WESTERN

INC.

P. O. Box 1599
Wichita, Kansas 67201

Company Graves Drilling Co., Inc. ETAL Lease & Well No. Sample #1

Elevation - Formation Mississippi Effective Pay - Ft. Ticket No. 25093

Date 5-4-76 Sec. 20 Twp. 29S Range 6W County Kingman State Kansas

Test Approved by Fredrick W. Stump Western Representative Charles Branstetter

Formation Test No. 1 O.K. X Misrun - Interval Tested From 4127' to 4146' Total Depth 4146'

Size Main Hole 7 7/8 Rat Hole - Conv. X B.T. - Damaged - Yes X No Conv. - B.T. X Damaged - Yes X No

Top Packer Depth 4118 Ft. Size 6 3/4 Bottom Packer Depth 4127 Ft. Size 6 3/4

Straddle - Conv. - B.T. - Damaged - Yes - No Packer Depth - Ft. Size -

Tool Size 5½OD Tool Joint Size 4½FH Anchor Length 19 Ft. Size 5½OD Surface Choke Size ¼ In. Bottom Choke Size 3/4 In.

RECORDERS Depth 4137 Ft. Clock No. 6866 Depth 4140 Ft. Clock No. 6896

Top Make Kuster Cap. 4500 No. 3085 Inside Outside Bottom Make Kuster Cap. 4400 No. 2603 Inside Outside

Below Straddle: Depth - Rec. No. - Clock No. - Inside Outside Depth - Ft. Rec. No. - Clock No. - Inside Outside

Time Set Packer 11:33 A. M

Tool Open I.F.P. From 11:35A M. to 11:50A M. - Hr. 15 Min. From (B) 50 P.S.I. To (C) 41 P.S.I.

Tool Closed I.C.I.P. From 11:50A M. to 12:35P M. - Hr. 45 Min (D) 1035 P.S.I.

Tool Open F.F.P. From 12:35P M. to 1:35P M. - Hr. 60 Min. From (E) 57 P.S.I. To (F) 61 P.S.I.

Tool Closed F.C.I.P. From 1:35P M. to 2:20P M. - Hr. 45 Min. (G) 671 P.S.I.

Initial Hydrostatic Pressure (A) 2186 P.S.I. Final Hydrostatic Pressure (H) 2166 P.S.I. Maximum Temp. 130

INFORMATION

BLOW Strong blow off bottom of bucket. Gas to surface in 70 minutes.
Gas to small to measure

Did Well Flow X Yes - No Recovery Total Ft. 140' oil and gas cut mud. 30' slightly watery mud.

Reversed Out - Yes X No Mud Type starch Viscosity 50 Weight 9.6 Water Loss 7.2 cc. Chlorides 88,000 P.P.M.

EXTRA EQUIPMENT: Type Circ. Sub. pin Safety Joint - Jars: Size - In. Make - Ser. No. -

Dual Packer yes Did Packers Hold? yes Did Tool Plug? no Where? - - -

DRILLING CONTRACTOR Graves Drlg. Co., Inc. Length Drill Pipe? 4017 Ft. I.D. Drill Pipe 3.8 In. Tool Joint Size 4½XH In.

Length Weight Pipe - Ft. I.D. Weight Pipe - In. Tool Joint Size - In. Length Drill Collars 90 Ft. I.D. Drill Collars 2.25 In.

Tool Joint Size 4½H-90 In. Length D.S.T. Tool 39 Ft.

Remarks:

WESTERN TESTING CO., INC.
Pressure Data

Date 5-4-76 Test Ticket No. 25093

Recorder No. 3085 Capacity 4500 Location 4137 Ft.

Clock No. 6866 Elevation - - - Well Temperature 130 °F

Point		Pressure			Time Given	Time Computed
A	Initial Hydrostatic Mud	2186 P.S.I.		Open Tool	11:33 A. M	
B	First Initial Flow Pressure	50 P.S.I.		First Flow Pressure	15 Mins.	15 Mins.
C	First Final Flow Pressure	41 P.S.I.		Initial Closed-in Pressure	45 Mins.	42 Mins.
D	Initial Closed-in Pressure	1035 P.S.I.		Second Flow Pressure	60 Mins.	60 Mins.
E	Second Initial Flow Pressure	57 P.S.I.		Final Closed-in Pressure	45 Mins.	42 Mins.
F	Second Final Flow Pressure	61 P.S.I.				
G	Final Closed-in Pressure	671 P.S.I.				
H	Final Hydrostatic Mud	2166 P.S.I.				

PRESSURE BREAKDOWN

First Flow Pressure
Breakdown: 3 Inc. of 5 mins. and a final inc. of 0 Min.

Point Mins.	Press.
P 1 0	50
P 2 5	40
P 3 10	41
P 4 15	41
P 5	
P 6	
P 7	
P 8	
P 9	
P10	
P11	
P12	
P13	
P14	
P15	
P16	
P17	
P18	
P19	
P20	

Initial Shut-In
Breakdown: 14 Inc. of 3 mins. and a final inc. of 0 Min.

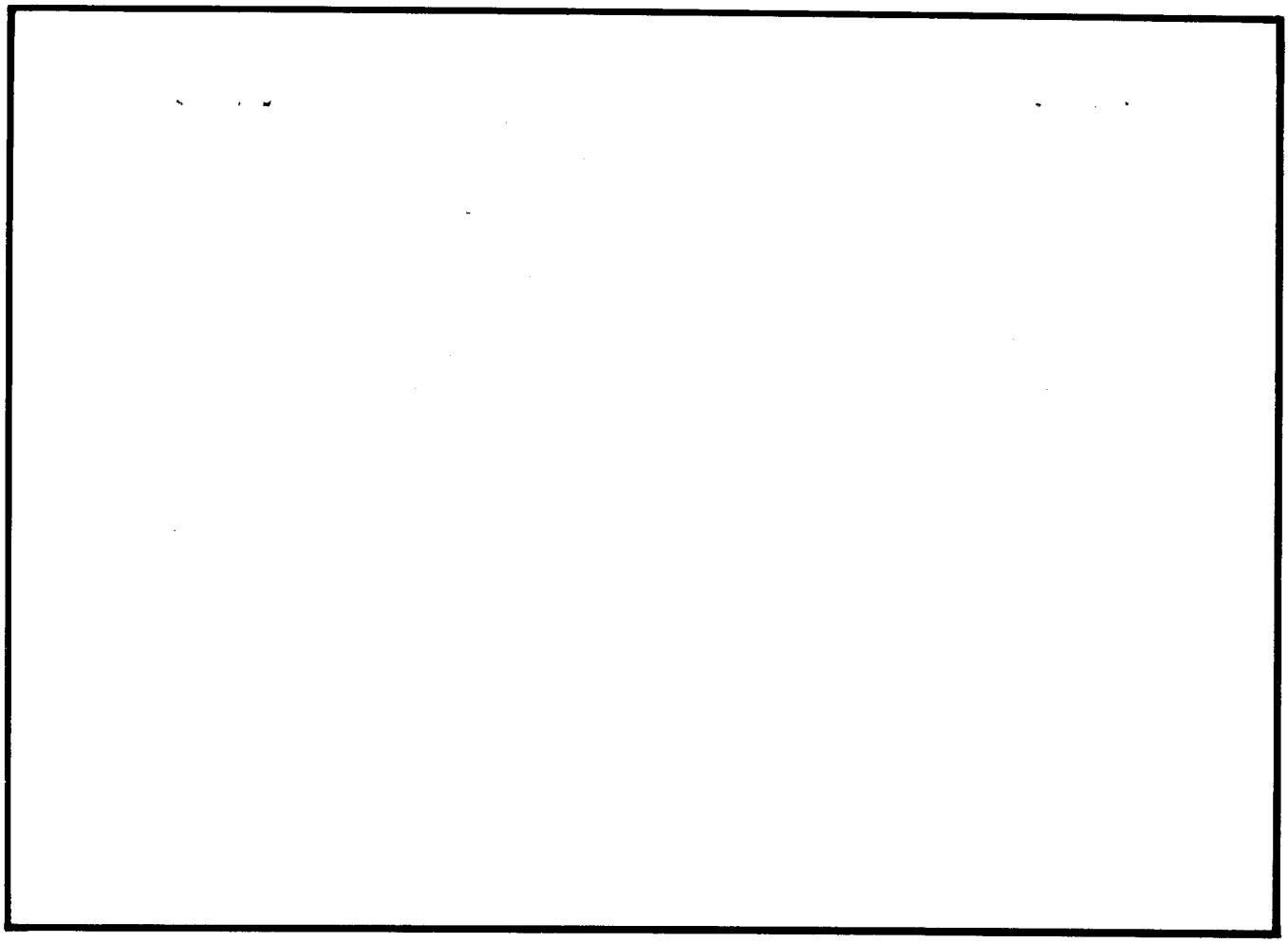
Point Minutes	Press.
0	41
3	131
6	225
9	311
12	397
15	478
18	558
21	636
24	706
27	774
30	832
33	878
36	946
39	993
42	1035

Second Flow Pressure
Breakdown: 12 Inc. of 5 mins. and a final inc. of 0 Min.

Point Minutes	Press.
0	57
5	50
10	49
15	50
20	53
25	55
30	57
35	61
40	64
45	65
50	65
55	62
60	61

Final Shut-In
Breakdown: 14 Inc. of 3 mins. and a final inc. of 0 Min.

Point Minutes	Press.
0	61
3	105
6	155
9	210
12	263
15	311
18	356
21	397
24	440
27	483
30	521
33	560
36	599
39	637
42	671



This is an actual photograph of recorder chart.

POINT		PRESSURE Field Reading	Office Reading	
(A)	Initial Hydrostatic Mud	2144	2186	PSI
(B)	First Initial Flow Pressure	36	50	PSI
(C)	First Final Flow Pressure	36	41	PSI
(D)	Initial Closed-in Pressure	1037	1035	PSI
(E)	Second Initial Flow Pressure	48	57	PSI
(F)	Second Final Flow Pressure	60	61	PSI
(G)	Final Closed-in Pressure	665	671	PSI
(H)	Final Hydrostatic Mud	2144	2166	PSI

WESTERN TESTERS INC.

P. O. Box 1599
Wichita, Kansas 67201

Company Graves Drilling Co., Inc. ETAL Lease & Well No. Sample #1

Elevation - Formation Mississippi Effective Pay - Ft. Ticket No. 25094

Date 5-5-76 Sec. 20 Twp. 29S Range 6W County Kingman State Kansas

Test Approved by Fredrick W. Stump Western Representative Charles Branstetter

Formation Test No. 2 O.K. X Misrun - Interval Tested From 4146' to 4168' Total Depth 4168'

Size Main Hole 7 7/8 Rat Hole - Conv. X B.T. - Damaged - Yes X No Conv. - B.T. X Damaged X Yes - No

Top Packer Depth 4141 Ft. Size 6 3/4 Bottom Packer Depth 4146 Ft. Size 6 3/4

Straddle - Conv. - B.T. - Damaged - Yes - No Packer Depth - Ft. Size -

Tool Size 5½ OD Tool Joint Size 4½ FH Anchor Length 22 Ft. Size 5½ OD Surface Choke Size ¼ In. Bottom Choke Size 3/4 In.

RECORDERS Depth 4156 Ft. Clock No. 6866 Depth 4159 Ft. Clock No. 6896

Top Make Kuster Cap. 4500 No. 3085 Inside ~~Outside~~ Bottom Make KUster Cap. 4400 No. 2603 ~~Inside~~ Outside

Below Straddle: Depth - Rec. No. - Clock No. - Inside Outside Depth - Ft. Rec. No. - Clock No. - Inside Outside

Time Set Packer 3:24 A. M

Tool Open I.F.P. From 3:25A M. to 3:40A M. - Hr. 15 Min. From (B) 59 P.S.I. To (C) 46 P.S.I.

Tool Closed I.C.I.P. From 3:40A M. to 4:25A M. - Hr. 45 Min (D) 1354 P.S.I.

Tool Open F.F.P. From 4:25A M. to 5:25A M. = Hr. 60 Min. From (E) 66 P.S.I. To (F) 81 P.S.I.

Tool Closed F.C.I.P. From 5:25A M. to 6:10A M. - Hr. 45 Min. (G) 1045 P.S.I.

Initial Hydrostatic Pressure (A) 2162 P.S.I. Final Hydrostatic Pressure (H) 2152 P.S.I. Maximum Temp. 133

INFORMATION

BLOW Strong blow throughout test. Gas to surface in 65 minutes. Gas amount to small to measure.

Did Well Flow X Yes No Recovery Total Ft. 90' oil and gas cut mud. 60' oil and gas cut muddy water 60' muddy water.

Reversed Out - Yes X No Mud Type starch Viscosity 50 Weight 9.6 Water Loss 7.2 cc. Chlorides 88,000 P.P.M.

EXTRA EQUIPMENT: Type Circ. Sub pin Safety Joint - Jars: Size - In. Make - Ser. No. -

Dual Packer yes Did Packers Hold? yes Did Tool Plug? no Where? - - -

DRILLING CONTRACTOR Graves Drlg. Co., Inc. Length Drill Pipe? 4036 Ft. I.D. Drill Pipe 3.8 In. Tool Joint Size 4½ XH In.

Length Weight Pipe = Ft. I.D. Weight Pipe - In. Tool Joint Size In. Length Drill Collars 90 Ft. I.D. Drill Collars 2.25 In.

Tool Joint Size 4½ H-90 In. Length D.S.T. Tool 42 Ft.

Remarks:

WESTERN TESTING CO., INC.
Pressure Data

Date 5-5-76 Test Ticket No. 25094

Recorder No. 3085 Capacity 4500 Location 4156 Ft.

Clock No. 6866 Elevation - - - Well Temperature 133 °F

Point		Pressure			Time Given	Time Computed
A	Initial Hydrostatic Mud	2162	P.S.I.	Open Tool	3:24 A. M	
B	First Initial Flow Pressure	59	P.S.I.	First Flow Pressure	15 Mins.	15 Mins.
C	First Final Flow Pressure	46	P.S.I.	Initial Closed-in Pressure	45 Mins.	45 Mins.
D	Initial Closed-in Pressure	1354	P.S.I.	Second Flow Pressure	60 Mins.	60 Mins.
E	Second Initial Flow Pressure	66	P.S.I.	Final Closed-in Pressure	45 Mins.	45 Mins.
F	Second Final Flow Pressure	81	P.S.I.			
G	Final Closed-in Pressure	1045	P.S.I.			
H	Final Hydrostatic Mud	2152	P.S.I.			

PRESSURE BREAKDOWN

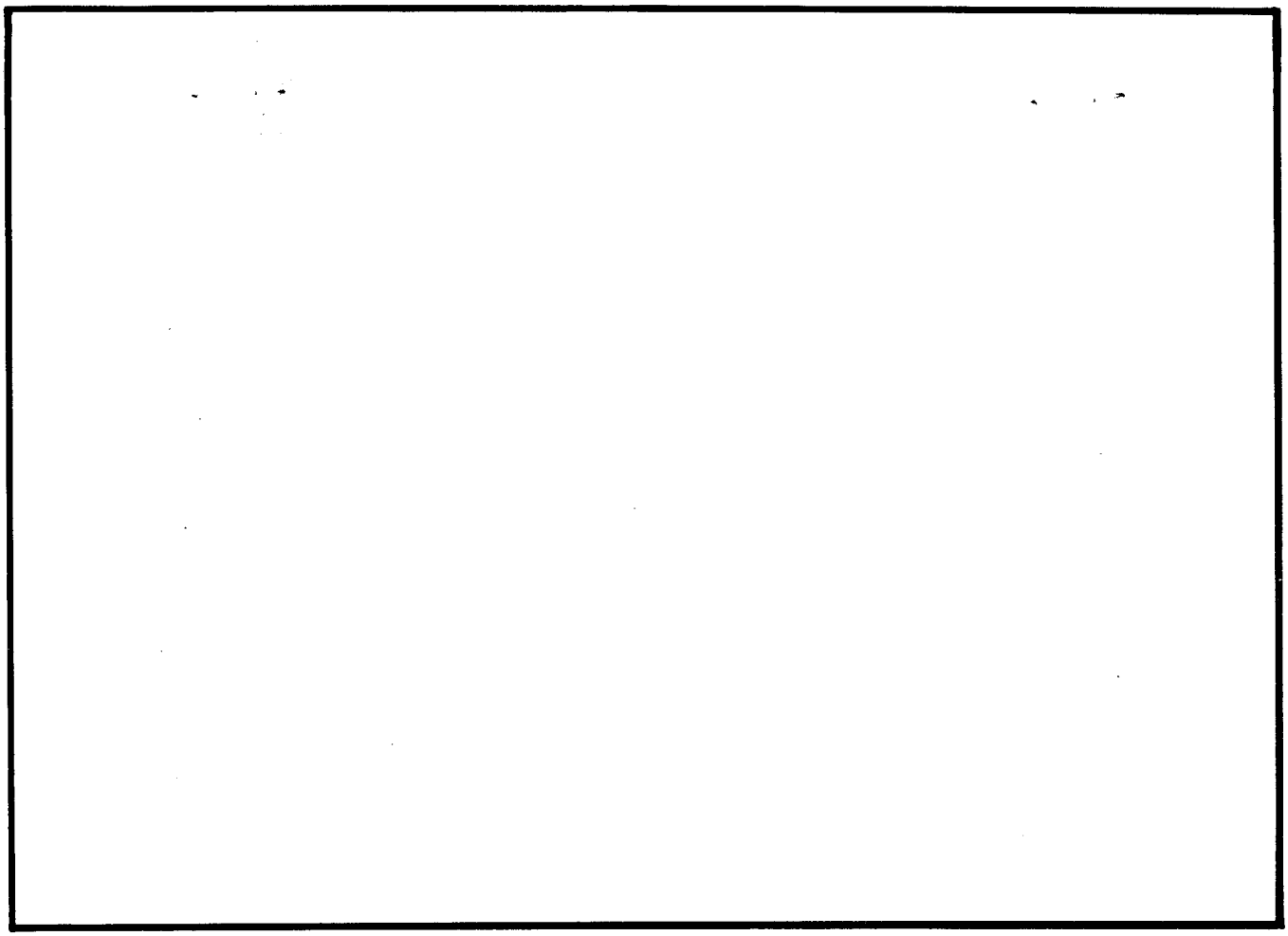
First Flow Pressure
Breakdown: 3 Inc. of 5 mins. and a final inc. of 0 Min.

Initial Shut-In
Breakdown: 15 Inc. of 3 mins. and a final inc. of 0 Min.

Second Flow Pressure
Breakdown: 2 12 Inc. of 5 mins. and a final inc. of 0 Min.

Final Shut-In
Breakdown: 15 Inc. of 3 mins. and a final inc. of 0 Min.

Point	Point Mins.	Press.	Point Minutes	Press.	Point Minutes	Press.	Point Minutes	Press.
P 1	0	59	0	46	0	66	0	81
P 2	5	45	3	206	5	59	3	151
P 3	10	45	6	356	10	62	6	234
P 4	15	46	9	502	15	66	9	315
P 5			12	653	20	69	12	391
P 6			15	800	25	72	15	464
P 7			18	928	30	72	18	535
P 8			21	1028	35	76	21	607
P 9			24	1113	40	81	24	674
P10			27	1176	45	83	27	741
P11			30	1226	50	82	30	804
P12			33	1266	55	81	33	864
P13			36	1298	60	81	36	920
P14			39	1321			39	974
P15			42	1342			42	1018
P16			45	1354			45	1045
P17								
P18								
P19								
P20								



This is an actual photograph of recorder chart.

POINT		PRESSURE Field Reading	Office Reading	
(A)	Initial Hydrostatic Mud	2212	2162	PSI
(B)	First Initial Flow Pressure	36	59	PSI
(C)	First Final Flow Pressure	36	46	PSI
(D)	Initial Closed-in Pressure	1222	1354	PSI
(E)	Second Initial Flow Pressure	48	66	PSI
(F)	Second Final Flow Pressure	72	81	PSI
(G)	Final Closed-in Pressure	1025	1045	PSI
(H)	Final Hydrostatic Mud	2155	2152	PSI

NOMENCLATURE

b	=	Approximate Radius of Investigation	Feet
b^1	=	Approximate Radius of Investigation (Net Pay Zone h^1)	Feet
D.R.	=	Damage Ratio	——
El	=	Elevation	Feet
GD	=	B.T. Gauge Depth (From Surface Reference)	Feet
h	=	Interval Tested	Feet
h^1	=	Net Pay Thickness	Feet
K	=	Permeability	md
K^1	=	Permeability (From Net Pay Zone h^1)	md
m	=	Slope Extrapolated Pressure Plot (Psi^2/cycle Gas)	psi/cycle
OF^1	=	Maximum Indicated Flow Rate	MCF/D
OF^2	=	Minimum Indicated Flow Rate	MCF/D
OF^3	=	Theoretical Open Flow Potential with/Damage Removed Max.	MCF/D
OF^4	=	Theoretical Open Flow Potential with/Damage Removed Min.	MCF/D
P^S	=	Extrapolated Static Pressure	Psig.
P^F	=	Final Flow Pressure	Psig.
$P^{\circ T}$	=	Potentiometric Surface (Fresh Water*)	Feet
Q	=	Average Adjusted Production Rate During Test	bbls/day
Q^1	=	Theoretical Production w/Damage Removed	bbls/day
Q^g	=	Measured Gas Production Rate	MCF/D
R	=	Corrected Recovery	bbls
r^w	=	Radius of Well Bore	Feet
t	=	Flow Time	Minutes
t°	=	Total Flow Time	Minutes
T	=	Temperature Rankine	°R
Z	=	Compressibility Factor	——
u	=	Viscosity Gas or Liquid	CP
Log	=	Common Log	

* Potentiometric Surface Reference to Rotary Table When Elevation Not Given, Fresh Water Corrected to 100° F.