



SURFACE INFORMATION

Well Flowed	Amount		
NO			
Reversed Out	Amount		
NO			
Recovered	Amount		
GAS CUT MUD	150' (2.13 BBLs)		
Maximum Surface Pressure			
Description (Rate of Flow)	Time	Pressure (P.S.I.G.)	Surface Choke
Opened Tool	0414	-	3/4"
CLOSED FOR INITIAL SHUT-IN	0419	-	-
RE-OPENED TOOL	0449	-	-
STRONG BLOW THROUGHOUT TEST			
CLOSED FOR FINAL SHUT-IN	0649	-	-
PULLED PACKER LOOSE	0719	-	-
Remarks: SLID TOOL 8' TO BOTTOM WHEN OPENED.			

TOOL, HOLE & MUD DATA

[illegible]

Customer	SAME AS BELOW.				
Company	TIME PET. CO.; 815 UNION NAT'L BLDG.; WICHITA, KANSAS			Date	6-25-63
Well	BOLINGER #1	Field	WILD CAT	Location	GNW NE 7-29-21W
Test Interval	2695' TO 2757' DST #1	Formation Test #	1	Casing Test #	-
County	FORD	State	KANSAS	Field Report No.	03390 A
Tester	EUGENE SALOGA	Test Approved By	MR. TOBY ELSTER	No. DST Reports Requested	5 x



Pressure Breakdown Data

Date 6-25-63

Field Report No. 03390 A

Recorder No. T-505 Capacity 3000#

Recorder Depth 2747'

Recorder Run INSIDE Clock Travel 0.02075 inches per min.

Well Temperature 100 °F.

Point	Pressure	Time Given	Time Computed
A Initial Hydrostatic Mud _____	1576		
B Initial Shut-in _____	766	0414	
C Initial Flow _____	127	5 Mins.	7 Mins.
D Final Flow _____	111	30 Mins.	30 Mins.
E Final Shut-in _____	695	120 Mins.	115 Mins.
F Final Hydrostatic Mud _____	1560	30 Mins.	32 Mins.

c-1	81
c-2	89
c-3	85

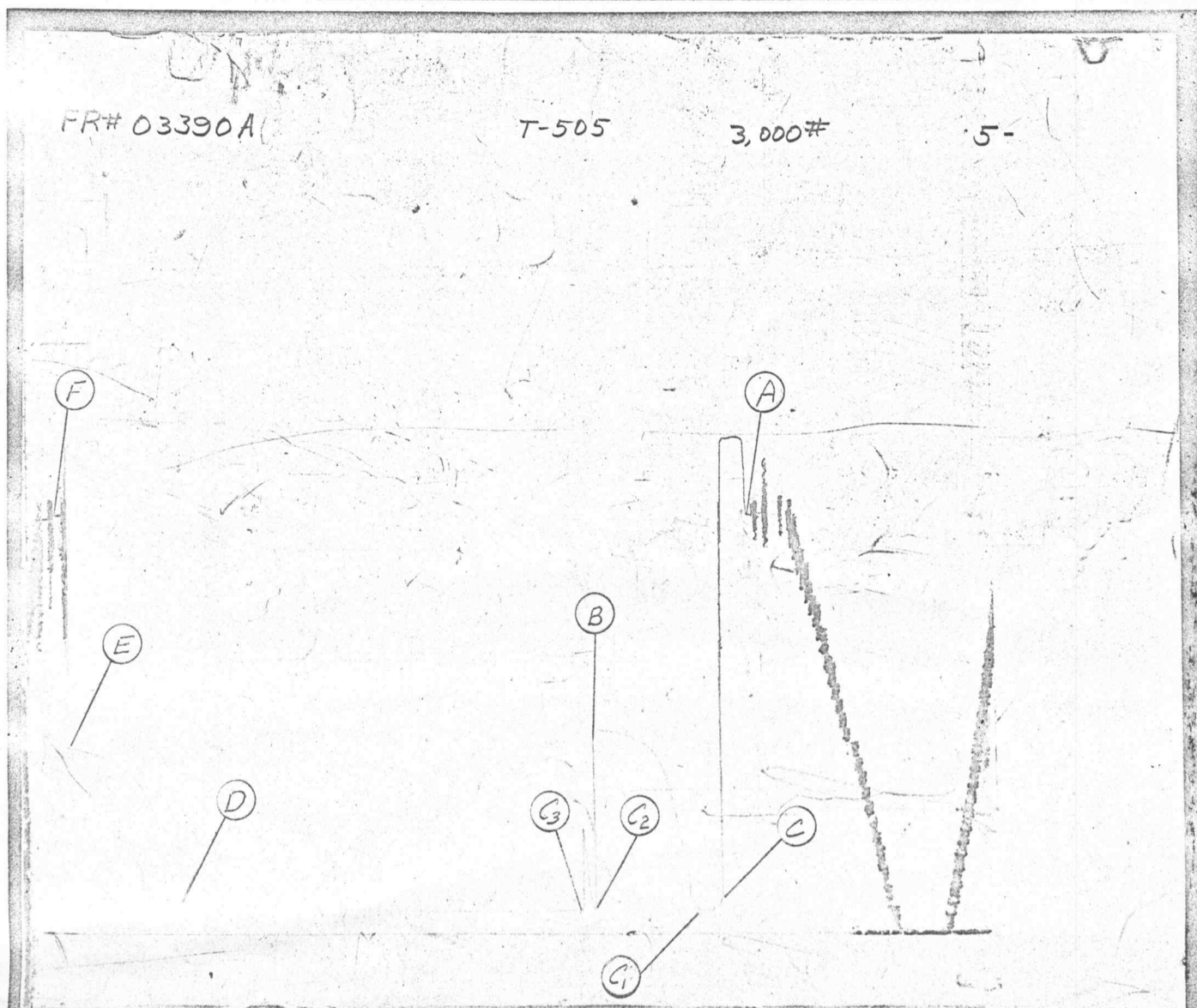
Remarks:

[illegible]

**JOHNSTON TESTERS****Pressure Data**Field Report No. 03390 A

Recorder No.	T-505	INSIDE			
Capacity (P.S.I.G.)	3000				
Recorder Depth	2747'				
Pressure Gradient P.S.I./Ft.					
Well Temperature °F.	100				
A Initial Hydrostatic Mud	1576				
B Initial Shut-in	* 766				
C Initial Flow	127				
D Final Flow	111				
E Final Shut-in	* 695				
F Final Hydrostatic Mud	1560				
Remarks:	c-1	81			
	c-2	89			
	c-3	85			

*Shut in pressure did not reach static reservoir pressure.



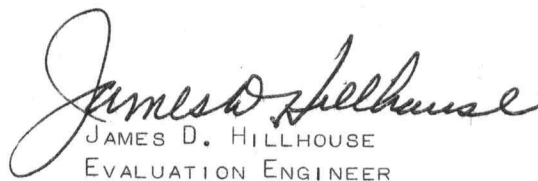
SPECIAL DATA ANALYSIS

FIELD REPORT #03391 A

JULY 10, 1963

THIS APPEARS TO BE A TEST OF A GOOD FORMATION AND A GOOD MECHANICAL TEST. THE TEST WAS CONDUCTED IN SUCH A MANNER THAT THE DATA OBTAINED SHOULD BE ADEQUATE FOR RELIABLE ANALYSIS.

1. WELL BORE DAMAGE: THE CALCULATED ESTIMATED DAMAGE RATIO OF 2.56 INDICATES THAT WELL BORE DAMAGE IS PRESENT AT THE TIME AND CONDITIONS OF THIS TEST. THIS VALUE INFERS THAT THE RATE OF PRODUCTION OBSERVED DURING THIS TEST MAY BE INCREASED 2.56 TIMES IF THE WELL BORE DAMAGE WERE REMOVED.
2. PERMEABILITY: THE CALCULATED TRANSMISSIBILITY FACTOR OF 29520 MD.-FT./CP. INDICATES AN AVERAGE EFFECTIVE PERMEABILITY TO GAS OF 41.98 MD. FOR THE 10 FOOT POROUS INTERVAL. THIS VALUE WAS CALCULATED ASSUMING THE GAS GRAVITY TO BE 0.70 AND SELECTING APPROPRIATE VALUES FOR GAS VISCOSITY AND DEVIATION FROM THE PERFECT GAS LAWS FROM THE LITERATURE.
3. RESERVOIR PRESSURE: EXTRAPOLATION OF THE INITIAL SHUT-IN PRESSURE BUILD-UP PLOT INDICATES A RESERVOIR PRESSURE OF 1686 P.S.I.G. AT RECORDER DEPTH.
4. RADIUS OF INVESTIGATION: THE RADIUS OF INVESTIGATION OF THIS TEST IS 58 FEET BASED ON A WEIGHT AVERAGE POROSITY OF 10.6%.
5. GENERAL COMMENTS: THIS IS A TEST OF A GOOD PERMEABILITY GAS INTERVAL. AN ACID TREATMENT FOR THE REMOVAL OF WELL BORE DAMAGE ALONE SHOULD BE SUFFICIENT TO RESULT IN A COMMERCIAL COMPLETION.


JAMES D. HILLHOUSE
EVALUATION ENGINEER

TIME PETROLEUM COMPANY
BOLINGER #1, FORD COUNTY, KANSAS
TEST #2, 5034' TO 5124'



JOHNSTON TESTERS

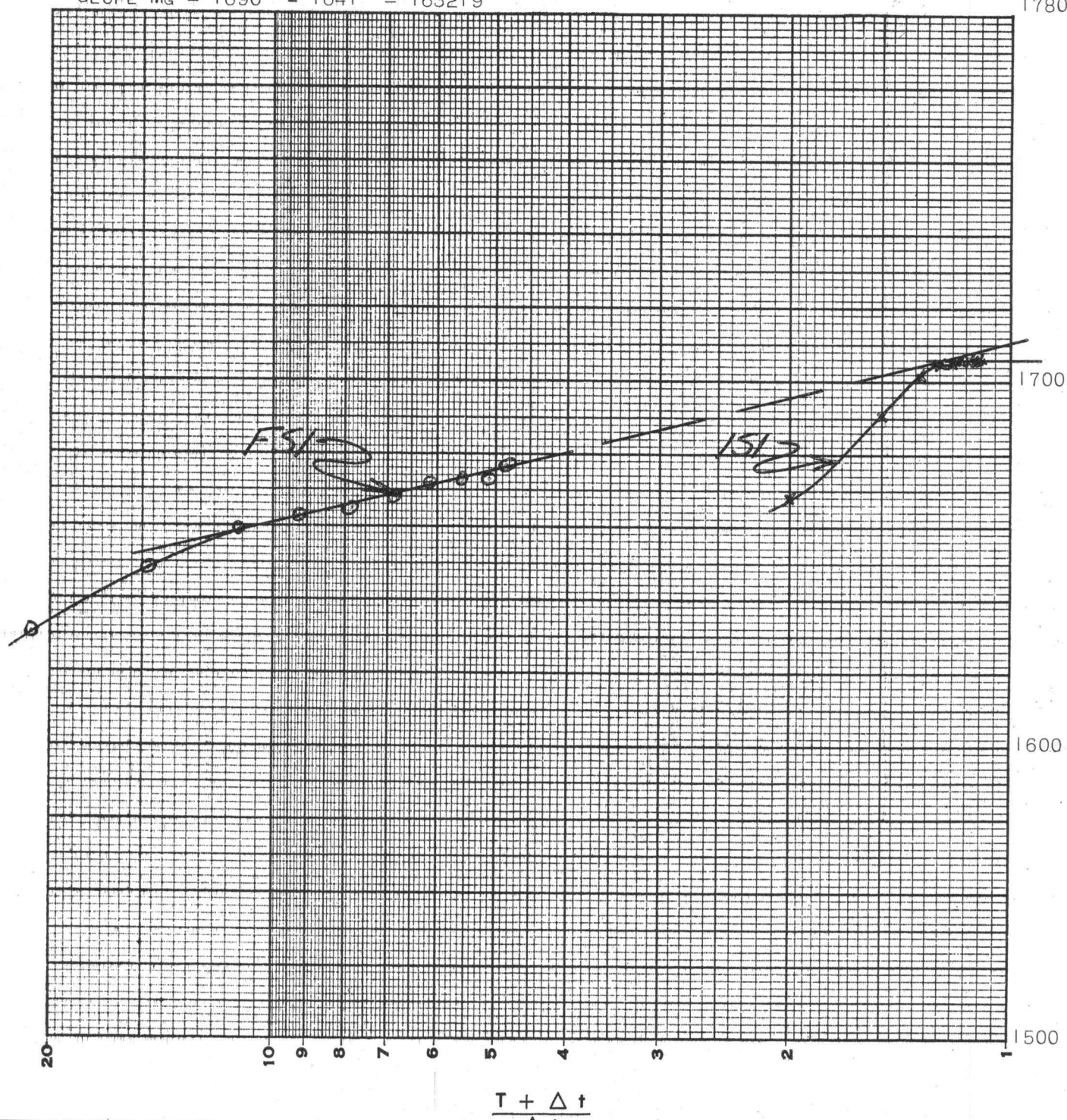
Gas Reservoir Engineering Data

Recorder No. T-505

Field Report No. 03391 A

Estimated Damage Ratio	EDR	2.56	Effective Transmissibility	$\frac{Kh}{\mu Z}$	29520	$\frac{Md-ft.}{Cp.}$
Maximum Reservoir Pressure	P_o	1686 P.S.I.G.	Flow Rate	Q_g	5110	MCF/Day
Slope of Shut-in Curve	M_g	1.6×10^5 PSI ² /log cycle	Flow Rate	Q		
Potentiometric Surface (Datum Plane, Sea Level)	PS	1183 ft.	Flow Rate	Q		
Radius of Investigation		58 ft.	K (Effective to Gas)		41.98	Md.

$$\text{SLOPE } M_g = 1690^2 - 1641^2 = 163219$$



Assumptions made for Calculations for Gas Recoveries

1. Q is taken as steady state flow and unless stated otherwise at standard conditions 14.7 P.S.I. and 60° F.
2. P_f is formation flowing pressure at steady state flow.
3. Formation flow is taken as single phase flow. If liquid (condensate) is produced at surface, condensation is assumed to have occurred in drill pipe.
4. Radial flow is assumed
5. Unless given, gas specific gravity is assumed to be 0.7 (air 1.0) and having critical temperature at 390° Rankin and critical pressure of 666 P.S.I.A.
6. Other standard radial flow, steady state assumptions.

Empirical Equations:

$$1. \text{ EDR} = \frac{1}{\log T + 2.65} \left[\frac{P_o^2 - P_f^2}{M_g} \right] \quad \text{Where } M_g = \frac{\Delta P^2}{\log \text{ cycle}}$$

$$2. \text{ Transmissibility } \frac{Kh}{\mu Z} = \frac{1637 \text{ } ^\circ T_f Q}{M_g}$$

$$3. \text{ P.S.} = \left[P_o \times 2.309 \text{ ft./PSI} \right] - \left[\text{Recorder depth to sea level.} \right]$$

Symbols		Dimensions	Symbols		Dimensions
B	Formation volume factor	vol./vol.	Q	Rate of flow during test	Bbls./day
c	Fluid compressibility	vol./vol./psi.	Q _o	Rate of oil flow during test	Bbls./day
EDR	Estimated damage ratio		Q _w	Rate of water flow during test	Bbls./day
f	Formation porosity	fractional	Q _g	Rate of gas flow during test	MCF/day
h	Producing interval	feet	r _w	Well bore radius	inches
J	Productivity index	Bbls./day/PSI	t	Final shut-in time period	minutes
K	Permeability	Millidarcies	Δt	Increment time of final shut-in	minutes
M _g	Slope of shut-in build up	PSI ² /log cycle		time period	minutes
P _f	Final flowing pressure	PSI	T	Open flow time period	minutes
P _{f si}	Final shut-in pressure at time t	PSI	°T _f	Formation temperature	°Rankin
P _{i si}	Initial shut-in pressure	PSI	μ	Fluid viscosity	Centipoise
P _o	Maximum reservoir pressure	PSI	Z	Gas deviation factor (Compressibility factor)	
P. S.	Potentiometric surface	ft.	$\frac{Kh}{\mu B} \text{ or } \frac{Kh}{\mu Z}$	Transmissibility factor	$\frac{\text{Md.} - \text{ft.}}{\text{Cp.}}$

In making any interpretation, our employees will give Customer the benefit of their best judgment as to the correct interpretation. Nevertheless, since all interpretations are opinions based on inferences from electrical, mechanical or other measurements, we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not be liable or responsible, except in the case of gross or wilful negligence on our part, for any loss, costs, damages or expenses incurred or sustained by Customer resulting from any interpretation made by any of our agents or employees.

[illegible]

**JOHNSTON TESTERS****SURFACE INFORMATION**

Well Flowed	Amount		
GAS			
Reversed Out	Amount		
NO			
Recovered	Amount		
NO FLUID RECOVERED			
Maximum Surface Pressure 39#			
Description (Rate of Flow)	Time	Pressure (P.S.I.G.)	Surface Choke
Opened Tool	1350		3/4"
GAS TO SURFACE	1351		
CLOSED FOR INITIAL SHUT-IN	1355		
RE-OPENED TOOL	1425		
GAS 1630MCF/DAY	1426	5	
GAS 2310MCF/DAY	1427	10	
GAS 2830MCF/DAY	1428	15	
GAS 3310MCF/DAY	1429	20	
GAS 3780MCF/DAY	1430	25	
GAS 4070MCF/DAY	1433	28	
GAS 4260MCF/DAY	1435	30	
GAS 5020MCF/DAY	1445	38	
GAS 5020MCF/DAY	1500	38	
GAS 5020MCF/DAY	1515	38	
GAS 5020MCF/DAY	1525	38	
GAS 5020MCF/DAY	1555	39	
GAS 5110MCF/DAY	1610	39	
Remarks: GAS 5110MCF/DAY	1625	39	
CLOSED FOR FINAL SHUT-IN	1625		
EQUALIZED MUD	1655		
PULLED PACKER LOOSE	1705		
LOCATION: C-N W-NE 7-29-21W			
GAS RATES MEASURED ON PITOT TUBE.			
REMARKS CONTINUED UNDER TOOL SEQUENCE.			

TOOL, HOLE & MUD DATA

Type Test CONVENTIONAL
 Formation Tested MISS.
 Elevation 2410 D.F. Ft.
 All Depths Measured From KELLY BUSHING

TOOL SEQUENCE

Tool	Size/Type	Depth/Length/ I.D.
DRILL PIPE	4 1/2" FH	4821' 3.8"
CIRCULATING SUB	4 1/2" FH	
DRILL PIPE	4 1/2" FH	180' 3.8"
CROSS-OVER SUB	3 1/2" FH	
4-STAGE SHUT-IN	3 1/2" FH	
HYDRAULIC TOOL	3 1/2" FH	
CROSS-OVER SUB	4 1/2" FH	
BOB-TAIL PACKER	6 5/8"	5034'
PERF. ANCHOR		10'
CROSS-OVER SUB	4 1/2" H-90	1'
DRILL COLLAR	4 1/2" H-90	63' 2.25"
DOUBLE PIN SUB	4 1/2" FH	1'
CROSS-OVER SUB	3 1/2" FH	1'
PERF. ANCHOR	3 1/2" FH	5'
RECORDER CARRIER	4 7/8" T	6'
RECORDER CARRIER	4 7/8" L	4'

REMARKS:

PRODUCTIVE INTERVAL	EST.	POROSITY
5036' TO 5038'		7%
5041' TO 5043'		10 1/2%
5052' TO 5053'		12%
5091' TO 5093'		11 1/2%
5113' TO 5116'		12%

Total Depth 5124 Ft.
 Main Hole Size 7 7/8" Rat Hole Size 8 5/8"
 Casing Size 8 5/8" Liner Size -
 Bottom Choke Size 3/4" Mud Type STARCH
 Mud Wt. 10.0 Mud Viscosity 43
 Water Loss 11.2 C.C.

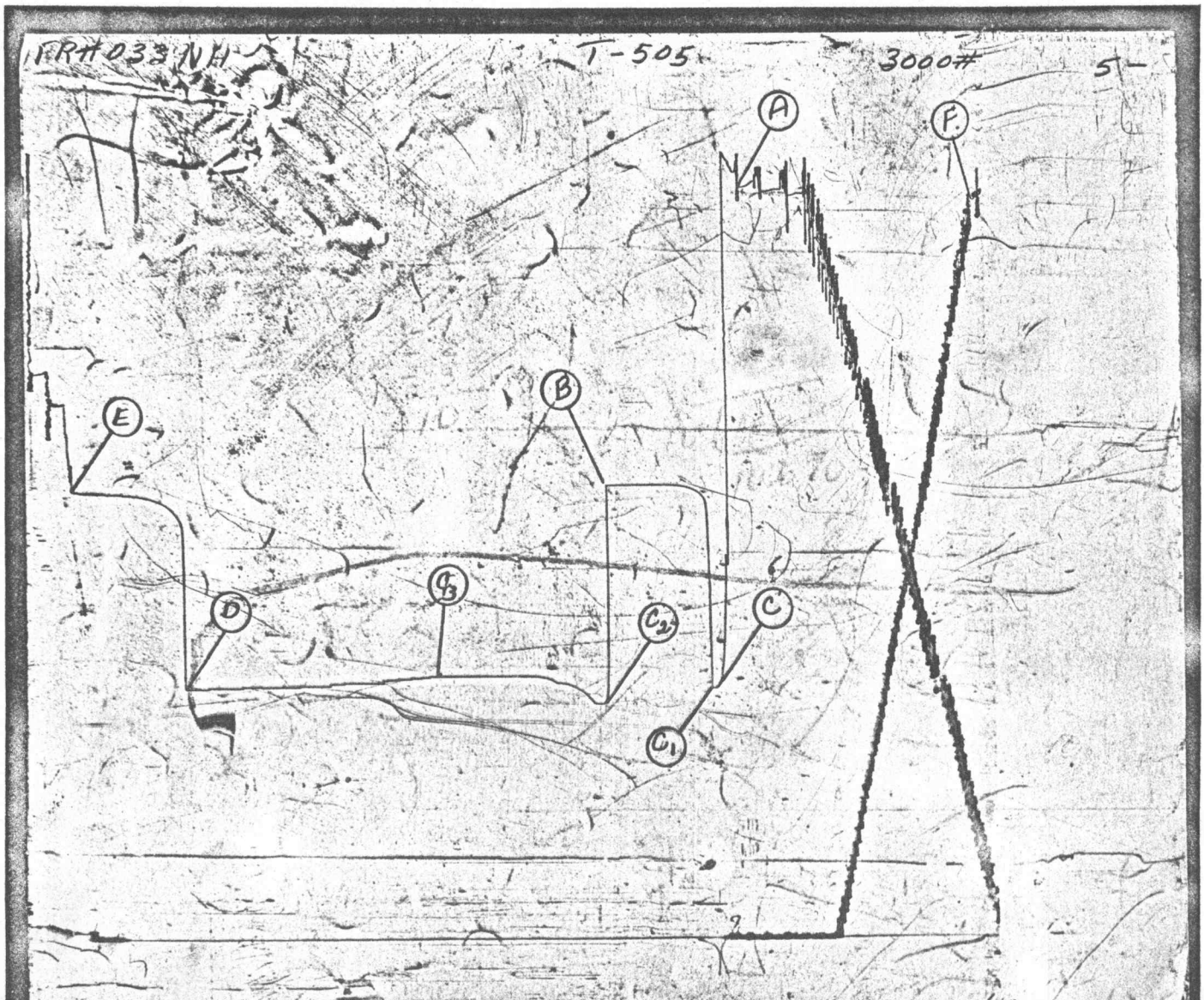
Cushion Type	Amount	Pressure
-	-	-

TIME DATA			
Initial Flow	-	Hrs.	5 Mins.
Initial Shut-in	-	Hrs.	30 Mins.
Final Flow	2	Hrs.	- Mins.
Final Shut-in	-	Hrs.	30 Mins.

Customer	SAME AS BELOW		
Company	TIME PETROLEUM COMPANY; 815 UNION NATIONAL BLDG.; WICHITA, KANSAS		Date 7-4-63
Well	BOLINGER #1	Field WILD CAT	Location SEE REMARKS
Test Interval	5034' TO 5124'	Formation Test # 2	Casing Test # -
County	FORD	State	KANSAS
Tester	EUGENE SALOGA	Test Approved By	MR. TOBY ELSTER
		Field Report No.	03391 A
		No. DST Reports Requested	5x

Recorder No.	T-505	INSIDE			
Capacity (P.S.I.G.)	3,000				
Recorder Depth	5,120'				
Pressure Gradient P.S.I./Ft.					
Well Temperature °F.	116				
A Initial Hydrostatic Mud	2785				
B Initial Shut-in	1686				
C Initial Flow	957				
D Final Flow	928				
E Final Shut-in	* 1657				
F Final Hydrostatic Mud	2729				
Remarks:	c-1	936			
	c-2	877			
	c-3	976			

*Shut in pressure did not reach static reservoir pressure.



SPECIAL DATA ANALYSIS

FIELD REPORT #03393 A

JULY 10, 1963

THIS APPEARS TO BE A TEST OF A POOR FORMATION AND A GOOD MECHANICAL TEST. THE TEST WAS CONDUCTED IN SUCH A MANNER THAT THE DATA OBTAINED SHOULD BE ADEQUATE FOR RELIABLE ANALYSIS.

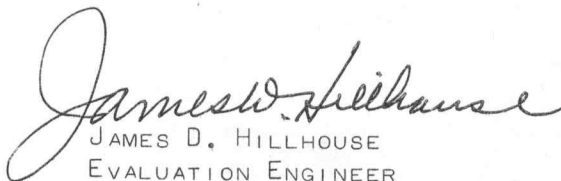
1. WELL BORE DAMAGE: THE CALCULATED ESTIMATED DAMAGE RATIO OF 1.26 INDICATES THAT WELL BORE DAMAGE IS PRESENT AT THE TIME AND CONDITIONS OF THIS TEST. THIS VALUE INFERS THAT THE RATE OF PRODUCTION OBSERVED DURING THIS TEST MAY BE INCREASED 1.26 TIMES IF THE WELL BORE DAMAGE WERE REMOVED.

2. PERMEABILITY: THE CALCULATED TRANSMISSIBILITY FACTOR OF 79.12 MD.-FT./CP. INDICATES AN AVERAGE EFFECTIVE PERMEABILITY TO GAS OF 0.03 MD. FOR THE 37 FOOT TEST INTERVAL. THIS VALUE WAS CALCULATED ASSUMING THE GAS GRAVITY TO BE 0.70 AND SELECTING APPROPRIATE VALUES FOR GAS VISCOSITY AND DEVIATION FROM THE PERFECT GAS LAWS FROM THE LITERATURE.

3. RESERVOIR PRESSURE: EXTRAPOLATION OF THE FINAL SHUT-IN PRESSURE BUILD-UP PLOT INDICATES A RESERVOIR PRESSURE OF 1697 P.S.I.G. AT RECORDER DEPTH. THE INITIAL SHUT-IN PERIOD WAS TOO SHORT TO GIVE RELIABLE DATA.

4. RADIUS OF INVESTIGATION: THE PERMEABILITY OF THE ZONE IS SO LOW THAT THE RADIUS OF INVESTIGATION WAS NOT CALCULATED.

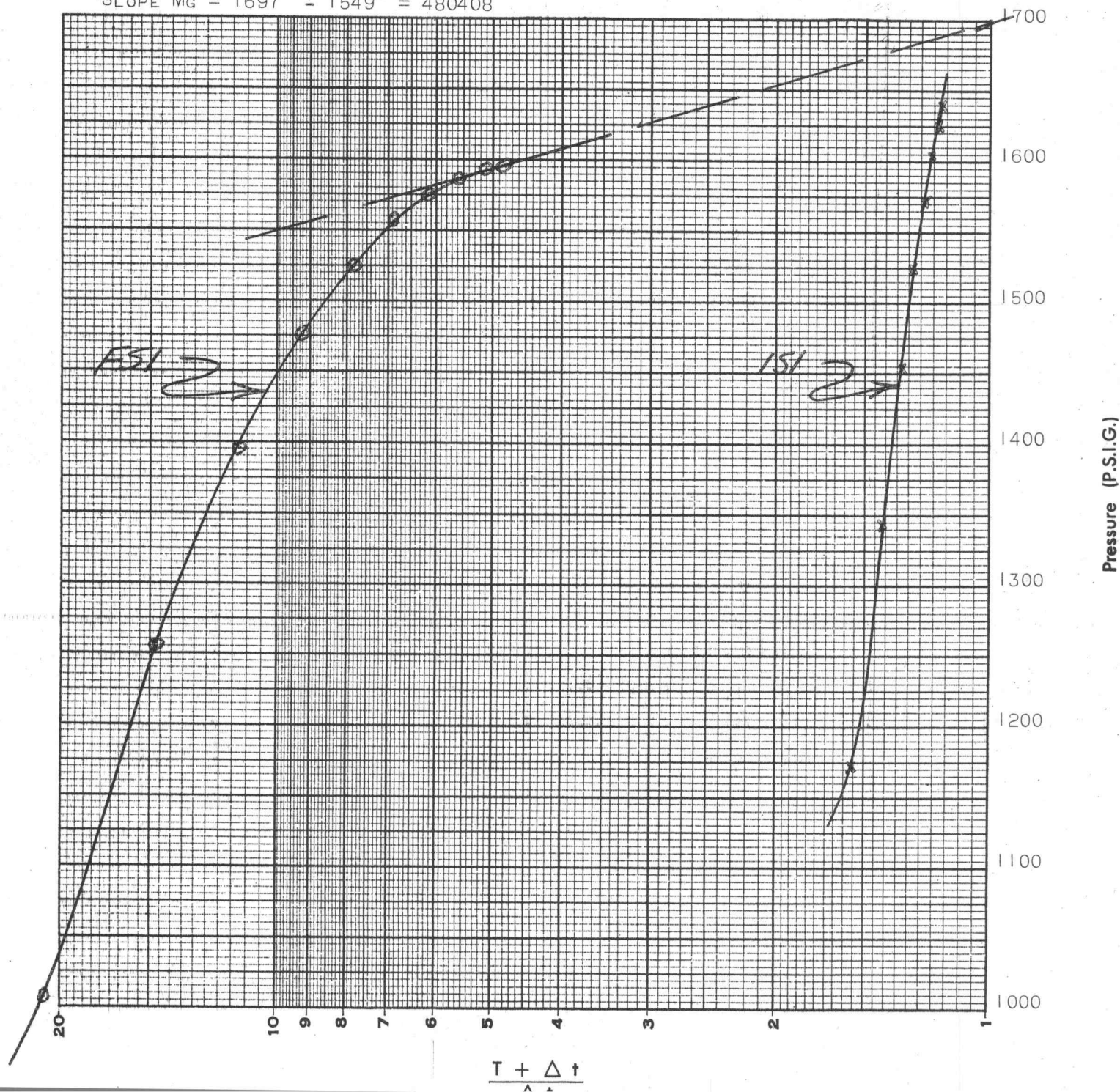
5. GENERAL COMMENTS: THIS IS A TEST OF A VERY LOW PERMEABILITY GAS ZONE. SOME WELL BORE DAMAGE IS PRESENT BUT A PRACTICAL COMPLETION IS UNLIKELY EVEN WITH A LARGE FRACTURE TREATMENT.


JAMES D. HILLHOUSE
EVALUATION ENGINEER

TIME PETROLEUM COMPANY
BOLINGER #1, FORD COUNTY, KANSAS
TEST #3, 5158' TO 5195'

Estimated Damage Ratio	EDR	1.26	Effective Transmissibility	$\frac{Kh}{\mu Z}$	79.12	$\frac{Md-ft.}{Cp.}$
Maximum Reservoir Pressure	P_o	1697 P.S.I.G.	Flow Rate	Q_g	40.4	MCF/Day
Slope of Shut-in Curve	M_g	4.8×10^5 PSI ² /log cycle	Flow Rate	Q		
Potentiometric Surface (Datum Plane, Sea Level)	PS	1143 ft.	Flow Rate	Q		
Radius of Investigation		ft.	K (Effective to GAS)		0.03	Md.

$$\text{SLOPE } M_g = 1697^2 - 1549^2 = 480408$$



Assumptions made for Calculations for Gas Recoveries

1. Q is taken as steady state flow and unless stated otherwise at standard conditions 14.7 P.S.I. and 60° F.
2. P_f is formation flowing pressure at steady state flow.
3. Formation flow is taken as single phase flow. If liquid (condensate) is produced at surface, condensation is assumed to have occurred in drill pipe.
4. Radial flow is assumed
5. Unless given, gas specific gravity is assumed to be 0.7 (air 1.0) and having critical temperature at 390° Rankin and critical pressure of 666 P.S.I.A.
6. Other standard radial flow, steady state assumptions.

Empirical Equations:

$$1. \text{ EDR} = \frac{1}{\log T + 2.65} \left[\frac{P_o^2 - P_f^2}{M_g} \right] \quad \text{Where } M_g = \frac{\Delta P^2}{\log \text{ cycle}}$$

$$2. \text{ Transmissibility } \frac{Kh}{\mu Z} = \frac{1637 \text{ } ^\circ T_f Q}{M_g}$$

$$3. \text{ P.S.} = \left[P_o \times 2.309 \text{ ft./PSI} \right] \left[\text{Recorder depth to sea level.} \right]$$

Symbols		Dimensions	Symbols		Dimensions
B	Formation volume factor	vol./vol.	Q	Rate of flow during test	Bbls./day
c	Fluid compressibility	vol./vol./psi.	Q _o	Rate of oil flow during test	Bbls./day
EDR	Estimated damage ratio		Q _w	Rate of water flow during test	Bbls./day
f	Formation porosity	fractional	Q _g	Rate of gas flow during test	MCF/day
h	Producing interval	feet	r _w	Well bore radius	inches
J	Productivity index	Bbls./day/PSI	t	Final shut-in time period	minutes
K	Permeability	Millidarcies	Δt	Increment time of final shut-in	minutes
M _g	Slope of shut-in build up	PSI ² /log cycle		time period	minutes
P _f	Final flowing pressure	PSI	T	Open flow time period	minutes
P _{f si}	Final shut-in pressure at time t	PSI	°T _f	Formation temperature	°Rankin
P _{i si}	Initial shut-in pressure	PSI	μ	Fluid viscosity	Centipoise
P _o	Maximum reservoir pressure	PSI	Z	Gas deviation factor (Compressibility factor)	
P. S.	Potentiometric surface	ft.	$\frac{Kh}{\mu B}$ or $\frac{Kh}{\mu Z}$	Transmissibility factor	$\frac{\text{Md.} - \text{ft.}}{\text{Cp.}}$

In making any interpretation, our employees will give Customer the benefit of their best judgment as to the correct interpretation. Nevertheless, since all interpretations are opinions based on inferences from electrical, mechanical or other measurements, we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not be liable or responsible, except in the case of gross or wilful negligence on our part, for any loss, costs, damages or expenses incurred or sustained by Customer resulting from any interpretation made by any of our agents or employees.



Date 7-6-63

Field Report No. 03393 A

Recorder No. T-505 Capacity 3,000# Recorder Depth 5,185'

Recorder Run INSIDE Clock Travel 0.02134 inches per min. Well Temperature 114 °F.

Opened Tool _____	0057		
Initial Flow _____	5	Mins.	5 Mins.
Initial Shut-in _____	30	Mins.	30 Mins.
Final Flow _____	120	Mins.	118 Mins.
Final Shut-in _____	30	Mins.	32 Mins.

c-1	31
c-2	27

Remarks:

[illegible]



SURFACE INFORMATION

Well Flowed GAS 	Amount
Reversed Out NO 	Amount
Recovered GAS CUT MUD 	Amount 90' (.44BBLs.)

Maximum Surface Pressure -			
Description (Rate of Flow)	Time	Pressure (P.S.I.G.)	Surface Choke
Opened Tool	0057		3/4"
CLOSED FOR INITIAL SHUT-IN	0102		
RE-OPENED TOOL	0132		
GAS TO SURFACE	0142		
GAS 34.69MCF/DAY	0152		
GAS 34.69MCF/DAY	0217		
GAS 38.78MCF/DAY	0232		
GAS 40.45MCF/DAY	0302		
GAS 40.45MCF/DAY	0332		
CLOSED FOR FINAL SHUT-IN	0332		
EQUALIZED MUD	0402		
PULLED PACKER LOOSE	0405		

Remarks: LOCATION: C NW NE 7-29-21W PRODUCTIVE INTERVAL AND POROSITY 5158' TO 5195'; 5161' TO 5165'; 7.8%, 5164' TO 5169'; 8%, 5169' TO 5171'; 11%, 5174' TO 5176'; 7%, 5180' TO 5182'; 11%, 5186' TO 5200'; 11%

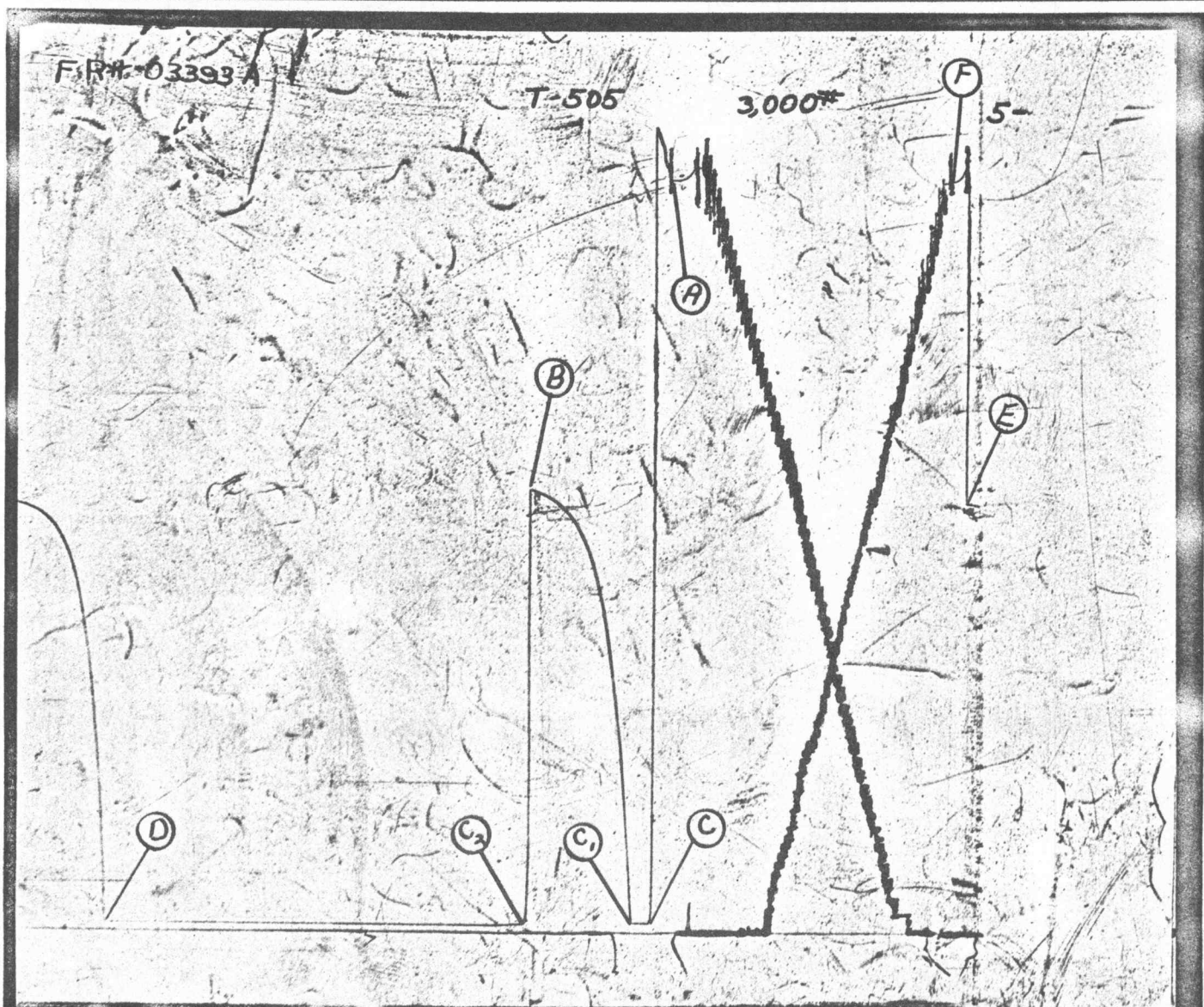
TOOL, HOLE & MUD DATA

[illegible]

Customer	SAME AS BELOW		
Company	TIME PETROLEUM COMPANY; 815 UNION NATIONAL BLDG.; WICHITA, KANSAS		Date 7-6-63
Well	BOLINGER #1	Field WILD CAT	Location SEE REMARKS
Test Interval	5158' TO 5195'	Formation Test # 3	Casing Test # -
County	FORD	State KANSAS	Field Report No. 03393 A
Tester	EUGENE SALOGA	Test Approved By MR. TOBY ELSTER	No. DST Reports Requested 5x

Recorder No.	T-505	INSIDE			
Capacity (P.S.I.G.)	3,000				
Recorder Depth	5,185'				
Pressure Gradient P.S.I./Ft.					
Well Temperature °F.	114				
A Initial Hydrostatic Mud	2786				
B Initial Shut-in	* 1640				
C Initial Flow	32				
D Final Flow	26				
E Final Shut-in	* 1596				
F Final Hydrostatic Mud	2783				
Remarks:	c-1 31				
	c-2 27				

*Shut in pressure did not reach static reservoir pressure.



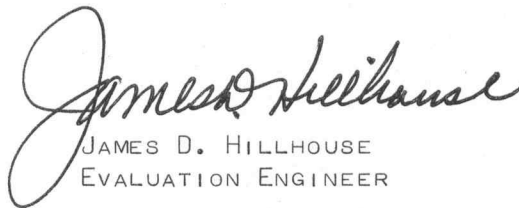
SPECIAL DATA ANALYSIS

FIELD REPORT #00394 A

JULY 10, 1963

THIS APPEARS TO BE A TEST OF A POOR FORMATION AND A GOOD MECHANICAL TEST. THE TEST WAS CONDUCTED IN SUCH A MANNER THAT THE DATA OBTAINED SHOULD HAVE BEEN ADEQUATE FOR RELIABLE ANALYSIS; HOWEVER, THE FORMATION PERMEABILITY WAS TOO LOW TO GIVE ADEQUATE BUILDUPS IN THE TIME ALLOTTED.

RESERVOIR PRESSURE: EXTRAPOLATION OF THE INITIAL SHUT-IN PRESSURE BUILDUP PLOT INDICATES A RESERVOIR PRESSURE OF 1905 P.S.I.G. AT RECORDER DEPTH. THIS IS THE BEST DATA AVAILABLE FROM THESE BUILDUPS. THIS VALUE SHOULD BE USED WITH CAUTION.

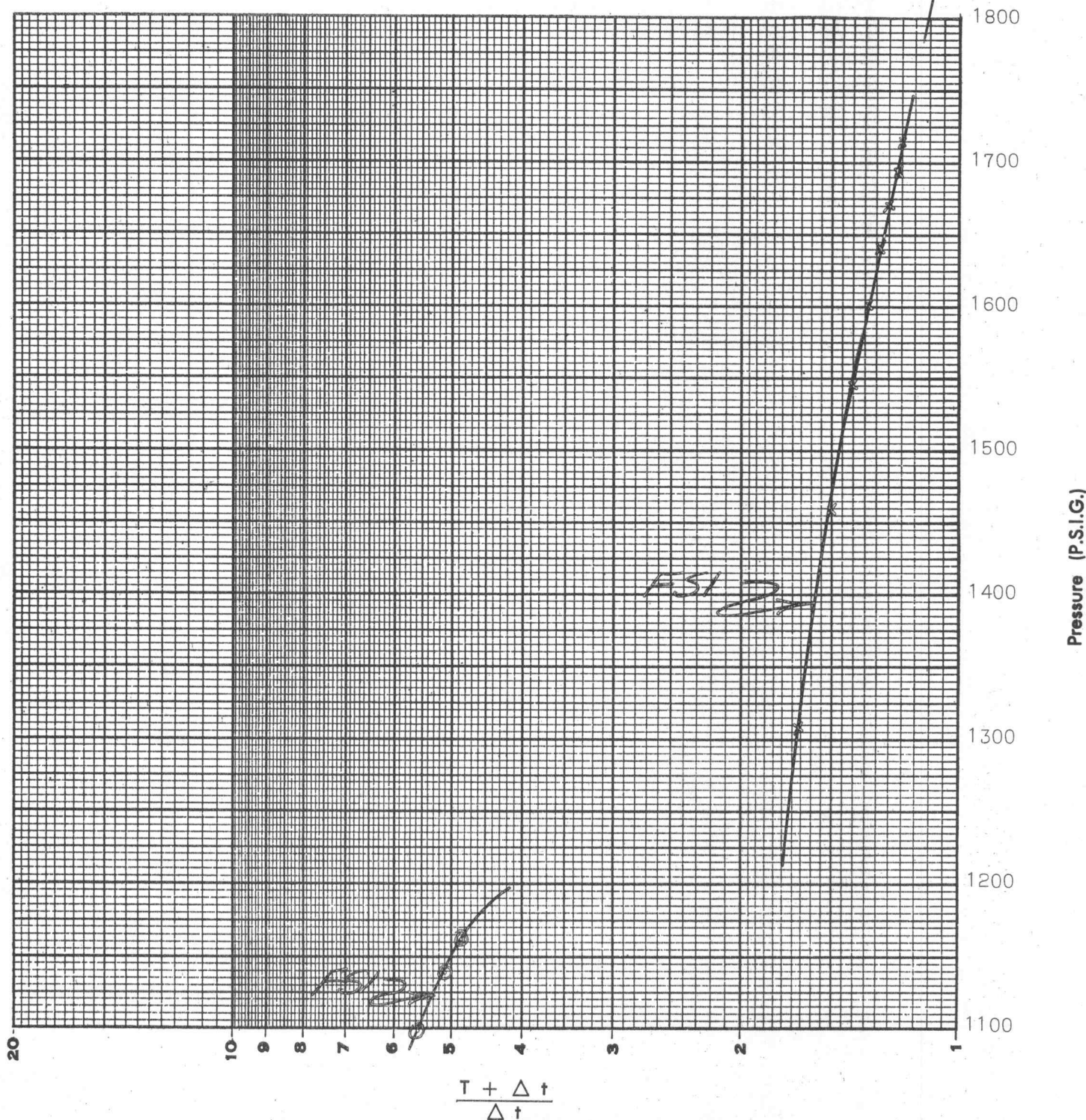


JAMES D. HILLHOUSE
EVALUATION ENGINEER

Recorder No. T-505

 Field Report No. 03394 A

Estimated Damage Ratio	EDR			Effective Transmissibility	$\frac{Kh}{\mu B}$	$\frac{Md-ft.}{Cp.}$
Maximum Reservoir Pressure	P_o	1905	P.S.I.G.	Effective Transmissibility	$\frac{Kh}{\mu B}$	$\frac{Md-ft.}{Cp.}$
Slope of Shut-in Curve	M		PSI/log cycle	Flow Rate	Q	Bbl./day
Potentiometric Surface (Datum Plane, Sea Level)	PS		ft.	Flow Rate	Q	Bbl./day
Productivity Index	PI		Bbl./day/PSI	Gas Oil Ratio	GOR	CF/Bbl.
Radius of Investigation			ft.	K (Effective to)		Md.



Assumptions made for Calculations for Liquid Recoveries

1. Q is taken as steady state flow.
2. P_f is formation flowing pressure at steady state flow.
3. Formation flow is taken as single phase flow.
If gas is produced at surface, phase separation is assumed to have occurred in drill pipe.
4. Radial flow is assumed.
5. Where PVT data is not available then it is assumed that:

Effective permeability, K, will fall between 1 to 200 md
 Formation porosity, f, will fall between 0.1 to 0.3
 Fluid compressibility, c, will fall between 10^{-6} to 10^{-4}
 Fluid viscosity, μ , will fall between 0.05 to 50 cp.
 Well bore radius, r_w , will fall between $3\frac{7}{8}$ " to $4\frac{3}{8}$ "
 Which gives an average value for the function $\log \frac{K}{f\mu cr_w^2}$ of 5.5

6. Other standard radial flow, steady state assumptions.

Empirical Equations:

$$1. \text{ EDR} = \frac{1}{\log T + 2.65} \left[\frac{P_o - P_f}{M} \right]$$

$$2. \text{ Transmissibility } \frac{Kh}{\mu B} = \frac{162.6Q}{M}$$

$$3. \text{ P.I.} = \frac{Q}{P_o - P_f}$$

$$4. \text{ P.S.} = \left[P_o \times 2.309 \text{ ft./PSI} \right] - \left[\text{Recorder depth to sea level.} \right]$$

Symbols		Dimensions	Symbols		Dimensions
B	Formation volume factor	vol./vol.	Q	Rate of flow during test	Bbls./day
c	Fluid compressibility	vol./vol./psi.	Q_o	Rate of oil flow during test	Bbls./day
EDR	Estimated damage ratio		Q_w	Rate of water flow during test	Bbls./day
f	Formation porosity	fractional	Q_g	Rate of gas flow during test	MCF/day
h	Producing interval	feet	r_w	Well bore radius	inches
J	Productivity index	Bbls./day/PSI	t	Final shut-in time period	minutes
K	Permeability	Millidarcies	Δt	Increment time of final shut-in	minutes
M	Slope of shut-in build up	PSI/log cycle		time period	minutes
P_f	Final flowing pressure	PSI	T	Open flow time period	minutes
P_{fsl}	Final shut-in pressure at time t	PSI	$^{\circ}T_f$	Formation temperature	$^{\circ}$ Rankin
P_{isi}	Initial shut-in pressure	PSI	μ	Fluid viscosity	Centipoise
P_o	Maximum reservoir pressure	PSI	Z	Gas deviation factor (Compressibility factor)	
P. S.	Potentiometric surface	ft.	$\frac{Kh}{\mu B}$ or $\frac{Kh}{\mu}$	Transmissibility factor	$\frac{\text{Md.} \text{---} \text{ft.}}{\text{Cp.}}$

In making any interpretation, our employees will give Customer the benefit of their best judgment as to the correct interpretation. Nevertheless, since all interpretations are opinions based on inferences from electrical, mechanical or other measurements, we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not be liable or responsible, except in the case of gross or wilful negligence on our part, for any loss, costs, damages or expenses incurred or sustained by Customer resulting from any interpretation made by any of our agents or employees.



SURFACE INFORMATION

Well Flowed NO 	Amount
Reversed Out NO 	Amount
Recovered MUD WITH A FEW SPECKS OF OIL GAS CUT MUD WITH A FEW SPECKS OF OIL TOTAL RECOVERED IN BARRELS 	Amount 90' 60' (1.83)

Maximum Surface Pressure			
Description (Rate of Flow)	Time	Pressure (P.S.I.G.)	Surface Choke
Opened Tool	0015		
CLOSED FOR INITIAL SHUT-IN	0020		
RE-OPENED TOOL	0050		
BY-PASSED MUD	0110		
BY-PASSED MUD	0150		
CLOSED FOR FINAL SHUT-IN	0250		
EQUALIZED MUD	0320		
PULLED PACKER LOOSE	0325		

Remarks:	<u>PRODUCTIVE INTERVAL</u> 5233' TO 5235' 5240' TO 5243' 5244' TO 5249' 5268' TO 5270'	<u>POROSITY</u> 5% 14% 10% 13%
	TOP SAMPLE: 1% OIL & 99% MUD	
	BOTTOM SAMPLE: 1% OIL & 99% MUD	

TOOL, HOLE & MUD DATA

[illegible]

Customer	SAME AS BELOW				
Company	TIME PETROLEUM CO.; 815 UNION NAT'L BLDG.; WICHITA, KANSAS				Date 7-7-63
Well	BOLINGER #1	Field	WILD CAT	Location	G NW NE 7-29-21W
Test Interval	5234' TO 5275'	Formation Test #	4	Casing Test #	-
County	FORD	State	KANSAS	Field Report No.	03394 A
Tester	EUGENE SALOGA	Test Approved By	MR. TOBY ELSTER	No. DST Reports Requested	5 x

Recorder No.	T-505	INSIDE			
Capacity (P.S.I.G.)	3000				
Recorder Depth	5265'				
Pressure Gradient P.S.I./Ft.					
Well Temperature °F.	116				
A Initial Hydrostatic Mud	2806				
B Initial Shut-in	*1715				
C Initial Flow	40				
D Final Flow	89				
E Final Shut-in	*1163				
F Final Hydrostatic Mud	2804				
Remarks:	C-1	40			
	C-2	50			

*Shut in pressure did not reach static reservoir pressure.

