

Company Mull Drilling Company Lease & Well No. Bertrand #1
 Elevation ----- Formation Lansing Effective Pay ----- Ft. Ticket No. 4084
 Date 5/1/80 Sec. 16 Twp. 11S Range 35W County Logan State Kansas
 Test Approved by Richard E. Roby Western Representative Randy Lackey
 Formation Test No. 1 Interval Tested from 4154 ft. to 4182 ft. Total Depth 4182 ft.
 Packer Depth 4149 ft. Size 6 3/4 in. Packer Depth - ft. Size - in.
 Packer Depth 4154 ft. Size 6 3/4 in. Packer Depth - ft. Size - in.
 Depth of Selective Zone Set -
 Top Recorder Depth (Inside) 4173 ft. Recorder Number 2608 Cap. 4150
 Bottom Recorder Depth (Outside) 4176 ft. Recorder Number 3473 Cap. 4000
 Below Straddle Recorder Depth - ft. Recorder Number - Cap. -
 Drilling Contractor Blue Goose Drlg. Rig #2 Drill Collar Length 311 I. D. 2.26 in.
 Mud Type P.S.#1 Polyner Viscosity 44 Weight Pipe Length - I. D. - in.
 Weight 9.1 Water Loss 8.8 cc. Drill Pipe Length 3836 I. D. 3.8 in.
 Chlorides 42,000 P.P.M. Test Tool Length 19 ft. Tool Size 5 1/2 in.
 Jars: Make No Serial Number - Anchor Length 28 ft. Size 5 1/2 in.
 Did Well Flow? No Reversed Out No Surface Choke Size 3/4 in. Bottom Choke Size 3/4 in.
 Main Hole Size 7 7/8 in. Tool Joint Size 4 1/2 FH in.

Blow: Weak blow building to strong blow by end of frist opening and second opening - weak blow building into strong blow by end of opening.

Recovered 740 ft. of muddy water Chlorides 41,000 ppm
 Recovered ft. of
 Recovered ft. of
 Recovered ft. of
 Recovered ft. of

Remarks:

Time Set Packer(s) 6:45 ~~P.M.~~ ^{A.M.} Time Started Off Bottom 10:00 ~~P.M.~~ ^{A.M.} Maximum Temperature 120
 Initial Hydrostatic Pressure (A) 2006 P.S.I.
 Initial Flow Period 30 Minutes (B) 62 P.S.I. to (C) 233 P.S.I.
 Initial Closed In Period 45 Minutes (D) 1228 P.S.I.
 Final Flow Period 60 Minutes (E) 266 P.S.I. to (F) 379 P.S.I.
 Final Closed In Period 60 Minutes (G) 1203 P.S.I.
 Final Hydrostatic Pressure (H) 2000 P.S.I.

WESTERN TESTING CO., INC.

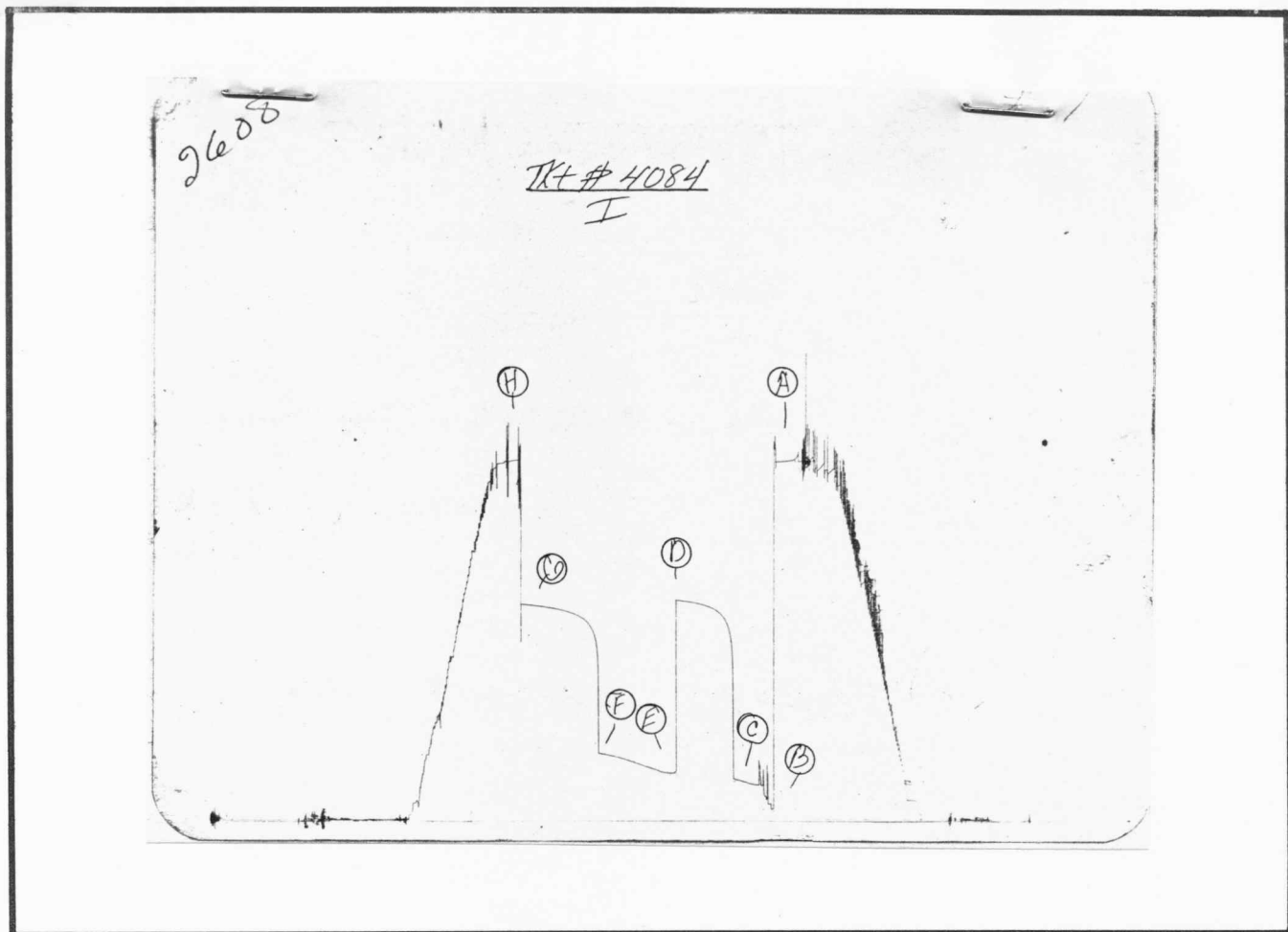
Pressure Data

Date 5/1/80 Recorder No. 2608 Capacity 4150 Test Ticket No. 4084
 Clock No. ----- Elevation ----- Location 4173 Ft. 120 °F

Point	Pressure		Time Given	Time Computed
A Initial Hydrostatic Mud	2006	P.S.I.	6:45A	M
B First Initial Flow Pressure	62	P.S.I.	30	Mins. 30 Mins.
C First Final Flow Pressure	233	P.S.I.	45	Mins. 45 Mins.
D Initial Closed-in Pressure	1228	P.S.I.	60	Mins. 60 Mins.
E Second Initial Flow Pressure	266	P.S.I.	60	Mins. 60 Mins.
F Second Final Flow Pressure	379	P.S.I.		
G Final Closed-in Pressure	1203	P.S.I.		
H Final Hydrostatic Mud	2000	P.S.I.		

PRESSURE BREAKDOWN

First Flow Pressure				Initial Shut-In				Second Flow Pressure				Final Shut-In			
Breakdown: <u>6</u> Inc.				Breakdown: <u>15</u> Inc.				Breakdown: <u>12</u> Inc.				Breakdown: <u>20</u> Inc.			
of <u>5</u> mins. and a				of <u>3</u> mins. and a				of <u>5</u> mins. and a				of <u>3</u> mins. and a			
final inc. of <u>0</u> Min.				final inc. of <u>0</u> Min.				final inc. of <u>0</u> Min.				final inc. of <u>0</u> Min.			
Point	Press.	Point	Press.	Point	Press.	Point	Press.	Point	Press.	Point	Press.	Point	Press.	Point	Press.
Mins.		Minutes		Minutes		Minutes		Minutes		Minutes		Minutes		Minutes	
P 1 <u>0</u>	62	0	233	0	266	0	379	0	266	0	1004	0	1060	0	1099
P 2 <u>5</u>	119	3	1017	5	266	3	1004	5	266	3	1004	3	1060	3	1099
P 3 <u>10</u>	198	6	1097	10	272	6	1060	10	272	6	1060	6	1060	6	1099
P 4 <u>15</u>	205	9	1132	15	286	9	1099	15	286	9	1099	9	1099	9	1099
P 5 <u>20</u>	215	12	1158	20	297	12	1120	20	297	12	1120	12	1120	12	1120
P 6 <u>25</u>	224	15	1174	25	310	15	1132	25	310	15	1132	15	1132	15	1132
P 7 <u>30</u>	233	18	1187	30	322	18	1141	30	322	18	1141	18	1141	18	1141
P 8		21	1195	35	334	21	1150	35	334	21	1150	21	1150	21	1150
P 9		24	1203	40	346	24	1158	40	346	24	1158	24	1158	24	1158
P10		27	1209	45	358	27	1166	45	358	27	1166	27	1166	27	1166
P11		30	1213	50	365	30	1174	50	365	30	1174	30	1174	30	1174
P12		33	1216	55	372	33	1178	55	372	33	1178	33	1178	33	1178
P13		36	1218	60	379	36	1182	60	379	36	1182	36	1182	36	1182
P14		39	1221			39	1186			39	1186	39	1186	39	1186
P15		42	1225			42	1190			42	1190	42	1190	42	1190
P16		45	1228			45	1193			45	1193	45	1193	45	1193
P17						48	1195			48	1195	48	1195	48	1195
P18						51	1197			51	1197	51	1197	51	1197
P19						54	1199			54	1199	54	1199	54	1199
P20						57	1201			57	1201	57	1201	57	1201
						60	1203			60	1203	60	1203	60	1203



This is an actual photograph of recorder chart.

POINT	PRESSURE	
	Field Reading	Office Reading
(A) Initial Hydrostatic Mud	2015	2006
(B) First Initial Flow Pressure	72	62
(C) First Final Flow Pressure	250	233
(D) Initial Closed-in Pressure	1234	1228
(E) Second Initial Flow Pressure	260	266
(F) Second Final Flow Pressure	385	379
(G) Final Closed-in Pressure	1203	1203
(H) Final Hydrostatic Mud	1983	2000

Company Mull Drilling Company Lease & Well No. Bertrand #1
Elevation 3302 Kelly Bushing Lansing Formation --- Effective Pay --- Ft. Ticket No. 4085
Date 5/1/80 Sec. 16 Twp. 11S Range 35W County Logan State Kansas
Test Approved by Richard E. Roby Western Representative Randy Lackey

Formation Test No. 2 Interval Tested from 4184 ft. to 4216 ft. Total Depth 4216 ft.

Packer Depth 4179 ft. Size 6 3/4 in. Packer Depth - ft. Size - in.

Packer Depth 4184 ft. Size 6 3/4 in. Packer Depth - ft. Size - in.

Depth of Selective Zone Set -

Top Recorder Depth (Inside) 4188 ft. Recorder Number 2608 Cap. 4150

Bottom Recorder Depth (Outside) 4191 ft. Recorder Number 3473 Cap. 4000

Below Straddle Recorder Depth - ft. Recorder Number - Cap. -

Drilling Contractor Blue Goose Drlg. Rig #2 Drill Collar Length 311 I. D. 2.26 in.

Mud Type P.S.#1 Plymer Viscosity 44 Weight Pipe Length - I. D. - in.

Weight 9.1 Water Loss 8.8 cc. Drill Pipe Length 3877 I. D. 3.8 in.

Chlorides 42,000 P.P.M. Test Tool Length 19 ft. Tool Size 5 1/2 in.

Jars: Make None Serial Number - Anchor Length 32 ft. Size 5 1/2 in.

Did Well Flow? No Reversed Out No Surface Choke Size 3/4 in. Bottom Choke Size 3/4 in.

Main Hole Size 7 7/8 in. Tool Joint Size 4 1/2 FH in.

Blow: Weak blow building to strong by end of frist opening. Weak blow building into strong blow forty minutes into second opening.

Recovered 1110 ft. of water scum of oil

Recovered ft. of

Recovered ft. of Chlorides 50,000 ppm

Recovered ft. of

Recovered ft. of

Remarks:

Time Set Packer(s) 12:15 ~~P.M.~~ ^{A.M.} Time Started Off Bottom 3:30 ~~P.M.~~ ^{A.M.} Maximum Temperature 122°

Initial Hydrostatic Pressure (A) 2004 P.S.I.

Initial Flow Period Minutes 30 (B) 87 P.S.I. to (C) 279 P.S.I.

Initial Closed In Period Minutes 45 (D) 1211 P.S.I.

Final Flow Period Minutes 60 (E) 300 P.S.I. to (F) 543 P.S.I.

Final Closed In Period Minutes 60 (G) 1195 P.S.I.

Final Hydrostatic Pressure (H) 1967 P.S.I.

WESTERN TESTING CO., INC.

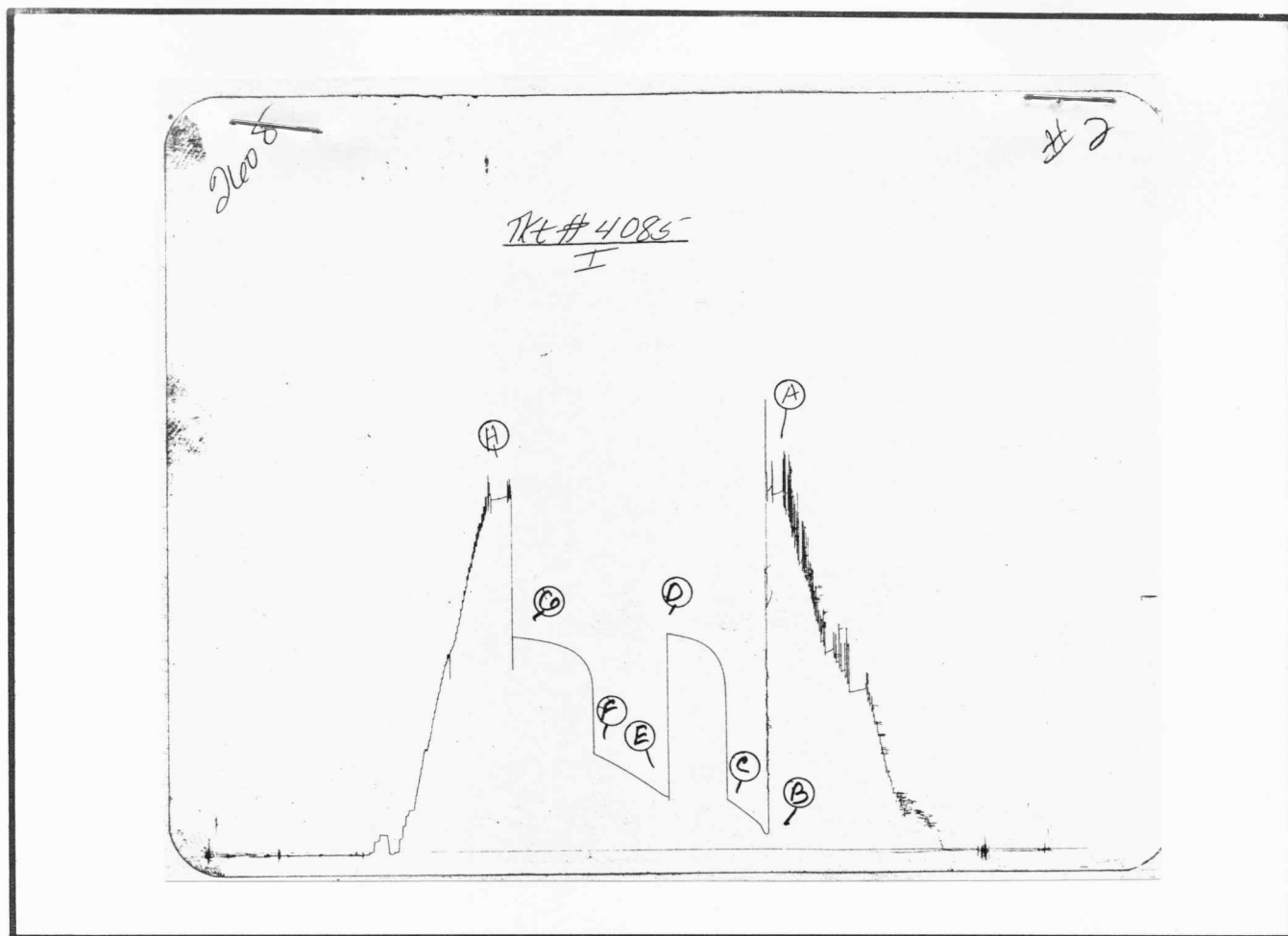
Pressure Data

Date 5/1/80 Test Ticket No. 4085
 Recorder No. 2608 Capacity 4150 Location 4188 Ft.
 Clock No. ---- Elevation 3302 Kelly Bushing Well Temperature 122 °F

Point	Pressure		Time Given	Time Computed
A Initial Hydrostatic Mud	2004	P.S.I.	12:15A	M
B First Initial Flow Pressure	87	P.S.I.	30	Mins. 30 Mins.
C First Final Flow Pressure	279	P.S.I.	45	Mins. 45 Mins.
D Initial Closed-in Pressure	1211	P.S.I.	60	Mins. 60 Mins.
E Second Initial Flow Pressure	300	P.S.I.	60	Mins. 60 Mins.
F Second Final Flow Pressure	543	P.S.I.		
G Final Closed-in Pressure	1195	P.S.I.		
H Final Hydrostatic Mud	1967	P.S.I.		

PRESSURE BREAKDOWN

First Flow Pressure		Initial Shut-In		Second Flow Pressure		Final Shut-In	
Breakdown: <u>6</u> Inc.		Breakdown: <u>15</u> Inc.		Breakdown: <u>12</u> Inc.		Breakdown: <u>20</u> Inc.	
of <u>5</u> mins. and a		of <u>3</u> mins. and a		of <u>5</u> mins. and a		of <u>3</u> mins. and a	
final inc. of <u>0</u> Min.		final inc. of <u>0</u> Min.		final inc. of <u>0</u> Min.		final inc. of <u>0</u> Min.	
Point Mins.	Press.	Point Minutes	Press.	Point Minutes	Press.	Point Minutes	Press.
P 1 <u>0</u>	<u>87</u>	<u>0</u>	<u>279</u>	<u>0</u>	<u>300</u>	<u>0</u>	<u>543</u>
P 2 <u>5</u>	<u>123</u>	<u>3</u>	<u>981</u>	<u>5</u>	<u>312</u>	<u>3</u>	<u>1004</u>
P 3 <u>10</u>	<u>162</u>	<u>6</u>	<u>1052</u>	<u>10</u>	<u>339</u>	<u>6</u>	<u>1046</u>
P 4 <u>15</u>	<u>196</u>	<u>9</u>	<u>1085</u>	<u>15</u>	<u>366</u>	<u>9</u>	<u>1075</u>
P 5 <u>20</u>	<u>225</u>	<u>12</u>	<u>1115</u>	<u>20</u>	<u>389</u>	<u>12</u>	<u>1095</u>
P 6 <u>25</u>	<u>252</u>	<u>15</u>	<u>1132</u>	<u>25</u>	<u>414</u>	<u>15</u>	<u>1112</u>
P 7 <u>30</u>	<u>279</u>	<u>18</u>	<u>1143</u>	<u>30</u>	<u>437</u>	<u>18</u>	<u>1121</u>
P 8		<u>21</u>	<u>1152</u>	<u>35</u>	<u>459</u>	<u>21</u>	<u>1129</u>
P 9		<u>24</u>	<u>1163</u>	<u>40</u>	<u>481</u>	<u>24</u>	<u>1138</u>
P10		<u>27</u>	<u>1172</u>	<u>45</u>	<u>502</u>	<u>27</u>	<u>1148</u>
P11		<u>30</u>	<u>1182</u>	<u>50</u>	<u>515</u>	<u>30</u>	<u>1157</u>
P12		<u>33</u>	<u>1188</u>	<u>55</u>	<u>529</u>	<u>33</u>	<u>1162</u>
P13		<u>36</u>	<u>1194</u>	<u>60</u>	<u>543</u>	<u>36</u>	<u>1167</u>
P14		<u>39</u>	<u>1200</u>			<u>39</u>	<u>1172</u>
P15		<u>42</u>	<u>1206</u>			<u>42</u>	<u>1176</u>
P16		<u>45</u>	<u>1211</u>			<u>45</u>	<u>1180</u>
P17						<u>48</u>	<u>1183</u>
P18						<u>51</u>	<u>1186</u>
P19						<u>54</u>	<u>1189</u>
P20						<u>57</u>	<u>1192</u>
						<u>60</u>	<u>1195</u>



This is an actual photograph of recorder chart.

POINT	PRESSURE	
	Field Reading	Office Reading
(A) Initial Hydrostatic Mud	2015	2004
(B) First Initial Flow Pressure	83	87
(C) First Final Flow Pressure	270	279
(D) Initial Closed-in Pressure	1193	1211
(E) Second Initial Flow Pressure	281	300
(F) Second Final Flow Pressure	531	543
(G) Final Closed-in Pressure	1193	1195
(H) Final Hydrostatic Mud	1983	1967

Company Mull Drilling Company Lease & Well No. Bertrand #1
Elevation 3302 Kelly Bushing Kansas City Effective Pay ---- Ft. Ticket No. 4086
Date 5/2/80 Sec. 16 Twp. 11S Range 35W County Logan State Kansas
Test Approved by Richard E. Roby Western Representative Randy Lackey
Formation Test No. 3 Interval Tested from 4301 ft. to 4335 ft. Total Depth 4335 ft.
Packer Depth 4330 ft. Size 6 3/4 in. Packer Depth -- ft. Size -- in.
Packer Depth 4335 ft. Size 6 3/4 in. Packer Depth -- ft. Size -- in.

Depth of Selective Zone Set --
Top Recorder Depth (Inside) 4341 ft. Recorder Number 2608 Cap. 4150
Bottom Recorder Depth (Outside) 4344 ft. Recorder Number 3473 Cap. 4000
Below Straddle Recorder Depth -- ft. Recorder Number -- Cap. --
Drilling Contractor Blue Goose Drilling Rig #2 Drill Collar Length 311 I. D. 2.26 in.
Mud Type PS#1 Ployner Viscosity 49 Weight Pipe Length -- I. D. -- in.
Weight 9.3 Water Loss 12.8 cc. Drill Pipe Length 3990 I. D. 3.8 in.
Chlorides 90,000 P.P.M. Test Tool Length 20 ft. Tool Size 5 1/2 in.
Jars: Make None Serial Number -- Anchor Length 34 ft. Size 5 1/2 in.
Did Well Flow? No Reversed Out No Surface Choke Size 3/4 in. Bottom Choke Size 3/4 in.
Main Hole Size 7 7/8 in. Tool Joint Size 4 1/2 FH in.

Blow: Weak blow building to fair blow first opening. Weak blow building to fair blow
thirty-five minutes after second opening.

Recovered 180 ft. of mud cut oil (70% oil;30% mud)
Recovered 120 ft. of muddy oil (50% oil;50% mud)
Recovered 60 ft. of oily mud (40% oil;60% mud)
Recovered ft. of
Recovered 360 ft. of Total fluid

Remarks:

Time Set Packer(s) 1:15 A.M. PM Time Started Off Bottom 4:30 A.M. PM Maximum Temperature 124°
Initial Hydrostatic Pressure (A) 2093 P.S.I.
Initial Flow Period 30 Minutes (B) 83 P.S.I. to (C) 114 P.S.I.
Initial Closed In Period 45 Minutes (D) 1296 P.S.I.
Final Flow Period 60 Minutes (E) 144 P.S.I. to (F) 173 P.S.I.
Final Closed In Period 63 Minutes (G) 1269 P.S.I.
Final Hydrostatic Pressure (H) 2083 P.S.I.

WESTERN TESTING CO., INC.

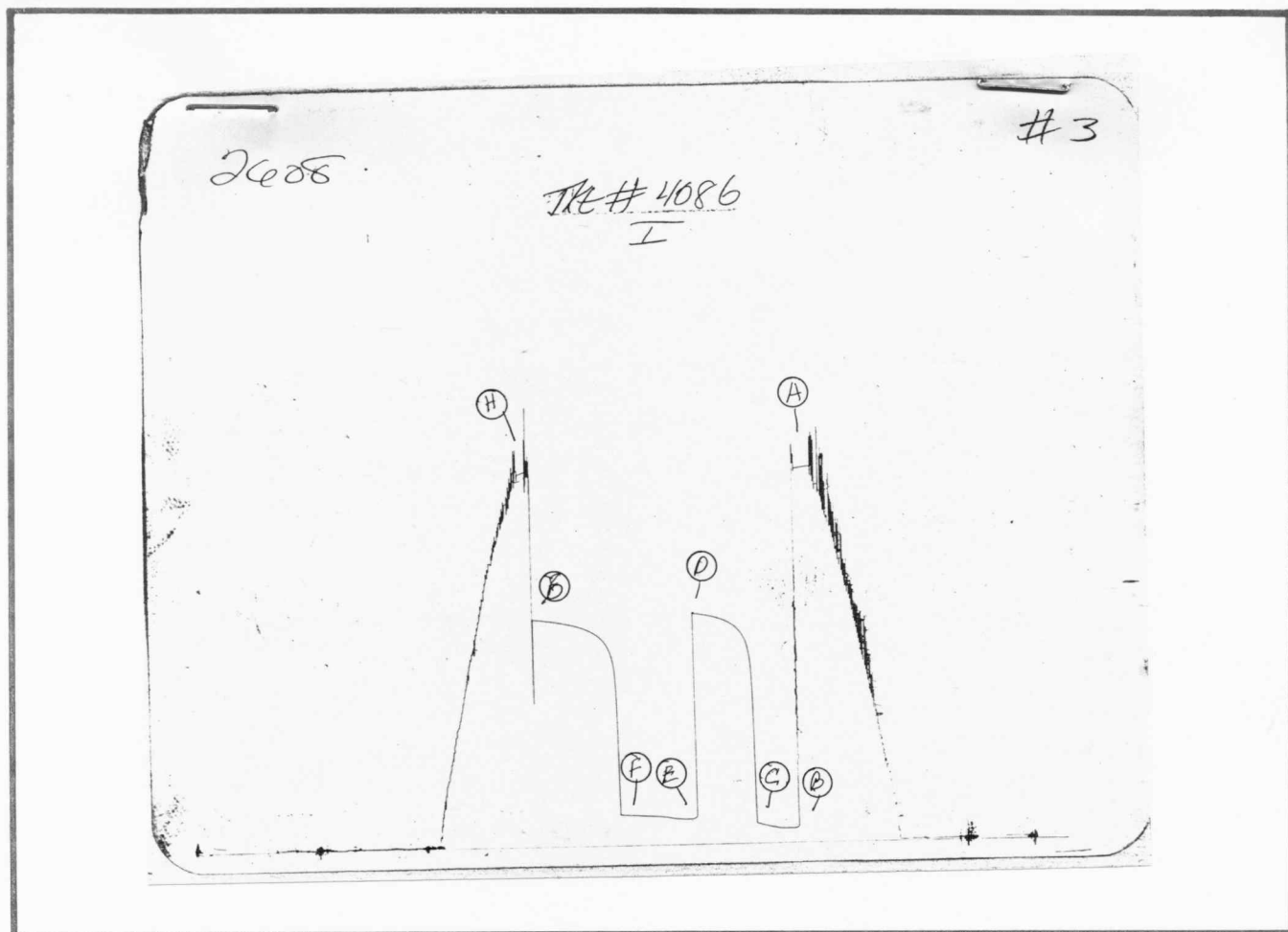
Pressure Data

Date 5/2/80 Recorder No. 2608 Capacity 4150 Test Ticket No. 4086
 Clock No. ----- Elevation 3302 Kelly Bushing Location 4335 Ft. 124 °F

Point	Pressure		Time Given	Time Computed
A Initial Hydrostatic Mud	2093 P.S.I.	Open Tool	1:15A	M
B First Initial Flow Pressure	83 P.S.I.	First Flow Pressure	30 Mins.	30 Mins.
C First Final Flow Pressure	114 P.S.I.	Initial Closed-in Pressure	45 Mins.	45 Mins.
D Initial Closed-in Pressure	1296 P.S.I.	Second Flow Pressure	60 Mins.	60 Mins.
E Second Initial Flow Pressure	144 P.S.I.	Final Closed-in Pressure	60 Mins.	63 Mins.
F Second Final Flow Pressure	173 P.S.I.			
G Final Closed-in Pressure	1269 P.S.I.			
H Final Hydrostatic Mud	2083 P.S.I.			

PRESSURE BREAKDOWN

First Flow Pressure		Initial Shut-In		Second Flow Pressure		Final Shut-In	
Breakdown: <u>6</u> Inc.		Breakdown: <u>15</u> Inc.		Breakdown: <u>12</u> Inc.		Breakdown: <u>21</u> Inc.	
of <u>5</u> mins. and a		of <u>3</u> mins. and a		of <u>5</u> mins. and a		of <u>3</u> mins. and a	
final inc. of <u>0</u> Min.		final inc. of <u>0</u> Min.		final inc. of <u>0</u> Min.		final inc. of <u>0</u> Min.	
Point Mins.	Press.	Point Minutes	Press.	Point Minutes	Press.	Point Minutes	Press.
P 1 <u>0</u>	<u>83</u>	<u>0</u>	<u>114</u>	<u>0</u>	<u>144</u>	<u>0</u>	<u>173</u>
P 2 <u>5</u>	<u>83</u>	<u>3</u>	<u>909</u>	<u>5</u>	<u>144</u>	<u>3</u>	<u>957</u>
P 3 <u>10</u>	<u>83</u>	<u>6</u>	<u>1114</u>	<u>10</u>	<u>146</u>	<u>6</u>	<u>1070</u>
P 4 <u>15</u>	<u>83</u>	<u>9</u>	<u>1164</u>	<u>15</u>	<u>154</u>	<u>9</u>	<u>1118</u>
P 5 <u>20</u>	<u>94</u>	<u>12</u>	<u>1197</u>	<u>20</u>	<u>159</u>	<u>12</u>	<u>1147</u>
P 6 <u>25</u>	<u>104</u>	<u>15</u>	<u>1217</u>	<u>25</u>	<u>162</u>	<u>15</u>	<u>1169</u>
P 7 <u>30</u>	<u>114</u>	<u>18</u>	<u>1234</u>	<u>30</u>	<u>164</u>	<u>18</u>	<u>1186</u>
P 8		<u>21</u>	<u>1246</u>	<u>35</u>	<u>166</u>	<u>21</u>	<u>1198</u>
P 9		<u>24</u>	<u>1255</u>	<u>40</u>	<u>168</u>	<u>24</u>	<u>1208</u>
P10		<u>27</u>	<u>1263</u>	<u>45</u>	<u>169</u>	<u>27</u>	<u>1217</u>
P11		<u>30</u>	<u>1269</u>	<u>50</u>	<u>171</u>	<u>30</u>	<u>1224</u>
P12		<u>33</u>	<u>1274</u>	<u>55</u>	<u>172</u>	<u>33</u>	<u>1231</u>
P13		<u>36</u>	<u>1278</u>	<u>60</u>	<u>173</u>	<u>36</u>	<u>1238</u>
P14		<u>39</u>	<u>1282</u>			<u>39</u>	<u>1242</u>
P15		<u>42</u>	<u>1286</u>			<u>42</u>	<u>1246</u>
P16		<u>45</u>	<u>1296</u>			<u>45</u>	<u>1250</u>
P17						<u>48</u>	<u>1254</u>
P18						<u>51</u>	<u>1258</u>
P19						<u>54</u>	<u>1260</u>
P20						<u>57</u>	<u>1263</u>
						<u>60</u>	<u>1266</u>
						<u>63</u>	<u>1269</u>



This is an actual photograph of recorder chart.

POINT	PRESSURE	
	Field Reading	Office Reading
(A) Initial Hydrostatic Mud	2098	2093 PSI
(B) First Initial Flow Pressure	83	83 PSI
(C) First Final Flow Pressure	104	114 PSI
(D) Initial Closed-in Pressure	1286	1296 PSI
(E) Second Initial Flow Pressure	146	144 PSI
(F) Second Final Flow Pressure	166	173 PSI
(G) Final Closed-in Pressure	1275	1269 PSI
(H) Final Hydrostatic Mud	2066	2083 PSI

Liquid Production

B.T. Gauge Numbers		2608	Ticket Number	4086
Initial Hydrostatic		PRESSURE 2093	Elevation	3302 KB ft.
Final Hydrostatic		2083	Indicated Production	1st Flow 52 5906 bbls. day
1st Flow	Initial	83	Total Flow	2.232 bbls. day
	Final	30		311 ft.
Initial Closed In Pressure		45	1296	Drill Collar I.D.
2nd Flow		Initial	144	Drill Pipe Factor
Final		60	173	Hole Size
Final Closed In Pressure		63	1269	Footage Tested
Extrapolated Static Pressure		Initial	1072-1353	Mud Weight
		Final	1144-1345	Viscosity, Oil or Water
Slope psi/cycle		Initial	280	Oil API Gravity
		Final	1072-1353 201	Water Specific Gravity

Remarks: _____

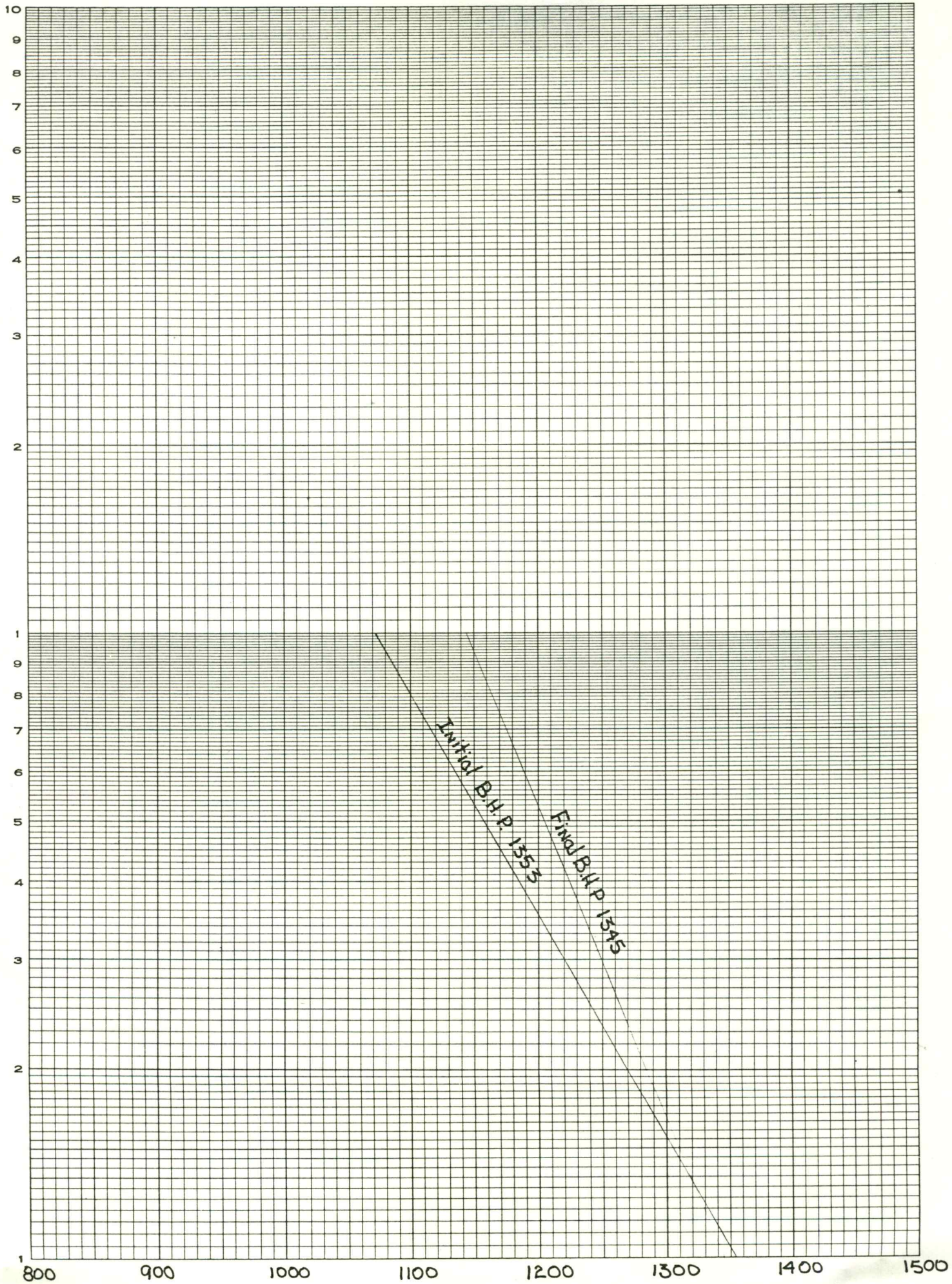
SUMMARY		Gauge No. Depth		
Product	Equation	INITIAL	FINAL	Units
Production	$Q = \frac{1440 R}{t}$	3 28.349	35.715	bbls. day.
Transmissibility	$\frac{Kh}{\mu} = \frac{162.6 Q}{m}$	16.404	28.892	md. ft. cp.
Indicated Flow Capacity	$Kh = \frac{Kh}{\mu} \mu$	.820	1.444	md. ft.
Average Effective Permeability	$K = \frac{Kh}{h}$	.911	.1605	md.
	$K_i = \frac{Kh}{h_i}$	.911	.1605	md.
Damage Ratio	$DR = .183 \frac{P_s - P_f}{m}$	.806	1.0670	—
Theoretical Potential w/Damage Removed	$Q_1 = Q DR$	22.875	38.110	bbls. day
Approx. Radius of Investigation	$b \approx \sqrt{Kt}$ or $\sqrt{Kt_0}$	1.653	3.800	ft.
	$b_1 \approx \sqrt{K_1 t}$ or $\sqrt{K_1 t_0}$	1.653	3.800	ft.
Potentiometric Surface *	$Pot. = EI - GD + 2.319 Ps$			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 elevations based thereon, Western Testing Co., Inc. is merely expressing its opinion. You agree that Western Testing Co., Inc. makes no warranty express or implied as to the accuracy of such calculations or opinions, and that Western Testing Co., Inc. 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

EUGENE DIETZGEN CO.
MADE IN U. S. A.

NO. 341-L210 DIETZGEN GRAPH PAPER
SEMI-LOGARITHMIC
2 CYCLES X 10 DIVISIONS PER INCH



Liquid Production

B.T. Gauge Numbers		2608	Ticket Number	4086
Initial Hydrostatic		2093	Elevation	3302 KB ft.
Final Hydrostatic		2083	Indicated Production	1st Flow .5906 bbls. day
1st Flow	Initial	83	Total Flow	2.232 bbls. day
	Final	114	Drill Collar Length	311 ft.
Initial Closed In Pressure		1296	Drill Collar I.D.	2.25 in.
2nd Flow	Initial	144	Drill Pipe Factor	.0142 bbls. ft.
	Final	173	Hole Size	7.875 in.
Final Closed In Pressure		1269	Footage Tested	34 ft.
Extrapolated Static Pressure	Initial	1072-1353	Mud Weight	9.3 lbs. gal.
	Final	1144-1345	Viscosity, Oil or Water	cp
Slope psi/cycle	Initial	280	Oil API Gravity	—
	Final	201	Water Specific Gravity	—

Remarks:

SUMMARY

Gauge
No.
Depth

Product	Equation	INITIAL	FINAL	Units
Production	$Q = \frac{1440 R}{t}$	28.349	35.715	bbls., day.
Transmissibility	$\frac{Kh}{\mu} = \frac{162.6 Q}{m}$	16.404	28.892	md. ft. cp
Indicated Flow Capacity	$Kh = \frac{Kh}{\mu} \mu$	.820	1.444	md. ft.
Average Effective Permeability	$K = \frac{Kh}{h}$	.911	.1605	md.
	$K_i = \frac{Kh}{h_i}$	.911	.1605	md.
Damage Ratio	$DR = .183 \frac{P_s - P_f}{m}$	.806	1.0670	—
Theoretical Potential w/Damage Removed	$Q_1 = Q DR$	22.875	38.110	bbls. day
Approx. Radius of Investigation	$b \approx \sqrt{Kt}$ or $\sqrt{Kt_0}$	1.653	3.800	ft.
	$b_1 \approx \sqrt{K_1 t}$ or $\sqrt{K_1 t_0}$	1.653	3.800	ft.
Potentiometric Surface *	$Pot. = EI - CD + 2.319 Ps$			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 elevations based thereon, Western Testing Co., Inc. is merely expressing its opinion. You agree that Western Testing Co., Inc. makes no warranty express or implied as to the accuracy of such calculations or opinions, and that Western Testing Co., Inc. 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

Company Mull Drilling Company Lease & Well No. Bertrand #1
Elevation 3302 Kelly Bushing Kansas City Formation Effective Pay - - - - Ft. Ticket No. 4087
Date 5/3/80 Sec. 16 Twp. 11S Range 35W County Logan State Kansas
Test Approved by Richard E. Roby Western Representative Randy Lackey

Formation Test No. 4 Interval Tested from 4336 ft. to 4370 ft. Total Depth 4370 ft.

Packer Depth 4331 ft. Size 6 3/4 in. Packer Depth - ft. Size - in.

Packer Depth 4336 ft. Size 6 3/4 in. Packer Depth - ft. Size - in.

Depth of Selective Zone Set -

Top Recorder Depth (Inside) 4340 ft. Recorder Number 2608 Cap. 4150PSI

Bottom Recorder Depth (Outside) 4343 ft. Recorder Number 3473 Cap. 4000PSI

Below Straddle Recorder Depth - ft. Recorder Number - Cap. -

Drilling Contractor Blue Goose Drlg. Rig #2 Drill Collar Length 311 I. D. 2.26 in.

Mud Type premix PS#1 viscosity 39 Weight Pipe Length - I. D. - in.

Weight 9.2 Water Loss 13.6 cc. Drill Pipe Length 4020 I. D. 3.8 in.

Chlorides 57,000 P.P.M. Test Tool Length 20 ft. Tool Size 5 1/2 in.

Jars: Make - Serial Number - Anchor Length 34 ft. Size 5 1/2 in.

Did Well Flow? No Reversed Out No Surface Choke Size 3/4 in. Bottom Choke Size 3/4 in.

Main Hole Size 7 7/8 in. Tool Joint Size 4 1/2 FH in.

Blow: Very weak; dead in twenty three minutes first opening.

Flushed tool on second opening, dead in nineteen minutes.

Recovered 140 ft. of mud slight trace of oil

Recovered ft. of

Recovered ft. of

Recovered ft. of

Recovered ft. of

Remarks: Slid 14' to bottom.

Time Set Packer(s) 6:57 ~~AM~~ P.M. Time Started Off Bottom 9:00 ~~AM~~ P.M. Maximum Temperature 122°
Initial Hydrostatic Pressure (A) 2121 P.S.I.
Initial Flow Period Minutes 30 (B) 85 P.S.I. to (C) 80 P.S.I.
Initial Closed In Period Minutes 27 (D) 1010 P.S.I.
Final Flow Period Minutes 30 (E) 89 P.S.I. to (F) 89 P.S.I.
Final Closed In Period Minutes 30 (G) 959 P.S.I.
Final Hydrostatic Pressure (H) 2106 P.S.I.

WESTERN TESTING CO., INC.

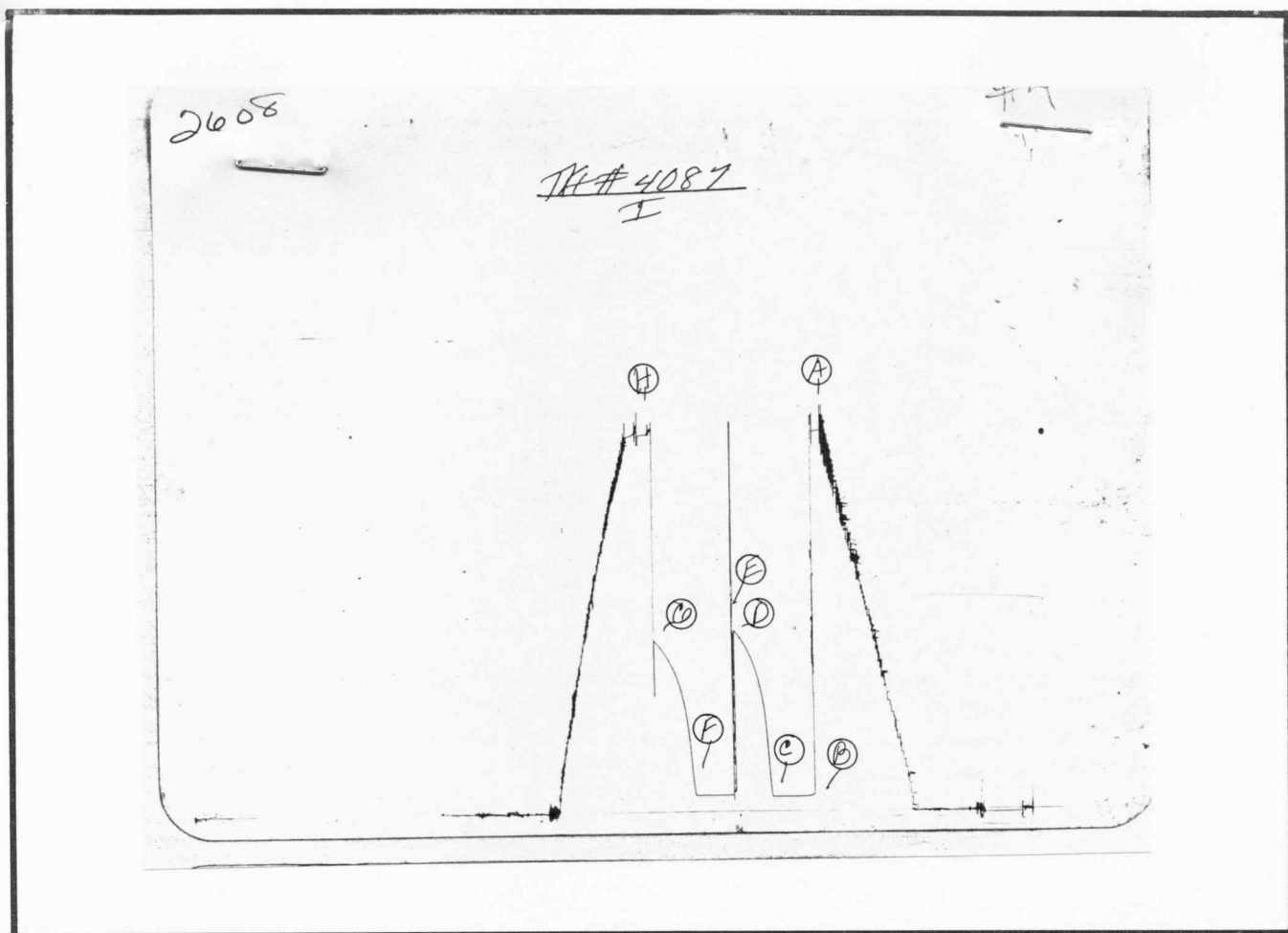
Pressure Data

Date 5/3/80 Recorder No. 2608 Capacity 4150 Test Ticket No. 4087
 Location 4340 Ft.
 Clock No. - Elevation 3302 Kelly Bushing Well Temperature 122 °F

Point	Pressure		Time Given	Time Computed
A Initial Hydrostatic Mud	<u>2121</u>	P.S.I.	<u>6:57P</u>	<u>M</u>
B First Initial Flow Pressure	<u>85</u>	P.S.I.	<u>30</u>	<u>Mins.</u>
C First Final Flow Pressure	<u>80</u>	P.S.I.	<u>30</u>	<u>Mins.</u>
D Initial Closed-in Pressure	<u>1010</u>	P.S.I.	<u>30</u>	<u>Mins.</u>
E Second Initial Flow Pressure	<u>89</u>	P.S.I.	<u>30</u>	<u>Mins.</u>
F Second Final Flow Pressure	<u>89</u>	P.S.I.	<u>30</u>	<u>Mins.</u>
G Final Closed-in Pressure	<u>959</u>	P.S.I.		
H Final Hydrostatic Mud	<u>2106</u>	P.S.I.		

PRESSURE BREAKDOWN

First Flow Pressure		Initial Shut-In		Second Flow Pressure		Final Shut-In	
Breakdown: <u>6</u> Inc.		Breakdown: <u>9</u> Inc.		Breakdown: <u>6</u> Inc.		Breakdown: <u>10</u> Inc.	
of <u>5</u> mins. and a		of <u>3</u> mins. and a		of <u>5</u> mins. and a		of <u>3</u> mins. and a	
final inc. of <u>0</u> Min.		final inc. of <u>0</u> Min.		final inc. of <u>0</u> Min.		final inc. of <u>0</u> Min.	
Point Mins.	Press.	Point Minutes	Press.	Point Minutes	Press.	Point Minutes	Press.
P 1 <u>0</u>	<u>85</u>	<u>0</u>	<u>80</u>	<u>0</u>	<u>89</u>	<u>0</u>	<u>89</u>
P 2 <u>5</u>	<u>83</u>	<u>3</u>	<u>304</u>	<u>5</u>	<u>89</u>	<u>3</u>	<u>322</u>
P 3 <u>10</u>	<u>80</u>	<u>6</u>	<u>531</u>	<u>10</u>	<u>89</u>	<u>6</u>	<u>510</u>
P 4 <u>15</u>	<u>80</u>	<u>9</u>	<u>661</u>	<u>15</u>	<u>89</u>	<u>9</u>	<u>628</u>
P 5 <u>20</u>	<u>80</u>	<u>12</u>	<u>760</u>	<u>20</u>	<u>89</u>	<u>12</u>	<u>716</u>
P 6 <u>25</u>	<u>80</u>	<u>15</u>	<u>830</u>	<u>25</u>	<u>89</u>	<u>15</u>	<u>779</u>
P 7 <u>30</u>	<u>80</u>	<u>18</u>	<u>894</u>	<u>30</u>	<u>89</u>	<u>18</u>	<u>828</u>
P 8		<u>21</u>	<u>938</u>			<u>21</u>	<u>865</u>
P 9		<u>24</u>	<u>979</u>			<u>24</u>	<u>905</u>
P10		<u>27</u>	<u>1010</u>			<u>27</u>	<u>934</u>
P11						<u>30</u>	<u>959</u>
P12							
P13							
P14							
P15							
P16							
P17							
P18							
P19							
P20							



This is an actual photograph of recorder chart.

POINT	PRESSURE		
	Field Reading	Office Reading	
(A) Initial Hydrostatic Mud	2119	2121	PSI
(B) First Initial Flow Pressure	83	85	PSI
(C) First Final Flow Pressure	83	80	PSI
(D) Initial Closed-in Pressure	996	1010	PSI
(E) Second Initial Flow Pressure	94	89	PSI
(F) Second Final Flow Pressure	94	89	PSI
(G) Final Closed-in Pressure	975	959	PSI
(H) Final Hydrostatic Mud	2108	2106	PSI

Mull Drilling Company, Inc.

Bertrand #1

Company _____ Lease & Well No. _____
 Elevation 3302 Kelley Bushing Cherokee Effective Pay ---- Ft. Ticket No. 4088
 Date 5/5/80 Sec. 16 Twp. 11S Range 35W County Logan State Kansas
 Test Approved by Richard E. Roby Western Representative Randy Lackey
 Formation Test No. 5 Interval Tested from 4716 ft. to 4750 ft. Total Depth 4750 ft.
 Packer Depth 4711 ft. Size 6 3/4 in. Packer Depth - ft. Size - in.
 Packer Depth 4716 ft. Size 6 3/4 in. Packer Depth - ft. Size - in.

Depth of Selective Zone Set -
 Top Recorder Depth (Inside) 4722 ft. Recorder Number 2608 Cap. 4150 PSI
 Bottom Recorder Depth (Outside) 4725 ft. Recorder Number 3473 Cap. 4000 PSI
 Below Straddle Recorder Depth - ft. Recorder Number - Cap. -
 Drilling Contractor Blue Goose Drilling Rig #2 Drill Collar Length 311 I. D. 2.26 in.
 Mud Type Premix P.S.#1 Viscosity 43 Weight Pipe Length - I. D. - in.
 Weight 9.2 Water Loss 20.0 cc. Drill Pipe Length 4415 I. D. 3.8 in.
 Chlorides 70,000 P.P.M. Test Tool Length 20 ft. Tool Size 5 1/2 in.
 Jars: Make None Serial Number - Anchor Length 34 ft. Size 5 1/2 in.
 Did Well Flow? No Reversed Out N O Surface Choke Size 3/4 in. Bottom Choke Size 3/4 in.
 Main Hole Size 7 7/8 in. Tool Joint Size 4 1/2 FH in.

Blow: Weak blow; flushed tool, reset packers, very weak blow; died four minutes into Initial Flow Period. Dad throughout final flow period.

Recovered 432 ft. of mud specks of oil throughout

Recovered ft. of

Recovered ft. of

Recovered ft. of

Recovered ft. of

Remarks: _____

Time Set Packer(s) 12:57 A.M. Time Started Off Bottom 3:00 P.M. Maximum Temperature 126°
 Initial Hydrostatic Pressure 2297 P.S.I.
 Initial Flow Period 30 Minutes (B) 48 P.S.I. to (C) 215 P.S.I.
 Initial Closed In Period 30 Minutes (D) 1128 P.S.I.
 Final Flow Period 30 Minutes (E) 233 P.S.I. to (F) 220 P.S.I.
 Final Closed In Period 33 Minutes (G) 1078 P.S.I.
 Final Hydrostatic Pressure 2295 P.S.I. (H)

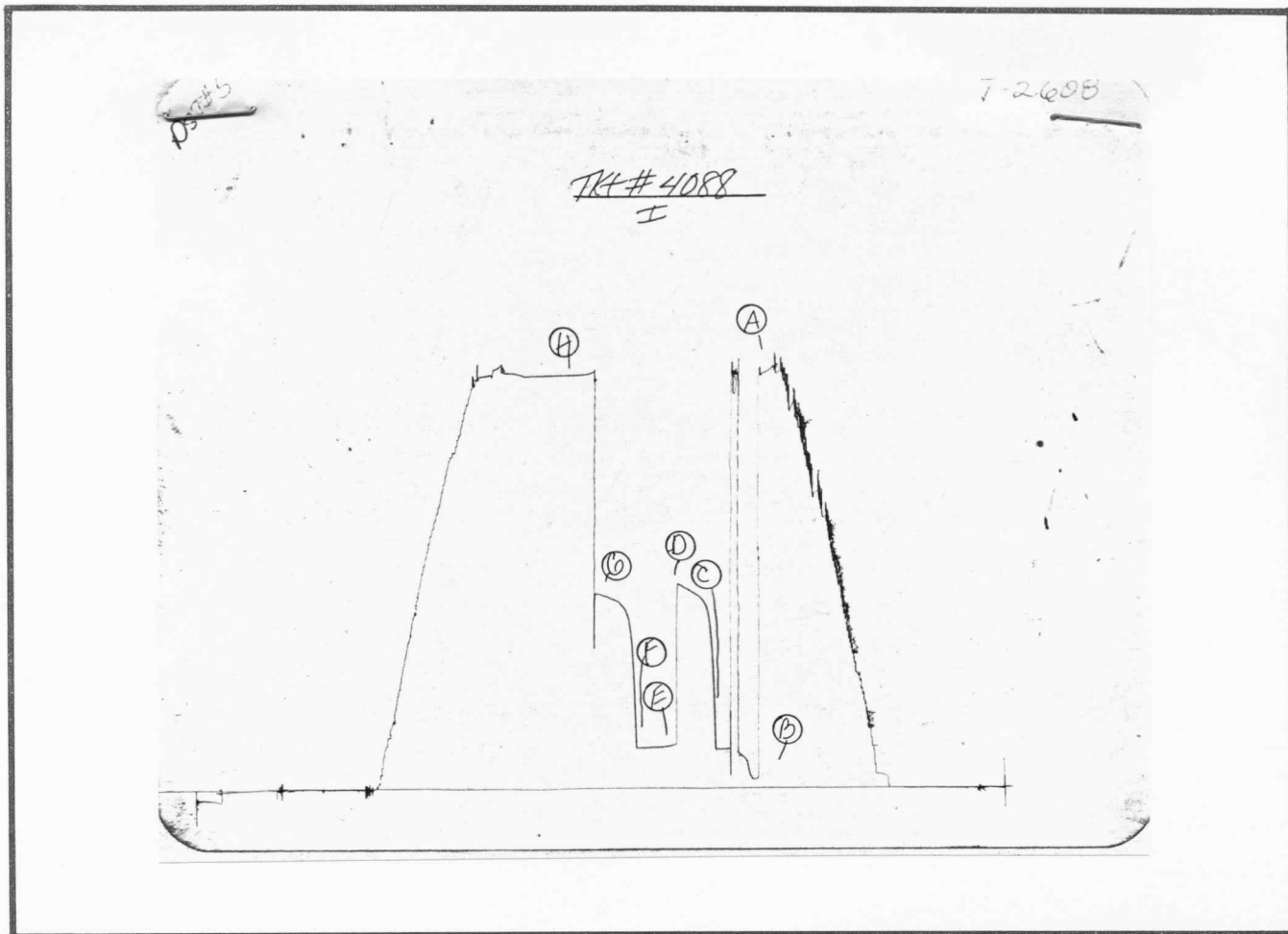
WESTERN TESTING CO., INC.

Pressure Data

Date 5/5/80 Recorder No. 2608 Capacity 4150 Test Ticket No. 4088
 Clock No. - Elevation 3302 Kelly Bushing Location 4722 Ft. Well Temperature 126 °F
 Point Pressure Time Given Time Computed
 A Initial Hydrostatic Mud 2297 P.S.I. Open Tool 12:57 M
 B First Initial Flow Pressure 48 P.S.I. First Flow Pressure 30 Mins. 30 Mins.
 C First Final Flow Pressure 215 P.S.I. Initial Closed-in Pressure 30 Mins. 30 Mins.
 D Initial Closed-in Pressure 1128 P.S.I. Second Flow Pressure 30 Mins. 30 Mins.
 E Second Initial Flow Pressure 233 P.S.I. Final Closed-in Pressure 30 Mins. 33 Mins.
 F Second Final Flow Pressure 220 P.S.I.
 G Final Closed-in Pressure 1078 P.S.I.
 H Final Hydrostatic Mud 2295 P.S.I.

PRESSURE BREAKDOWN

First Flow Pressure		Initial Shut-In		Second Flow Pressure		Final Shut-In	
Breakdown: <u>6</u> Inc.		Breakdown: <u>10</u> Inc.		Breakdown: <u>6</u> Inc.		Breakdown: <u>11</u> Inc.	
of <u>5</u> mins. and a		of <u>3</u> mins. and a		of <u>5</u> mins. and a		of <u>3</u> mins. and a	
final inc. of <u>0</u> Min.		final inc. of <u>0</u> Min.		final inc. of <u>0</u> Min.		final inc. of <u>0</u> Min.	
Point Mins.	Press.	Point Minutes	Press.	Point Minutes	Press.	Point Minutes	Press.
P 1 <u>0</u>	<u>48</u>	<u>0</u>	<u>215</u>	<u>0</u>	<u>233</u>	<u>0</u>	<u>220</u>
P 2 <u>5</u>	<u>60</u>	<u>3</u>	<u>572</u>	<u>5</u>	<u>231</u>	<u>3</u>	<u>605</u>
P 3 <u>10</u>	<u>168</u>	<u>6</u>	<u>832</u>	<u>10</u>	<u>227</u>	<u>6</u>	<u>847</u>
P 4 <u>15</u>	<u>196</u>	<u>9</u>	<u>990</u>	<u>15</u>	<u>225</u>	<u>9</u>	<u>952</u>
P 5 <u>20</u> Flushed tool		<u>12</u>	<u>1037</u>	<u>20</u>	<u>223</u>	<u>12</u>	<u>1000</u>
P 6 <u>25</u>	<u>215</u>	<u>15</u>	<u>1064</u>	<u>25</u>	<u>221</u>	<u>15</u>	<u>1027</u>
P 7 <u>30</u>	<u>215</u>	<u>18</u>	<u>1078</u>	<u>30</u>	<u>220</u>	<u>18</u>	<u>1037</u>
P 8		<u>21</u>	<u>1092</u>			<u>21</u>	<u>1046</u>
P 9		<u>24</u>	<u>1104</u>			<u>24</u>	<u>1056</u>
P10		<u>27</u>	<u>1116</u>			<u>27</u>	<u>1065</u>
P11		<u>30</u>	<u>1128</u>			<u>30</u>	<u>1075</u>
P12						<u>33</u>	<u>1078</u>
P13							
P14							
P15							
P16							
P17							
P18							
P19							
P20							



This is an actual photograph of recorder chart.

POINT	PRESSURE	
	Field Reading	Office Reading
(A) Initial Hydrostatic Mud	2285	2297 PSI
(B) First Initial Flow Pressure	52	48 PSI
(C) First Final Flow Pressure	218	215 PSI
(D) Initial Closed-in Pressure	1141	1128 PSI
(E) Second Initial Flow Pressure	218	233 PSI
(F) Second Final Flow Pressure	218	220 PSI
(G) Final Closed-in Pressure	1079	1078 PSI
(H) Final Hydrostatic Mud	2254	2295 PSI