CASE 7312: PHILLIPS PETROLEUM COMPANY FOR DOWNHOLE COMMINGLING, EDDY COUNTY, NEW MEXICO

Case No.

7312

Application

Transcripts

Small Exhibits

ETC

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

October 5, 1981

Re: CASE NO. 7312
ORDER NO. R-6791

Mr. Thomas Kellahin
Kellahin & Kellahin
Attorneys at Law
Post Office Box 1769
Santa Fe, New Mexico

Applicant:

Phillips Petroleum Company

Dear Sir:

Enclosed herewith are two copies of the above-referenced Division order recently entered in the subject case.

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

Copy of order also sent to:

Hobbs OCD x
Artesia OCD x
Aztec OCD

Other

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 7312
Order No. R-6791

APPLICATION OF PHILLIPS PETROLEUM
COMPANY FOR DOWNHOLE COMMINGLING,
EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on July 29, 1981, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 2nd day of October, 1981, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Phillips Petroleum Company, is the owner and operator of the Malaga A Well No. 2, located in Unit D of Section 2, Township 24 South, Range 28 East, NMPM, Eddy County, New Mexico.

(3) That the applicant seeks authority to commingle Atoka and Morrow production within the wellbore of the above-described well.

(4) That from the Atoka zone, the subject well is capable of very low marginal production only.

(5) That from the Morrow zone, the subject well is capable of very low marginal production only.

(6) That the proposed commingling may result in the recovery of additional hydrocarbons from each of the subject pools, thereby preventing waste, and will not violate correlative rights.

(7) That the reservoir characteristics of each of the subject zones are such that underground waste would not be caused by the proposed commingling provided that the well is not shut-in for an extended period.

(8) That if said well should be shut-in for any reason, crossflow could occur between zones.

(9) That the applicant should be required to install a check valve, rated for at least a 5000-pound differential, between the zones to be commingled.

(10) That the applicant should notify the Division's district office at Artesia of the date and time the check valve is to be run in the well in order that the same may be witnessed.

(11) That to afford the Division the opportunity to assess the potential for waste and to expeditiously order appropriate remedial action, the operator should notify the Artesia district office of the Division any time the subject well is shut-in for 7 consecutive days.

(12) That in order to allocate the commingled production to each of the commingled zones in the subject well, 54 percent of the commingled production should be allocated to the Atoka zone, and 46 percent of the commingled production to the Morrow zone.

IT IS THEREFORE ORDERED:

(1) That the applicant, Phillips Petroleum Company, is hereby authorized to commingle Atoka and Morrow production within the wellbore of the Malaga A Well No. 2, located in Unit D of Section 2, Township 24 South, Range 28 East, NMPM, Malaga Field, Eddy County, New Mexico.

(2) That 54 percent of the commingled production shall be allocated to the Atoka zone and 46 percent of the commingled production shall be allocated to the Morrow zone.

(3) That the operator shall install a check valve, rated for at least a 5000-pound differential, between the zones to be commingled.

(4) That the operator shall notify the Division's district office at Artesia of the date and time the check valve is to be run in the well in order that the same may be witnessed.

(5) That the operator of the subject well shall immediately notify the Division's Artesia district office any time the well has been shut-in for 7 consecutive days and shall concurrently present, to the Division, a plan for remedial action.

(6) That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

SEAL

fd/

PHILLIPS PETROLEUM COMPANY
ODESSA, TEXAS 79762
4001 PENBROOK

NATURAL RESOURCES GROUP
Exploration and Production

August 19, 1981

New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Attention Mr. Richard L. Stamets, Examiner

Re: New Mexico Oil Conservation Division Case No. 7312 - Application of Phillips Petroleum Company for Downhole Commingling - Malaga A Well No. 2, Eddy County, New Mexico

Gentlemen:

Phillips Petroleum Company hereby submits its additional Exhibits Nos. 13, 14 and 15 for the subject hearing, all of which were prepared by the undersigned.

Exhibit No. 13 shows the bottom hole pressures, both measured and calculated, for the Malaga area. As can be seen in these figures, there is a wide range in the bottom hole pressures. The Atoka bottom hole pressures range from 5190 psi to 9125 psi, and the Morrow bottom hole pressures range from 3439 psi to 8221 psi.

Exhibit No. 14 is a drawing of the proposed downhole completion showing the approximate depth of the sliding sleeve with the LWV check valve. This system will prevent cross flow between the Morrow and Atoka formations during long periods of shut-in time.

Exhibit No. 15 (four pages) shows the specifications of the proposed downhole check valve assembly. In figures III-3, III-26 and III-15 on pages 1, 3 and 4 of the Exhibit, the sliding sleeve, the check valve and the locking device are outlined in red. The check valve and locking device will set inside the sliding sleeve. Minor modifications will be made on the sleeve and check valve so that the system will be totally compatible. This assembly will prevent cross flow between the two sets of perforations.

Our proposed procedure is to connect the Atoka at the surface for a time until the bottom hole flowing pressure of the Atoka is approximately the same as the bottom hole flowing pressure

of the Morrow. This will reduce the chance of cross flow while the well is shut in to install the check valve assembly. There will be a minimum time when cross flow can occur while the sliding sleeve is open and before the check valve is set. The estimated cost for this procedure is $18,000.00.

Respectfully submitted,

PHILLIPS PETROLEUM COMPANY

By Jerry L. Blevins

Jerry L. Blevins
Associate Reservoir Engineer
Witness for Phillips Petroleum Company

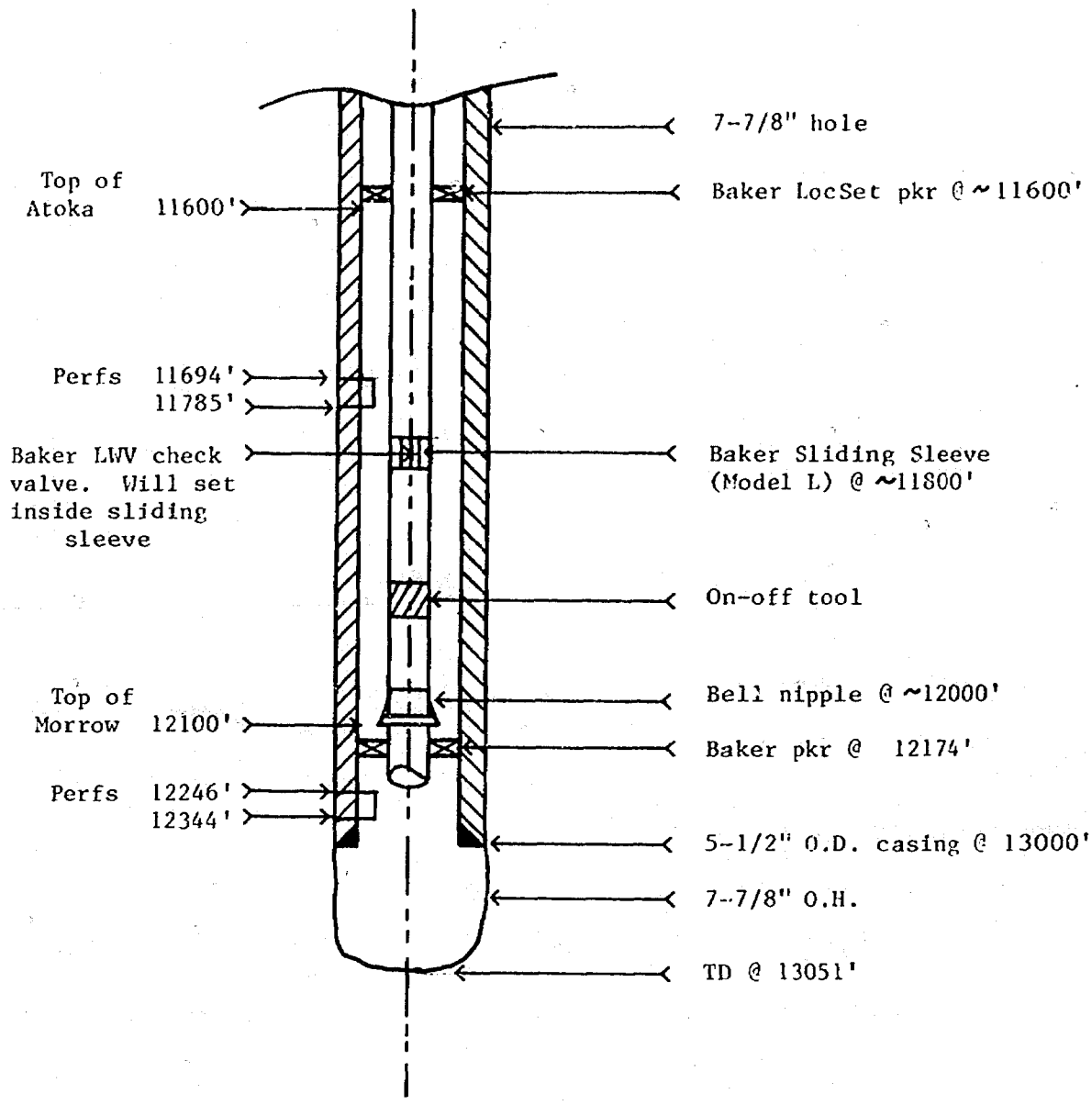
JLB:JVP:nc
Enclosures

Case No. 7312, July 29, 1981
Phillips Exhibit 13

MORROW AND ATOKA PRESSURES

OPERATOR	WELL NAME	LOCATION	FIELD	BHP	THP	CALC. BHP
Adams	Ann Con No. 1	Sec. 15, T-24-S, R-28-E	Malaga Atoka	7483		
Aminoil	Willow Lake No. 3	Sec. 15, T-24-S, R-28-E	Malaga Morrow		4335	5636
Aminoil	Willow Lake No. 2	Sec. 16, T-24-S, R-28-E	Malaga Morrow	7380		
Burman	Williams No. 1	Sec. 25, T-23-S R-28-E	Malaga Morrow	8221		
Burman	Willow Lake Unit No. 1	Sec. 22, T-24-S, R-28-E	Malaga Atoka	7608		
HNG	NM State No. 1	Sec. 16, T-24-S, R-28-E	Malaga West Morrow	3828		
HNG	Pardue No. 1	Sec. 34, T-23-S, R-28-E	Malaga Atoka		5255	6832
HNG	Williams No. 1	Sec. 35, T-23-S, R-28-E	Malaga Atoka		7019	9125
HNG	Woods No. 1	Sec. 9, T-24-S, R-28-E	Malaga Morrow		3269	4250
HNG	Woods No. 2	Sec. 9, T-24-S, R-28-E	Malaga Atoka		3992	5190
Maddox	Malaga No. 1	Sec. 3, T-24-S, R-28-E	Malaga Atoka	6110		
Maddox	Pardue No. 1	Sec. 27, T-23-S, R-28-E	Malaga Atoka	6672		
Phillips	Malaga "A" No. 1	Sec. 2, T-24-S, R-28-E	Malaga Morrow		2645	3439
Phillips	Malaga "A" No. 2	Sec. 2, T-23-S, R-28-E	Malaga Atoka		6100	7422
Phillips	Malaga "A" No. 2	Sec. 2, T-23-S, R-28-E	Malaga Morrow		2775	3638

Case No. 7312, July 29, 1981
Phillips Exhibit 14



NO.	REVISION	BY	DATE	CHKD	APP'D

FOR BIDS	PHILLIPS PETROLEUM COMPANY BARTLESVILLE, OKLAHOMA	AFE NO. / FILE CODE
FOR APPR		
FOR CONST	PHILLIPS PETROLEUM COMPANY MALAGA-A No. 2 APPLICATION FOR EXCEPTION TO RULE 303(a) WELLBORE SKETCH	SCALE UNLESS OTHERWISE NOTED
DRAWN 8-18-81		DWG NO.
CHECKED		SH NO.
APP'D		

FORM 1779 6-76

PRINTED IN U.S.A.

Room for Growth. Ordinary seals, under heat and pressure, can swell with enough force to bind a sleeve. The BFC seals have a special profile that allows room for growth without binding.

Trapped Pressures Bleed Off. As the closing sleeve shifts, the area between the seals tends to trap pressures that might cause pressure-lock, but the BFC seal design assures bleedoff of these pressures.

Super-Smooth Bore. Seals tend to stick to sealing surfaces during periods of heat and pressure. The BFC super-smooth bore minimizes this possibility.

Seals Molded to Closing Sleeve Body. Damage caused by high-velocity, high-pressure flow across and behind non-bonded seals is eliminated by these molecularly-bonded closing sleeve seals.

In many field and laboratory tests, BFC sleeves were repeatedly opened and closed at high differential pressures without seal damage.

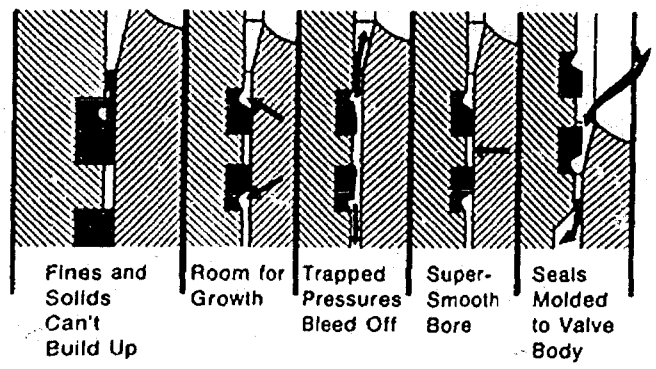


Fig. III-2
Seal design prevents sticking and binding.

ACCESSORIES

In addition to the tubing-to-casing flow control available using the built-in closing sleeve, "L" Sliding Sleeves will also act as seats for a number of wireline-retrievable flow control products.

As may be seen by comparing the upper portion of the sliding sleeve with upper portions of Models "F" and "J" Seating Nipples (See Page 745) every BFC Model "L" Sliding Sleeve contains a built-in non-ported seating nipple at no additional cost. This upper sub contains a locking groove/shoulder combination (for both selective and NoGo-type locks) and a super-smooth sealing bore, which is continued in the lower sub to accept those wireline products that seal off both above and below the ports. Figure III-3 shows some of the wireline flow control devices that can be seated in BFC Sliding Sleeves. NOTE: When a wireline product is landed in a Model "L" Sliding Sleeve using a Model "E" Selective Running Tool (See Page 755) the running tool must be dressed so that only the down-facing locks will open during the initial setting operation. When the wireline product is run on a Model "C" Running Tool with the locks trailing, the running tool must be dressed with a locating ring so that it will seat on the NoGo shoulder in the upper end of the sliding sleeve. Thus BFC Sliding Sleeves may be used as a part of a totally-selective system, or in a system that includes the added assurances of NoGo locking.

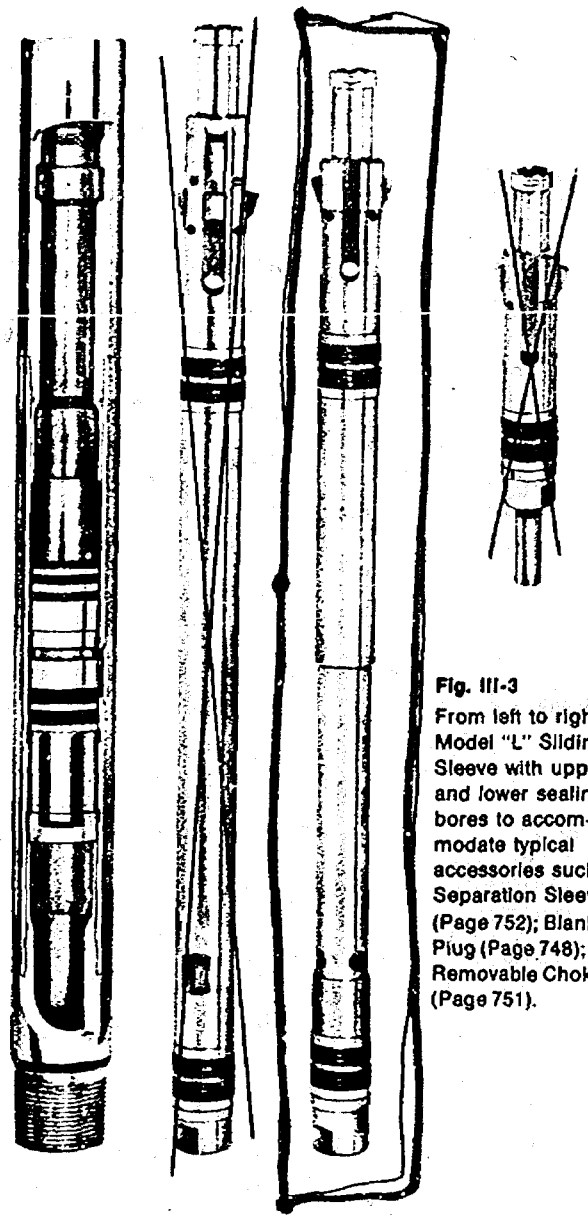


Fig. III-3
From left to right: Model "L" Sliding Sleeve with upper and lower sealing bores to accommodate typical accessories such as Separation Sleeve (Page 752); Blanking Plug (Page 748); and Removable Choke (Page 751).

AVAILABILITY

The Seal Bore Availability Chart on Page 760 used in conjunction with the Seal Bore Selector on Page 758 makes it easy to select just the right BFC Model "L" Sliding Sleeve for virtually any downhole flow control operation.

Case No. 7312, July 29, 1981
Phillips Exhibit 15, page 2

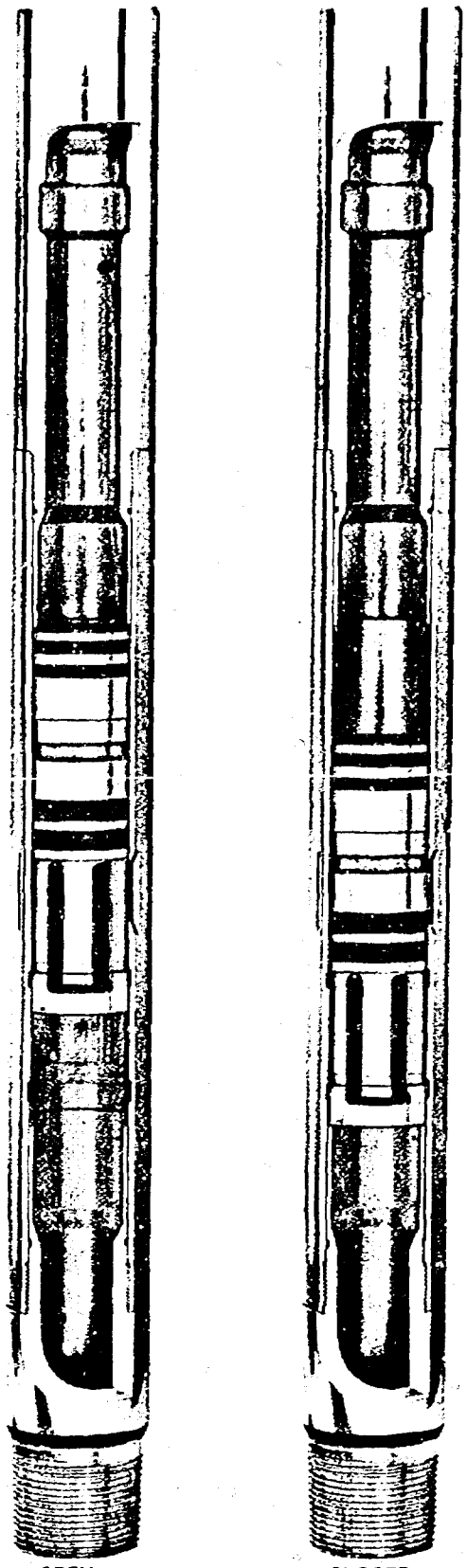


Fig. III-1
BFC Model "L" Sliding Sleeve
Product No. 810-04

BFC MODEL "L" SLIDING SLEEVE

Product No. 810-04

BFC Model "L" Sliding Sleeves effectively control fluid communication between the tubing and casing annulus with a degree of convenience and reliability formerly expected of well-head valves only.

USE: Sliding sleeves may be used to establish tubing-to-annulus communication for such operations as:

1. Displacing fluids after the well is flanged up;
2. Selective testing, treating and producing zones in a single-string multi-zone selective well;
3. Using the tubing to "kick off" the annulus in a tubing/annulus dual completion;
4. Confluent production;
5. Killing a well by circulating without disturbing the well-head connections;
6. Gas lifting.

FEATURES/ADVANTAGES

Simple, Positive Control. With a BFC Sliding Sleeve, establishing or closing off tubing-to-casing annulus communication is simple, dependable and quick. This type of product makes it possible to close the ports without leaving any obstruction in the tubing once the shifting operation is completed. The Baker Shifting Tool is described on Page 756.

Protected Closing Sleeve. The area in which the closing sleeve moves is recessed so that there is no danger of opening or closing the ports by mistake while running another wireline tool through or while seating a flow control device in the sliding sleeve.

Run in Tandem. Any number of BFC Sliding Sleeves may be run in tandem and still accept wireline flow control devices. BFC selective-type locks will pass through as many of the sleeves as the operator chooses and seat in any sleeve he selects.

BFC SLEEVES WORK WHEN OTHERS FAIL

The key to the overwhelming success of BFC Sliding Sleeves is in the closing sleeve with its specially designed sets of seals. The location of the seals, the size and shape of the seals, even the composition and fabrication of the seals—these and other refinements constitute a major innovation in closing sleeves. As shown in our extensive testing and qualification program, failure of sleeves to work properly falls into two categories: (1) sticking or binding of the closing sleeve, and (2) leaking due to damaged seals. The five diagrams in Fig. III-2 illustrate some of the reasons the BFC seal design works so well.

Fines and Solids Can't Build Up. Seals are located close to the ports, reducing the areas in which solids can build up to wedge or bind the sleeve. As the closing sleeve shifts, any buildup is sheared out.

BAKER PACKERS
Leaders in Oil and Gas Well Completions

FLOW CONTROL EQUIPMENT
EQUALIZING CHECK VALVES AND CHOKES

BFC EQUALIZING CHECK VALVES

Gas lift systems, installations employing plungers or free pistons, and wells to be perforated prior to remedial work often require the use of check valves that will permit upward but not downward flow in the tubing. There is a BFC Equalizing Check Valve to perform this function at any point in virtually any tubing string. The check valves described on this page are for use with BFC Seating Nipples or Sliding Sleeves; check valves for seating and sealing off in the tubing ID are shown on Page 757.

All of the valves described below feature chevron packing for maximum dependability and have equalizing devices that can be opened for quick and easy equalizing of pressure across the tools before retrieving. Models "FB-2" and "RB-2" Check Valves are complete units (not control bottoms) used to run and land in "F" and "R" Seating Nipples, respectively. The "FB-2" seats on the top NoGo shoulder of an "F" Nipple, and the "RB-2" Valve seats on the bottom NoGo shoulder of an "R" Nipple. Both NoGo shoulders prevent downward movement, but the valves are not locked into the nipples to prevent upward movement.

The "V" valve differs from B-type valves in that it is locked into the nipple or sleeve. It cannot be run with a BFC Model "S" Lock because the ball cannot be held off the seat during running and landing. (The ball and seat design would prevent the upward movement required to land an "S" Lock.)

Fig. III-26
Model "V" Equalizing Check Valve

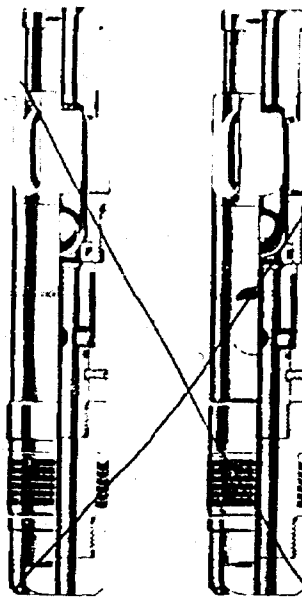


Fig. III-27
Model "FB-2" Equalizing Check Valve

Fig. III-28
Model "RB-2" Equalizing Check Valve

"FWV" Equalizing Check Valve, Product No. 809-03
"RZV" Equalizing Check Valve, Product No. 809-04
"FB-2" Equalizing Check Valve, Product No. 809-35
"RB-2" Equalizing Check Valve, Product No. 809-36

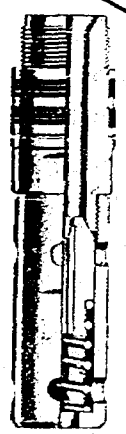


Fig. III-29
Model "Y" Circulating Choke Bottom With Ceramic Bean

Fig. III-30
Model "D" Choke Bottom With Ceramic Bean

Fig. III-31
Model "T" Circulating Choke Bottom

Fig. III-32
Model "C" Choke Bottom

BFC CHOKES

BFC Chokes restrict fluid flow in a tubing string for various operations such as:

1. reducing gas-oil ratios under some conditions;
2. preventing freezing of surface controls;
3. prolonging the flowing life of a well by maintaining bottom hole pressure; and
4. lessening water encroachment.

Models "T" and "Y" Chokes are held open for fluid bypass to simplify running and landing.

The BFC Chokes shown here use chevron-type packing for the choke-to-nipple (or sleeve) sealoff.

All "C" and "T" Model Chokes have steel flow beans, and all "D" and "Y" Model Chokes have ceramic flow beans for maximum life.

Fig. III-14
Model "S" Locking Device

Fig. III-15
Model "W" Locking Device

Fig. III-16
Model "Z" Locking Device

BFC PACKING ASSEMBLY FOR "S", "W", AND "Z" LOCKS

The standard packing assembly used to pack off the various BFC flow control devices in seating nipples and sliding sleeves on "S", "W", and "Z" Locks is made up of an API Crossover Packing Mandrel and a set of six chevron-type seals arranged as shown below.

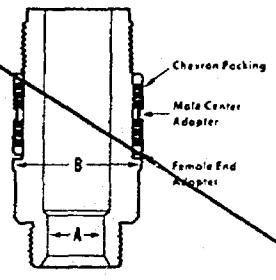


Fig. III-17

DIMENSIONAL DATA

Size	A	B
1.18	0.438	1.177
1.25		
1.43	0.500	1.427
1.50		
1.56	0.750	1.552
1.62		
1.78	0.875	1.771
1.81		1.802
1.87		
2.25		2.240
2.31		
2.75	1.000	2.740
2.81		
3.68		3.678
3.81		3.802

BFC "W" & "Z" LOCKS

The Model "W" is a top-NoGo lock for use in a Model "F" or Model "J" Seating Nipple or a Model "L" Sliding Sleeve. The Model "Z" is a bottom-NoGo lock used with a Model "R" or Model "N" Seating Nipple.

These locks have standard-design external fishing necks and may be used with any of the BFC Blanking Plugs, Chokes, Equalizing Check Valves, etc. shown on the following pages.

BFC "W" and "Z" Locks are run with a BFC Model "C-1" Running Tool equipped with a BFC Model "A" Shank. A "B" Probe on a standard pulling tool (long core, short reach) will retrieve either lock.

"W-2" AND "Z-2" SPECIFICATIONS

Seal Bore Size	Fishing Neck OD	Fishing Neck ID	Model "W-2" Lock NoGo OD	Model "Z-2" Lock Max. OD	"C-1" Running Tool Size & Mod. "A" Shank Size	Pulling Tool		Mod. "B" Releasing Probe Size	Maximum Equalizing Prong OD
						Otis	Camco		
1.18[1]	0.875	0.500	1.240	1.177	1.660	40RB11 or 40SM4[1]		1.660	1/4
1.25			Special	N/A					
1.43	1.188	0.750	1.490	1.427	1.900—2-1/16	40RB14 or 40SB6[1]	JUC15174 or JDC15154	1.900	7/16
1.50			Special	N/A					
1.56			1.615	1.552		40RB14, 40RB21, 40SB6 or 40SB8		2-1/16	
1.62			Special	Not Available					
1.78	1.375	0.875	1.855	1.771	2-3/8	40RB17 or 40SB1		2-3/8	1/2
1.81				1.802					
1.87			1.928[2]	N/A					
2.25	1.750	1.188	2.302	2.240	2-7/8	40RB18 or 40SB2		2-7/8	3/4
2.31			2.365[2]	N/A					
2.75[1]	2.313	1.438	2.802	2.740	3-1/2	40RB19 or 40SB7[3]	JUC15180[3] or JDC15160[3]	3-1/2	15/16
2.81[1]			2.865	N/A					
3.68[1]	3.125	2.062	3.740	3.678	4-1/2	40RB20[3] or 40SB10[3]	JUC15182[3] or JDC15162[3]	4-1/2	1-1/4
3.81[1]			3.875	3.802					

[1]Available in Models W and Z only [2]Diameter over OD's tubing should be drifted before running
[3]Check OD of these tools before running through the given seal bore size

BFC "S" LOCK

The BFC Model "S" is a selective lock for use in a Model "F" or a Model "J" Seating Nipple or a Model "L" Sliding Sleeve. It is described as selective because it can be run through any number of seating nipples or sliding sleeves until the selected seating location is reached.

This lock has a standard-design external fishing neck and can be used with the various types of BFC Blanking Plugs, Chokes, Equalizing Check Valves, etc. shown on the following pages.

A BFC "S" Lock is run with a BFC Model "E" or Model "G" Running Tool or with a BFC Model "C-1" Running Tool and "A" Shank. An "A" or "AC" Probe on a standard pulling tool (long core, short reach) is used for retrieving.

"S-2" SPECIFICATIONS

Seal Bore Size	Fishing Neck OD	Fishing Neck ID	Maximum OD of Lock	Available Running Tool Models	Pulling Tool		Mod. "A" Releasing Probe Size	Maximum Equalizing Prong OD
					Otis	Camco		
1.18[1]	0.875	0.500	1.156	E,G,C-1[2]	40RB11 or 40SM4[2]		1.660	1.4
1.25[1]								
1.43	1.188	0.750	1.406	E,G,C-1[2]	40RB14 or 40SB6[2]	JUC15174 or JDC15154	1.900	7/16
1.50								
1.56			1.531		40RB14, 40RB21, 40SB6 or 40SB8		2-1/16	
1.62								
1.78	1.375	0.875	1.750		40RB17 or 40SB1	JUC15176 or JDC15156	2-3/8	1/2
1.81								
1.87								
2.25	1.750	1.188	2.188		40RB18 or 40SB2	JUC15178 or JDC15158	2-7/8	3/4
2.31								
2.75	2.313	1.438	2.688		40RB19 or 40SB7[2]	JUC15180[2] or JDC15160[2]	3-1/2	15/16
2.81								
3.68[1]	3.125	2.062	3.562	C-1,5[2]	40RB20[2] or 40SB10[2]	JUC15182[2] or JDC15162[2]	4-1/2	1-1/4
3.81[1]								

[1]Available in Model S-1 only [2]Run with Model A Shank [3]Check OD of these tools before running through the given seal bore size

Case No. 7312, July 29, 1981
Phillips Exhibit 13

MORROW AND ATOKA PRESSURES

OPERATOR	WELL NAME	LOCATION	FIELD	BHP	THP	CALC. BHP
Adams	Ann Con No. 1	Sec. 15, T-24-S, R-28-E	Malaga Atoka	7483		
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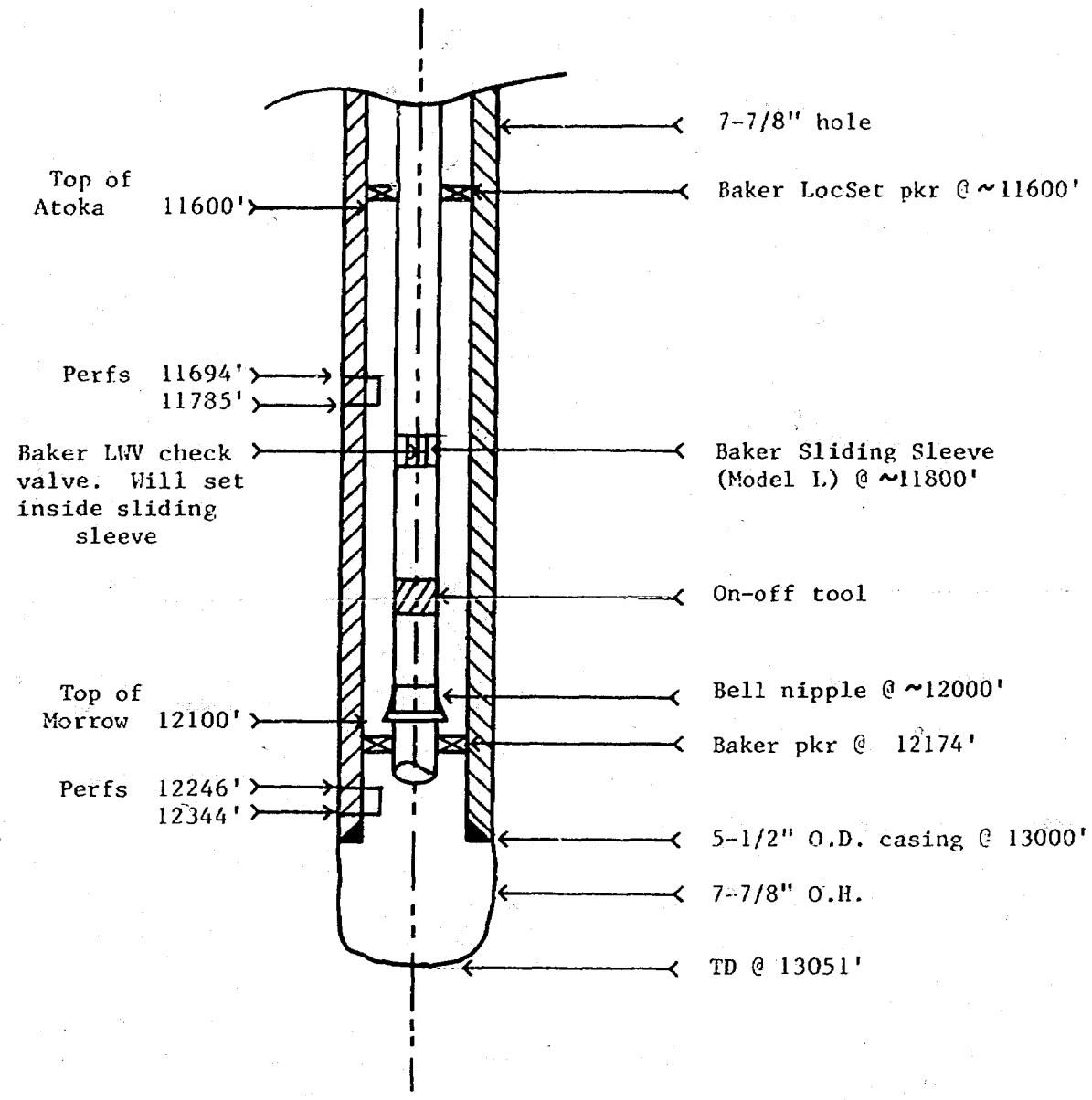
Aminoil	Willow Lake No. 2	Sec. 16, T-24-S, R-28-E	Malaga Morrow	7380		
Burman	Williams No. 1	Sec. 25, T-23-S R-28-E	Malaga Morrow	8221		
Burman	Willow Lake Unit No. 1	Sec. 22, T-24-S, R-28-E	Malaga Atoka	7608		
HNG	NM State No. 1	Sec. 16, T-24-S, R-28-E	Malaga West Morrow	3828		
HNG	Pardue No. 1	Sec. 34, T-23-S, R-28-E	Malaga Atoka		5255	6832
HNG	Williams No. 1	Sec. 35, T-23-S, R-28-E	Malaga Atoka		7019	9125
HNG	Woods No. 1	Sec. 9, T-24-S, R-28-E	Malaga Morrow		3269	4250
HNG	Woods No. 2	Sec. 9, T-24-S, R-28-E	Malaga Atoka		3992	5190
Maddox	Malaga No. 1	Sec. 3, T-24-S, R-28-E	Malaga Atoka	6110		
Maddox	Pardue No. 1	Sec. 27, T-23-S, R-28-E	Malaga Atoka	6672		
Phillips	Malaga "A" No. 1	Sec. 2, T-24-S, R-28-E	Malaga Morrow		2645	3439
Phillips	Malaga "A" No. 2	Sec. 2, T-23-S, R-28-E	Malaga Atoka		6100	7422
Phillips	Malaga "A" No. 2	Sec. 2, T-23-S, R-28-E	Malaga Morrow		2775	3638

Case No. 7312, July 29, 1981
Phillips Exhibit 14



NO.	REVISION	BY	DATE	CHKD	APP'D

FOR BIDS	PHILLIPS PETROLEUM COMPANY	AFE NO. / FILE CODE
FOR APPR	BARTLESVILLE, OKLAHOMA	
FOR CONST	PHILLIPS PETROLEUM COMPANY MALAGA-A No. 2 APPLICATION FOR EXCEPTION TO RULE 303(a) WELLBORE SKETCH	SCALE UNLESS OTHERWISE NOTED DWG NO. SH NO.
DRAWN 8-18-81		
CHECKED		
APP'D		

FORM 1779 6-76

PRINTED IN U.S.A.

Room for Growth. Ordinary seals, under heat and pressure, can swell with enough force to bind a sleeve. The BFC seals have a special profile that allows room for growth without binding.

Trapped Pressures Bleed Off. As the closing sleeve shifts, the area between the seals tends to trap pressures that might cause pressure-lock, but the BFC seal design assures bleedoff of these pressures.

Super-Smooth Bore. Seals tend to stick to sealing surfaces during periods of heat and pressure. The BFC super-smooth bore minimizes this possibility.

Seals Molded to Closing Sleeve Body. Damage caused by high-velocity, high-pressure flow across and behind non-bonded seals is eliminated by these molecularly-bonded closing sleeve seals.

In many field and laboratory tests, BFC sleeves were repeatedly opened and closed at high differential pressures without seal damage.

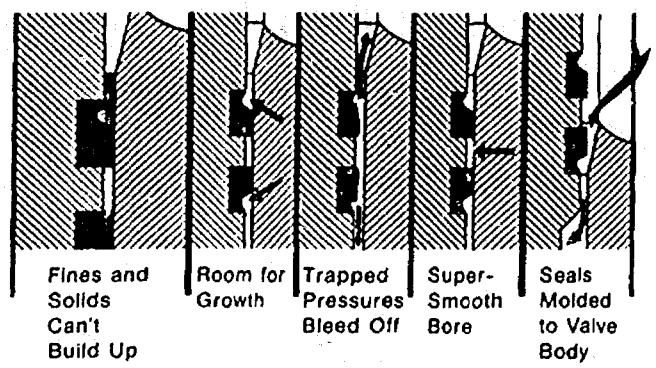


Fig. III-2
Seal design prevents sticking and binding.

ACCESSORIES

In addition to the tubing-to-casing flow control available using the built-in closing sleeve, "L" Sliding Sleeves will also act as seats for a number of wireline-retrievable flow control products.

As may be seen by comparing the upper portion of the sliding sleeve with upper portions of Models "F" and "J" Seating Nipples (See Page 745) every BFC Model "L" Sliding Sleeve contains a built-in non-ported seating nipple at no additional cost. This upper sub contains a locking groove/shoulder combination (for both selective and NoGo-type locks) and a super-smooth sealing bore, which is continued in the lower sub to accept those wireline products that seal off both above and below the ports. Figure III-3 shows some of the wireline flow control devices that can be seated in BFC Sliding Sleeves. NOTE: When a wireline product is landed in a Model "L" Sliding Sleeve using a Model "E" Selective Running Tool (See Page 755) the running tool must be dressed so that only the down-facing locks will open during the initial setting operation. When the wireline product is run on a Model "C" Running Tool with the locks trailing, the running tool must be dressed with a locating ring so that it will seat on the NoGo shoulder in the upper end of the sliding sleeve. Thus BFC Sliding Sleeves may be used as a part of a totally-selective system, or in a system that includes the added assurances of NoGo locking.

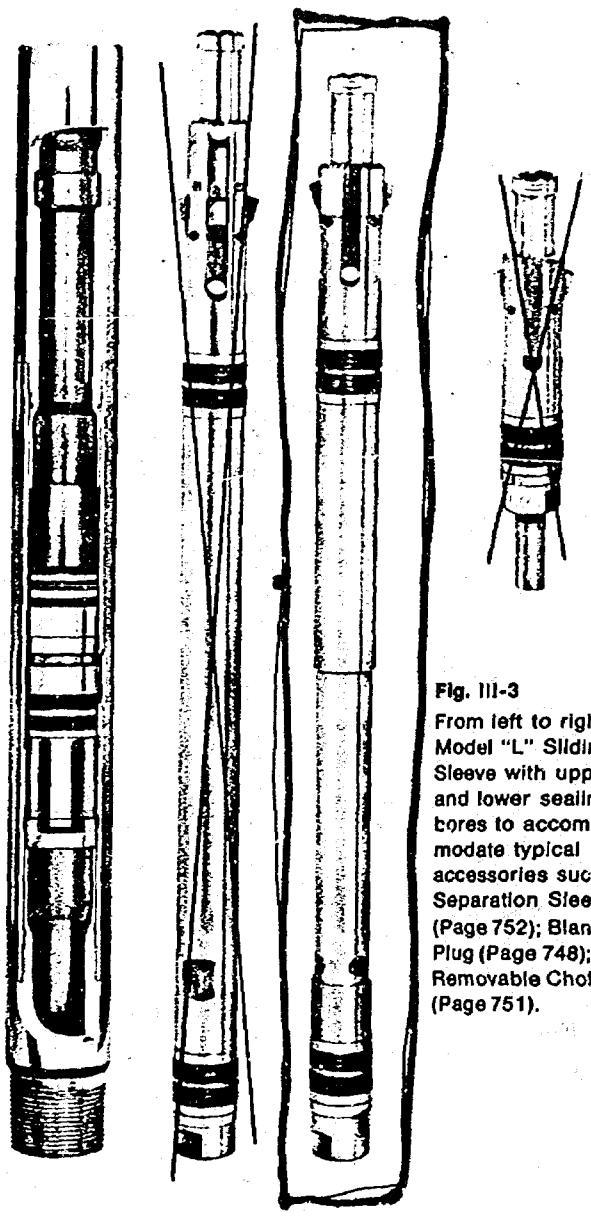


Fig. III-3
From left to right: Model "L" Sliding Sleeve with upper and lower sealing bores to accommodate typical accessories such as Separation Sleeve (Page 752); Blanking Plug (Page 748); and Removable Choke (Page 751).

AVAILABILITY

The Seal Bore Availability Chart on Page 760 used in conjunction with the Seal Bore Selector on Page 758 makes it easy to select just the right BFC Model "L" Sliding Sleeve for virtually any downhole flow control operation.

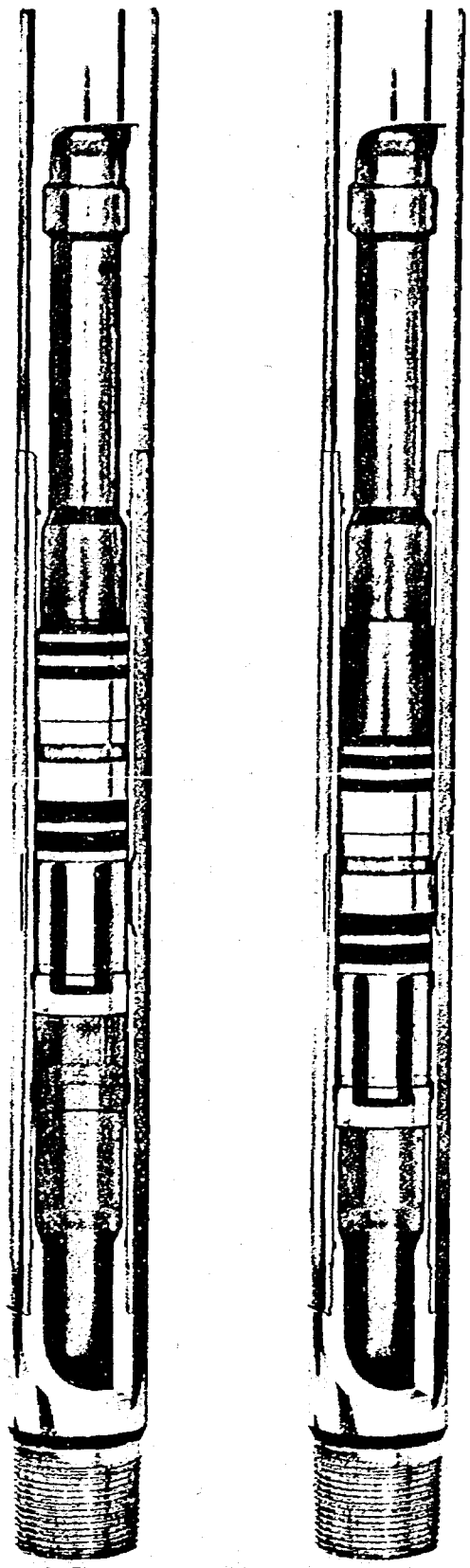


Fig. III-1
BFC Model "L" Sliding Sleeve
Product No. 810-04

BFC MODEL "L" SLIDING SLEEVE

Product No. 810-04

BFC Model "L" Sliding Sleeves effectively control fluid communication between the tubing and casing annulus with a degree of convenience and reliability formerly expected of well-head valves only.

USE: Sliding sleeves may be used to establish tubing-to-annulus communication for such operations as:

1. Displacing fluids after the well is flanged up;
2. Selective testing, treating and producing zones in a single-string multi-zone selective well;
3. Using the tubing to "kick off" the annulus in a tubing/annulus dual completion;
4. Confluent production;
5. Killing a well by circulating without disturbing the well-head connections;
6. Gas lifting.

FEATURES/ADVANTAGES

Simple, Positive Control. With a BFC Sliding Sleeve, establishing or closing off tubing-to-casing annulus communication is simple, dependable and quick. This type of product makes it possible to close the ports without leaving any obstruction in the tubing once the shifting operation is completed. The Baker Shifting Tool is described on Page 756.

Protected Closing Sleeve. The area in which the closing sleeve moves is recessed so that there is no danger of opening or closing the ports by mistake while running another wireline tool through or while seating a flow control device in the sliding sleeve.

Run in Tandem. Any number of BFC Sliding Sleeves may be run in tandem and still accept wireline flow control devices. BFC selective-type locks will pass through as many of the sleeves as the operator chooses and seat in any sleeve he selects.

BFC SLEEVES WORK WHEN OTHERS FAIL

The key to the overwhelming success of BFC Sliding Sleeves is in the closing sleeve with its specially designed sets of seals. The location of the seals, the size and shape of the seals, even the composition and fabrication of the seals—these and other refinements constitute a major innovation in closing sleaves. As shown in our extensive testing and qualification program, failure of sleeves to work properly falls into two categories: (1) sticking or binding of the closing sleeve, and (2) leaking due to damaged seals. The five diagrams in Fig. III-2 illustrate some of the reasons the BFC seal design works so well.

Fines and Solids Can't Build Up. Seals are located close to the ports, reducing the areas in which solids can build up to wedge or bind the sleeve. As the closing sleeve shifts, any buildup is sheared out.

BFC EQUALIZING CHECK VALVES

Gas lift systems, installations employing plungers or free pistons, and wells to be perforated prior to remedial work often require the use of check valves that will permit upward but not downward flow in the tubing. There is a BFC Equalizing Check Valve to perform this function at any point in virtually any tubing string. The check valves described on this page are for use with BFC Seating Nipples or Sliding Sleeves; check valves for seating and sealing off in the tubing ID are shown on Page 757.

All of the valves described below feature chevron packing for maximum dependability and have equalizing devices that can be opened for quick and easy equalizing of pressure across the tools before retrieving. Models "FB-2" and "RB-2" Check Valves are complete units (not control bottoms) used to run and land in "F" and "R" Seating Nipples, respectively. The "FB-2" seats on the top NoGo shoulder of an "F" Nipple, and the "RB-2" Valve seats on the bottom NoGo shoulder of an "R" Nipple. Both NoGo shoulders prevent downward movement, but the valves are not locked into the nipples to prevent upward movement.

The "V" valve differs from B-type valves in that it is locked into the nipple or sleeve. It cannot be run with a BFC Model "S" Lock because the ball cannot be held off the seat during running and landing. (The ball and seat design would prevent the upward movement required to land an "S" Lock.)

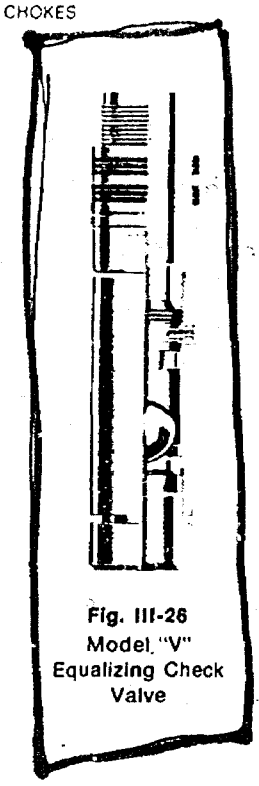


Fig. III-26
Model "V" Equalizing Check Valve

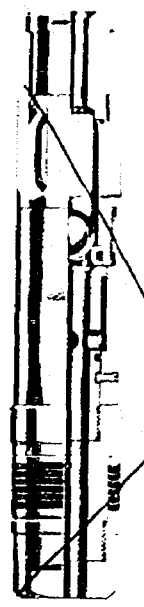


Fig. III-27
Model "FB-2" Equalizing Check Valve

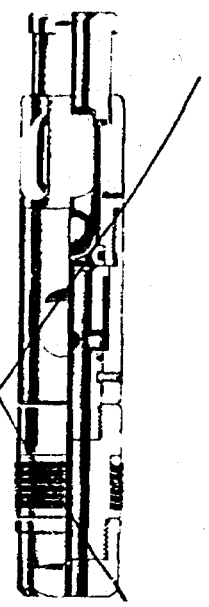


Fig. III-28
Model "RB-2" Equalizing Check Valve

"FWV" Equalizing Check Valve, Product No. 809-03
"RZV" Equalizing Check Valve, Product No. 809-04
"FB-2" Equalizing Check Valve, Product No. 809-35
"RB-2" Equalizing Check Valve, Product No. 809-36

Fig. III-29
Model "Y" Circulating Choke Bottom With Ceramic Bean

Fig. III-30
Model "D" Choke Bottom With Ceramic Bean

Fig. III-31
Model "T" Circulating Choke Bottom

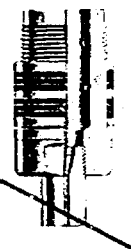


Fig. III-32
Model "C" Choke Bottom

BFC CHOKES

BFC Chokes restrict fluid flow in a tubing string for various operations such as:

1. reducing gas-oil ratios under some conditions;
2. preventing freezing of surface controls;
3. prolonging the flowing life of a well by maintaining bottom hole pressure; and
4. lessening water encroachment.

Models "T" and "Y" Chokes are held open for fluid bypass to simplify running and landing.

The BFC Chokes shown here use chevron-type packing for the choke-to-nipple (or sleeve) sealoff.

All "C" and "T" Model Chokes have steel flow beans, and all "D" and "Y" Model Chokes have ceramic flow beans for maximum life.

Case No. 7312, July 29, 1981
Phillips Exhibit 15, page 4

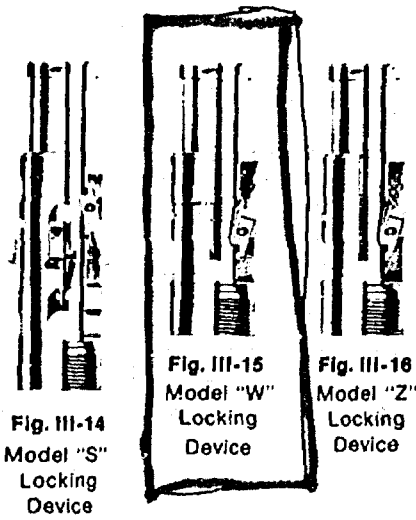


Fig. III-14 Model "S" Locking Device

Fig. III-15 Model "W" Locking Device

Fig. III-16 Model "Z" Locking Device

BFC PACKING ASSEMBLY FOR "S", "W", AND "Z" LOCKS

The standard packing assembly used to pack off the various BFC flow control devices in seating nipples and sliding sleeves on "S", "W", and "Z" Locks is made up of an API Crossover Packing Mandrel and a set of six chevron-type seals arranged as shown below.

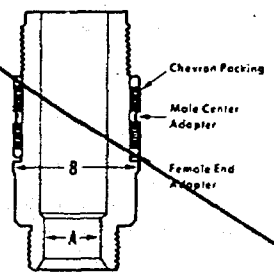


Fig. III-17

DIMENSIONAL DATA

Size	A	B
1.18	0.438	1.177
1.25		
1.43	0.500	1.427
1.50		
1.56	0.750	1.552
1.62		
1.78	0.875	1.771
1.81		1.802
1.87		
2.25		2.240
2.31		
2.75	1.000	2.740
2.81		
3.68		3.678
3.81		3.802

BFC "W" & "Z" LOCKS

The Model "W" is a top-NoGo lock for use in a Model "F" or Model "J" Seating Nipple or a Model "L" Sliding Sleeve. The Model "Z" is a bottom-NoGo lock used with a Model "R" or Model "N" Seating Nipple.

These locks have standard-design external fishing necks and may be used with any of the BFC Blanking Plugs, Chokes, Equalizing Check Valves, etc. shown on the following pages.

BFC "W" and "Z" Locks are run with a BFC Model "C-1" Running Tool equipped with a BFC Model "A" Shank. A "B" Probe on a standard pulling tool (long core, short reach) will retrieve either lock.

"W-2" AND "Z-2" SPECIFICATIONS

Seal Bore Size	Fishing Neck OD	Fishing Neck ID	Model "W-2" Lock NoGo OD	Model "Z-2" Lock Max. OD	"C-1" Running Tool Size & Mod. "A" Shank Size	Pulling Tool		Mod. "B" Releasing Probe Size	Maximum Equalizing Prong OD
						Otis	Camco		
1.18[1]	0.875	0.500	1.240	1.177	1.660	40RB11 or 40SM4[3]		1.660	1/4
1.25			Special	N/A					
1.43	1.188	0.750	1.490	1.427	1.900—2-1/16	40RB14 or 40SB6[3]	JUC15174 or JDC15154	1.900	7/16
1.50			Special	N/A					
1.56			1.615	1.552		40RB14, 40RB21, 40SB6 or 40SB8		2-1/16	
1.62			Special	Not Available					
1.78	1.375	0.875	1.865	1.771	2-3/8	40RB17 or 40SB1		2-3/8	1/2
1.81				1.802					
1.87			1.928[2]	N/A					
2.25	1.750	1.188	2.302	2.240	2-7/8	40RB18 or 40SB2		2-7/8	3/4
2.31			2.365[2]	N/A					
2.75[1]	2.313	1.438	2.802	2.740	3-1/2	40RB19 or 40SB7[3]	JUC15180[3] or JDC15160[3]	3-1/2	15/16
2.81[1]			2.865	N/A					
3.68[1]	3.125	2.062	3.740	3.678	4-1/2	40RB20[3] or 40SB10[3]	JUC15182[3] or JDC15162[3]	4-1/2	1-1/4
3.81[1]			3.875	3.802					

[1]Available in Models W and Z only. [2]Diameter over Drift. Tubing should be drifted before running. [3]Check OD of these tools before running through the given seal bore size.

BFC "S" LOCK

The BFC Model "S" is a selective lock for use in a Model "F" or a Model "J" Seating Nipple or a Model "L" Sliding Sleeve. It is described as selective because it can be run through any number of seating nipples or sliding sleeves until the selected seating location is reached.

This lock has a standard-design external fishing neck and can be used with the various types of BFC Blanking Plugs, Chokes, Equalizing Check Valves, etc. shown on the following pages.

A BFC "S" Lock is run with a BFC Model "E" or Model "G" Running Tool or with a BFC Model "C-1" Running Tool and "A" Shank. An "A" or "AC" Probe on a standard pulling tool (long core, short reach) is used for retrieving.

"S-2" SPECIFICATIONS

Seal Bore Size	Fishing Neck OD	Fishing Neck ID	Maximum OD of Lock	Available Running Tool Models	Pulling Tool		Mod. "A" Releasing Probe Size	Maximum Equalizing Prong OD
					Otis	Camco		
1.18[1]	0.875	0.500	1.158	E,G,C-1[2]	40RB11 or 40SM4[3]		1.660	1/4
1.25[1]								
1.43	1.188	0.750	1.406	E,G,C-1[2]	40RB14 or 40SB6[3]	JUC15174 or JDC15154	1.900	7/16
1.50								
1.56			1.531		40RB14, 40RB21, 40SB6 or 40SB8		2-1/16	
1.62								
1.78	1.375	0.875	1.750		40RB17 or 40SB1	JUC15176 or JDC15156	2-3/8	1/2
1.81								
1.87								
2.25	1.750	1.188	2.188		40RB18 or 40SB2	JUC15178 or JDC15158	2-7/8	3/4
2.31								
2.75	2.313	1.438	2.688		40RB19 or 40SB7[3]	JUC15180[3] or JDC15160[3]	3-1/2	15/16
2.81								
3.68[1]	3.125	2.067	3.562	C-1,G[2]	40RB20[3] or 40SB10[3]	JUC15182[3] or JDC15162[3]	4-1/2	1-1/4
3.81[1]								

[1]Available in Model S-1 only. [2]Run with Model "A" Shank. [3]Check OD of these tools before running through the given seal bore size.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
29 July 1981

EXAMINER HEARING

IN THE MATTER OF:

Application of Phillips Petroleum Company for downhole commingling, Eddy County, New Mexico. CASE 7312

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: Ernest L. Padilla, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: W. Thomas Kellahin, Esq.
KELLAHIN & KELLAHIN
500 Don Gaspar
Santa Fe, New Mexico 87501

I N D E X

E X H I B I T S

MR. STAMETS: Call next Case 7312.

MR. PADILLA: Application of Phillips Petroleum Company for downhole commingling, Eddy County, New Mexico.

MR. KELLAHIN: If the Examiner please, I'm Tom Kellahin of Santa Fe, New Mexico, appearing on behalf of the applicant, and I have one witness.

(Witness sworn.)

JERRY BLEVINS

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Would you please state your name and occupation, please, sir?

A. My name is Jerry Blevins. I'm Associate Petroleum Engineer for Phillips Petroleum in Odessa, Texas.

Q. Mr. Blevins, have you previously testified before the Commission and had your qualifications as a petroleum engineer accepted and made a matter of record?

A. Yes, sir.

Q. Have you made a study of the facts surrounding this application by Phillips?

A. Yes, sir, I have.

MR. KELLAHIN: We tender Mr. Blevins as an expert petroleum engineer.

MR. STAMETS: He is considered qualified.

Q. Mr. Blevins, let me direct your attention to what we've marked as Phillips' Exhibit Number One and have you identify the subject well and explain briefly what you're seeking to accomplish.

A. This is a lease plat of the subject Malaga Field, our Malaga No. 2, located in Section 2, the yellow arrow designation.

We are attempting to downhole commingle the Morrow and the Atoka zones. The Atoka wells you'll see colored in green. The Morrow wells you'll see colored in purple. Underneath each well you'll see two numbers, such as in our Malaga No. 2, 2.5 MM, which was the initial potential test, and the lower number is the cumulative production through December of '80.

Q. What is the proration unit assigned for the Atoka and the Morrow production from the Malaga 2-A Well?

A. It is considered the west half of Section 2.

Q. All right. That's at an unorthodox location, is it not, Mr. Blevins?

A. Yes, sir, it is.

Q. And that's been previously approved by the Division, has it not?

A. Yes, sir.

Q. And what is that order number?

A. R-6321.

Q. All right, sir, with regards to the proposed downhole commingling of Atoka and Morrow production, is the ownership in the west half common for those two formations?

A. Yes, sir, it is.

Q. All right. Why are you seeking to do this, Mr. Blevins?

A. Basically, we attempted to complete -- the well was drilled as an Atoka test to the Morrow. We tested Atoka. It was not the commercial production of the Atoka wells just to the north of us. We made 150, 200 Mcf of gas a day out there, where these wells came in at 22 million. So we decided to go down to the Morrow.

Our Morrow test was 2.5 MM. The well is flowing probably 1500 Mcf a month right now. So it's not as good as what we had anticipated. By commingling the wells we can economically shorten the life, total life of the well

without hurting either zone, increase our total production from the wells, and that's why we seek this application.

Q. In the absence of downhole commingling would there be hydrocarbons left in either formation that would not be recovered?

A. Yes, sir.

Q. And in your opinion both of these formations constitute marginal production formations?

A. Yes, sir.

Q. All right, sir. Let's turn to Exhibit Number Two and have you identify that.

A. Exhibit Number Two is according to the rules of commingling, we give our lease name with the well number, the well location, the upper zone, which is the Malaga Atoka. We squeezed off and we went down to complete in the Morrow but since completing in the Morrow the squeeze cement job has started leaking and we have production possibilities out of the Atoka there. The completion interval, that's the gross fluid interval where we are completed in the Atoka. The lower zone is in the Morrow, again the gross interval.

Q. You're going to continue to produce the Morrow up the tubing under the packer?

A. Underneath the packer, yes, sir.

Q. All right, and how will you produce the Atoka?

A. We're going to open a sliding sleeve.

Q. In the tubing?

A. In the tubing. It sits right above the packer. That's where our initial completion would be to see how well we did on the flow line. It would determine the stimulation proceedings we needed after that.

Q. All right, sir. Do either of these formations make any liquid?

A. No, sir.

Q. Let's go to --

MR. STAMETS: I believe Exhibit Two shows the Morrow makes 5 barrels of water a day.

A. That came in and that's our latest well test and I have to take our field report, but they have not made any fluid, and it made that 5 barrels and that was all that was turned in for the whole month. So we haven't seen any fluid come in besides that 5 barrels.

Q. All right, sir, Exhibit Number Three, is it? What's that last one you looked at?

A. This is Two. This one is Three.

Q. I don't have them in the same order. Turn to Exhibit Number Three and identify that for me, please.

A. This is a sketch of the wellbore, a wellbore schematic, showing the casings, where they set, where we've got our cement to. It has the Atoka perfs that were squeezed off listed, the Morrow perfs, which are open, the packer depth that is set right above the Morrow perforations, where the casing, how deep we drilled. Basically this is to show what we would have and how we would complete it, opening the sliding sleeve, which is right above the packer, does not work and we have -- we decide to go in, we would go in and remove the packer totally and lower the -- lower the tubing down below the bottom set of Morrow perfs to increase our flow rates.

Q. Let's go back to Exhibit Number Two. Let me direct your attention back to Exhibit Number Two, Mr. Blevins, and if you'll explain to me the bottom hole calculations of pressures indicated in paragraphs ten and eleven on that exhibit.

A. Okay. What we do, we take a shut-in wellhead pressures on each side of the -- on the casing and on the tubing. From this we use a computer program and calculate what our bottom hole pressures would be, and the calculated bottom hole pressures from the upper zone is almost to absolute reservoir pressure due to the long being shut in.

Q. All right, let me ask you about that.

Your calculated bottom hole pressure on the Atoka shows 7422 pounds.

A. Yes, sir.

Q. How long a period of time did it take you to build up the pressure in the Atoka to obtain that amount?

A. We're looking at six or seven weeks, the difference in the time when we first tested down in the Morrow and what we shut the well in at.

Q. Based upon your experience, do you have an opinion as to what would be the pressure differential between the two formations in a producing state?

A. Relatively none. The difference would be in the difference in the depths of the formations and that would be essentially all. They're both going to flow at approximately 200 to 250 pounds bottom hole flowing pressure.

Q. In your opinion is there a significant differential between the two formations that would cause gas to migrate out of one formation into the other?

A. No, sir.

Q. All right, let's go on to Exhibit Number Four. Exhibit Number Four is a copy of the log.

A. Yes, it's a copy of the log that we had that we turned in to the State.

Q. All right, sir. Exhibit Number Five.

A. This is a production graph on our Malaga "A". This is the Morrow production. We had three points on there, the test data we had back in January, and then production when we went on-stream and El Paso connected us, and in May and June we had production. This is total Mcf per month and this latest two months that we have on the well.

Q. All right, Exhibit Number Six.

A. Exhibit Six is just the detail of the total production as has been made as required by the rules.

Q. All right, sir, Exhibit Number Seven?

A. Number Seven is a production, 4-point pressure test on the Malaga Morrow. It's a 4-point that we turn in to the State. It was the initial test indicating that the absolute open flow was 1066 Mcf a day. The surface pressure was, shut-in, was 2788.2; flowing pressures are going to be around 1000 pounds in the tubing.

Q. All right.

A. The flow rates that we had were 700 to 800 Mcf a day.

The second page of it is just the calculation in graphic scale.

Q. All right, sir, Exhibit Number Eight.

A. This one is the Malaga Atoka. It's a

1-point test just recently taken in the middle of this month for this hearing. We flowed it at 118 Mcf a day up the casing. The pressure was about 400 pounds flowing up the casing. We would have a greater amount of flow rate up the tubing due to diameter differences.

Q. Have you made any calculations to show us what the flow rate up the tubing would be?

A. I have an estimation. It would be approximately 200 Mcf a day.

Q. All right, sir, when I asked you that question awhile ago on the pressure differentials, your answer is based on your study of this data and other data?

A. Yes, sir, it is.

Q. All right. Let's go to Exhibit Number Nine.

A. These are gas samples taken from the Malaga Morrow and the Malaga Atoka to show the compatibility of the fluids. In the Atoka zone we have 97-1/2 percent methane. In the Morrow we have 97.3 percent methane, so basically the gases coming out of each zone are the same, basic BTU contents are the same, so they should be compatible in all respects.

Q. All right, sir, Exhibit Number Ten.

A. Exhibit Ten is the economics of the com-

mingling.

Case One was the commingled example, the gas that we would produce and the cash flow in constant dollars for the years that we produced.

Case Two showed the individual production where we would produce the Atoka -- produce the Morrow to depletion and then produce the Atoka to depletion.

Based on this we would have an increase of reserves of almost 12-million cubic feet and an increase in cash flow of about $44,650.

Q. Increase in reserves is reserves from both the Atoka and Morrow?

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Q. So approval of this application will not only result in an economic advantage, it will result in the production of additional gas that would not otherwise be produced.

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Q. Is that your recommendation to the Examiner of a percentage split between the formations for allocation purposes?

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A. Yes, sir, and 54 for the Atoka.

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tive rights?

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Q. Were Exhibits One through Twelve prepared by you or compiled under your direction and supervision?

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BY MR. STAMETS:

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The shut-in pressure after 40 hours was 6400 pounds. It built up considerably after we did shut it in.

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or so, it would be about 125 - 130 pounds on the tubing.

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Morrow zone, that they would approach the same pressures.

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A. The flowing pressures, yes, sir.

Q. Now there the shut-in pressure on the Atoka is 6100 pounds.

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Q. It still appears to be a --

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The Atoka zone had been shut-in for these seven weeks where this test on the Morrow was taken for the State and so we could get connected to El Paso.

If we were to shut-in for seven weeks on the Morrow, you would see approximately the same pressures at the surface. You'd also see approximately the same pressures at bottom hole.

Q. Do you have any evidence which would demonstrate that?

A. Basically what, when we drilled through

the area, the guidelines that we used to drill, we find the bottom hole pressures over there -- there's an over pressure zone, so we watch for that. We plot the over pressure, the pressures of the other wells around in the area versus their depths, and it -- they're very consistent with each other on these plots.

Q. Do you have anything that shows that, any drill stem tests, any pressure build-up projections?

A. Not with me, no, sir.

Q. Do you have anything that you could furnish us which would confirm that conclusion?

A. Just those plots of the wells where we measured the bottom hole pressures that were calculated on the other wells prior to drilling. That would be all I'd have, because I haven't run any well test on these wells yet.

Q. Without something along those lines which would confirm that the pressure differential is not as great as it seems, I think it would be difficult to approve this application, or at least approve it without requiring a bridge plug until those pressures became more compatible.

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Q. I'm certain of that.

A. We could, you know, again, you know, once we open, I think you'd see that the pressures, the flowing pressures of the wells themselves would be consistent with each other.

MR. KELLAHIN: If the Examiner please, perhaps subsequent to the hearing we could submit you additional information that would help document Mr. Blevins opinion that the pressure differential is not going to cause problems in this well.

MR. STAMETS: Okay, we'll hold the record open for that additional data which would be supportive of his testimony.

Any other questions of this witness?

Q. Oh, one other question, Mr. Blevins. What's the depth of the sliding sleeve?

A. It's 2-foot above the packer. Just a second I'll tell you. That's just the length of it. It sets right above where the packer is. The packer is at 12,174, so I'd say approximately 12,170.

Q All right.

MR. STAMETS: If there is nothing further, the witness may be excused and the case will be taken under advisement.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 7312 heard by me on 7-29 19 87.

Richard L. Stamm, Examiner
Oil Conservation Division

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
29 July 1981

EXAMINER HEARING

IN THE MATTER OF:

Application of Phillips Petroleum Company for downhole commingling, Eddy County, New Mexico. CASE 7312

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: Ernest L. Padilla, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: W. Thomas Kellahin, Esq.
KELLAHIN & KELLAHIN
500 Don Gaspar
Santa Fe, New Mexico 87501

I N D E X

E X H I B I T S

MR. STAMETS: Call next Case 7312.

MR. PADILLA: Application of Phillips Petroleum Company for downhole commingling, Eddy County, New Mexico.

MR. KELLAHIN: If the Examiner please, I'm Tom Kellahin of Santa Fe, New Mexico, appearing on behalf of the applicant, and I have one witness.

(Witness sworn.)

JERRY BLEVINS

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Would you please state your name and occupation, please, sir?

A. My name is Jerry Blevins. I'm Associate Petroleum Engineer for Phillips Petroleum in Odessa, Texas.

Q Mr. Blevins, have you previously testified before the Commission and had your qualifications as a petroleum engineer accepted and made a matter of record?

A. Yes, sir.

Q. Have you made a study of the facts surrounding this application by Phillips?

A. Yes, sir, I have.

MR. KELLAHIN: We tender Mr. Blevins as an expert petroleum engineer.

MR. STAMETS: He is considered qualified.

Q. Mr. Blevins, let me direct your attention to what we've marked as Phillips' Exhibit Number One and have you identify the subject well and explain briefly what you're seeking to accomplish.

A. This is a lease plat of the subject Malaga Field, our Malaga No. 2, located in Section 2, the yellow arrow designation.

We are attempting to downhole commingle the Morrow and the Atoka zones. The Atoka wells you'll see colored in green. The Morrow wells you'll see colored in purple. Underneath each well you'll see two numbers, such as in our Malaga No. 2, 2.5 MM, which was the initial potential test, and the lower number is the cumulative production through December of '80.

Q. What is the proration unit assigned for the Atoka and the Morrow production from the Malaga 2-A Well?

A. It is considered the west half of Section 2.

Q All right. That's at an unorthodox location, is it not, Mr. Blevins?

A. Yes, sir, it is.

Q And that's been previously approved by the Division, has it not?

A. Yes, sir.

Q And what is that order number?

A. R-6321.

Q All right, sir, with regards to the proposed downhole commingling of Atoka and Morrow production, is the ownership in the west half common for those two formations?

A. Yes, sir, it is.

Q All right. Why are you seeking to do this, Mr. Blevins?

A. Basically, we attempted to complete -- the well was drilled as an Atoka test to the Morrow. We tested Atoka. It was not the commercial production of the Atoka wells just to the north of us. We made 150, 200 Mcf of gas a day out there, where these wells came in at 22 million. So we decided to go down to the Morrow.

Our Morrow test was 2.5 MM. The well is flowing probably 1500 Mcf a month right now. So it's not as good as what we had anticipated. By commingling the wells we can economically shorten the life, total life of the well

without hurting either zone, increase our total production from the wells, and that's why we seek this application.

Q. In the absence of downhole commingling would there be hydrocarbons left in either formation that would not be recovered?

A. Yes, sir.

Q. And in your opinion both of these formations constitute marginal production formations?

A. Yes, sir.

Q. All right, sir. Let's turn to Exhibit Number Two and have you identify that.

A. Exhibit Number Two is according to the rules of commingling, we give our lease name with the well number, the well location, the upper zone, which is the Malaga Atoka. We squeezed off and we went down to complete in the Morrow but since completing in the Morrow the squeeze cement job has started leaking and we have production possibilities out of the Atoka there. The completion interval, that's the gross fluid interval where we are completed in the Atoka. The lower zone is in the Morrow, again the gross interval.

Q. You're going to continue to produce the Morrow up the tubing under the packer?

A. Underneath the packer, yes, sir.

Q. All right, and how will you produce the Atoka?

A. We're going to open a sliding sleeve.

Q. In the tubing?

A. In the tubing. It sits right above the packer. That's where our initial completion would be to see how well we did on the flow line. It would determine the stimulation proceedings we needed after that.

Q. All right, sir. Do either of these formations make any liquid?

A. No, sir.

Q. Let's go to --

MR. STAMETS: I believe Exhibit Two shows the Morrow makes 5 barrels of water a day.

A. That came in and that's our latest well test and I have to take our field report, but they have not made any fluid, and it made that 5 barrels and that was all that was turned in for the whole month. So we haven't seen any fluid come in besides that 5 barrels.

Q. All right, sir, Exhibit Number Three, is it? What's that last one you looked at?

A. This is Two. This one is Three.

Q. I don't have them in the same order. Turn to Exhibit Number Three and identify that for me, please.

A. This is a sketch of the wellbore, a wellbore schematic, showing the casings, where they set, where we've got our cement to. It has the Atoka perfs that were squeezed off listed, the Morrow perfs, which are open, the packer depth that is set right above the Morrow perforations, where the casing, how deep we drilled. Basically this is to show what we would have and how we would complete it, opening the sliding sleeve, which is right above the packer, does not work and we have -- we decide to go in, we would go in and remove the packer totally and lower the -- lower the tubing down below the bottom set of Morrow perfs to increase our flow rates.

Q. Let's go back to Exhibit Number Two. Let me direct your attention back to Exhibit Number Two, Mr. Blevins, and if you'll explain to me the bottom hole calculations of pressures indicated in paragraphs ten and eleven on that exhibit.

A. Okay. What we do, we take a shut-in wellhead pressures on each side of the -- on the casing and on the tubing. From this we use a computer program and calculate what our bottom hole pressures would be, and the calculated bottom hole pressures from the upper zone is almost to absolute reservoir pressure due to the long being shut in.

Q. All right, let me ask you about that.

Your calculated bottom hole pressure on the Atoka shows 7422 pounds.

A. Yes, sir.

Q. How long a period of time did it take you to build up the pressure in the Atoka to obtain that amount?

A. We're looking at six or seven weeks, the difference in the time when we first tested down in the Morrow and what we shut the well in at.

Q. Based upon your experience, do you have an opinion as to what would be the pressure differential between the two formations in a producing state?

A. Relatively none. The difference would be in the difference in the depths of the formations and that would be essentially all. They're both going to flow at approximately 200 to 250 pounds bottom hole flowing pressure.

Q. In your opinion is there a significant differential between the two formations that would cause gas to migrate out of one formation into the other?

A. No, sir.

Q. All right, let's go on to Exhibit Number Four. Exhibit Number Four is a copy of the log.

A. Yes, it's a copy of the log that we had that we turned in to the State.

Q. All right, sir. Exhibit Number Five.

A. This is a production graph on our Malaga "A". This is the Morrow production. We had three points on there, the test data we had back in January, and then production when we went on-stream and El Paso connected us, and in May and June we had production. This is total Mcf per month and this latest two months that we have on the well.

Q. All right, Exhibit Number Six.

A. Exhibit Six is just the detail of the total production as has been made as required by the rules.

Q. All right, sir, Exhibit Number Seven?

A. Number Seven is a production, 4-point pressure test on the Malaga Morrow. It's a 4-point that we turn in to the State. It was the initial test indicating that the absolute open flow was 1066 Mcf a day. The surface pressure was, shut-in, was 2788.2; flowing pressures are going to be around 1000 pounds in the tubing.

Q. All right.

A. The flow rates that we had were 700 to 800 Mcf a day.

The second page of it is just the calculation in graphic scale.

Q. All right, sir, Exhibit Number Eight.

A. This one is the Malaga Atoka. It's a

1-point test just recently taken in the middle of this month for this hearing. We flowed it at 118 Mcf a day up the casing. The pressure was about 400 pounds flowing up the casing. We would have a greater amount of flow rate up the tubing due to diameter differences.

Q. Have you made any calculations to show us what the flow rate up the tubing would be?

A. I have an estimation. It would be approximately 200 Mcf a day.

Q. All right, sir, when I asked you that question awhile ago on the pressure differentials, your answer is based on your study of this data and other data?

A. Yes, sir, it is.

Q. All right. Let's go to Exhibit Number Nine.

A. These are gas samples taken from the Malaga Morrow and the Malaga Atoka to show the compatibility of the fluids. In the Atoka zone we have 97-1/2 percent methane. In the Morrow we have 97.3 percent methane, so basically the gases coming out of each zone are the same, basic BTU contents are the same, so they should be compatible in all respects.

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mingling.

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Sally W. Boyd CSR

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. _____, heard by me on _____ 19____.

_____, Examiner
Oil Conservation Division

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

R-28-E

R-29-E

T 23 S

27

Maddox
I-Pardue
1.7 MM
0.3 BCF

Maddox
I-Pardue
10.2 MM
3.9 BCF

26

Amoco
I-Pardue
11.0 MM
3.8 BCF

Phillips 4.69 %

25

Amoco
Williams I-C
2.9 MM
0.3 BCF

Amoco

Phillips

34

HNG
I-Pardue
5.4 MM
1.5 BCF

Phillips 21.88 %

35

HNG
I-Williams
5.6 MM
2.4 BCF

Phillips 35.35 %

HNG
2-Williams
22 MM
1.2 BCF

Phillips 1.56 %

Phillips

36

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
Phillips EXHIBIT NO. 1
CASE NO. 7312
Submitted by _____
Hearing Date _____

T 24 S

3

Maddox
I-Malaga
16.6 MM
5.2 BCF

Phillips 40 %

Phillips
2-Malaga-A
IP 2.5 MM
Cum 5.1 MMCF

Phillips
I-Malaga-A
2.4 MM
0.3 BCF

Phillips 97.68 %

Phillips 2

1

Phillips

10

Aminoil
I-Guitar

Phillips 32.77 %

Aminoil
I-Kirkes
17.7 MMCF

Aminoil
CNB St
2 MM
0.3 BCF — M
1.5 BCF — A

11

Coquina

MALAGA FIELD
EDDY COUNTY, NEW MEXICO
SCALE: 1" = 2000'

● Atoka
● Morrow

PHILLIPS PETROLEUM COMPANY
4001 Penbrook Street
Odessa, Texas 79762

1. Lease Name: Malaga-A
2. Well No.: 2
3. Well Location: Unit D, 660 feet from North line, 660 feet from West line of Section 2, Township 24-S, Range 28-E, Eddy County, New Mexico.
4. Upper Zone: Malaga (Atoka) Squeezed, but now leaking.
5. Completion Interval: 11,694-11,785'.
6. Lower Zone: Malaga (Morrow)
7. Completion Interval: 12,246-12,394'.
8. Dual Completion Authorized by Commission Order No.: Never dually completed.
9. Latest Well Test Summary:

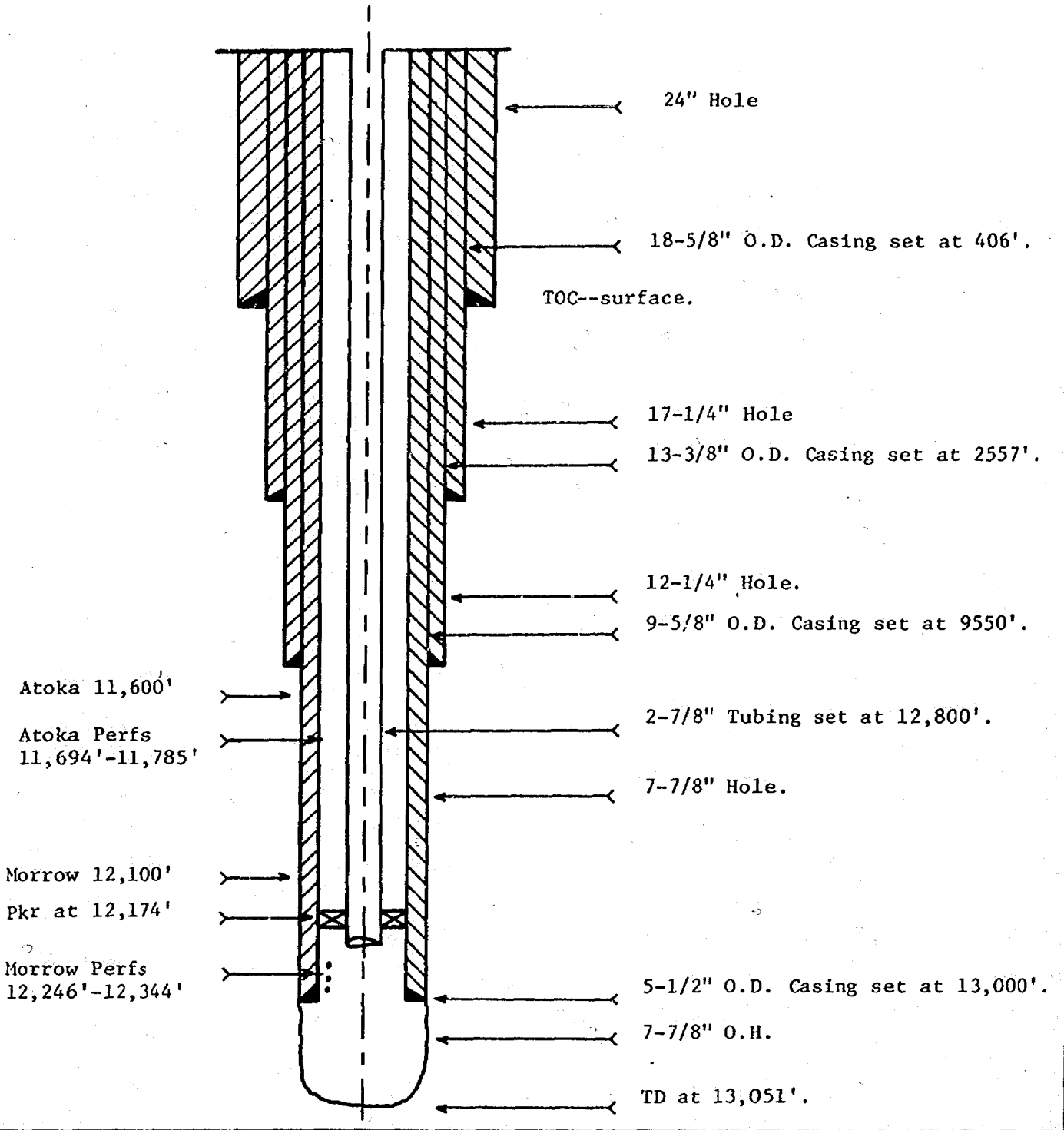
	Malaga (Atoka) (Upper Zone)	Malaga (Morrow) (Lower Zone)
Current Status	SI	Flowing
Gas Mcf/day	173	130
Cond. Bbls/day	0	0
Water Bbls/day	0	5
Date	July 14, 1981	July 14, 1981
	24 psi FCP	410 psi FTP

10. Calculated Bottom-hole Pressure from SIWHP of Upper Zone: 7422 psi.
11. Calculated Bottom-hole Pressure from SIWHP of Lower Zone: 3638 psi.

By: J. L. Blevins
Date: 7-22-81

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
phillips EXHIBIT NO. 2
CASE NO. 7812
Submitted by _____
Hearing Date _____

(Commingled sketch will exclude packer and lower the tbg below bottom perfs.)



NO.	REVISION	BY	DATE	CHKD	APP'D

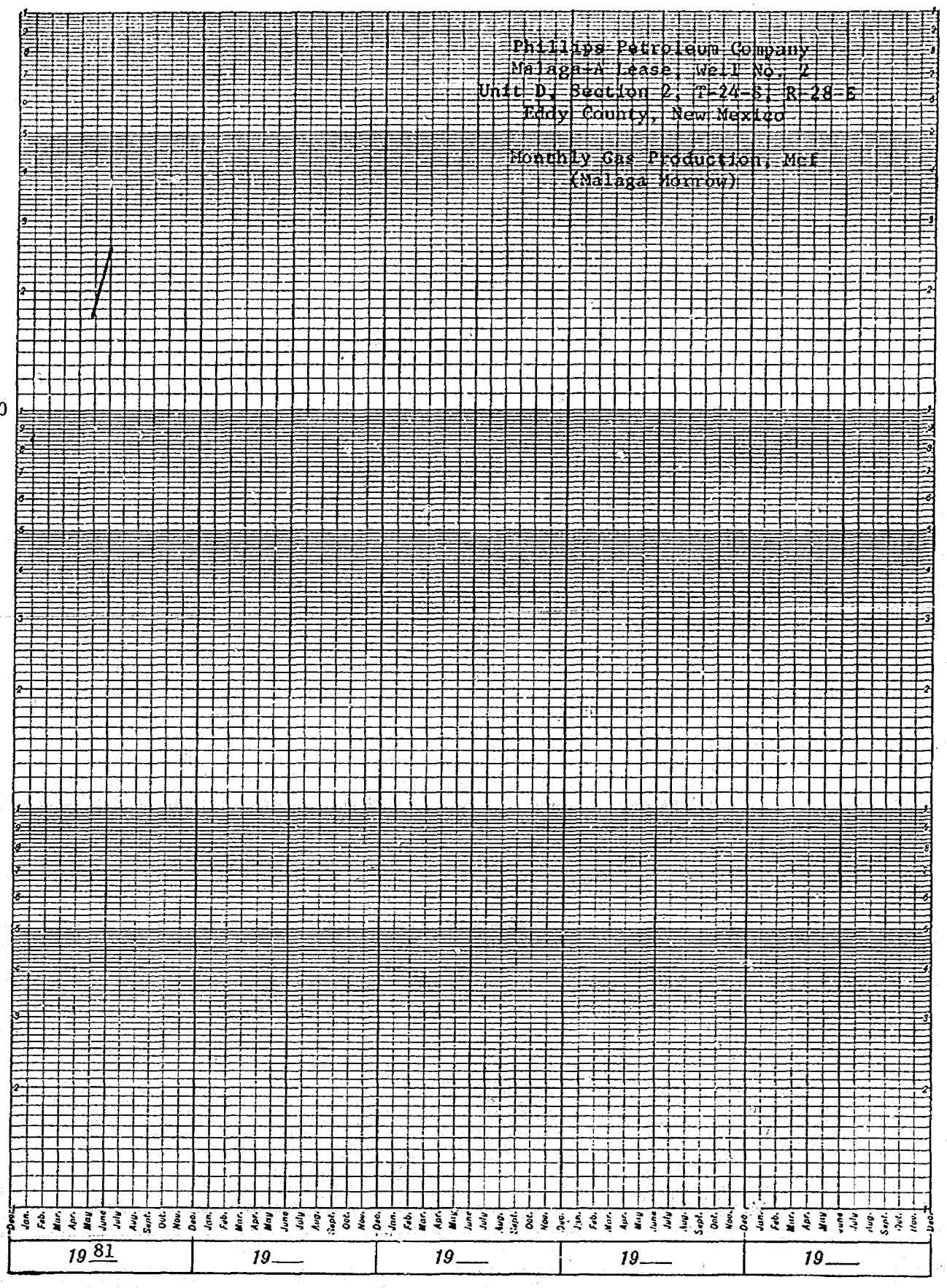
FOR BIDS	PHILLIPS PETROLEUM COMPANY	AFE NO. / FILE CODE
FOR APPR	BARTLESVILLE, OKLAHOMA	
FOR CONST	PHILLIPS PETROLEUM COMPANY MALAGA-A No. 2 APPLICATION FOR EXCEPTION TO RULE 303(a) WELLBORE SKETCH	SCALE UNLESS OTHERWISE NOTED
DRAWN 7-20-81		DWG NO.
CHECKED		SH NO.
APP'D		

FORM 1779 6-76

PRINTED IN U.S.A.

Phillips Petroleum Company
Malaga+A Lease; Well No. 2
Unit D; Section 2; T-24-S; R-28-E
Eddy County, New Mexico

Monthly Gas Production, Mcf
(Malaga Morrow)



PHILLIPS PETROLEUM COMPANY

Malaga-A Lease, Well No. 2
Unit D, Section 2, T-24-S, R-28-E
Eddy County, New Mexico

Production History
Malaga Field

Year & Month	Morrow Gas, Mcf
1981	
JAN	851
FEB	
MAR	
APR	
MAY	1784
JUN	2511
TOTAL YR.	5146
ACCUM.	5146

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
Phillips EXHIBIT NO. 6
CASE NO. 7312
Submitted by
Hearing Date

NEW MEXICO OIL CONSERVATION COMMISSION

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 9-1-65

API # 30-015-23287

Type Test: [X] Initial [ ] Annual [ ] Special							Test Date: 5-25-81				
Company: Phillips Petroleum				Connection: El Paso Natural Gas							
Pool: Malaga-Morrow (Gas)				Formation: Morrow						Unit:	
Completion Date: 11-22-80		Total Depth: 13,050			Plug Back TD: 13,009			Elevation: 3016' GR		Farm or Lease Name: Malaga "A"	
Csg. Size: 5-1/2"	Wt.: 17,20,23	d: 4.778	Set At: 13,050		Perforations: From 12,246 To 12,394					Well No.: 2	
Tbg. Size: 2-7/8"	Wt.: 6.40	d: 2.441	Set At: 12,170		Perforations: From To					Unit: D	Sec.: 2	Twp.: 24-S	Rge.: 28-E
Type Well – Single – Bradenhead – G.G. or G.O. Multiple: Single					Packer Set At: 12140					County: Eddy	
Producing Thru: Tubing	Reservoir Temp. °F: 178 @ 11800'		Mean Annual Temp. °F: 74		Baro. Press. – P_a: 13,2					State: New Mexico	
L: 12,320	H: 12,320	Gg: .588	% CO_2:	% N_2:	% H_2S:	Prover:	Meter Run: 4"	Taps: Flange			

	FLOW DATA					TUBING DATA		CASING DATA		
NO.	Prover Line Size	X Orifice Size	Press. p.s.i.g.	Diff. h_w	Temp. °F	Press. p.s.i.g.	Temp. °F	Press. p.s.i.g.	Temp. °F	Duration of Flow
SI						2775	60	packer		48 hrs.
1.	4:00	.750	580	96	70	2450	70	packer		1 hr.
2.	4:00	.750	590	97	72	1700	70	packer		1 hr.
3.	4:00	.750	590	94	75	1190	70	packer		1 hr.
4.	4:00	.750	590	67	75	740	70	packer		1 hr.
5.										

RATE OF FLOW CALCULATIONS

NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P_m	Flow Temp. Factor Ft.	Gravity Factor Fg	Super Compress. Factor, Fpv	Rate of Flow Q, Mcfd
1	2.661	238.64	593.2	.9905	1.304	1.040	853
2.	2.661	241.89	603.2	.9887	1.304	1.040	863
3.	2.661	238.12	603.2	.9859	1.304	1.040	847
4.	2.661	201.03	603.2	.9859	1.304	1.040	715
5.							

NO.	P_t	Temp. °R	T_r	Z
1.	.78	530	1.51	.924
2.	.79	532	1.52	.925
3.	.80	535	1.53	.924
4.	.80	535	1.53	.924
5.				

Gas Liquid Hydrocarbon Ratio ------- Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons ------- Deg.
Specific Gravity Separator Gas .588 XXXXXXXXX
Specific Gravity Flowing Fluid XXXXX
Critical Pressure 672 P.S.I.A. ____ P.S.I.A.
Critical Temperature 350 R ____ R

P_c 2788.2 P_c^2 7774.1

NO	P_t^2	P_w	P_w^2	$P_c^2 - P_w^2$
1	6067.4	2464.9	6075.7	1698.4
2	2935.1	1783.6	3181.2	6291.3
3	1447.7	1206.5	1455.6	6318.5
4	567.3	757.2	573.3	7200.8
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = \frac{7774.1}{6291.3}$ (2) $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 1.236$

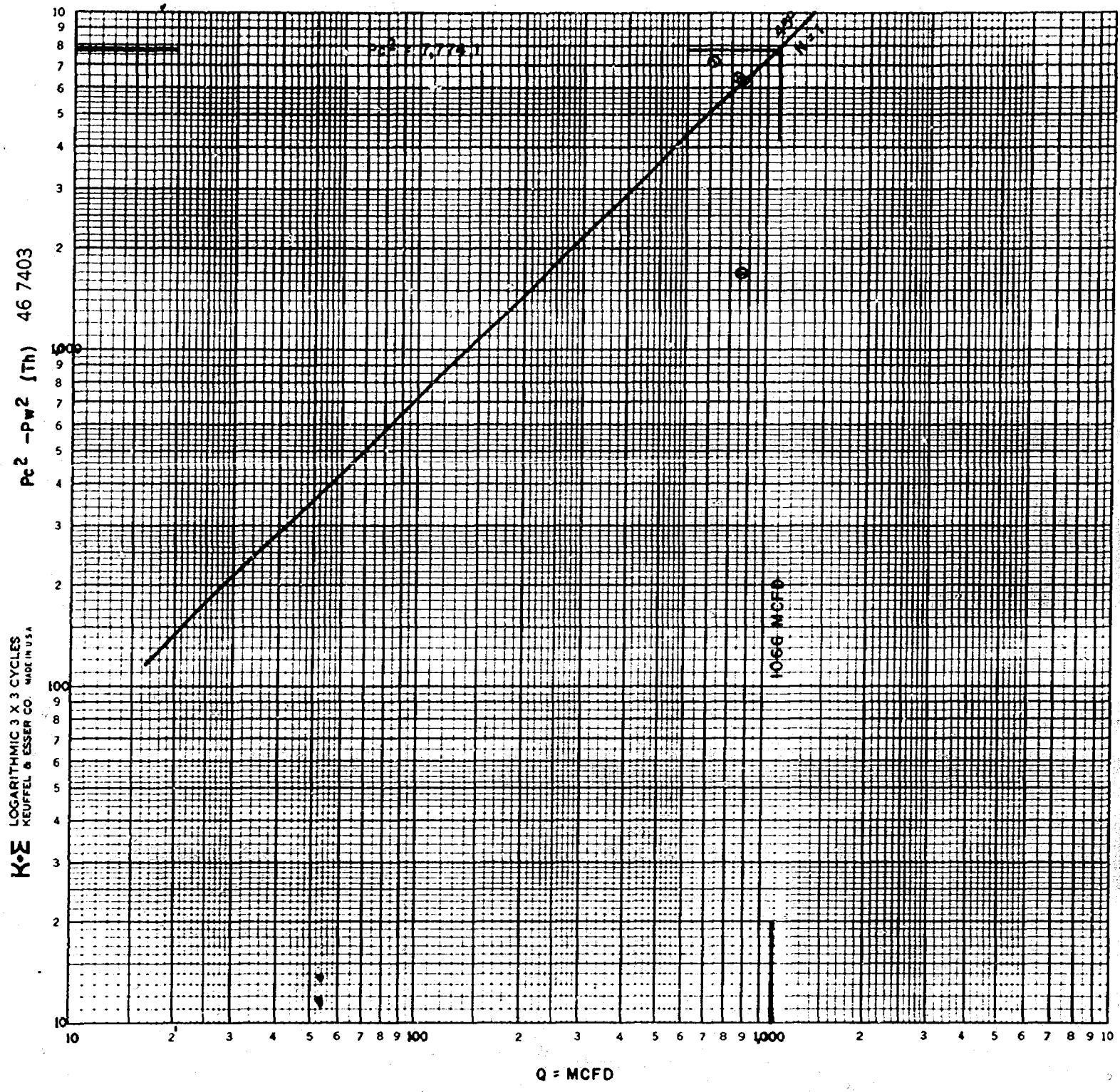
$AOF = Q \left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 1.066$

Absolute Open Flow 1.066 Mcfd @ 15.025 Angle of Slope θ 45 Slope, n 1

Remarks: Calculations made by computer. Program based on New Mexico Manual for back-pressure listing of Natural Gas wells.
*Form C-105 filed 2-11-81

Approved By Commission:	Conducted By:	Calculated By:	Checked By:
	Robert Lee	D. E. Simpson	

PHILLIPS PETROLEUM COMPANY
Malaga "A" Well No. 2
Malaga - Morrow (Gas) Pool
Eddy County, New Mexico
Test Date: 5-25-81



NEW MEXICO OIL CONSERVATION COMMSSION

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 9-1-65

Type Test: [X] Initial [ ] Annual [ ] Special				Test Date: 7-14-81	
Company: Phillips Petroleum			Connection: El Paso Natural Gas		
Pool: Malaga--Atoka (Gas)			Formation: Atoka		Unit:
Completion Date: 11-22-80	Total Depth: 13050		Plug Back TD: 13009	Elevation: 3016 GR	Farm or Lease Name: Magala A
Csg. Size: 5-1/2" / Wt.: 17,20,23 / d: 4.778 / Set At: 13,050			Perforations: From 11694 To 11721		Well No.: 2
Tbg. Size: 2-7/8" / Wt.: 6.40 / d: 2.441 / Set At: 12,170			Perforations: From To		Unit: D / Sec.: 2 / Twp.: 24-S / Rge.: 28-E
Type Well – Single – Bradenhead – G.G. or G.O. Multiple: Dual			Packer Set At: 12140		County: Eddy
Producing Thru: Annulus	Reservoir Temp. °F: 178 @ 11800	Mean Annual Temp. °F: 74	Baro. Press. – P_a: 13.2		State: New Mexico

L	H	Gg	% CO_2	% N_2	% H_2S	Prover DWT	Meter Run	Taps
11694	11694	.591				2		

	FLOW DATA					TUBING DATA		CASING DATA		
NO.	Prover Line Size	X Orifice Size	Press. ~~p.s.i.g. in Mercury~~	Diff. h_w	Temp. °F	Press. p.s.i.g.	Temp. °F	Press. p.s.i.g.	Temp. °F	Duration of Flow
SI						Producing		6100	80	
1.	2:00	.50	24		80	410	80	400	80	24 hrs.
2.										
3.										
4.										
5.										

RATE OF FLOW CALCULATIONS

NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P_m	Flow Temp. Factor Ft.	Gravity Factor Fg	Super Compress. Factor, Fpv	Rate of Flow Q, Mcfd
1	119			.9813	1.0084	---	118
2.							
3.							
4.							
5.							

NO.	P_r	Temp. °R	T_r	Z
1.				
2.				
3.				
4.				
5.				

Gas Liquid Hydrocarbon Ratio _____ Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons _____ Deg.
Specific Gravity Separator Gas .591 XXXXXXXXX
Specific Gravity Flowing Fluid XXXXX
Critical Pressure 672 P.S.I.A. _____ P.S.I.A.
Critical Temperature 354 R _____ R

P_c 6113.2 P_c^2 37371.2

NO	P_t^2	P_w	P_w^2	$P_c^2 - P_w^2$
1	179.5	423.7	179.5	37191.7
2				
3				
4				
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = \frac{37371.2}{37191.7}$ (2) $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 1.005$

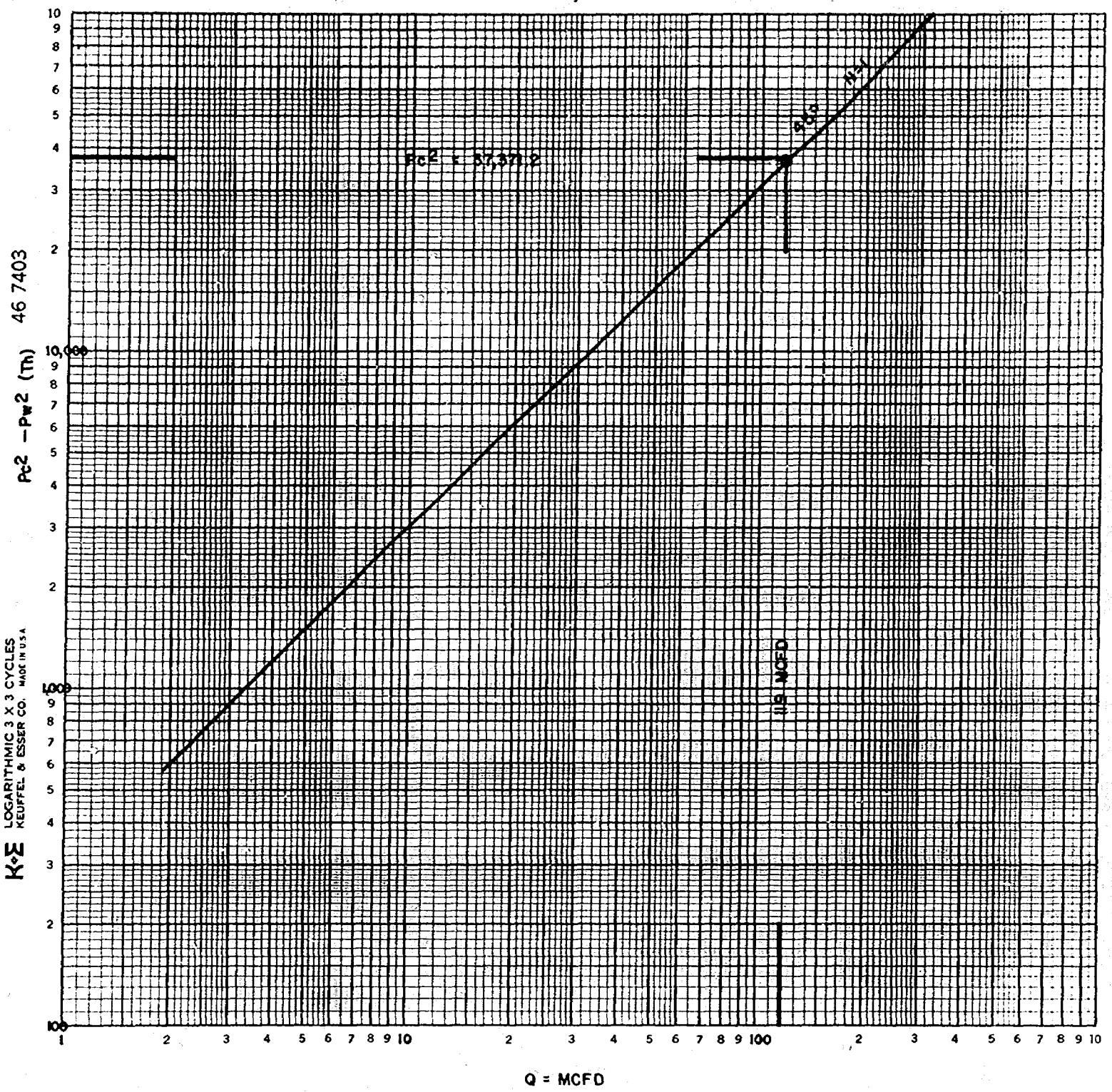
AOF = Q $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n$ = 119

Absolute Open Flow 119 Mcfd @ 15.025 | Angle of Slope θ 45 | Slope, n 1

Remarks: Gas volumes from orifice well tests. Calculations made by computer.

Approved By Commission:	Conducted By:	Calculated By:	Checked By:
	Robert Lee	D. E. Simpson	

PHILLIPS PETROLEUM COMPANY
Malaga "A" Well No. 2
Malaga - Atoka (Gas) Pool
Eddy County, New Mexico
Test Date: 7-14-81



PHILLIPS PETROLEUM CO.-GAS CHROMATOGRAPH ANALYSIS-G & GL SURVEY

CO. Phillips Petro. Co. ....LEASE Malaga A. ....NE. #. 2 ..TYPE GAS Gas Well
LOCATION 660 N. & 660 W. 2-24-28. ....COUNTY Eddy ....STATE N. M.
FIELD. Malaga .....FORM. Atoka .....CHOKE. — .TYPE TRAP Wellhead
TRAP TEMP. — TRAP PRESS 280 FTP. — .ATMOS TEMP 96. GAS TEMP 90°. BARO. 685
DATE SEC 6-24-81. DATE RUN 6-29-81 SEC BY Patton RUN BY A.B. BOMB PRESS. 300.
H2S GR. (CORR) STA. CO2 ON TAG 0.30% MISC. Tested thru A-L only

INST 1 METH 1 FILE 40

RUN 1 G-430 1 : 25.3 0 / 3 / 9

COMPONENT	FINAL MOL %
C6 PLUS	0
N2	.6
C1	97.55
CO2	.45
ETHANE	1.27
C3	.11
IC4	.01
NC4	.01
IC5	0
NC5	0
TOTAL	100

PRESSURE BASE AT 60 DEG. F.

		14.696	14.65
ETHANE	GPM	.3386	.3376
C3	GPM	.0301	.0301
IC4	GPM	.0032	.0032
NC4	GPM	.0031	.0031
			0.000
TOTAL GPM		.375	.374
Z FACTOR=		.99804	
SAT. BASIS BTU		995.208	992.092
CAL. SP. GR.		.569	

G-430

Date 6-24-81
Type Gas GAS Well
State New Mexico
County Eddy
Field Malaga
Formation Atoka
Company Phillips Pet. Co.
Wells #2
Lease Malaga A. 660 N & W
Sampler 2-24-28 CAREY SKELTON

Baro 24.6 P.S.I.
Atmos. Temp. 96°F
Trap Press. 280 #
Gas Temp. 90°F
Type of Trap Wellhead ( )
H2S STA
CO2 0.30%
Choke —
FTP —
Bomb Press. 300 #

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
Phillips EXHIBIT NO. 11
CASE NO. 7312
Submitted by
Hearing Date

PHILLIPS PETROLEUM CO.-GAS CHROMATOGRAPH ANALYSIS-G & GL SURVEY

CO.. Phillips Pet. Co. ...LEASE. Malaga A ...WEL .2...TYPE GAS New Well

LOCATION. 660 N & 660 W. 2-24S-28E .....COUNTY..Eddy...STATE..NM

FIELD.. Malaga .....FORM. Morrow .....CHOKE Demand TYPE TRAP. Heat

TRAP TEMP....TRAP PRESS 315. FTP 325# ..ATMOS TEMP. 96 .GAS TEMP 105. BARO. 695.

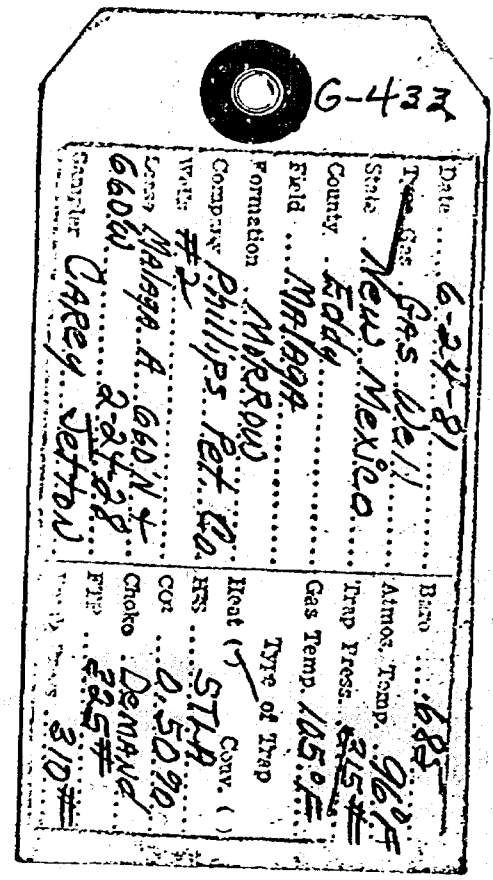
DATE SEC 6-24-81 DATE RUN 6-29-81 SEC BY Jetton RUN BY AB ..BOMB PRESS. 310

H2S GR. (CORR) STD ..CO2 ON TAG. 5% .MISC.. Sr. Ret. Cond. Only

INST 2 METH 2 FILE 62

RUN 1 G-433 16 : 10.4 6 / 29 / 31

COMPONENT	FINAL MOL %
C6 PLUS	0
N2	.84
C1	97.27
CO2	.31
ETHANE	.95
C3	.1
IC4	.02
NC4	.01
IC5	0
NC5	0
TOTAL	100



PRESSURE BASE AT 60 DEG. F.

		14.696	14.65
ETHANE	GPM	.2533	.2525
C3	GPM	.0274	.0273
IC4	GPM	.0065	.0065
NC4	GPM	.0031	.0031 0.000
TOTAL GPM		.2903	.2894
Z FACTOR=		.998853	
SAT. BASIS BTU		986.911	983.321
CAL. SP. GR.		.572	

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
Phillips EXHIBIT NO. 12
CASE NO. 7312
Submitted by
Hearing Date

MALAGA 'A' NO. 1

ECONOMICS OF COMMINGLING

MORROW AND ATOKA FORMATIONS

Year	Case 1: Commingled Production		Case 2: Individual Production	
	Gas (MCF)	Cash Flow ($)	Gas (MCF)	Cash Flow ($)
1	80,178	91,331	21,930	24,109
2	54,360	61,410	18,317	19,814
3	37,603	41,942	15,300	16,202
4	26,580	29,085	12,780	13,159
5	19,214	20,439	10,674	10,584
6	14,200	14,498	8,916	8,400
7	10,717	10,313	7,447	6,539
8	8,244	7,279	6,221	4,944
9	6,448	5,006	5,196	3,562
10	4,340	2,359	4,340	2,359
11	3,625	1,304	3,625	1,304
12	3,028	360	3,028	360
13			58,248	62,022
14			36,043	35,936
15			22,303	19,584
16			13,800	9,226
17			8,540	2,471
Total	268,537 MCF	$285,326	256,708 MCF	$240,675

Increase in reserves = 11,829 MCF.

Increase in Cash Flow = $44,651.

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
Phillips EXHIBIT NO. 14
CASE NO. 7312
Submitted by _____
Hearing Date _____

MALAGA - A No. 2
Sec. 2, T-24-S, R-28-E, Unit D
Eddy County, New Mexico

Well History

April 22, 1980

Location: 660' FNL & 660' FWL, Sec 2, T-24-S, R-28-E, Unit D, Eddy County, New Mexico.

Ran 18-5/8" 87.50# K-55 Butt R-3 Cond 1 casing at 406'. Cemented with 735 sacks of Class "H". Circulated 125 sacks.

Ran 13-3/8" 61# K-55 ST&C. Casing set at 2557'. Cemented w/ 2550 sacks Class "H". Circ 183 sacks.

Ran 9-5/8" 40# K-55 LT&C (779.46') and 9-5/8" 40# N-80 LT&C (8706.07') set at 9500'. Cemented 1st stage w/ 1100 sacks of Class "H". Circulated 150 sacks cement. Continued 2nd stage w/ 2000 sacks Class "H". Circulated 350 sacks of cement.

Ran 5-1/2" 23#, 20#, 17# N-80 LT&C casing. Cemented w/ 1600 sacks of Class "H". Top of cement at 8390'.

October 21, 1980

Set packer at 11,530' on 2-7/8" N-80 tubing. Perforated Atoka with 2 JSPF from 11694'-11700' and 11714'-11721'. No indication of pressure. Swabbed 3 hours, 65 BLW, no oil, no gas, swabbed dry. SITP after 14 hours at 125#.

Treated Atoka down 2-7/8" tubing thru casing perfs 11694-11721' with 2000 gals Morflo BC acid with 1000 SCF nitrogen per bbl. Flushed with 43 bbls 2% KCl water with 1000 SCF nitrogen per bbl. Dropped 1 ball sealer each 2 bbls acid in last 1000 gals. Max pressure - 7200#, ISDP - 6200#, 5-min SIP - 6100#, Avg injection rate at 3 BPM for acid, plus 1-1/2 BPM for nitrogen. SITP 3475#. Flowed gas to pit 8 hrs, ran swb, fluid at 6500', rec 15 BAW. SIP after 15 min - 105#, 30 min - 200#: 45 min - 250#; 60 min - 300# SITP after 40 hrs 6400#. Flared to pit 8 hrs, gas rate 150 to 200 MCFD. SITP after 14 hrs - 125#. Frac'd down 2-7/8" tbg thru 5-1/2" casing perfs 11694-11721' with 15,000 gals Versagel "1500" with 22,000# sand and 6000 gals CO_2. Max press at 9400#. Avg press at 8900#, ISDP 6080#, 15 min SIP at 5000#. Avg injection rate at 10 BPM. SITP after 13 hrs 1600# SITP after 14 hrs 1500#. Flowed to pit 8 hrs, recovered 10 BLW, FTP at 25#. Ran swab to 11,530', no fluid, estimated gas rate 150 MCFD.

October 14, 1980

SITP after 40 hrs at 6100#. Perforated Atoka zone with 2 JSPF from 11,780-11,785; 11,822'-11,829'. SITP after 14 hrs 2000#. Treated Atoka down 2-7/8" tbg thru casing perfs 11694-11827' with 4000 gals Morflo "BC" acid containing 1000 SCF nitrogen/ bbl. Flushed with 47 bbls 2% KCl water with 1000 SCF nitrogen per bbl, with 1 ball sealer 2 bbls acid last 3500 gals. Max pressure 7200#, min pressure 6000#, ISDP 5000#, 5 min SIP 4600#. SITP after 14 hrs 1800#. Flowed and swabbed 8 hrs, gas rate at 100 MCFD. SITP after 14 hrs 2150#, gas rate at 120 MCFD, FTP zero.

SITP after 14 hrs 3150#. Gas rate at 200 MCFD. SITP after 40 hrs 6300#.

October 22, 1980

SITP after 14 hrs 5500#, gas rate at 900 MCFD. SITP after 14 hrs 5500#. Squeezed casing perfs at 11,694-11827' with 35 sacks of Class "H" cement with 10% LWL mixed with 15.6# per gal. Pumped 15 sacks in formation. Left 20 sacks in casing. Max pressure at 4600#. Top of cement at 11,630'. SITP after 14 hrs 4200#. Cut over Baker F-1 packer at 11,530'. Drilled cement inside 5-1/2" casing from 11,569-11,715'. Circulated out gas. Drilled cement from 11,715-11,785' and recovered gas kick-off bottom. SIP 1100#. Tight place in 5-1/2" casing from 11,715-11,720'.

November 1, 1980

SIP 1700#. Went in hole with RTTS packer set at 11,300'.

Squeezed casing perfs at 11,822-11,827' w/ 35 sxs Class "H" with 1/10% LWL 15.6# per gallon. Pumped 20 sacks into formation, left 15 sacks inside 5-1/2" casing. Max pressure 4500#, SION. Drilled cement from 11700' to 11,827'. Drilling frac sand and barite at 12,871'. Cleaned out to 13,009'. Pulled bit to 12,520'. Spotted 8 bbls 10% Acetic acid.
Went in hole with Baker F-1 packer and stopped at 11,714'. Started out of hole and packer hung up at 11,660'. Unable to pull packer out of hole, unable to set packer, pull out of WL rope socket. Left collar locators, set tool and packer at 11,660'. Tallied in hole with overshot, latched on sheared off setting tool from packer and recovered collar locator and set tool. Tallied in hole w/ cutrite shoe and packer picker. Cut over Baker F-1 packer at 11,660'. Pulled out of hole. Finished coming out of hole with packer & tallied in hole with bit and string mill. Milled out tight place in 5-1/2" casing, from 11,715-11,720'. Had indication of gas. Shut in pressure after 38 hrs 2400#. Prepared to mill out tight place in casing. SI casing pressure after 14 hours 2550#. Tallied in hole with swedge, 2 string mills, jars and bumper sub on 2-7/8" tbg. Circulated out gas while going in hole. Swedged thru tight place at 11,715' & used 20,000# to work swedge thru tight place. No improvement. 11-12-80: SIP - 2600#. Milled out tight place in casing from 11,715-11,720'. Circulated out iron cutting, cmt form. SIP 2000#. Set Baker Model "D" pkr at 12,170'. WIH w/ Baker pkr seal assembly on 2-7/8" N-80 tbg. Set in pkr at 12,170' in 5000# compression. Baker Model-F nipple w/ a 2.131 ID set at 12,139'. Swbd tbg to 7000' and lost swb in hole plus 3000' line. Fished swab line. Ran 394 jts 2-7/8" tbg, set in Baker Model "D" pkr 12,170' in 5,000# compression. Swbd tbg dry to 7500'. Perf'd Marrow zone w/ 2 JSPF at 12,246-12,274' and 12,282-12,286'. No indication of flow @ surface. Howco treated dwn 2-7/8" tbg through csg perfs 12246-12286' w/ 6500 gals of Morflo HF acid w/ inhibitor containing 1000 SCF nitrogen per bbl. Flushed w/ 55 bbls of 2% KCL water with 1000 SCF nitrogen per bbl. Max press 7100#, Avg press 6071#, ISDP 3600#, 5 min SIP 3550#, 15 min SIP 3400#. AIR 4BA + 2.2 bbls nitrogen per min.

SIP after 40 hrs, 3000#. FL 5500'. Swbd 8 hrs, recd 25 BAW w/ trace of condensate. Estimated gas rate, 200 MCF. Well swbd dry. SI tbg press after 38 hrs, 2000#. Perf'd Morrow Zone w/ 2 JSPF at 12,328-12,362' and 12,372-12,394'. No indication of press at surf. Halliburton trtd dwn 2-7/8" tbg through csg perfs 12,246-12,394' w/ 10,500 gals acid (12% HCl and 3% HF) w/ 1000 SCF nitrogen/ bbl. Flshd w/ 46 bbls 2% KCl wtr w/ 1000 SCF nitrogen/ bbl. Dropped one ball sealer per 1/2 bbls acid in last 9500 gals acid. Avg inj rate 8.5 BPM. Max press 6000#, avg press 5600#, ISDP 3600#. SITP after 14 hrs, 2050#. Est gas rate, 400 MCF. SITP after 62 hrs, 3500#. Flwg tbg press 25-50#. No gas estimate. SI for evaluation. Flowed 4 hrs, 12/64" chk, for single flow rate: 24-hr rate, 851 MCFG, FTP 825#, no condensate, 11 BW, from 5-1/2" csg perfs 12,246-12,394'.

Docket No. 23-81

Dockets Nos. 25-81 and 26-81 are tentatively set for August 12 and 26, 1981. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: COMMISSION HEARING - MONDAY - JULY 20, 1981

OIL CONSERVATION COMMISSION - 9 A.M. - ROOM 205
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

CASE 6892: (DE NOVO)

Application of Merrion & Bayless for compulsory pooling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the South Blanco-Pictured Cliffs Pool underlying the SW/4 of Section 27, Township 24 North, Range 2 West, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.

Upon application of Merrion & Bayless, this case will be heard De Novo pursuant to the provisions of Rule 1220.

****

Docket No. 24-81

DOCKET: EXAMINER HEARING - WEDNESDAY - JULY 29, 1981

9 A.M. - OIL CONSERVATION DIVISION CONFERENCE ROOM,
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

The following cases will be heard before Richard L. Stamets, Examiner, or Daniel S. Nutter, Alternate Examiner:

CASE 7309: Application of Gulf Oil Corporation for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the South Shugart Deep Unit Area, comprising 3,806 acres, more or less, of State and Federal lands in Townships 18 and 19 South, Range 31 East.

CASE 7310: Application of Amoco Production Company for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the El Alto Grande Unit Area, comprising 2,560 acres, more or less, of Federal lands in Township 22 South, Ranges 33 and 34 East.

CASE 7311: Application of Amoco Production Company for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the Big Sinks Federal Exploratory Unit Area, comprising 3,520 acres, more or less, of State and Federal lands in Townships 25 and 26 South, Range 31 East.

CASE 7280: (Continued from July 15, 1981, Examiner Hearing)

Application of Northwest Pipeline Corporation for a dual completion and downhole commingling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks authority to dually complete its Rosa Unit Well No. 77 located in Unit L of Section 33, Township 31 North, Range 5 West, to produce gas from the Mesaverde formation and commingled Gallup and Dakota production through separate strings of tubing.

CASE 7312: Application of Phillips Petroleum Company for downhole commingling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Atoka and Morrow production in the wellbore of its Malaga A Well No. 2 located in Unit D of Section 2, Township 24 South, Range 28 East, Malaga Field.

CASE 7313: Application of Phillips Petroleum Company for downhole commingling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Atoka and Morrow production in the wellbore of its Drag A Well No. 1 located in Unit C of Section 18, Township 23 South, Range 27 East, South Carlsbad Field.

CASE 7314: Application of Elliott Oil Company for downhole commingling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Gallup, Dakota, and Mesaverde production in the wellbore of its ORA Well No. 1 located in Unit E of Section 21, Township 25 North, Range 3 West.

KELLAHIN and KELLAHIN
Attorneys at Law
500 Don Gaspar Avenue
Post Office Box 1769
Santa Fe, New Mexico 87501

Jason Kellahin
W. Thomas Kellahin
Karen Aubrey

Telephone 982-4285
Area Code 505

June 26, 1981

Mr. Joe Ramey
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

Case 7312

RE: Phillips Petroleum Company
Malaga A No. 2 well
Downhole Commingling

Dear Joe:

Please set the enclosed application for an examiner hearing on July 29, 1981.

Very truly yours,

W. Thomas Kellahin

WTK:jm
Enclosure

cc: Mr. Joe Peacock

STATE OF NEW MEXICO

DEPARTMENT OF ENERGY AND MINERALS

OIL CONSERVATION DIVISION

IN THE MATTER OF THE APPLICATION
OF PHILLIPS PETROLEUM COMPANY FOR
DOWNHOLE COMMINGLING, EDDY COUNTY
NEW MEXICO

Case 7312

A P P L I C A T I O N

COMES NOW PHILLIPS PETROLEUM COMPANY by and through its attorneys and applies to the Oil Conservation Division of New Mexico for approval to downhole commingle production from the Atoka formation and Morrow formation in its Malaga A No. 2 2311 located in Unit D, Section 2, T24S, R28E, NMPM, Malaga Morrow and Malaga Atoka Pool, Eddy County New Mexico and in support thereof would show the Division:

1. Applicant is the operator of the Malaga A No. 2 well located in Unit D, Section 2, T24S, R28E, NMPM, Eddy County New Mexico.

2. Applicant seeks permission to downhole commingle production from the Atoka perforations (11,694 feet to 11,721 feet) with production from the Morrow perforations (12,246 feet to 12,394 feet) in the well bore of said well.

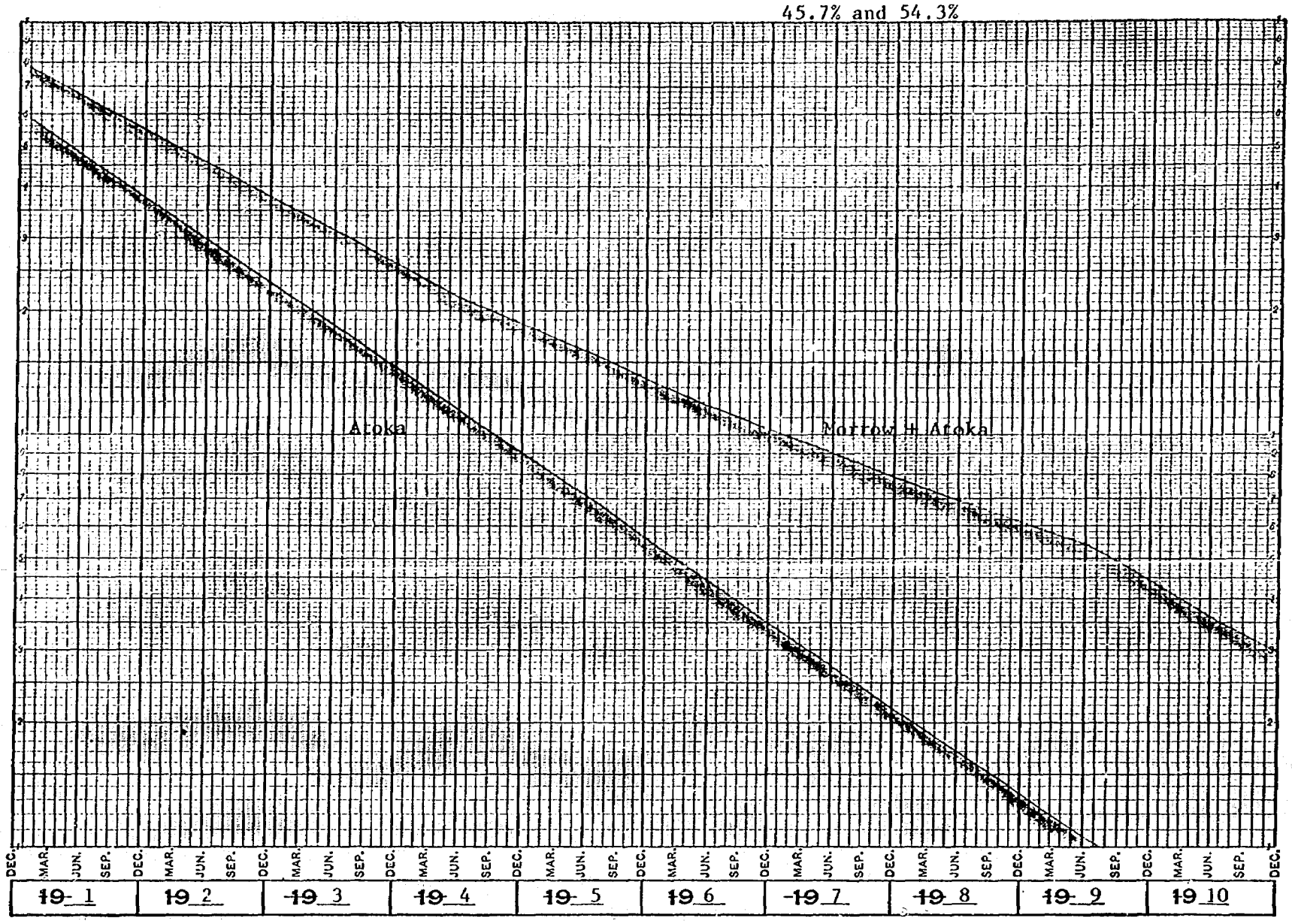
3. That approval of said application will be in the best interest of conservation, the prevention of waste and the protection of correlative rights.

WHEREFORE, Applicant prays that its application be set for hearing and after notice and hearing, the application be granted as requested.

KELLAHIN & KELLAHIN

By _____
W. Thomas Kellahin
P.O. Box 1769
Santa Fe, New Mexico 87501
(505) 982-4285

Malaga 'A' No. 1
Eddy County, New Mexico
Morrow and Atoka Commingled Forecast
45.7% and 54.3%



R-28-E

R-29-E

T 23 S

T 24 S

27

Maddox
1-Pardue
1.7 MM
0.3 BCF

26

Maddox
1-Pardue
10.2 MM
3.9 BCF

Amoco
1-Pardue
11.0 MM
3.8 BCF

Phillips 4.69 %

25

Amoco
Williams
1-C
2.9 MM
0.3 BCF

Amoco

Phillips

34

HNG
1-Pardue
5.4 MM
1.5 BCF

Phillips 21.88 %

35

HNG
1-Williams
5.6 MM
2.4 BCF

Phillips 35.35 %

HNG
2-Williams
22 MM
1.2 BCF

Phillips 1.56 %

Phillips

36

3

Maddox
1-Malaga
16.6 MM
5.2 BCF

Phillips 40 %

Phillips
2-Malaga-A
2.5 MM
5.1 MMCF

Phillips
1-Malaga-A
2.4 MM
0.3 BCF

Phillips 97.68 %

Phillips 2

1

Phillips

10

Aminoil
1-Guitar

Phillips 32.77 %

Aminoil
1-Kirkes
—
17.7 MMCF

Aminoil
CNB St
2 MM
0.3 BCF — M
1.5 BCF — A

11

Coquina

MALAGA FIELD
EDDY COUNTY, NEW MEXICO
SCALE: 1" = 2000'

● Atoka
◒ Morrow

PHILLIPS PETROLEUM COMPANY
4001 Penbrook Street
Odessa, Texas 79762

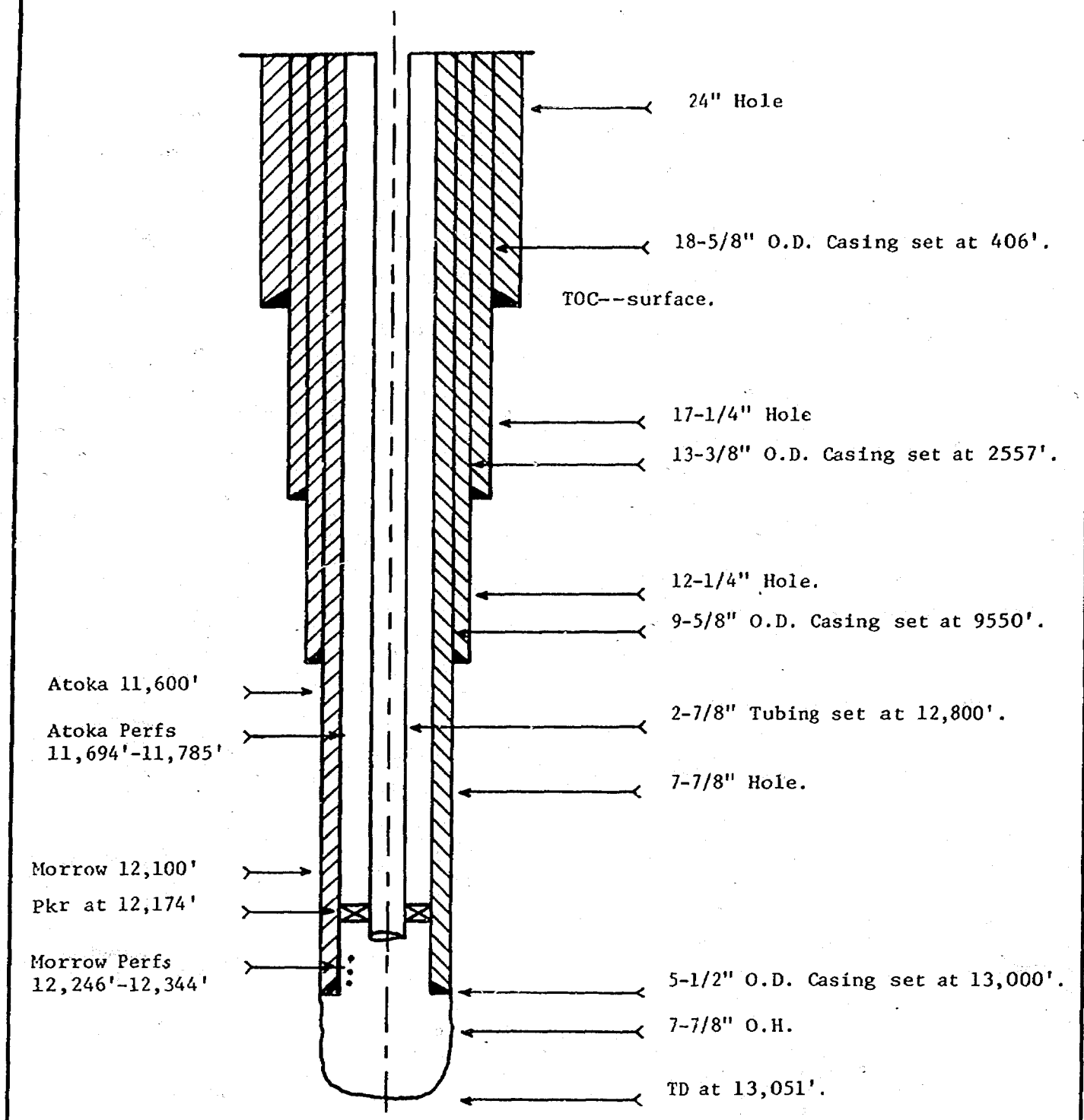
1. Lease Name: Malaga-A
2. Well No.: 2
3. Well Location: Unit D, 660 feet from North line, 660 feet from West line of Section 2, Township 24-S, Range 28-E, Eddy County, New Mexico.
4. Upper Zone: Malaga (Atoka) Squeezed, but now leaking.
5. Completion Interval: 11,694-11,785'.
6. Lower Zone: Malaga (Morrow)
7. Completion Interval: 12,246-12,394'.
8. Dual Completion Authorized by Commission Order No.: Never dually completed.
9. Latest Well Test Summary:

	Malaga (Atoka) (Upper Zone)	Malaga (Morrow) (Lower Zone)
Current Status	SI	Flowing
Gas Mcf/day	173	130
Cond. Bbls/day	0	0
Water Bbls/day	0	5
Date	July 14, 1981	July 14, 1981
	24 psi FCP	410 psi FTP

10. Calculated Bottom-hole Pressure from SIWHP of Upper Zone: 7422 psi.
11. Calculated Bottom-hole Pressure from SIWHP of Lower Zone: 3638 psi.

By: J. L. Blevins
Date: 7-22-81

(Commingled sketch will exclude packer and lower the tbg below bottom perfs.)



NO.	REVISION	BY	DATE	CHKD	APP'D

FOR BIDS	PHILLIPS PETROLEUM COMPANY	AFE NO. / FILE CODE
FOR APPR	BARTLESVILLE, OKLAHOMA	
FOR CONST	PHILLIPS PETROLEUM COMPANY MALAGA-A No. 2 APPLICATION FOR EXCEPTION TO RULE 303(a) WELLBORE SKETCH	SCALE UNLESS OTHERWISE NOTED
DRAWN 7-20-81		DWG NO.
CHECKED		
APP'D		SH NO.

FORM 1779 6-76

PRINTED IN U.S.A.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 7312
Order No. R-6791

APPLICATION OF PHILLIPS PETROLEUM
COMPANY FOR DOWNHOLE COMMINGLING,
EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on July 29, 1981, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 2nd day of October, 1981, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Phillips Petroleum Company, is the owner and operator of the Malaga A Well No. 2, located in Unit D of Section 2, Township 24 South, Range 28 East, NMPM, Eddy County, New Mexico.

(3) That the applicant seeks authority to commingle Atoka and Morrow production within the wellbore of the above-described well.

(4) That from the Atoka zone, the subject well is capable of very low marginal production only.

(5) That from the Morrow zone, the subject well is capable of very low marginal production only.

(6) That the proposed commingling may result in the recovery of additional hydrocarbons from each of the subject pools, thereby preventing waste, and will not violate correlative rights.

(7) That the reservoir characteristics of each of the subject zones are such that underground waste would not be caused by the proposed commingling provided that the well is not shut-in for an extended period.

(8) That if said well should be shut-in for any reason, crossflow could occur between zones.

(9) That the applicant should be required to install a check valve, rated for at least a 5000-pound differential, between the zones to be commingled.

(10) That the applicant should notify the Division's district office at Artesia of the date and time the check valve is to be run in the well in order that the same may be witnessed.

(11) That to afford the Division the opportunity to assess the potential for waste and to expeditiously order appropriate remedial action, the operator should notify the Artesia district office of the Division any time the subject well is shut-in for 7 consecutive days.

(12) That in order to allocate the commingled production to each of the commingled zones in the subject well, 54 percent of the commingled production should be allocated to the Atoka zone, and 46 percent of the commingled production to the Morrow zone.

IT IS THEREFORE ORDERED:

(1) That the applicant, Phillips Petroleum Company, is hereby authorized to commingle Atoka and Morrow production within the wellbore of the Malaga A Well No. 2, located in Unit D of Section 2, Township 24 South, Range 28 East, NMPM, Malaga Field, Eddy County, New Mexico.

(2) That 54 percent of the commingled production shall be allocated to the Atoka zone and 46 percent of the commingled production shall be allocated to the Morrow zone.

(3) That the operator shall install a check valve, rated for at least a 5000-pound differential, between the zones to be commingled.

(4) That the operator shall notify the Division's district office at Artesia of the date and time the check valve is to be run in the well in order that the same may be witnessed.

(5) That the operator of the subject well shall immediately notify the Division's Artesia district office any time the well has been shut-in for 7 consecutive days and shall concurrently present, to the Division, a plan for remedial action.

(6) That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

S E A L

fd/

R-28-E

R-29-E

T 23 S

T 24 S

27

Maddox
I-Pardue
1.7 MM
0.3 BCF

26

Maddox
I-Pardue
10.2 MM
3.9 BCF

Amoco
I-Pardue
11.0 MM
3.8 BCF

Phillips 4.69 %

25

Amoco
Williams
I-C
2.9 MM
0.3 BCF

Amoco

Phillips

34

HNG
I-Pardue
5.4 MM
1.5 BCF

Phillips 21.88 %

35

HNG
I-Williams
5.6 MM
2.4 BCF

Phillips 35.35 %

HNG
2-Williams
22 MM
1.2 BCF

Phillips 1.56 %

36

Phillips

3

Maddox
I-Malaga
15.6 MM
5.2 BCF

Phillips 40 %

Phillips
2-Malaga-A
2.5 MM
5.1 MMCF

Phillips
I-Malaga-A
2.4 MM
0.3 BCF

Phillips 97.68 %

2

Phillips

1

Phillips

10

Aminoil
I-Guitar

Phillips 32.77 %

Aminoil
I-Kirkes
17.7 MMCF

Aminoil
CNB St
2 MM
0.3 BCF — M
1.5 BCF — A

11

Coquina

MALAGA FIELD
EDDY COUNTY, NEW MEXICO
SCALE: 1" = 2000'

Exhibit 1
Case 7312

● Atoka
◒ Morrow

PHILLIPS PETROLEUM COMPANY
4001 Penbrook Street
Odessa, Texas 79762

1. Lease Name: Malaga-A
2. Well No.: 2
3. Well Location: Unit D, 660 feet from North line, 660 feet from West line of Section 2, Township 24-S, Range 28-E, Eddy County, New Mexico.
4. Upper Zone: Malaga (Atoka) Squeezed, but now leaking.
5. Completion Interval: 11,694-11,785'.
6. Lower Zone: Malaga (Morrow)
7. Completion Interval: 12,246-12,394'.
8. Dual Completion Authorized by Commission Order No.: Never dually completed.
9. Latest Well Test Summary:

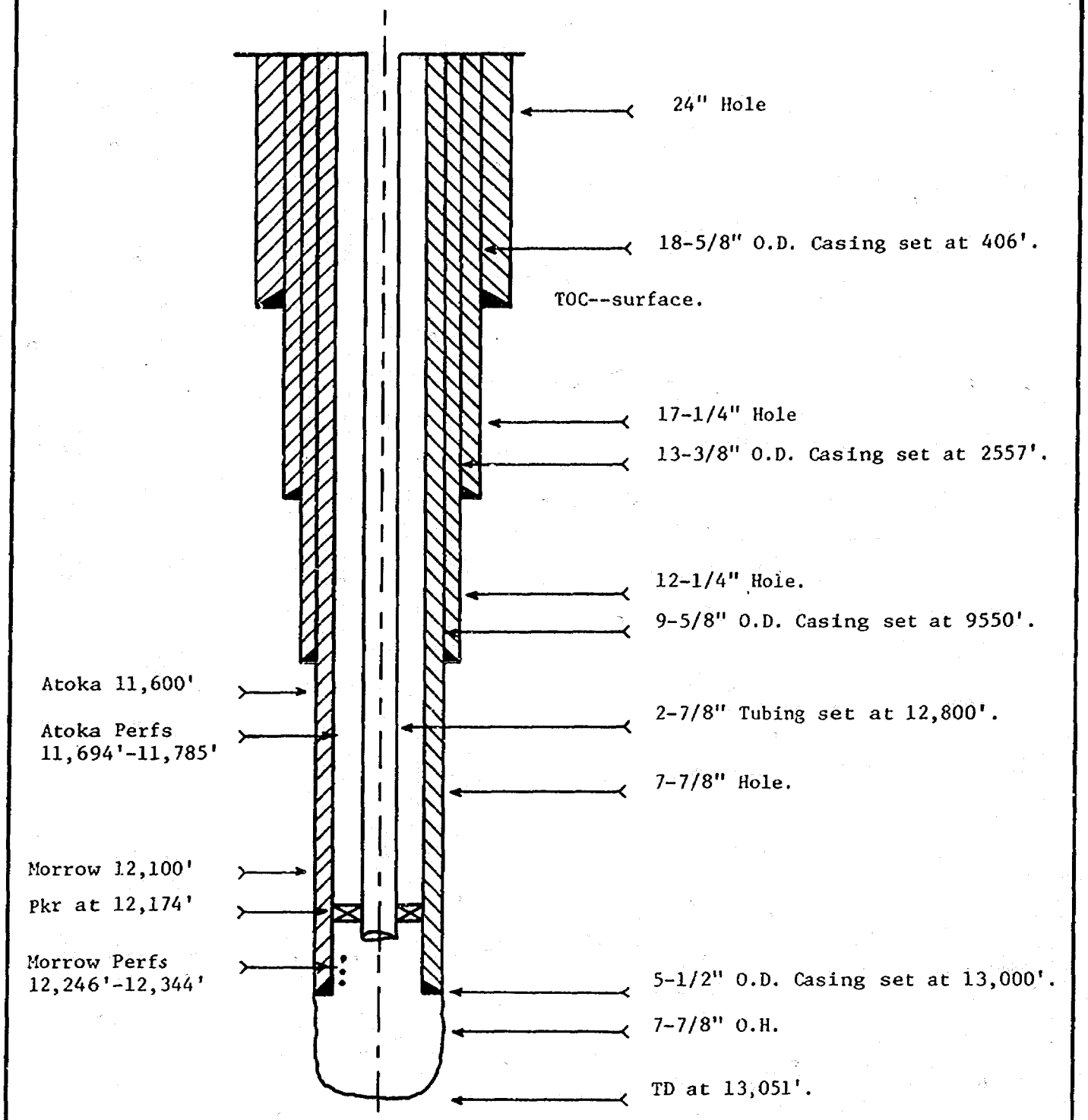
	Malaga (Atoka) (Upper Zone)	Malaga (Morrow) (Lower Zone)
Current Status	SI	Flowing
Gas Mcf/day	173	130
Cond. Bbls/day	0	0
Water Bbls/day	0	5
Date	July 14, 1981	July 14, 1981
	24 psi FCP	410 psi FTP

10. Calculated Bottom-hole Pressure from SIWHP of Upper Zone: 7422 psi.
11. Calculated Bottom-hole Pressure from SIWHP of Lower Zone: 3638 psi.

By: J. L. Blevins
Date: 7-22-81

Exhibit 2
Case 7312

(Commingled sketch will exclude packer and lower the tbg below bottom perfs.)



NO.	REVISION	BY	DATE	CHKD	APP'D

FOR BIDS	PHILLIPS PETROLEUM COMPANY	AFE NO. / FILE CODE
FOR APPR	BARTLESVILLE, OKLAHOMA	
FOR CONST	PHILLIPS PETROLEUM COMPANY MALAGA-A No. 2 APPLICATION FOR EXCEPTION TO RULE 303(a) WELLBORE SKETCH	SCALE UNLESS OTHERWISE NOTED
DRAWN 7-20-81	Exhibit 3 Case 7312	DWG NO.
CHECKED		SH NO.
APP'D		

FORM 1779 6-76

PRINTED IN U.S.A.

Phillips Petroleum Company
Malaga-A Lease, Well No. 2
Unit D, Section 2, T-24-S, R-28-E
Eddy County, New Mexico

Monthly Gas Production, Mcf
(Malaga Morrow)

Gas (Mcf)

1000

100

10

Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

19 81 | 19 ___ | 19 ___ | 19 ___ | 19 ___

Exhibit 5
Case 7312

PHILLIPS PETROLEUM COMPANY

Malaga-A Lease, Well No. 2
Unit D, Section 2, T-24-S, R-28-E
Eddy County, New Mexico

Production History
Malaga Field

Year & Month	Morrow Gas, Mcf
1981	
JAN	851
FEB	
MAR	
APR	
MAY	1784
JUN	2511
TOTAL YR.	5146
ACCUM.	5146

Exhibit 6
Case 7312

NEW MEXICO OIL CONSERVATION COMMSSION

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 9-1-65

API # 30-015-23287

Type Test: [X] Initial [ ] Annual [ ] Special				Test Date: 5-25-81	
Company: Phillips Petroleum		Connection: El Paso Natural Gas			
Pool: Malaga-Morrow (Gas)		Formation: Morrow			Unit
Completion Date: 11-22-80	Total Depth: 13,050		Plug Back TD: 13,009	Elevation: 3016' GR	Farm or Lease Name: Malaga "A"
Csg. Size: 5-1/2" / Wt.: 17,20,23 / d: 4.778 / Set At: 13,050			Perforations: From 12,246 To 12,394		Well No.: 2
Tbg. Size: 2-7/8" / Wt.: 6.40 / d: 2.441 / Set At: 12,170			Perforations: From To		Unit: D / Sec.: 2 / Twp.: 24-S / Rge.: 28-E
Type Well – Single – Bradenhead – G.G. or G.O. Multiple: Single			Packer Set At: 12140		County: Eddy
Producing Thru: Tubing	Reservoir Temp. °F: 178 @ 11800'	Mean Annual Temp. °F: 74	Baro. Press. – P_a: 13.2		State: New Mexico

L	H	Gg	% CO_2	% N_2	% H_2S	Prover	Meter Run	Taps
12,320	12,320	.588					4"	Flange

	FLOW DATA				TUBING DATA		CASING DATA		
NO.	Prover Line Size	X Orifice Size	Press. p.s.i.g.	Diff. h_w	Temp. °F	Press. p.s.i.g.	Temp. °F	Press. p.s.i.g.	Temp. °F	Duration of Flow
SI						2775	60	packer		48 hrs.
1.	4:00	.750	580	96	70	2450	70	packer		1 hr.
2.	4:00	.750	590	97	72	1700	70	packer		1 hr.
3.	4:00	.750	590	94	75	1190	70	packer		1 hr.
4.	4:00	.750	590	67	75	740	70	packer		1 hr.
5.										

RATE OF FLOW CALCULATIONS

NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P_m	Flow Temp. Factor Ft.	Gravity Factor Fg	Super Compress. Factor, Fpv	Rate of Flow Q, Mcfd
1	2.661	238.64	593.2	.9905	1.304	1.040	853
2.	2.661	241.89	603.2	.9887	1.304	1.040	863
3.	2.661	238.12	603.2	.9859	1.304	1.040	847
4.	2.661	201.03	603.2	.9859	1.304	1.040	715
5.							

NO.	P_t	Temp. °R	T_f	Z
1.	.78	530	1.51	.924
2.	.79	532	1.52	.925
3.	.80	535	1.53	.924
4.	.80	535	1.53	.924
5.				

Gas Liquid Hydrocarbon Ratio ——— Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons ——— Deg.
Specific Gravity Separator Gas .588 XXXXXXXXX
Specific Gravity Flowing Fluid XXXXX
Critical Pressure 672 P.S.I.A. ——— P.S.I.A.
Critical Temperature 350 R ——— R

P_c 2788.2 P_c^2 7774.1

NO	P_t^2	P_w	P_w^2	$P_c^2 - P_w^2$
1	6067.4	2464.9	6075.7	1698.4
2	2935.1	1783.6	3181.2	6291.3
3	1447.7	1206.5	1455.6	6318.5
4	567.3	757.2	573.3	7200.8
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = \frac{7774.1}{6291.3}$ (2) $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 1.236$

AOF = Q $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 1.066$

Absolute Open Flow 1,066 Mcfd @ 15.025 | Angle of Slope θ 45 | Slope, n 1

Remarks: Calculations made by computer, Program based on New Mexico Manual for back-pressure listing of Natural Gas wells.
*Form C-105 filed 2-11-81

Approved By Commission:	Conducted By:	Calculated By:	Checked By:
	Robert Lee	D. E. Simpson	

Exhibit 8
Case 5312

PHILLIPS PETROLEUM COMPANY
Malaga "A" Well No. 2
Malaga - Morrow (Gas) Pool
Eddy County, New Mexico
Test Date: 5-25-81

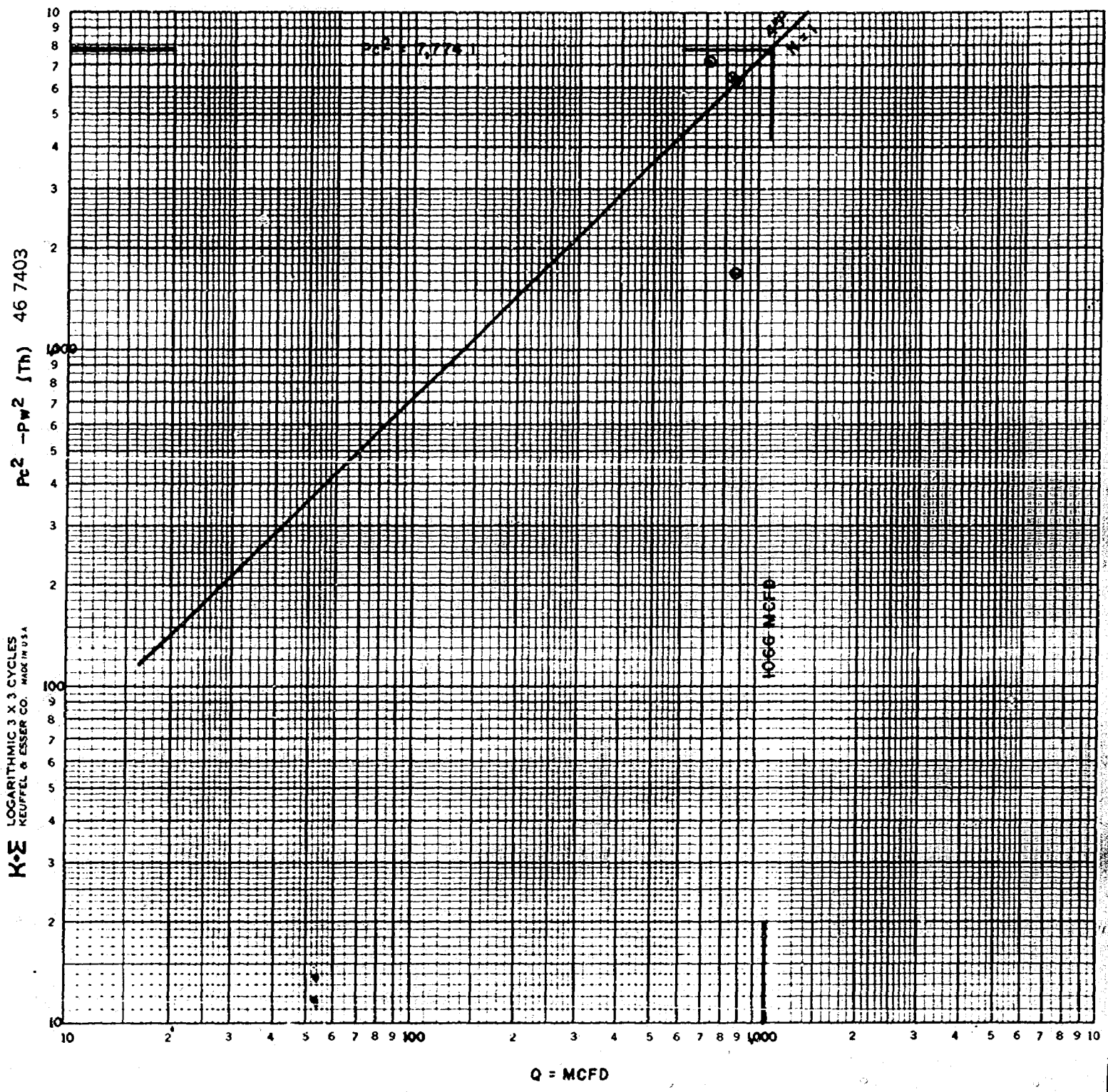


Exhibit 8
Case 7312

NEW MEXICO OIL CONSERVATION COMMSSION

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 9-1-65

Type Test: [X] Initial [ ] Annual [ ] Special				Test Date: 7-14-81	
Company: Phillips Petroleum		Connection: El Paso Natural Gas			
Pool: Malaga--Atoka (Gas)		Formation: Atoka			Unit:
Completion Date: 11-22-80	Total Depth: 13050		Plug Back TD: 13009	Elevation: 3016 GR	Farm or Lease Name: Magala A
Csg. Size: 5-1/2" / Wt.: 17,20,23 / d: 4.778 / Set At: 13,050			Perforations: From 11694 To 11721		Well No.: 2
Tbg. Size: 2-7/8" / Wt.: 6.40 / d: 2.441 / Set At: 12,170			Perforations: From To		Unit: D / Sec.: 2 / Twp.: 24-S / Rge.: 28-E
Type Well – Single – Bradenhead – G.G. or G.O. Multiple: Dual			Packer Set At: 12140		County: Eddy
Producing Thru: Annulus	Reservoir Temp. °F: 178 @ 11800	Mean Annual Temp. °F: 74	Baro. Press. – P_a: 13.2		State: New Mexico
L: 11694	H: 11694	Gg: .591	% CO_2	% N_2	% H_2S	Prover DWT: 2	Meter Run	Taps

FLOW DATA / TUBING DATA / CASING DATA

NO.	Prover Line Size	X	Orifice Size	Press. p.s.i.g. ~~in Mercury~~	Diff. h_w	Temp. °F	Tubing Press. p.s.i.g.	Tubing Temp. °F	Casing Press. p.s.i.g.	Casing Temp. °F	Duration of Flow
SI							Producing		6100	80	
1.	2:00		.50	24		80	410	80	400	80	24 hrs.
2.											
3.											
4.											
5.											

RATE OF FLOW CALCULATIONS

NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P_m	Flow Temp. Factor Ft.	Gravity Factor Fg	Super Compress. Factor, Fpv	Rate of Flow Q, Mcfd
1	119			.9813	1.0084	---	118
2.							
3.							
4.							
5.							

NO.	P_t	Temp. °R	T_r	Z
1.				
2.				
3.				
4.				
5.				

Gas Liquid Hydrocarbon Ratio _____ Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons _____ Deg.
Specific Gravity Separator Gas .591 XXXXXXXXX
Specific Gravity Flowing Fluid XXXXX
Critical Pressure 672 P.S.I.A. _____ P.S.I.A.
Critical Temperature 354 R _____ R

P_c 6113.2 P_c^2 37371.2

NO	P_t^2	P_w	P_w^2	$P_c^2 - P_w^2$
1	179.5	423.7	179.5	37191.7
2				
3				
4				
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = \frac{37371.2}{37191.7}$ (2) $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 1.005$

$AOF = Q \left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 119$

Absolute Open Flow 119 Mcfd @ 15.025 Angle of Slope θ 45 Slope, n 1

Remarks: Gas volumes from orifice well tests. Calculations made by computer.

Approved By Commission:	Conducted By:	Calculated By:	Checked By:
	Robert Lee	D. E. Simpson	

Exhibit 9
Case 7312

PHILLIPS PETROLEUM COMPANY
Malaga "A" Well No. 2
Malaga - Atoka (Gas) Pool
Eddy County, New Mexico
Test Date: 7-14-81

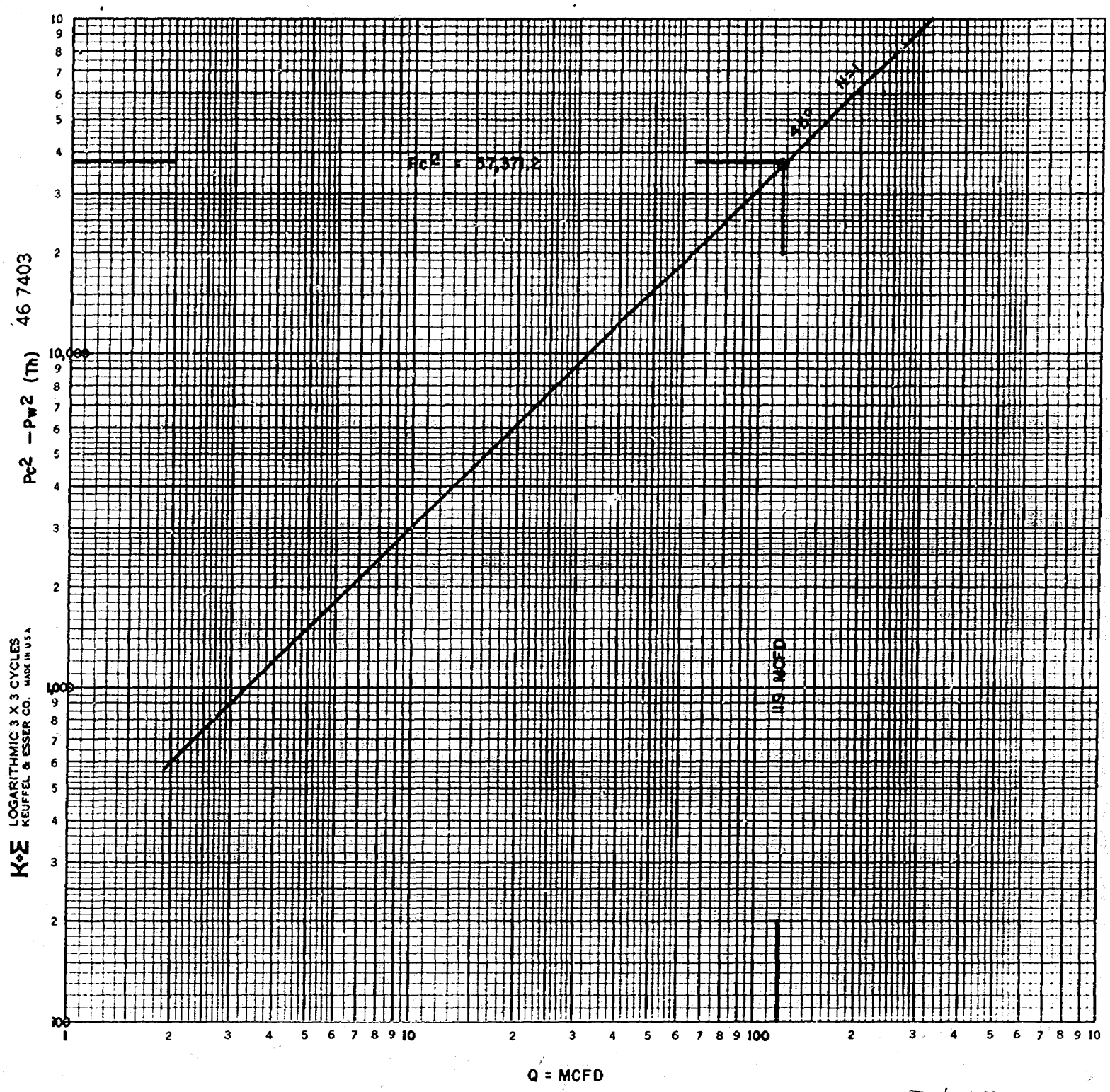


Exhibit 10
Case 7312

PHILLIPS PETROLEUM CO.-GAS CHROMATOGRAPH ANALYSIS-G & GL SURVEY

CO. Phillips Petro. Co. ....LEASE Malaga A. ...WE. #. 2..TYPE GAS Gas. Well
LOCATION. 660 N. & 660 W. 2-24-28. .....COUNTY Eddy ....STATE N. M.
FIELD. Malaga .....FORM. Atoka .....CHOKE. —..TYPE TRAP Wellhead
TRAP TEMP. —.TRAP PRESS 200.FTP. —..ATMOS TEMP 96.GAS TEMP 90°.BARO. 685
DATE SEC 6/24/81.DATE RUN 6/29/81 SEC BY Sutton RUN BY A.R. BOMB PRESS. 200.
H2S GR. (CORR) STA. .CO2 ON TAG 0.30% MISC. Fractionator only

INST 1 METH 1 FILE 40

RUN 1 G-430 1 : 25.3 0 / 3 / 0

COMPONENT	FINAL MOL %
C6 PLUS	0
N2	.6
C1	97.55
CO2	.45
ETHANE	1.27
C3	.11
IC4	.01
NC4	.01
IC5	0
NC5	0
TOTAL	100

PRESSURE BASE AT 60 DEG. F.

		14.696	14.65
ETHANE	GPM	.3386	.3376
C3	GPM	.0301	.0301
IC4	GPM	.0032	.0032
NC4	GPM	.0031	.0031
			0.000
TOTAL GPM		.375	.374
Z FACTOR=		.99804	
SAT. BASIS BTU		995.208	992.092
CAL. SP. GR.		.569	

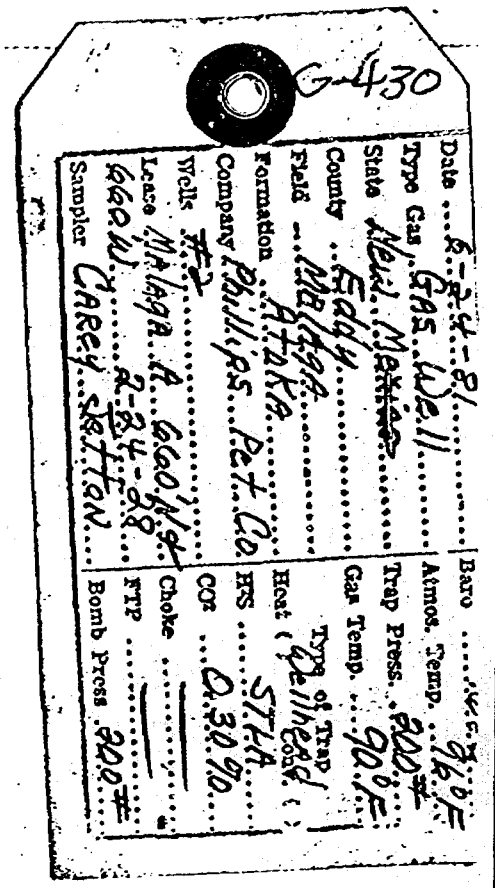


Exhibit 11
case 7312

PHILLIPS PETROLEUM CO.-GAS CHROMATOGRAPH ANALYSIS-G & GL SURVEY
CO..Phillips Pet. Co..... ...LEASE..Malaga A...WEL).2..TYPE GAS..Gas Well
LOCATION.660'N.&660'W..2-24S-28E.....COUNTY..Eddy...STATE..NM
FIELD..Malaga.....FORM.Morrow.....CHOKE Demand TYPE TRAP.Heat
TRAP TEMP....TRAP PRESS315.FTP325#..ATMOS TEMP.96..GAS TEMP.105.BARO.685.
DATE SEC6-24-81 DATE RUN.6-29-81.SEC BY Jetton RUN BY AB..BOMB PRESS.310.
H2S GR.(CORR).STA..CO2 ON TAG.1.5%.MISC..Prod. Comp. Only

INST 2 METH 2 FILE 62

RUN 1 G-433 16 : 10.4 6 / 29 / 31

COMPONENT	FINAL MOL %
C6 PLUS	0
N2	.84
C1	97.27
CO2	.31
ETHANE	.95
C3	.1
IC4	.02
NC4	.01
IC5	0
NC5	0
TOTAL	100

PRESSURE BASE AT 60 DEG. F.

		14.696	14.65
ETHANE	GPM	.2533	.2525
C3	GPM	.0274	.0273
IC4	GPM	.0065	.0065
NC4	GPM	.0031	.0031
			0.000
TOTAL GPM		.2903	.2894
Z FACTOR=		.998853	
SAT. BASIS BTU		986.911	983.321
CAL. SP. GR.		.572	

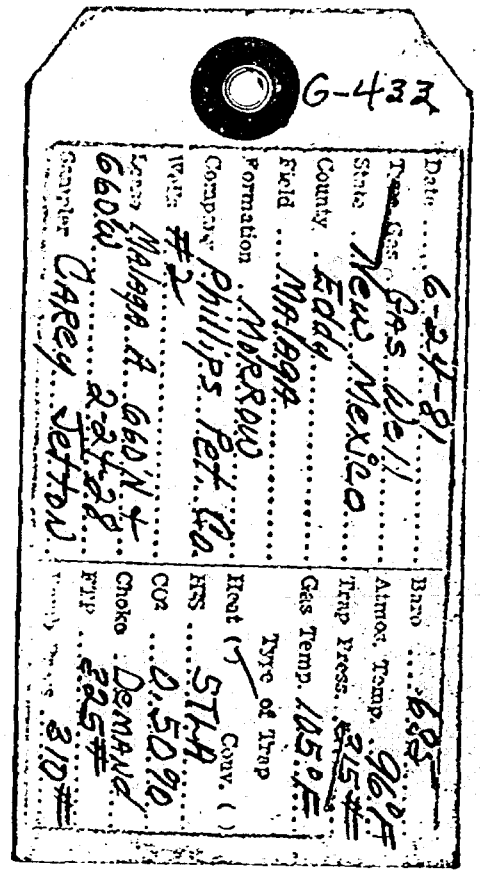


Exhibit 12
Case 7312

1

MALAGA 'A' NO. 1

ECONOMICS OF COMMINGLING

MORROW AND ATOKA FORMATIONS

Year	Case 1: Commingled Production		Case 2: Individual Production	
	Gas (MCF)	Cash Flow ($)	Gas (MCF)	Cash Flow ($)
1	80,178	91,331	21,930	24,109
2	54,360	61,410	18,317	19,814
3	37,603	41,942	15,300	16,202
4	26,580	29,085	12,780	13,159
5	19,214	20,439	10,674	10,584
6	14,200	14,498	8,916	8,400
7	10,717	10,313	7,447	6,539
8	8,244	7,279	6,221	4,944
9	6,448	5,006	5,196	3,562
10	4,340	2,359	4,340	2,359
11	3,625	1,304	3,625	1,304
12	3,028	360	3,028	360
13			58,248	62,022
14			36,043	35,936
15			22,303	19,584
16			13,800	9,226
17			8,540	2,471
Total	268,537 MCF	$285,326	256,708 MCF	$240,675

Increase in reserves = 11,829 MCF.

Increase in Cash Flow = $44,651.

Exhibit 13
Case 7312

MALAGA - A No. 2
Sec. 2, T-24-S, R-28-E, Unit D
Eddy County, New Mexico

Well History

April 22, 1980

Location: 660' FNL & 660' FWL, Sec 2, T-24-S, R-28-E, Unit D, Eddy County, New Mexico.

Ran 18-5/8" 87.50# K-55 Butt R-3 Cond 1 casing at 406'. Cemented with 735 sacks of Class "H". Circulated 125 sacks.

Ran 13-3/8" 61# K-55 ST&C. Casing set at 2557'. Cemented w/ 2550 sacks Class "H". Circ 183 sacks.

Ran 9-5/8" 40# K-55 LT&C (779.46') and 9-5/8" 40# N-80 LT&C (8706.07') set at 9500'. Cemented 1st stage w/ 1100 sacks of Class "H". Circulated 150 sacks cement. Continued 2nd stage w/ 2000 sacks Class "H". Circulated 350 sacks of cement.

Ran 5-1/2" 23#, 20#, 17# N-80 LT&C casing. Cemented w/ 1600 sacks of Class "H". Top of cement at 8390'.

October 21, 1980

Set packer at 11,530' on 2-7/8" N-80 tubing. Perforated Atoka with 2 JSPF from 11694'-11700' and 11714'-11721'. No indication of pressure. Swabbed 3 hours, 65 BLW, no oil, no gas, swabbed dry. SITP after 14 hours at 125#.

Treated Atoka down 2-7/8" tubing thru casing perfs 11694-11721' with 2000 gals Morflo BC acid with 1000 SCF nitrogen per bbl. Flushed with 43 bbls 2% KCl water with 1000 SCF nitrogen per bbl. Dropped 1 ball sealer each 2 bbls acid in last 1000 gals. Max pressure - 7200#, ISDP - 6200#, 5-min SIP - 6100#, Avg injection rate at 3 BPM for acid, plus 1-1/2 BPM for nitrogen. SITP 3475#. Flowed gas to pit 8 hrs, ran swb, fluid at 6500', rec 15 BAW. SIP after 15 min - 105#, 30 min - 200#: 45 min - 250#; 60 min - 300# SITP after 40 hrs 6400#. Flared to pit 8 hrs, gas rate 150 to 200 MCFD. SITP after 14 hrs - 125#. Frac'd down 2-7/8" tbg thru 5-1/2" casing perfs 11694-11721' with 15,000 gals Versagel "1500" with 22,000# sand and 6000 gals CO_2. Max press at 9400#. Avg press at 8900#, ISDP 6080#, 15 min SIP at 5000#. Avg injection rate at 10 BPM. SITP after 13 hrs 1600# SITP after 14 hrs 1500#. Flowed to pit 8 hrs, recovered 10 BLW, FTP at 25#. Ran swab to 11,530', no fluid, estimated gas rate 150 MCFD.

October 14, 1980

SITP after 40 hrs at 6100#. Perforated Atoka zone with 2 JSPF from 11,780-11,785; 11,822'-11,829'. SITP after 14 hrs 2000#. Treated Atoka down 2-7/8" tbg thru casing perfs 11694-11827' with 4000 gals Morflo "BC" acid containing 1000 SCF nitrogen/ bbl. Flushed with 47 bbls 2% KCl water with 1000 SCF nitrogen per bbl, with 1 ball sealer 2 bbls acid last 3500 gals. Max pressure 7200#, min pressure 6000#, ISDP 5000#, 5 min SIP 4600#. SITP after 14 hrs 1800#. Flowed and swabbed 8 hrs, gas rate at 100 MCFD. SITP after 14 hrs 2150#, gas rate at 120 MCFD, FTP zero.

SITP after 14 hrs 3150#. Gas rate at 200 MCFD. SITP after 40 hrs 6300#.

Exhibit 14
Case 7312

October 22, 1980

SITP after 14 hrs 5500#, gas rate at 900 MCFD. SITP after 14 hrs 5500#. Squeezed casing perfs at 11,694-11827' with 35 sacks of Class "H" cement with 10% LWL mixed with 15.6# per gal. Pumped 15 sacks in formation. Left 20 sacks in casing. Max pressure at 4600#. Top of cement at 11,630'. SITP after 14 hrs 4200#. Cut over Baker F-1 packer at 11,530'. Drilled cement inside 5-1/2" casing from 11,569-11,715'. Circulated out gas. Drilled cement from 11,715-11,785' and recovered gas kick-off bottom. SIP 1100#. Tight place in 5-1/2" casing from 11,715-11,720'.

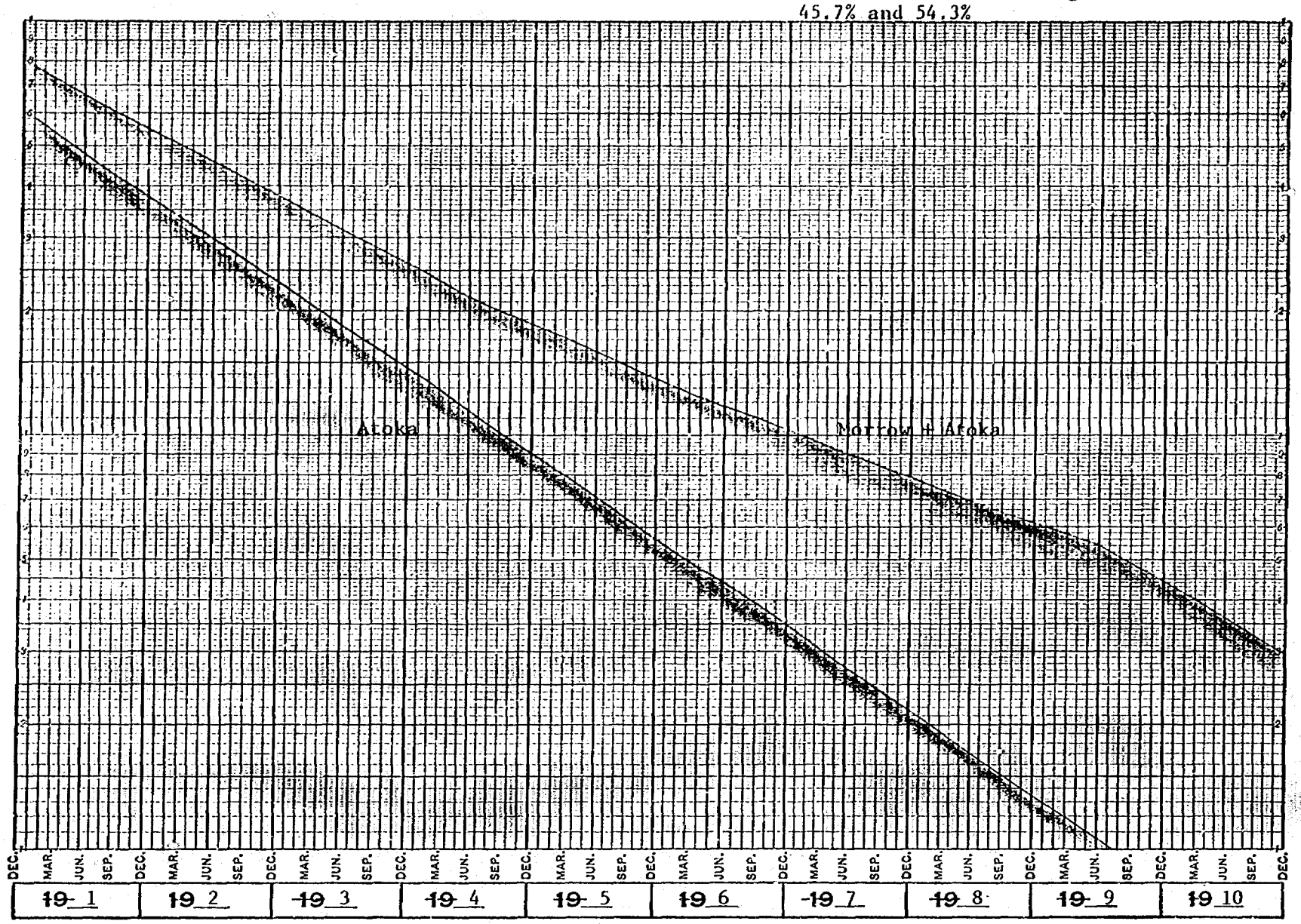
November 1, 1980

SIP 1700#. Went in hole with RTTS packer set at 11,300'.

Squeezed casing perfs at 11,822-11,827' w/ 35 sxs Class "H" with 1/10% LWL 15.6# per gallon. Pumped 20 sacks into formation, left 15 sacks inside 5-1/2" casing. Max pressure 4500#, SION. Drilled cement from 11700' to 11,827'. Drilling frac sand and barite at 12,871'. Cleaned out to 13,009'. Pulled bit to 12,520'. Spotted 8 bbls 10% Acetic acid.
Went in hole with Baker F-1 packer and stopped at 11,714'. Started out of hole and packer hung up at 11,660'. Unable to pull packer out of hole, unable to set packer, pull out of WL rope socket. Left collar locators, set tool and packer at 11,660'. Tallied in hole with overshot, latched on sheared off setting tool from packer and recovered collar locator and set tool. Tallied in hole w/ cutrite shoe and packer picker. Cut over Baker F-1 packer at 11,660'. Pulled out of hole. Finished coming out of hole with packer & tallied in hole with bit and string mill. Milled out tight place in 5-1/2" casing, from 11,715-11,720'. Had indication of gas. Shut in pressure after 38 hrs 2400#. Prepared to mill out tight place in casing. SI casing pressure after 14 hours 2550#. Tallied in hole with swedge, 2 string mills, jars and bumper sub on 2-7/8" tbg. Circulated out gas while going in hole. Swedged thru tight place at 11,715' & used 20,000# to work swedge thru tight place. No improvement. 11-12-80: SIP - 2600#. Milled out tight place in casing from 11,715-11,720'. Circulated out iron cutting, cmt form. SIP 2000#. Set Baker Model "D" pkr at 12,170'. WIH w/ Baker pkr seal assembly on 2-7/8" N-80 tbg. Set in pkr at 12,170' in 5000# compression. Baker Model-F nipple w/ a 2.131 ID set at 12,139'. Swbd tbg to 7000' and lost swb in hole plus 3000' line. Fished swab line. Ran 394 jts 2-7/8" tbg, set in Baker Model "D" pkr 12,170' in 5,000# compression. Swbd tbg dry to 7500'. Perf'd Marrow zone w/ 2 JSPF at 12,246-12,274' and 12,282-12,286'. No indication of flow @ surface. Howco treated dwn 2-7/8" tbg through csg perfs 12246-12286' w/ 6500 gals of Morflo HF acid w/ inhibitor containing 1000 SCF nitrogen per bbl. Flushed w/ 55 bbls of 2% KCL water with 1000 SCF nitrogen per bbl. Max press 7100#, Avg press 6071#, ISDP 3600#, 5 min SIP 3550#, 15 min SIP 3400#. AIR 4BA + 2.2 bbls nitrogen per min.

SIP after 40 hrs, 3000#. FL 5500'. Swbd 8 hrs, recd 25 BAW w/ trace of condensate. Estimated gas rate, 200 MCF. Well swbd dry. SI tbg press after 38 hrs, 2000#. Perf'd Morrow Zone w/ 2 JSPF at 12,328-12,362' and 12,372-12,394'. No indication of press at surf. Halliburton trtd dwn 2-7/8" tbg through csg perfs 12,246-12,394' w/ 10,500 gals acid (12% HCl and 3% HF) w/ 1000 SCF nitrogen/ bbl. Flshd w/ 46 bbls 2% KCl wtr w/ 1000 SCF nitrogen/ bbl. Dropped one ball sealer per 1/2 bbls acid in last 9500 gals acid. Avg inj rate 8.5 BPM. Max press 6000#, avg press 5600#, ISDP 3600#. SITP after 14 hrs, 2050#. Est gas rate, 400 MCF. SITP after 62 hrs, 3500#. Flwg tbg press 25-50#. No gas estimate. SI for evaluation. Flowed 4 hrs, 12/64" chk, for single flow rate: 24-hr rate, 851 MCFG, FTP 825#, no condensate, 11 BW, from 5-1/2" csg perfs 12,246-12,394'.

Malaga 'A' No. 1
Eddy County, New Mexico
Morrow and Atoka Commingled Forecast
45.7% and 54.3%



Phillips Petroleum Company
Malaga-A Lease, Well No. 2
Unit D, Section 2, T-24-S, R-28-E
Eddy County, New Mexico

Monthly Gas Production, Mcf
(Malaga Morrow)

Gas (Mcf)

1000

100

10

19 81	19 ___	19 ___	19 ___	19 ___
Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov.	Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov.	Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov.	Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov.	Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

PHILLIPS PETROLEUM COMPANY

Malaga-A Lease, Well No. 2
Unit D, Section 2, T-24-S, R-28-E
Eddy County, New Mexico

Production History
Malaga Field

Year & Month	Morrow Gas, Mcf
1981	
JAN	851
FEB	
MAR	
APR	
MAY	1784
JUN	2511
TOTAL YR.	5146
ACCUM.	5146

NEW MEXICO OIL CONSERVATION COMMSSION

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 9-1-65

API # 30-015-23287

Type Test: [X] Initial [ ] Annual [ ] Special				Test Date: 5-25-81	
Company: Phillips Petroleum		Connection: El Paso Natural Gas			
Pool: Malaga-Morrow (Gas)		Formation: Morrow		Unit:	
Completion Date: 11-22-80	Total Depth: 13,050	Plug Back TD: 13,009	Elevation: 3016' GR	Farm or Lease Name: Malaga "A"	
Csg. Size: 5-1/2" / Wt.: 17,20,23 / d: 4.778 / Set At: 13,050		Perforations: From 12,246 To 12,394		Well No.: 2	
Tbg. Size: 2-7/8" / Wt.: 6.40 / d: 2.441 / Set At: 12,170		Perforations: From To		Unit: D / Sec.: 2 / Twp.: 24-S / Rge.: 28-E	
Type Well – Single – Bradenhead – G.G. or G.O. Multiple: Single		Packer Set At: 12140		County: Eddy	
Producing Thru: Tubing	Reservoir Temp. °F: 178 @ 11800'	Mean Annual Temp. °F: 74	Baro. Press. – P_a: 13.2	State: New Mexico	

L	H	Gg	% CO_2	% N_2	% H_2S	Prover	Meter Run	Taps
12,320	12,320	.588					4"	Flange

NO.	FLOW DATA: Prover Line Size	X Orifice Size	Press. p.s.i.g.	Diff. h_w	Temp. °F	TUBING DATA: Press. p.s.i.g.	Temp. °F	CASING DATA: Press. p.s.i.g.	Temp. °F	Duration of Flow
SI						2775	60	packer		48 hrs.
1.	4:00	.750	580	96	70	2450	70	packer		1 hr.
2.	4:00	.750	590	97	72	1700	70	packer		1 hr.
3.	4:00	.750	590	94	75	1190	70	packer		1 hr.
4.	4:00	.750	590	67	75	740	70	packer		1 hr.
5.										

RATE OF FLOW CALCULATIONS

NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P_m	Flow Temp. Factor Ft.	Gravity Factor Fg	Super Compress. Factor, Fpv	Rate of Flow Q, Mcfd
1	2.661	238.64	593.2	.9905	1.304	1.040	853
2.	2.661	241.89	603.2	.9887	1.304	1.040	863
3.	2.661	238.12	603.2	.9859	1.304	1.040	847
4.	2.661	201.03	603.2	.9859	1.304	1.040	715
5.							

NO.	P_t	Temp. °R	T_f	Z
1.	.78	530	1.51	.924
2.	.79	532	1.52	.925
3.	.80	535	1.53	.924
4.	.80	535	1.53	.924
5.				

Gas Liquid Hydrocarbon Ratio ——— Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons ——— Deg.
Specific Gravity Separator Gas .588 XXXXXXXXX
Specific Gravity Flowing Fluid XXXXX
Critical Pressure 672 P.S.I.A. ——— P.S.I.A.
Critical Temperature 350 R ——— R

P_c 2788.2 P_c^2 7774.1

NO	P_t^2	P_w	P_w^2	$P_c^2 - P_w^2$
1	6067.4	2464.9	6075.7	1698.4
2	2935.1	1783.6	3181.2	6291.3
3	1447.7	1206.5	1455.6	6318.5
4	567.3	757.2	573.3	7200.8
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = \frac{7774.1}{6291.3}$ (2) $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 1.236$

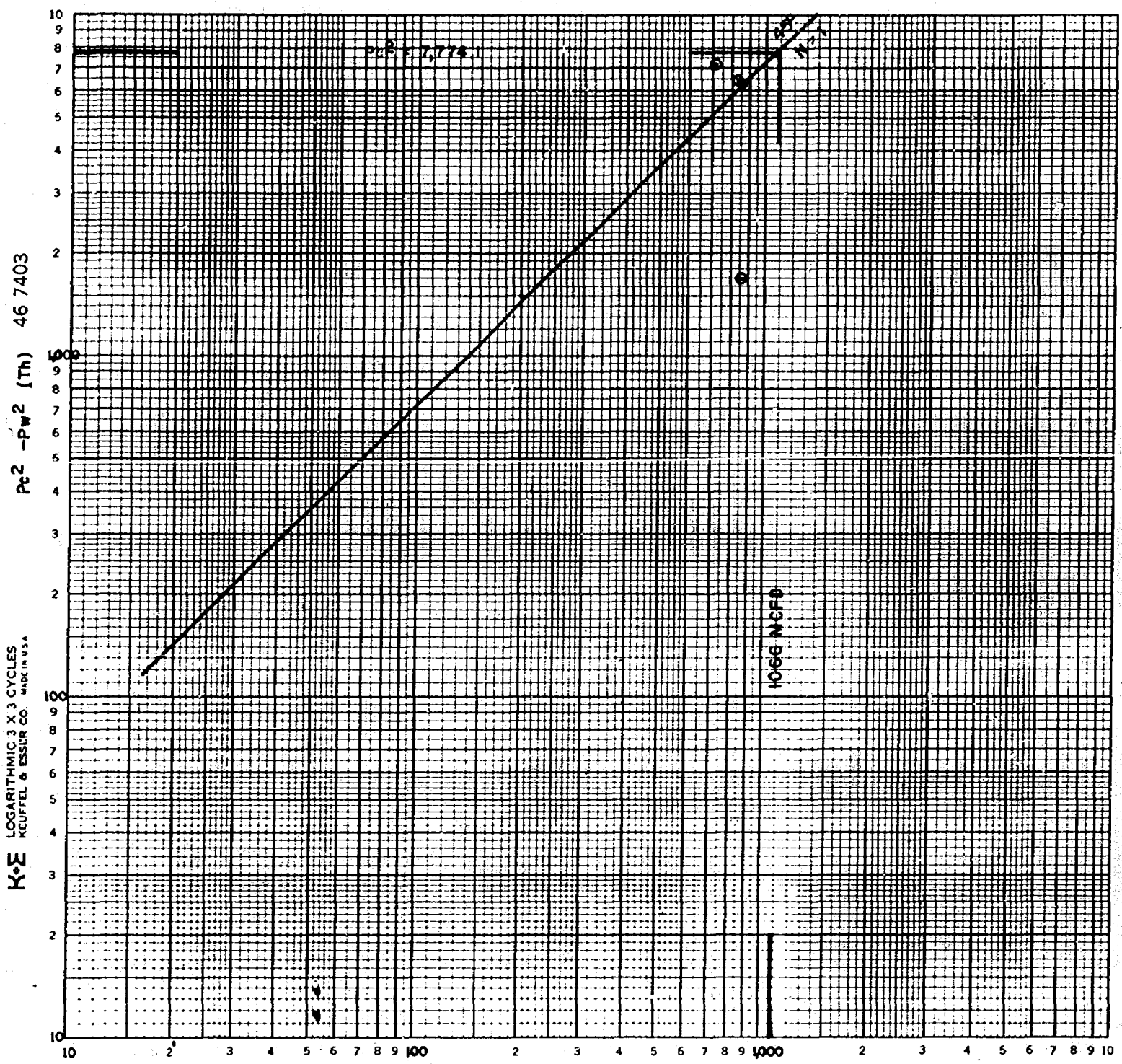
AOF = Q $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 1.066$

Absolute Open Flow 1,066 Mcfd @ 15.025 Angle of Slope θ 45 Slope, n 1

Remarks: Calculations made by computer, Program based on New Mexico Manual for back-pressure listing of Natural Gas wells.
*Form C-105 filed 2-11-81

Approved By Commission:	Conducted By:	Calculated By:	Checked By:
	Robert Lee	D. E. Simpson	

PHILLIPS PETROLEUM COMPANY
Malaga "A" Well No. 2
Malaga - Morrow (Gas) Pool
Eddy County, New Mexico
Test Date: 5-25-81



NEW MEXICO OIL CONSERVATION COMMSSION

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 9-1-65

Type Test: [X] Initial [ ] Annual [ ] Special				Test Date: 7-14-81	
Company: Phillips Petroleum			Connection: El Paso Natural Gas		
Pool: Malaga--Atoka (Gas)			Formation: Atoka		Unit
Completion Date: 11-22-80	Total Depth: 13050		Plug Back TD: 13009	Elevation: 3016 GR	Farm or Lease Name: Magala A
Csg. Size: 5-1/2" / Wt.: 17,20,23 / d: 4.778 / Set At: 13,050			Perforations: From 11694 To 11721		Well No.: 2
Tbg. Size: 2-7/8" / Wt.: 6.40 / d: 2.441 / Set At: 12,170			Perforations: From To		Unit: D / Sec.: 2 / Twp.: 24-S / Rge.: 28-E
Type Well – Single – Bradenhead – G.G. or G.O. Multiple: Dual			Packer Set At: 12140		County: Eddy
Producing Thru: Annulus	Reservoir Temp. °F: 178 @ 11800	Mean Annual Temp. °F: 74	Baro. Press. – P_a: 13.2		State: New Mexico

L	H	Gg	% CO_2	% N_2	% H_2S	Prover DWT	Meter Run	Taps
11694	11694	.591				2		

	FLOW DATA					TUBING DATA		CASING DATA		
NO.	Prover Line Size	X Orifice Size	Press. ~~p.s.i.g. in Mercury~~	Diff. h_w	Temp. °F	Press. p.s.i.g.	Temp. °F	Press. p.s.i.g.	Temp. °F	Duration of Flow
SI						Producing		6100	80	
1.	2:00	.50	24		80	410	80	400	80	24 hrs.
2.										
3.										
4.										
5.										

RATE OF FLOW CALCULATIONS

NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P_m	Flow Temp. Factor Ft.	Gravity Factor Fg	Super Compress. Factor, Fpv	Rate of Flow Q, Mcfd
1	119			.9813	1.0084	---	118
2.							
3.							
4.							
5.							

NO.	P_t	Temp. °R	T_t	Z
1.				
2.				
3.				
4.				
5.				

Gas Liquid Hydrocarbon Ratio _____ Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons _____ Deg.
Specific Gravity Separator Gas .591 XXXXXXXXX
Specific Gravity Flowing Fluid XXXXX
Critical Pressure 672 P.S.I.A. _____ P.S.I.A.
Critical Temperature 354 R _____ R

P_c 6113.2 P_c^2 37371.2

NO	P_t^2	P_w	P_w^2	$P_c^2 - P_w^2$
1	179.5	423.7	179.5	37191.7
2				
3				
4				
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = \frac{37371.2}{37191.7}$ (2) $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 1.005$

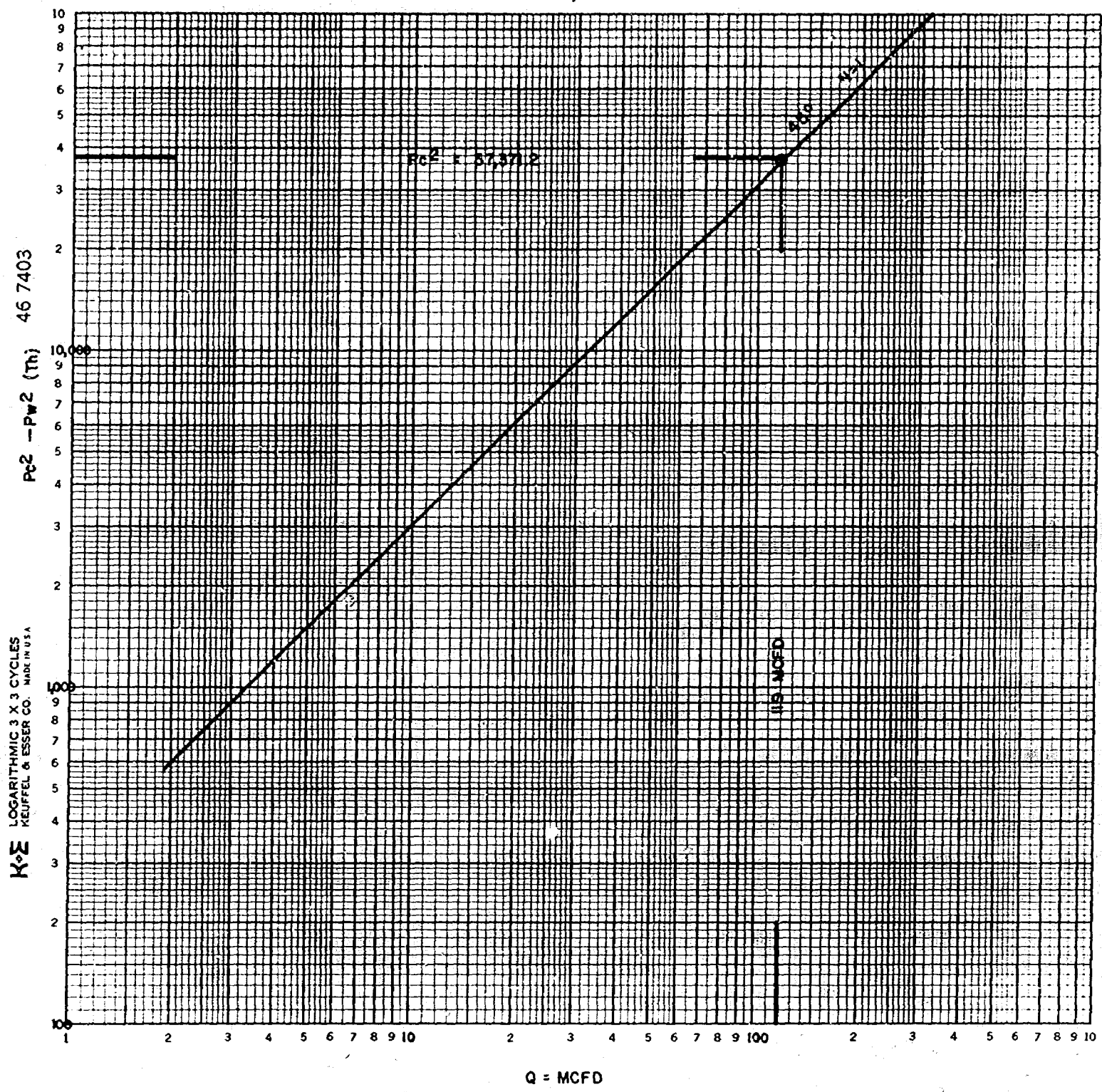
$AOF = Q\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 119$

Absolute Open Flow 119 Mcfd @ 15.025 Angle of Slope θ 45 Slope, n 1

Remarks: Gas volumes from orifice well tests. Calculations made by computer.

Approved By Commission:	Conducted By:	Calculated By:	Checked By:
	Robert Lee	D. E. Simpson	

PHILLIPS PETROLEUM COMPANY
Malaga "A" Well No. 2
Malaga - Atoka (Gas) Pool
Eddy County, New Mexico
Test Date: 7-14-81



PHILLIPS PETROLEUM CO.-GAS CHROMATOGRAPH ANALYSIS-G & GL SURVEY
CO. Phillips Petro. Co. ....LEASE Malaga A. ....WE. #. 2 ..TYPE GAS Gas Well
LOCATION. 660 N. & 660 W. 2-24-28 .....COUNTY Eddy ....STATE N. M.
FIELD. Malaga .....FORM. Atoka .....CHOKE. ---..TYPE TRAP Wellhead
TRAP TEMP. ---.TRAP PRESS 200 .FTP. ---.ATMOS TEMP 96 .GAS TEMP 90°.BARO. 685
DATE SEC 6/24/81.DATE RUN 6/29/81 SEC BY Patton RUN BY A.B. BOMB PRESS. 200.
H2S GR. (CORR) STD A. .CO2 ON TAG 0.30% MISC. Extension Analysis Only

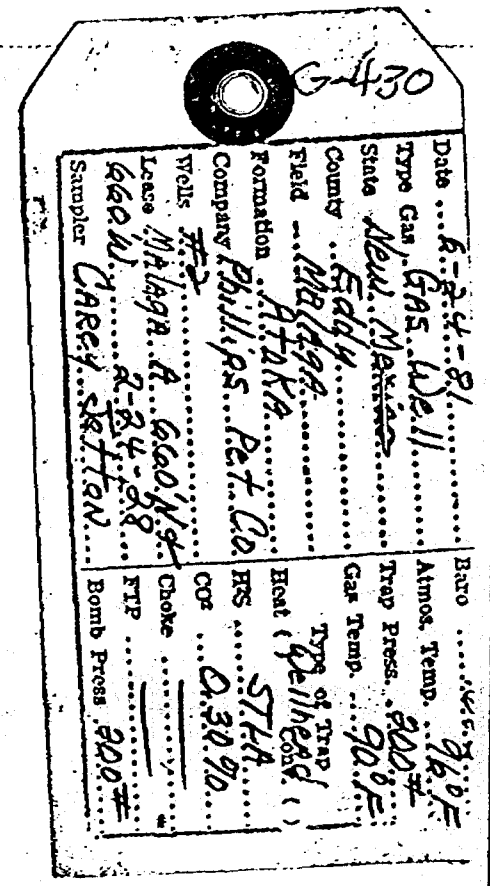
INST 1 METH 1 FILE 40

RUN 1 G-430 1 : 25.3 0 / 3 / 9

COMPONENT	FINAL MOL %
C6 PLUS	0
N2	.6
C1	97.55
CO2	.45
ETHANE	1.27
C3	.11
IC4	.01
NC4	.01
IC5	0
NC5	0
TOTAL	100

PRESSURE BASE AT 60 DEG. F.

		14.696	14.65
ETHANE	GPM	.3386	.3376
C3	GPM	.0301	.0301
IC4	GPM	.0032	.0032
NC4	GPM	.0031	.0031
			0.000
TOTAL GPM		.375	.374
Z FACTOR=		.99804	
SAT. BASIS BTU		995.208	992.092
CAL. SP. GR.		.569	



PHILLIPS PETROLEUM CO.-GAS CHROMATOGRAPH ANALYSIS-G & GL SURVEY
CO..Phillips Pet. Co.....LEASE.Malaga A...WEL..2..TYPE GAS..Gas Well
LOCATION.660 N & 660 W..2-24S-28E.....COUNTY..Eddy..STATE..NM
FIELD..Malaga.....FORM.Morrow.....CHOKE.Demand..TYPE TRAP.Heat
TRAP TEMP....TRAP PRESS.315.FTP.325#..ATMOS TEMP.96..GAS TEMP.105.BARO.685.
DATE SEC.6-24-81.DATE RUN.6-29-81.SEC BY.Jetton.RUN BY.AB..BOMB PRESS.310.
H2S GR.(CORR).STM..CO2 ON TAG..5%.MISC..Extended Gonly

INST 2 METH 2 FILE 62

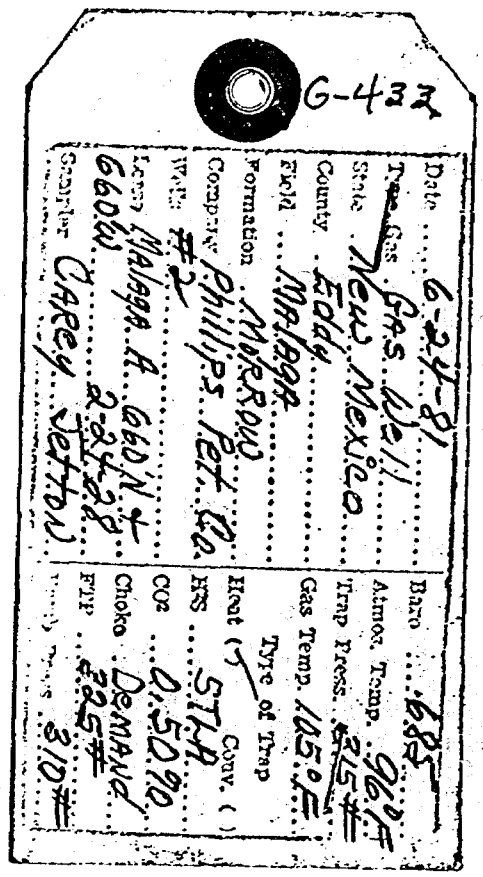
RUN 1 G-433 16 : 10.4 6 / 29 / 81

COMPONENT	FINAL MOL %
C6 PLUS	0
N2	.84
C1	97.27
CO2	.31
ETHANE	.95
C3	.1
IC4	.02
NC4	.01
IC5	0
NC5	0
TOTAL	100

PRESSURE BASE AT 60 DEG. F.

		14.696	14.65
ETHANE	GPM	.2533	.2525
C3	GPM	.0274	.0273
IC4	GPM	.0065	.0065
NC4	GPM	.0031	.0031
TOTAL GPM		.2903	.2894
Z FACTOR=		.998853	
SAT. BASIS BTU		986.911	983.321
CAL. SP. GR.		.572	

0.000



MALAGA 'A' NO. 1

ECONOMICS OF COMMINGLING

MORROW AND ATOKA FORMATIONS

Year	Case 1: Commingled Production		Case 2: Individual Production	
	Gas (MCF)	Cash Flow ($)	Gas (MCF)	Cash Flow ($)
1	80,178	91,331	21,930	24,109
2	54,360	61,410	18,317	19,814
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13			58,248	62,022
14			36,043	35,936
15			22,303	19,584
16			13,800	9,226
17			8,540	2,471
Total	268,537 MCF	$285,326	256,708 MCF	$240,675

Increase in reserves = 11,829 MCF.

Increase in Cash Flow = $44,651.

MALAGA - A No. 2
Sec. 2, T-24-S, R-28-E, Unit D
Eddy County, New Mexico

Well History

April 22, 1980

Location: 660' FNL & 660' FWL, Sec 2, T-24-S, R-28-E, Unit D, Eddy County, New Mexico.

Ran 18-5/8" 87.50# K-55 Butt R-3 Cond 1 casing at 406'. Cemented with 735 sacks of Class "H". Circulated 125 sacks.

Ran 13-3/8" 61# K-55 ST&C. Casing set at 2557'. Cemented w/ 2550 sacks Class "H". Circ 183 sacks.

Ran 9-5/8" 40# K-55 LT&C (779.46') and 9-5/8" 40# N-80 LT&C (8706.07') set at 9500'. Cemented 1st stage w/ 1100 sacks of Class "H". Circulated 150 sacks cement. Continued 2nd stage w/ 2000 sacks Class "H". Circulated 350 sacks of cement.

Ran 5-1/2" 23#, 20#, 17# N-80 LT&C casing. Cemented w/ 1600 sacks of Class "H". Top of cement at 8390'.

October 21, 1980

Set packer at 11,530' on 2-7/8" N-80 tubing. Perforated Atoka with 2 JSPF from 11694'-11700' and 11714'-11721'. No indication of pressure. Swabbed 3 hours, 65 BLW, no oil, no gas, swabbed dry. SITP after 14 hours at 125#.

Treated Atoka down 2-7/8" tubing thru casing perfs 11694-11721' with 2000 gals Morflo BC acid with 1000 SCF nitrogen per bbl. Flushed with 43 bbls 2% KCl water with 1000 SCF nitrogen per bbl. Dropped 1 ball sealer each 2 bbls acid in last 1000 gals. Max pressure - 7200#, ISDP - 6200#, 5-min SIP - 6100#, Avg injection rate at 3 BPM for acid, plus 1-1/2 BPM for nitrogen. SITP 3475#. Flowed gas to pit 8 hrs, ran swb, fluid at 6500', rec 15 BAW. SIP after 15 min - 105#, 30 min - 200#: 45 min - 250#; 60 min - 300# SITP after 40 hrs 6400#. Flared to pit 8 hrs, gas rate 150 to 200 MCFD. SITP after 14 hrs - 125#. Frac'd down 2-7/8" tbg thru 5-1/2" casing perfs 11694-11721' with 15,000 gals Versagel "1500" with 22,000# sand and 6000 gals CO_2. Max press at 9400#. Avg press at 8900#, ISDP 6080#, 15 min SIP at 5000#. Avg injection rate at 10 BPM. SITP after 13 hrs 1600# SITP after 14 hrs 1500#. Flowed to pit 8 hrs, recovered 10 BLW, FTP at 25#. Ran swab to 11,530', no fluid, estimated gas rate 150 MCFD.

October 14, 1980

SITP after 40 hrs at 6100#. Perforated Atoka zone with 2 JSPF from 11,780-11,785; 11,822'-11,829'. SITP after 14 hrs 2000#. Treated Atoka down 2-7/8" tbg thru casing perfs 11694-11827' with 4000 gals Morflo "BC" acid containing 1000 SCF nitrogen/ bbl. Flushed with 47 bbls 2% KCl water with 1000 SCF nitrogen per bbl, with 1 ball sealer 2 bbls acid last 3500 gals. Max pressure 7200#, min pressure 6000#, ISDP 5000#, 5 min SIP 4600#. SITP after 14 hrs 1800#. Flowed and swabbed 8 hrs, gas rate at 100 MCFD. SITP after 14 hrs 2150#, gas rate at 120 MCFD, FTP zero.

SITP after 14 hrs 3150#. Gas rate at 200 MCFD. SITP after 40 hrs 6300#.

October 22, 1980

SITP after 14 hrs 5500#, gas rate at 900 MCFD. SITP after 14 hrs 5500#. Squeezed casing perfs at 11,694-11827' with 35 sacks of Class "H" cement with 10% LWL mixed with 15.6# per gal. Pumped 15 sacks in formation. Left 20 sacks in casing. Max pressure at 4600#. Top of cement at 11,630'. SITP after 14 hrs 4200#. Cut over Baker F-1 packer at 11,530'. Drilled cement inside 5-1/2" casing from 11,569-11,715'. Circulated out gas. Drilled cement from 11,715-11,785' and recovered gas kick-off bottom. SIP 1100#. Tight place in 5-1/2" casing from 11,715-11,720'.

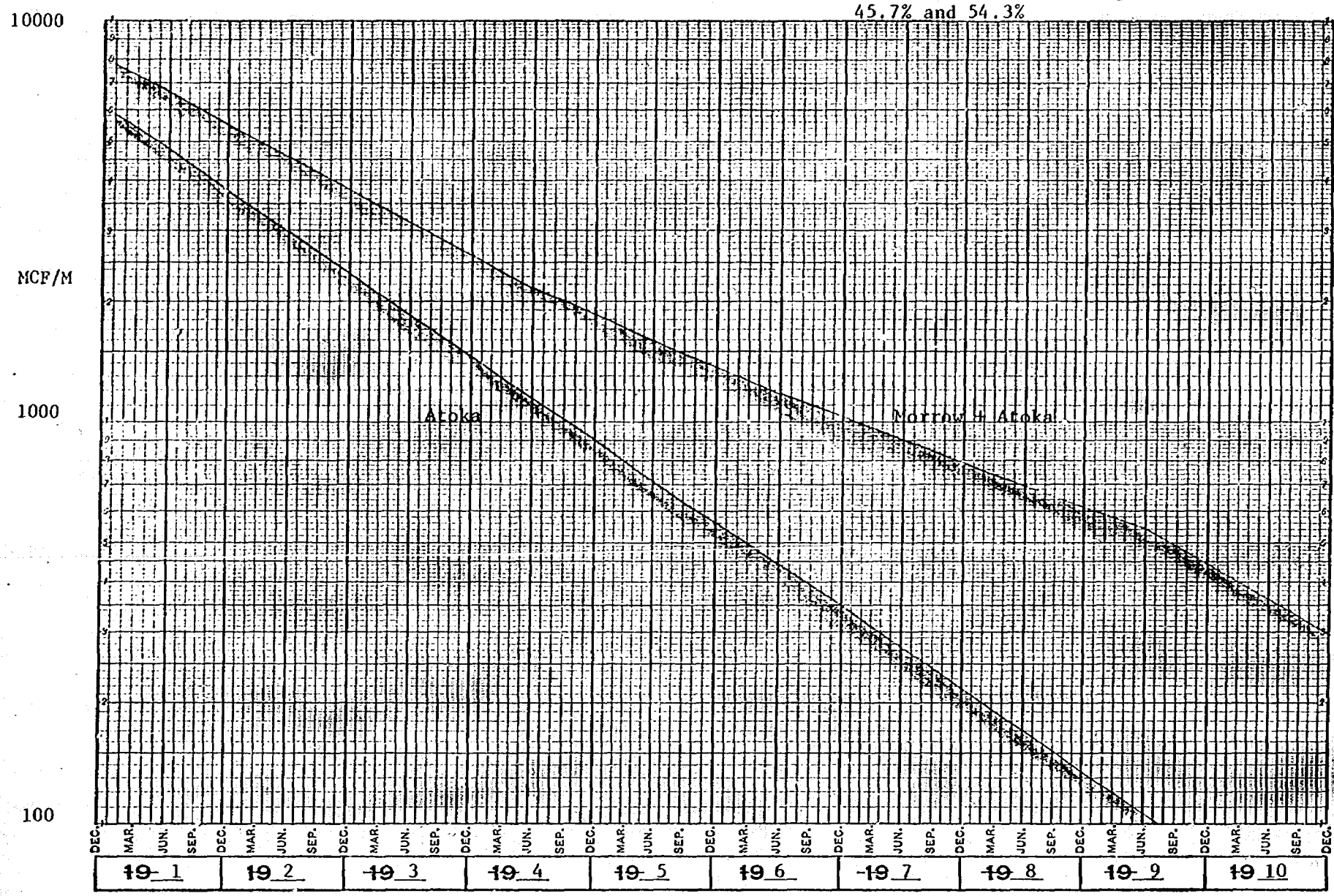
November 1, 1980

SIP 1700#. Went in hole with RTTS packer set at 11,300'.

Squeezed casing perfs at 11,822-11,827' w/ 35 sxs Class "H" with 1/10% LWL 15.6# per gallon. Pumped 20 sacks into formation, left 15 sacks inside 5-1/2" casing. Max pressure 4500#, SION. Drilled cement from 11700' to 11,827'. Drilling frac sand and barite at 12,871'. Cleaned out to 13,009'. Pulled bit to 12,520'. Spotted 8 bbls 10% Acetic acid.
Went in hole with Baker F-1 packer and stopped at 11,714'. Started out of hole and packer hung up at 11,660'. Unable to pull packer out of hole, unable to set packer, pull out of WL rope socket. Left collar locators, set tool and packer at 11,660'. Tallied in hole with overshot, latched on sheared off setting tool from packer and recovered collar locator and set tool. Tallied in hole w/ cutrite shoe and packer picker. Cut over Baker F-1 packer at 11,660'. Pulled out of hole. Finished coming out of hole with packer & tallied in hole with bit and string mill. Milled out tight place in 5-1/2" casing, from 11,715-11,720'. Had indication of gas. Shut in pressure after 38 hrs 2400#. Prepared to mill out tight place in casing. SI casing pressure after 14 hours 2550#. Tallied in hole with swedge, 2 string mills, jars and bumper sub on 2-7/8" tbg. Circulated out gas while going in hole. Swedged thru tight place at 11,715' & used 20,000# to work swedge thru tight place. No improvement. 11-12-80: SIP - 2600#. Milled out tight place in casing from 11,715-11,720'. Circulated out iron cutting, cmt form. SIP 2000#. Set Baker Model "D" pkr at 12,170'. WIH w/ Baker pkr seal assembly on 2-7/8" N-80 tbg. Set in pkr at 12,170' in 5000# compression. Baker Model-F nipple w/ a 2.131 ID set at 12,139'. Swbd tbg to 7000' and lost swb in hole plus 3000' line. Fished swab line. Ran 394 jts 2-7/8" tbg, set in Baker Model "D" pkr 12,170' in 5,000# compression. Swbd tbg dry to 7500'. Perf'd Marrow zone w/ 2 JSPF at 12,246-12,274' and 12,282-12,286'. No indication of flow @ surface. Howco treated dwn 2-7/8" tbg through csg perfs 12246-12286' w/ 6500 gals of Morflo HF acid w/ inhibitor containing 1000 SCF nitrogen per bbl. Flushed w/ 55 bbls of 2% KCL water with 1000 SCF nitrogen per bbl. Max press 7100#, Avg press 6071#, ISDP 3600#, 5 min SIP 3550#, 15 min SIP 3400#. AIR 4BA + 2.2 bbls nitrogen per min.

SIP after 40 hrs, 3000#. FL 5500'. Swbd 8 hrs, recd 25 BAW w/ trace of condensate. Estimated gas rate, 200 MCF. Well swbd dry. SI tbg press after 38 hrs, 2000#. Perf'd Morrow Zone w/ 2 JSPF at 12,328-12,362' and 12,372-12,394'. No indication of press at surf. Halliburton trtd dwn 2-7/8" tbg through csg perfs 12,246-12,394' w/ 10,500 gals acid (12% HCl and 3% HF) w/ 1000 SCF nitrogen/ bbl. Flshd w/ 46 bbls 2% KCl wtr w/ 1000 SCF nitrogen/ bbl. Dropped one ball sealer per 1/2 bbls acid in last 9500 gals acid. Avg inj rate 8.5 BPM. Max press 6000#, avg press 5600#, ISDP 3600#. SITP after 14 hrs, 2050#. Est gas rate, 400 MCF. SITP after 62 hrs, 3500#. Flwg tbg press 25-50#. No gas estimate. SI for evaluation. Flowed 4 hrs, 12/64" chk, for single flow rate: 24-hr rate, 851 MCFG, FTP 825#, no condensate, 11 BW, from 5-1/2" csg perfs 12,246-12,394'.

Malaga 'A' No. 1
Eddy County, New Mexico
Morrow and Atoka Commingled Forecast
45.7% and 54.3%



dr/

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 7312

Order No. R-6791

APPLICATION OF PHILLIPS PETROLEUM COMPANY

FOR DOWNHOLE COMMINGLING, EDDY

COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on July 29, 19 81, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this _____ day of _____, 19_____, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Phillips Petroleum Company, is the owner and operator of the Malaga A Well No. 2, located in Unit D of Section 2, Township 24 South, Range 28 East, NMPM, Eddy County, New Mexico.

(3) That the applicant seeks authority to commingle Atoka and Morrow production within the wellbore of the above-described well.

(4) That from the Atoka zone, the subject well is capable of very low marginal production only.

(5) That from the Morrow zone, the subject well is capable of very low marginal production only.

(6) That the proposed commingling may result in the recovery of additional hydrocarbons from each of the subject pools, thereby preventing waste, and will not violate correlative rights.

(7) That the reservoir characteristics of each of the subject zones are such that underground waste would not be caused by the proposed commingling provided that the well is not shut-in for an extended period.

(8) – (10)

(11) ~~(10)~~ That to afford the Division the opportunity to assess the potential for waste and to expeditiously order appropriate remedial action, the operator should notify the Artesia district office of the Division any time the subject well is shut-in for 7 consecutive days.

(12) ~~(11)~~ ~~(9)~~ That in order to allocate the commingled production to each of the commingled zones in the subject well, 54 percent of the commingled _____ production should be allocated to the Atoka zone, and 46 percent of the commingled _____ production to the Morrow zone.

~~(8) That while flowing pressures for both zones are comparable, shut-in pressures are substantially different.~~

(8) That if said well should be shut in for any reason, crossflow could occur between zones.

(9) ~~(10)~~ That the applicant should be required to install a check valve, rated for at least a 5,000-pound differential, between the zones to be commingled.

(10) That the applicant should notify the Division's district office at Artesia of the date and time the check valve is to be run in the well in order that the

IT IS THEREFORE ORDERED:

(1) That the applicant, Phillips Petroleum Company, is hereby authorized to commingle Atoka and Morrow production within the wellbore of the Malaga A Well No. 2, located in Unit D of Section 2, Township 24 South, Range 28 East, NMPM, Malaga Field, Eddy County, New Mexico.

(2) That the applicant shall consult with the Supervisor of the Artesia district office of the Division and determine an allocation formula for the allocation of production to each zone in each of the subject wells.

(ALTERNATE)

(2) That 54 percent of the commingled production shall be allocated to the Atoka zone and 46 percent of the commingled 46 production shall be allocated to the Morrow zone.

(3) ~~(2)~~ That the operator ~~applicant should~~ be required to install a check valve, rated for at least a 5,000 pound differential, between the zones to be commingled.

(4) ~~(3)~~ That the operator ~~applicant should~~ shall notify the Division's district office at Artesia of the date and time the check valve is to be run in the well in order that the same may be witnessed.

(5) ~~(3)~~ That the operator of the subject well shall immediately notify the Division's Artesia district office any time the well has been shut-in for 7 consecutive days and shall concurrently present, to the Division, a plan for remedial action.

(6) ~~(4)~~ That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.