid level: dry, no fluid in hole
static wellhead pressure: 906 psig (67 hrs.)

$$\frac{(.75)(7328')}{53.34(563)} \Big/ .90$$

P_{sfs} = 906 x e

P_{sfs} = 1,110 psig = 1,123 psia

Therefore:

SBHP of Dakota = 1,123 psia

SBHP = 1,123 psia @ 7328'

To correct the Gallup pressure to
a common datum of 7328'

$$\frac{(.70)(938')}{53.34(546)} \Big/ .90$$

P_{sfs} = 1,154 x e

P_{sfs} = 1,183 psia @ 7328'

Therefore:

Gallup SBHP @ 7328' = 1,183 psia

Dakota SBHP @ 7328' = 1,123 psia

Jicarilla Apache "A" #9

Allocation Of Production To Each Zone

Decline Rate Computations For Oil:

Gallup Zone

Since the Gallup in this wellbore was recently completed, production history from the J. Apache "A" #5, a former Gallup producer, was used to determine a decline rate.

q_i = 78 BO/mo.
q = 70 BO/mo.
t = 1 year

$a = \ln (78/70)/1$

$a_{(\text{Gal oil})} = 0.10821/\text{yr.}$

Dakota Zone

q_i = 100 BC/mo.
q = 82 BC/mo.
t = 1 year

$a = \ln (100/82)/1$

$a_{(\text{Dak. cond.})} = 0.19845/\text{yr.}$

Gallup/Dakota Combined

To figure the average combined decline rate per year it is known the new Gallup completion in this well will produce 213 BOPM and using the decline rate of 0.10821/yr. from above, after the one year it will be making 190 BOPM.

Therefore:

$q_i = 100 + 213 = 313$ B/mo.
$q = 82 + 190 = 272$ B/mo.
t = 1 year

$a = \ln(313/272)/1$

$a_{(\text{comb.})} = 0.14040/\text{yr.}$

Actual Allocation:

X = Gallup Oil Allocation
X-1 = Dakota Condensate Allocation

$$0.14040 = (X)(0.10821) + (1-X)(0.19845)$$
$$0.14040 = (X)(0.10821) + (0.19845) - (X)(0.19845)$$
$$-0.05805 = (X)(-0.09024)$$

$$X = 0.64328$$
$$1-X = 0.35672$$

Therefore:

Gallup Production Allocation For Oil = 64%
Dakota Production Allocation For Condensate = 36%

Decline Rate Computations For Gas:

Gallup Zone

On test, the Gallup in the J. Apache "A" #9 produced 517 MCFPM to sales. Since the Gallup is a solution gas drive reservoir it is fair to assume the gas rate will decline at the same rate as the oil production.

$a_{\left(\frac{Gal}{gas}\right)} = 0.10821/yr.$

q_i = 517 MCF/mo.
q = 461 MCF/mo.
t = 1 year

Dakota Zone

q_i = 3642 MCF/mo.

q = 3571 MCF/mo.

t = 1 year

$a = \ln (3642/3571)/1$

$a_{\left(\frac{Dak}{gas}\right)} = 0.01969/yr.$

Gallup/Dakota
Combined

q_i = 517 + 3642 = 4159 MCF/mo.

q = 461 + 3571 = 4032 MCF/mo.

t = 1 year

a = ln (4159/4032)/1

$a_{(Comb.)}$ = 0.03101/yr.

Actual Allocation:

X = Gallup Gas Allocation
X-1 = Dakota Gas Allocation

0.03101 = (X)(0.10821)+(1-X)(0.01969)
0.03101 = (X)(0.10821)+(0.01969)-(X)(0.01969)
0.01132 = (X)(0.08852)

X = 0.12788
1-X = 0.87212

Therefore:

Gallup Production Allocation For Gas = 13%
Dakota Production Allocation For Gas = 87%

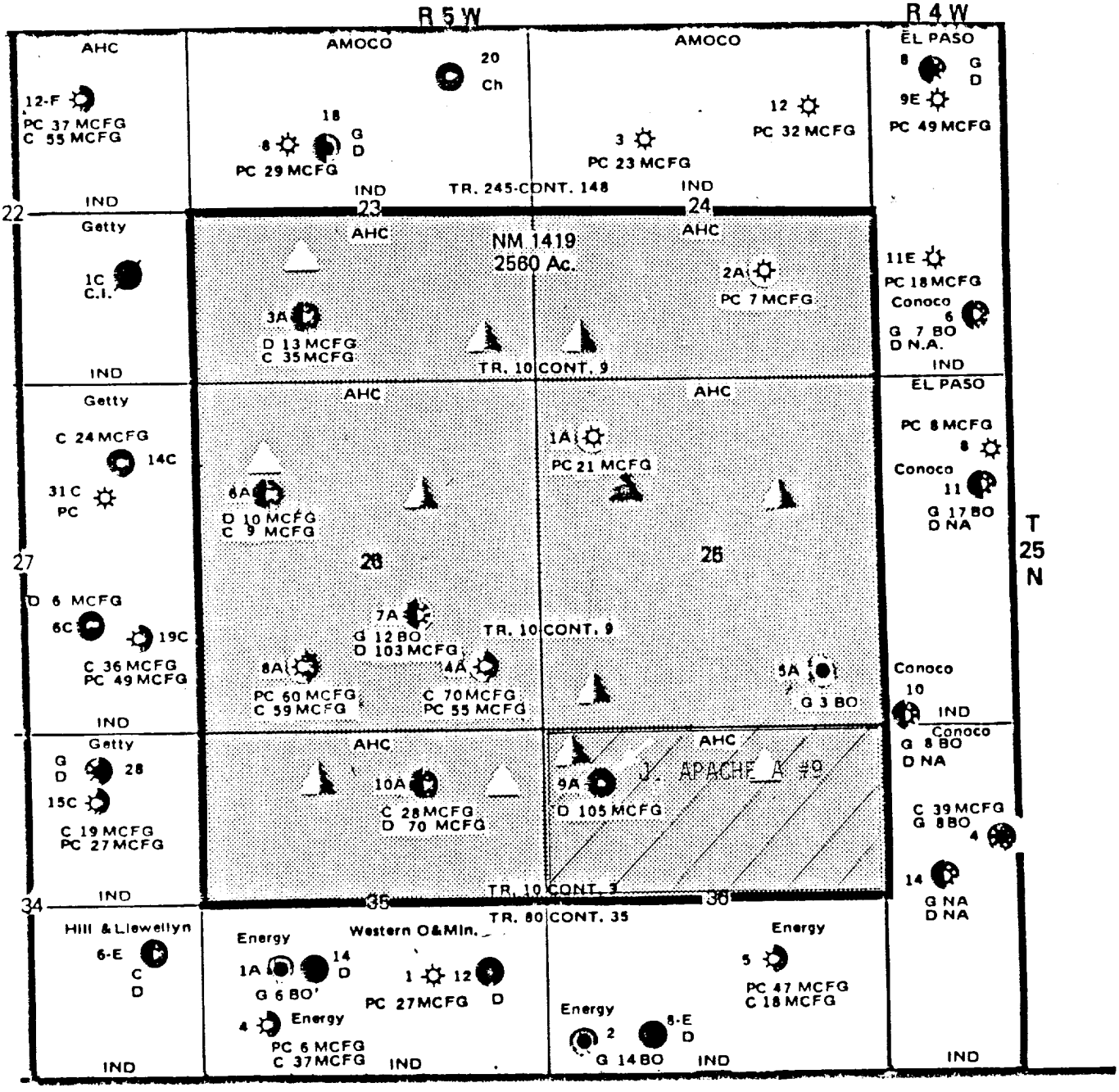
Offset Operators

BHP Petroleum
P. O. Box 977
Farmington, New Mexico 87499

Western Oil & Minerals Limited
P. O. Box 191
Farmington, New Mexico 87499

Conoco, Inc.
207 Rio Grande
Aztec, New Mexico 87410

PLAT SHOWING BASIN DAKOTA ACREAGE DEDICATION



LOCATION MAP	LEGEND	TYPE OF OWNERSHIP	TULSA EXPLORATION REGION JICARILLA APACHE "A" Rio Arriba County, New Mexico
COLORADO Santa Fe NEW MEXICO	AHC Pictured Cliffs Chacra Gallup Dakota/Graneros Dual Completion (Zones as color coded) Lease Outline Offsetting Wells Outline Proposed Wells	Ind. - Jicarilla Apache Fed. - Federal St. - State	AMERADA HESS CONTRACT NO. 9 LEASE N M-1419 0 1/2 1 Mile Volumes indicate average daily production for 1st half of 1981.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Form C-116
Revised 10-1-78

GAS – OIL RATIO TESTS

Operator: Amerada Hess Corporation
Pool: Otero Gallup
County: Rio Arriba
Address: Drawer "D", Monument, New Mexico 88265
TYPE OF TEST – (X): Scheduled [ ] Completion [ ] Special [X]

LEASE NAME	WELL NO.	LOCATION U	S	T	R	DATE OF TEST	STATUS	CHOKE SIZE	TBG. PRESS.	DAILY ALLOWABLE	LENGTH OF TEST HOURS	PROD. DURING TEST WATER BBLS.	GRAV. OIL	OIL BBLS.	GAS M.C.F.	GAS – OIL RATIO CU.FT/BBL
Jicarilla Apache "A"	9	D	36	25	5	10-10-85	P	2"	30	-	24	0	-	7	17	2429

No well will be assigned an allowable greater than the amount of oil produced on the official test.

During gas-oil ratio test, each well shall be produced at a rate not exceeding the top unit allowable for the pool in which well is located by more than 25 percent. Operator is encouraged to take advantage of this 25 percent tolerance in order that well can be assigned increased allowables when authorized by the Division.

Gas volumes must be reported in MCF measured at a pressure base of 15.025 psia and a temperature of 60° F. Specific gravity base will be 0.60.

Report casing pressure in lieu of tubing pressure for any well producing through casing.

Mail original and one copy of this report to the district office of the New Mexico Oil Conservation Division in accordance with Rule 301 and appropriate pool rules.

I hereby certify that the above informat
is true and complete to the best of my kn
ledge and belief.

Lesley Johnson
(Signature)

Production Technician
(Title)

October 17, 1985
(Date)

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Form C-116
Revised 10-1-78

GAS – OIL RATIO TESTS

Operator: Amerada Hess Corporation | Pool: Basin Dakota | County: Rio Arriba

Address: Drawer "D", Monument, New Mexico 88265 | TYPE OF TEST – (X) Scheduled [ ] Completion [ ] Special [X]

LEASE NAME	WELL NO.	LOCATION U	S	T	R	DATE OF TEST	STATUS	CHOKE SIZE	TBG. PRESS.	DAILY ALLOWABLE	LENGTH OF TEST HOURS	PROD. DURING TEST WATER BBLS.	GRAV. OIL	OIL BBLS.	GAS M.C.F.	GAS – OIL RATIO CU.FT/BBL.
Jicarilla Apache "A"	9	D	36	25	5	9-3-85	P	-	130	116	24	0	-	2	110	55,000

No well will be assigned an allowable greater than the amount of oil produced on the official test.

During gas-oil ratio test, each well shall be produced at a rate not exceeding the top unit allowable for the pool in which well is located by more than 25 percent. Operator is encouraged to take advantage of this 25 percent tolerance in order that well can be assigned increased allowables when authorized by the Division.

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Report casing pressure in lieu of tubing pressure for any well producing through casing.

Mail original and one copy of this report to the district office of the New Mexico Oil Conservation Division in accordance with Rule 301 and appropriate pool rules.

I hereby certify that the above informati is true and complete to the best of my kno ledge and belief.

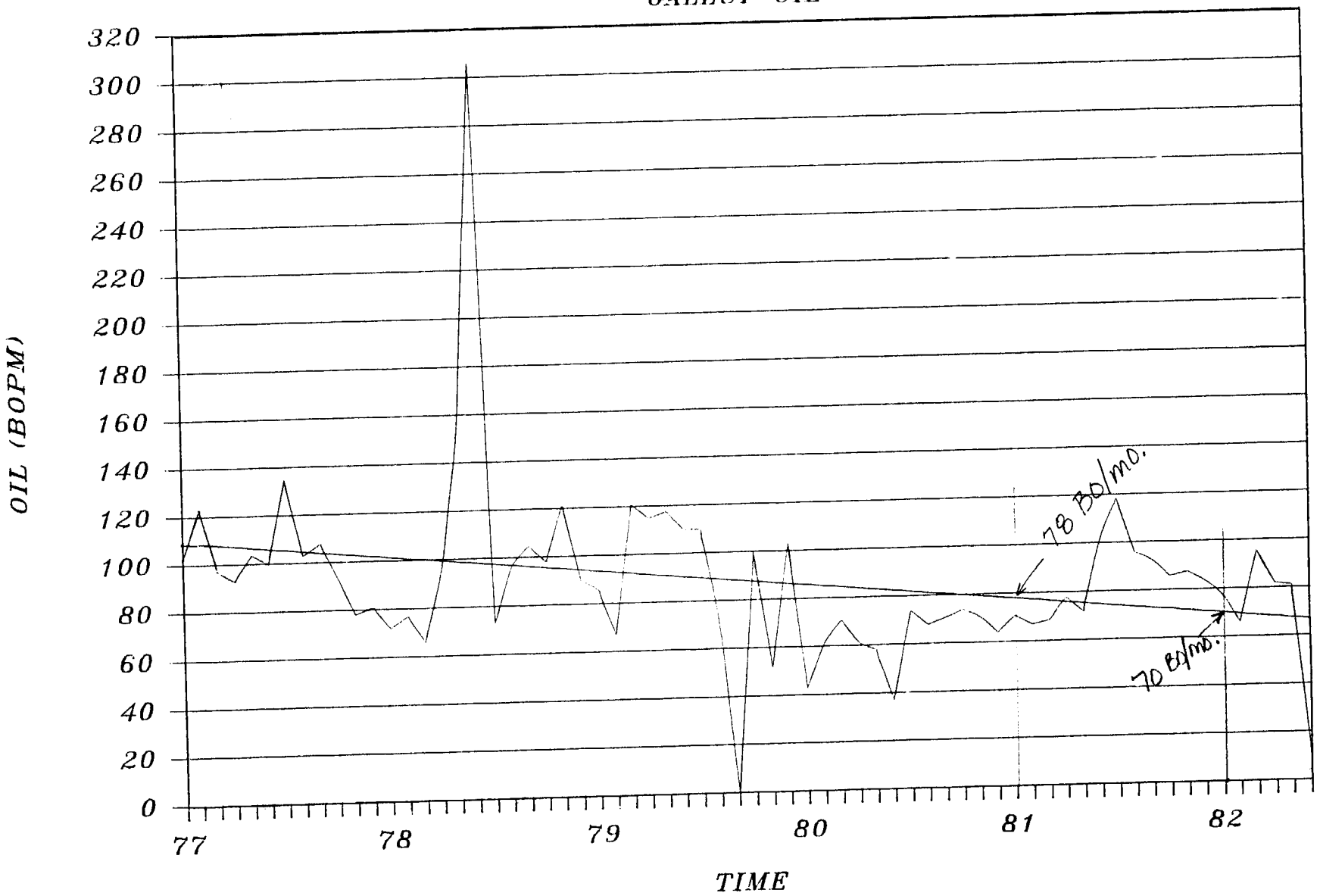
Linda Johnson
(Signature)

Production Technician
(Title)

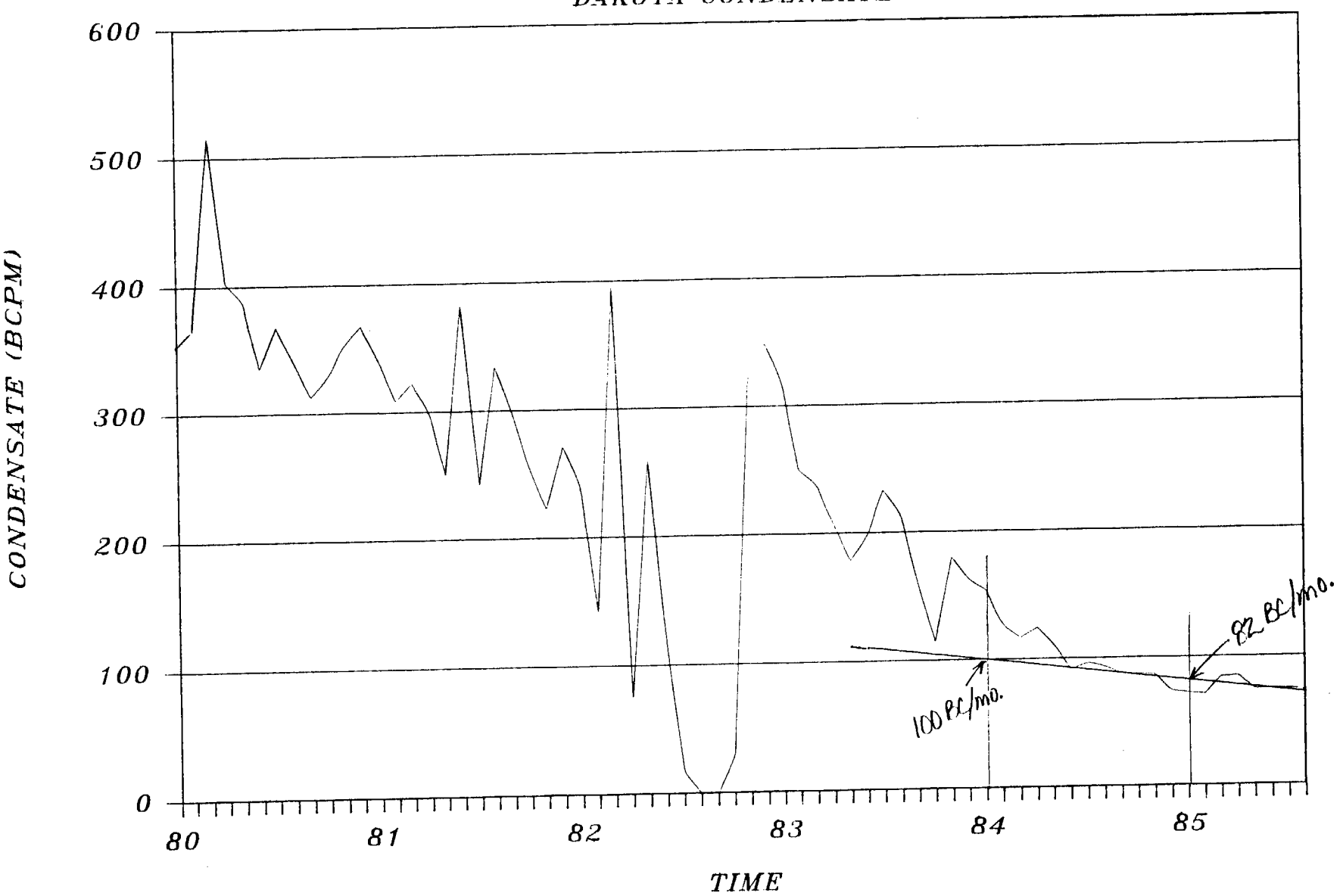
October 17, 1985
(Date)

JICARILLA APACHE "A" #5

CALLUP OIL



JICARILLA APACHE "A" # 9



JICARILLA APACHE "A" # 9

DAKOTA GAS