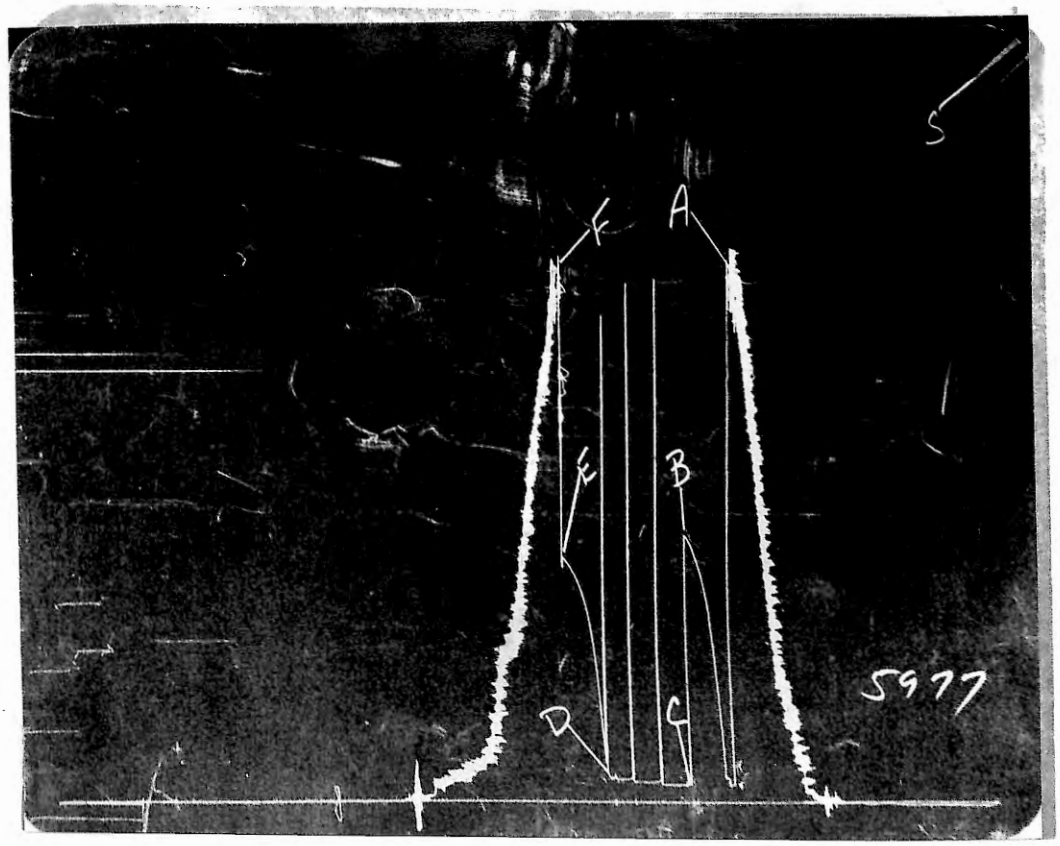
Time: Each Square _____ minutes

Pressure: Each Square _____ psi



Tool Open 1 hr. 5 mins: Shut-in: Initial _____ hr. 30 mins: Final _____ hr. 30 mi

	Field Reading	Corrected Reading
(A) Initial Hydrostatic Pressure	2390	2505
(B) Initial Shut-in Pressure	1210	1217
(C) Initial Flow Pressure	85	83
(D) Final Flow Pressure	85	110
(E) Final Shut-in Pressure	1140	1123
(F) Final Hydrostatic Pressure	2360	2450

5977

MILLER TESTING COMPANY

Box 547

GREAT BEND, KANSAS

Company MULL DRILLING COMPANY

Lease and Well No. RAUM # 1

County NESS State KANSAS Date MAY 17, 1963

Formation Test No. 1 Total Depth 4351

Interval Tested 4284 To 4351 Anchor Length 77'

Size Hole 7 7/8 Size Drill Pipe 4 1/2 FH Size Packer 6 3/4

Mud Weight 10.1 Viscosity 52 Bottom Hole Temp. 110 ° F

Chokes: Top 1/2 Bottom 1/2 Ticket No. 5977

RECOVERY

INITIAL OPENING 5 MINUTES

WEAK BLOW FOR 5 MINUTES
FLUSHED TOOL AFTER 20, 40, 60 MINUTES

40 FEET DRILLING MUD WITH
FEW SPECKS OF OIL

Lease and Well No. RAUM # 1 22 18 23 C NW NW Formation Test No. 1

COMPANY MULL DRILLING COMPANY DATE MAY 17, 1963

LEASE RAHM WELL NO. #1 TEST NO. 1 TICKET NO. 5977

	TIME	PSI
INITIAL HYDRO MUD PRESSURE	------	2505
INITIAL CLOSED IN PRESSURE	30 MINUTES	1217
INITIAL FLOW	------	75
FINAL FLOW	60 MINUTES	110
FINAL CLOSED IN PRESSURE	30 MINUTES	1123
FINAL HYDRO MUD PRESSURE	-----	2450

TOTAL DEPTH 4351

PACKER DEPTH 4284

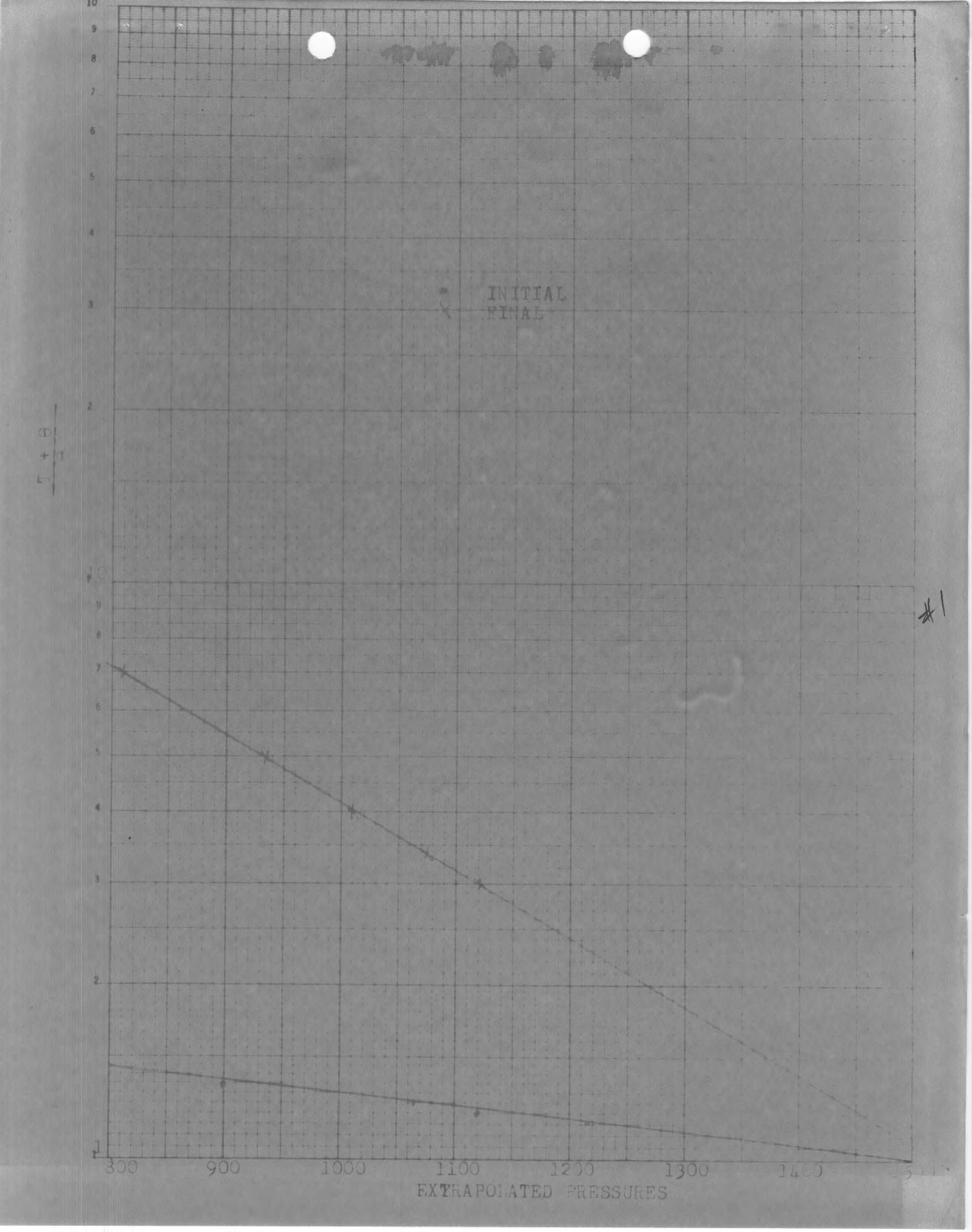
ST. NO. 1049 DEPTH 4346

	1ST FLOW PRESSURE		INITIAL CIP		2ND FLOW PRESSURE		FINAL CIP	
	TIME DEFL. .000"	PSI TEMP. CORR.	TIME DEFL. .000"	PSI TEMP. CORR.	TIME DEFL. .000"	PSI TEMP. CORR.	TIME DEFL. .000"	PSI TEMP. CORR.
P0	.000	75	.000	75	.000	83	.000	110
P1	.042	75	.042	242	.083	83	.042	525
P2			.083	607	.167	83	.083	810
P3			.125	900	.250	90	.125	935
P4			.167	1065	.333	90	.167	1010
P5			.209	1120	.416	110	.209	1075
P6			.250	1217	.500	110	.250	1123
P7								
P8								
P9								
P10								
	5 MINUTE INTERVAL		5 MINUTE INTERVAL		10 MINUTE INTERVAL		5 MINUTE INTERVAL	

REMARKS

INITIAL OPENING 5 MINUTES

SPECIAL PRESSURE DATA


INITIAL
FINAL
EXTRAPOLATED PRESSURES
300
900
1000
1100
1200
1300

Liquid Production

S.T. Gauge Numbers		1049	Ticket Number		5977
Initial Hydrostatic		2505	Elevation	KB	2321 ft.
Final Hydrostatic		2450	Indicated Production	1st Flow	20.2 bbls./day
1st Flow — Initial	Time -----	75		Total Flow	6.4 bbls./day
1st Flow — Final	5	75	Drill Collar Length		Total Rec. ft.
Initial Closed In Pressure	30	1217	Drill Collar I.D.		2.76 in.
2nd Flow — Initial	-----	75	Drill Pipe Factor		.0074 bbls./ft.
2nd Flow — Final	60	110	Hole Size		7 7/8 in.
Final Closed In Pressure	30	1123	Footage Tested		67 ft.
Extrapolated Static Pressure	Initial	1500	Mud Weight		10.1 lbs./gal.
	Final	1520	Viscosity, Oil or Water		1.2 cp
Slope psi/cycle	Initial	4400	Oil API Gravity		—
	Final	840	Water Specific Gravity		—

Remarks:

SUMMARY

Gauge No. / Depth

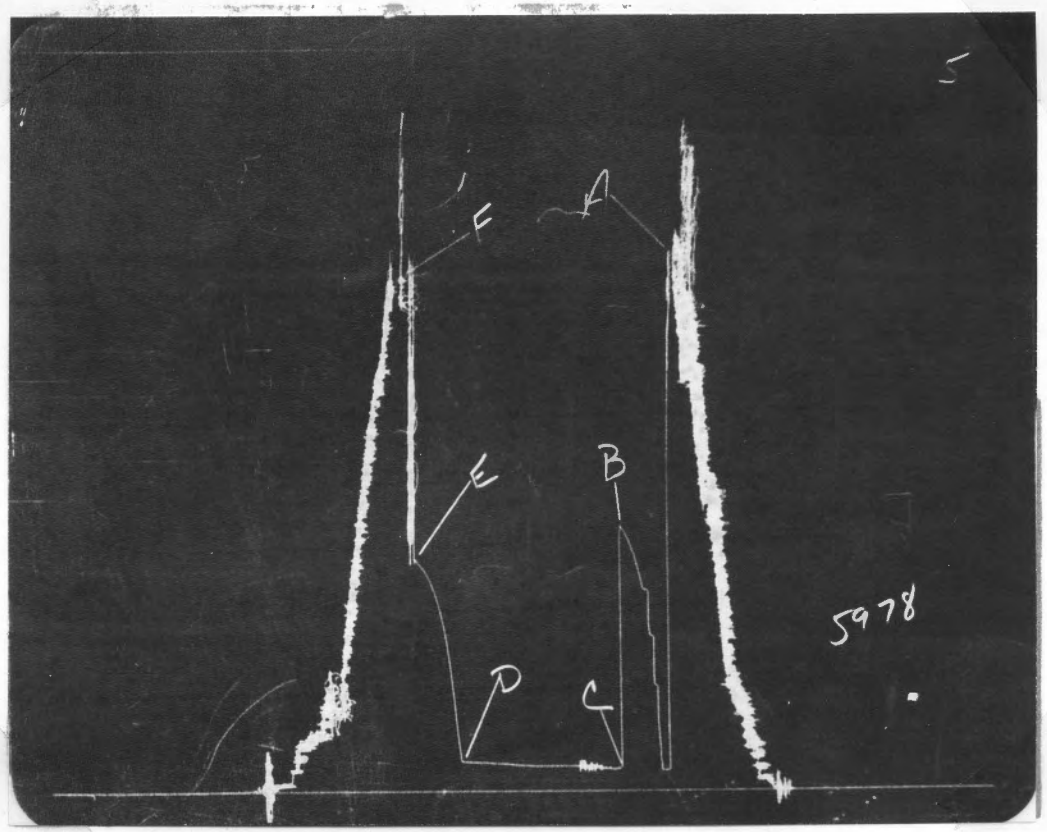
Product	Equation	INITIAL	FINAL	Units
Production	$Q = \frac{1440\ R}{t}$	20.2	5.3	bbls./day
Transmissibility	$\frac{Kh}{\mu} = \frac{162.6\ Q}{m}$	0.75	1.0	md. ft./cp
Indicated Flow Capacity	$Kh = \frac{Kh}{\mu}\ \mu$	0.9	1.2	md. ft.
Average Effective Permeability	$K = \frac{Kh}{h}$	0.01	0.02	md.
	$K_1 = \frac{Kh}{h_1}$			md.
Damage Ratio	$DR = .183\ \frac{Ps - Pf}{m}$	0.06	0.31	—
Theoretical Potential w/Damage Removed	$Q_1 = Q\ DR$	20.2	5.3	bbls./day
Approx. Radius of Investigation	$b \cong \sqrt{Kt}$ or $\sqrt{Kt_0}$	0.2	1.1	ft.
	$b_1 \cong \sqrt{K_1 t}$ or $\sqrt{K_1 t_0}$			ft.
Potentiometric Surface KB *	$Pot. = El - GD + 2.319\ Ps$	1454	1500	ft.

NOTICE: These calculations are based upon information furnished by you and taken from Drill Stem Test pressure charts, and are furnished you for your information. In furnishing such calculations and evaluations based thereon, Miller Testing Co. is merely expressing its opinion. You agree that Miller Testing Co. makes no warranty express or implied as to the accuracy of such calculations or opinions, and that Miller Testing Co. shall not be liable for any loss or damage, whether due to negligence or otherwise, in connection with such calculations and opinions.

INTERPRETATIONS AND CALCULATIONS

Time: Each Square ____ minutes

Pressure: Each Square ____ psi



Tool Open 2 hr. 5 mins: Shut-in: Initial ____ hr. 30 mins: Final ____ hr. 35 mi

	Field Reading	Corrected Reading
(A) Initial Hydrostatic Pressure	2440	2490
(B) Initial Shut-in Pressure	1210	1210
(C) Initial Flow Pressure	100	100
(D) Final Flow Pressure	145	135
(E) Final Shut-in Pressure	1080	1065
(F) Final Hydrostatic Pressure	2400	2470

5978

ILLER TESTING COMPANY

Box 547

GREAT BEND, KANSAS

Company MULL DRILLING COMPANY

Lease and Well No. RAUM # 1

County [redacted] State KANSAS Date MAY 18, 1963

Formation Test No. 2 Total Depth 4368

Interval Tested 4283 To 4368 Anchor Length 75'

Size Hole 7 7/8 Size Drill Pipe 4 1/2 FH Size Packer 6 3/4

Mud Weight 10.1 Viscosity 52 Bottom Hole Temp. 112 ° F

Chokes: Top 1/2 Bottom 1/2 Ticket No. 5978

RECOVERY

INITIAL OPENING 5 MINUTES

WEAK INTERMITTENT BLOW
THROUGHOUT TEST

110 FEET DRILLING MUD

Lease and Well No. RAUM # 1 Sec. 22 Twp. 18 Rge. 23 E W NW Formation Test No. 2

P1	.042	90	.042	705	.167	100	.042	357
P2			.083	910	.333	113	.083	650
P3			.125	1007	.500	113	.125	802
P4			.167	1085	.666	117	.167	890

COMPANY MULL DRILLING COMPANY DATE MAY 18, 1963

LEASE RAUM WELL NO. 1 TEST NO. 2 TICKET NO. 5978

	TIME	PSI
INITIAL HYDRO MUD PRESSURE	-----	2490
INITIAL CLOSED IN PRESSURE	30 MINUTES	1210
INITIAL FLOW	-----	100
FINAL FLOW	100 MINUTES	135
FINAL CLOSED IN PRESSURE	35 MINUTES	1065
FINAL HYDRO MUD PRESSURE	-----	2470

TOTAL DEPTH 4368

PACKER DEPTH 4283

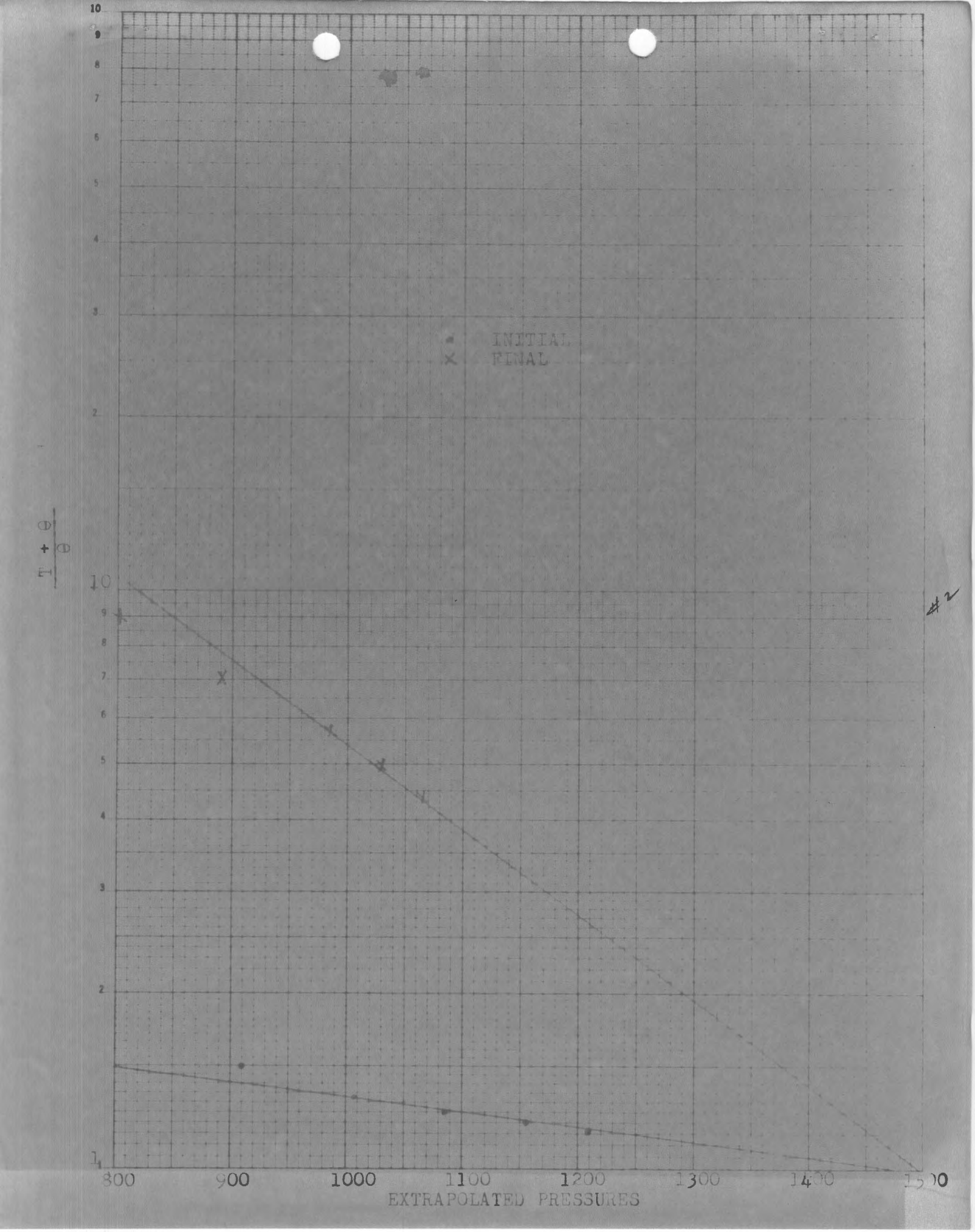
BT. NO. 1049 DEPTH 4363

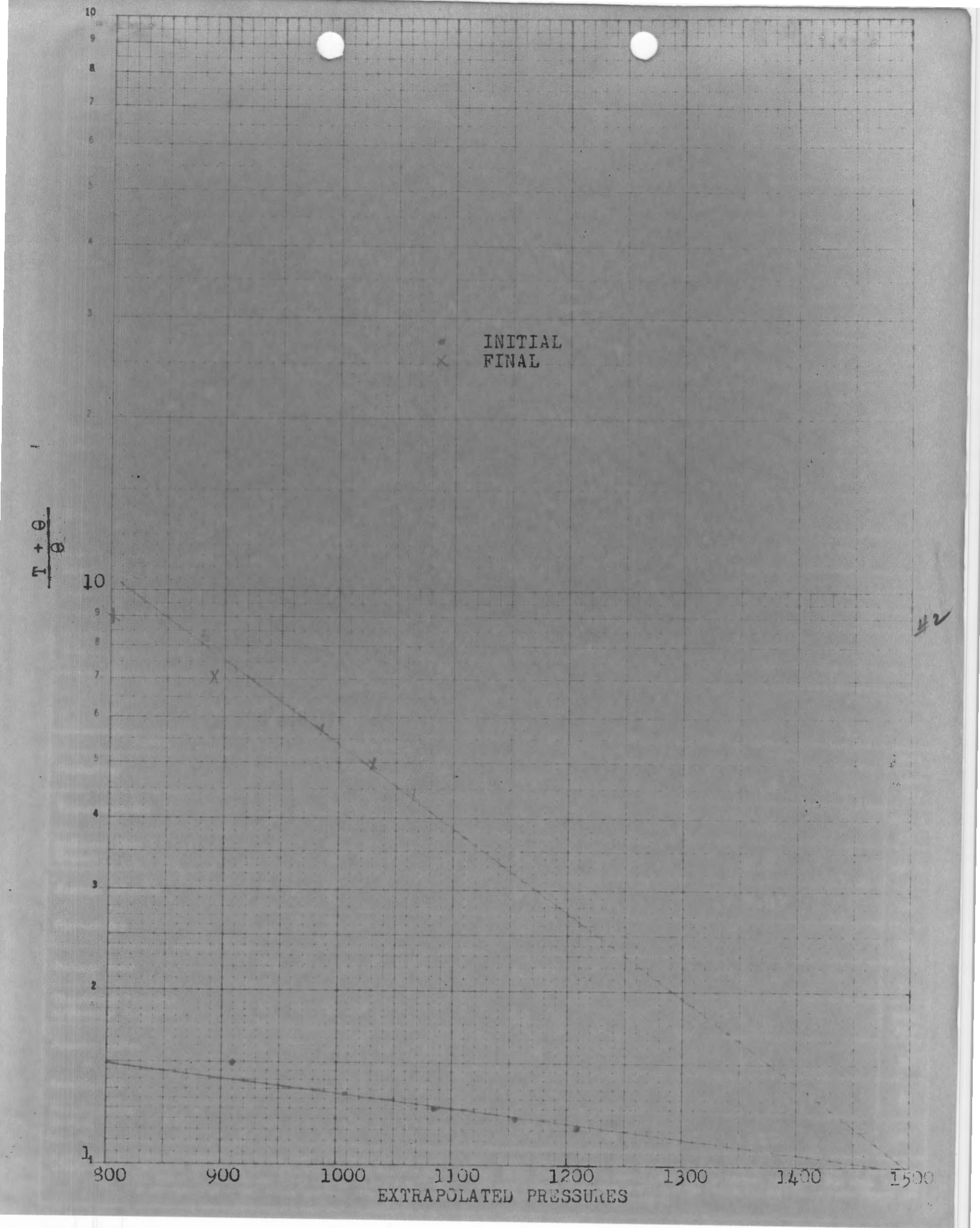
	1ST FLOW PRESSURE		INITIAL CIP		2ND FLOW PRESSURE		FINAL CIP	
	TIME DEFL. .000"	PSI TEMP. CORR.	TIME DEFL. .000"	PSI TEMP. CORR.	TIME DEFL. .000"	PSI TEMP. CORR.	TIME DEFL. .000"	PSI TEMP. CORR.
P0	.000	90	.000	90	.000	100	.000	135
P1	.042	90	.042	705	.167	100	.042	357
P2			.083	910	.333	113	.083	650
P3			.125	1007	.500	113	.125	802
P4			.167	1085	.666	117	.167	890
P5			.209	1155	.833	125	.209	985
P6			.250	1210	.999	135	.250	1030
P7							.292	1065
P8								
P9								
P10								
	5 MINUTE INTERVAL		5 MINUTE INTERVAL		20 MINUTE INTERVAL		5 MINUTE INTERVAL	

REMARKS

INITIAL OPENING 5 MINUTES

SPECIAL PRESSURE DATA


INITIAL
FINAL
#2
800
900
1000
1100
1200
1300
1400
1500
EXTRAPOLATED PRESSURES


INITIAL
FINAL
$\frac{T+\theta}{\theta}$
10
9
8
7
6
5
4
3
2
1
800
900
1000
1100
1200
1300
1400
1500
EXTRAPOLATED PRESSURES
#2

Liquid Production

B.T. Gauge Numbers		1049	Ticket Number		5978
Initial Hydrostatic		2490	Elevation		2321 ft.
Final Hydrostatic		2470	Indicated Production	1st Flow	52 bbls. day
1st Flow — Initial	Time ----	90		Total Flow	9.3 bbls. day
1st Flow — Final	5	90	Drill Collar Length		Total Rec. ft.
Initial Closed In Pressure	30	1210	Drill Collar I.D.		2.76 in.
2nd Flow — Initial	----	100	Drill Pipe Factor		.0074 bbls. ft.
2nd Flow — Final	120	135	Hole Size		7 7/8 in.
Final Closed In Pressure	35	1065	Footage Tested		85 ft.
Extrapolated Static Pressure — Initial		1470	Mud Weight		10.1 lbs. gal.
Extrapolated Static Pressure — Final		1500	Viscosity, Oil or Water		1.2 cp
Slope psi/cycle — Initial		3720	Oil API Gravity		—
Slope psi/cycle — Final		680	Water Specific Gravity		—

Remarks:

SUMMARY

Gauge No. / Depth

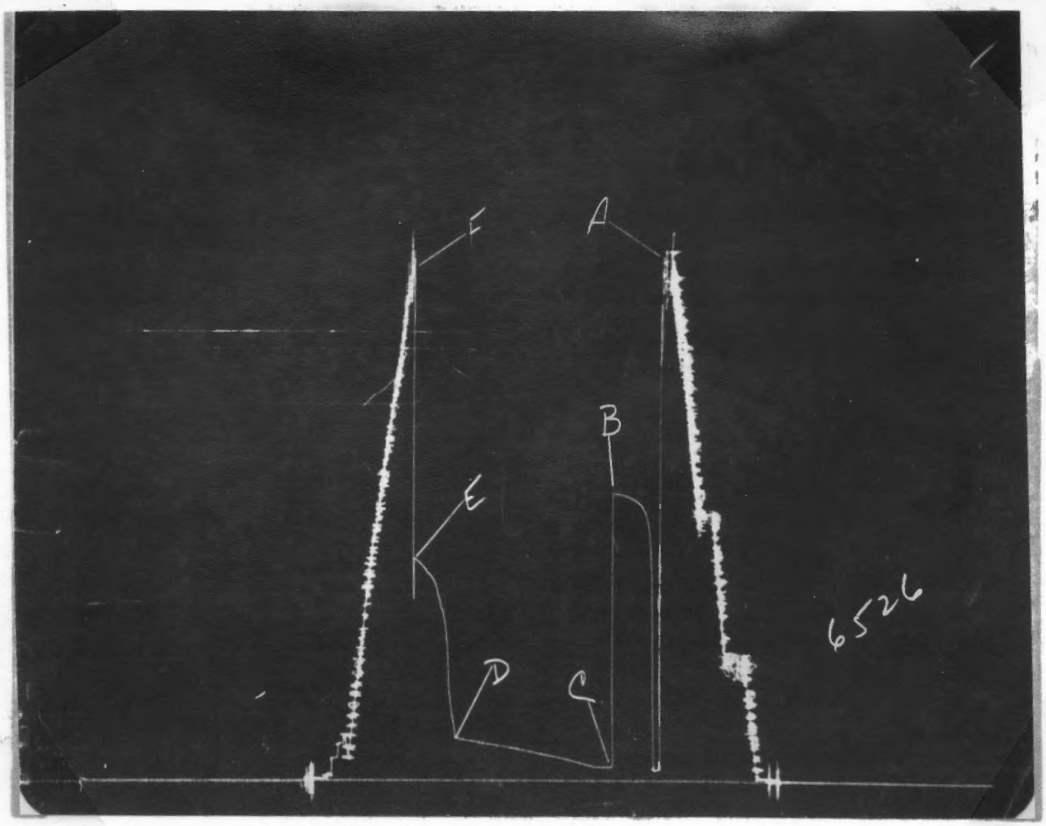
Product	Equation	INITIAL	FINAL	Units
Production	$Q = \frac{1440\ R}{t}$	52	7.6	bbls./day.
Transmissibility	$\frac{Kh}{\mu} = \frac{162.6\ Q}{m}$	2.3	1.8	$\frac{md.\ ft.}{cp.}$
Indicated Flow Capacity	$Kh = \frac{Kh}{\mu}\ \mu$	2.7	2.2	md. ft.
Average Effective Permeability	$K = \frac{Kh}{h}$	0.03	0.03	md.
	$K_1 = \frac{Kh}{h_1}$			md.
Damage Ratio	$DR = .183\ \frac{Ps - Pf}{m}$	0.07	0.37	—
Theoretical Potential w/Damage Removed	$Q_1 = Q\ DR$	52	7.6	bbls. day
Approx. Radius of Investigation	$b \leftrightharpoons \sqrt{Kt}$ or $\sqrt{Kt_o}$	0.4	1.9	ft.
	$b_1 \leftrightharpoons \sqrt{K_1 t}$ or $\sqrt{K_1 t_o}$			ft.
Potentiometric Surface KB *	$Pot. = El - GD + 2.319\ Ps$	1367	1437	ft.

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INTERPRETATIONS AND CALCULATIONS

Time: Each Square _____ minutes

Pressure: Each Square _____ psi



Tool Open 2 hr. 5 mins: Shut-in: Initial _____ hr. 30 mins: Final _____ hr. 30 mins.

	Field Reading	Corrected Reading
(A) Initial Hydrostatic Pressure	2450	2450
(B) Initial Shut-in Pressure	1310	1330
(C) Initial Flow Pressure	85	65
(D) Final Flow Pressure	195	200
(E) Final Shut-in Pressure	1030	1013
(F) Final Hydrostatic Pressure	2435	2395

ILLER TESTING COMPAN

Box 547

GREAT BEND, KANSAS

Company MULL DRILLING COMPANY

Lease and Well No. RAUM # 1

County NESS State KANSAS Date MAY 18, 1963

Formation Test No. 1 Total Depth 4378

Interval Tested 4368 To 4378 Anchor Length 10'

Size Hole 7 7/8 Size Drill Pipe 4 1/2 FH Size Packer 6 3/4

Mud Weight 10 Viscosity 48 Bottom Hole Temp. 130 ° F

Chokes: Top 1/2 Bottom 1/2 Ticket No. 6526

RECOVERY

INITIAL OPENING 5 MINUTES

FAIR BLOW THROUGHOUT TEST

340 FEET MUDDY WATER
150 FEET SLIGHTLY MUDDY WATER

Lease and Well No. RAUM # 1 22 18 23 C NW NW Formation Test No. 3