CRUDE OIL
TESTING INC.

FORMATION TESTING SERVICE REPORT

CRUDE OIL TESTING, INC.

DATE 9/16/84 TEST TICKET NO. 4633

Company: A. Scott Ritchie
Company Address: 125 N. Market Suite 950 Wichita KS 67202
Location: Sec. 18 Twp. 11S Range 22W Co. Trego State KS
Well Name & Number: #4 Harger A Code E6

ENGINEERING DATA

Elevation	2259 KB	Drill Pipe Length	3332 ID 3.8 "
Mud Viscosity	73	Weight Pipe Length	
Mud Weight	9.3	Drill Collar Length	118 ID 2.25"
Water Loss	10.6	Top Packer Depth	3466
Type of Mud	Starch	Bottom Packer Depth	3471
Anchor Length	59	Tool Joint Size	4.5 XH
Hole Size	7 7/8	Test Tool Size	5 1/2
Casing Size	8 5/8	Packer Size	6 3/4
Surface Choke	3/4	Reversed Out	No
Bottom Choke	3/4	Recorder #	13255
Extra Equipment		None	

REMARKS

DST #1
Weak blow on shutin.

FORMATION

Toronto/Lans Zone Top Test Type Conventional
Interval 3471 To 3530 Total Depth 3530
Open 30 Shut In 30 Open 30 Shut In 30
Packer(s) Set 10:43PM Started Off Bottom 12:45AM
Blow 1st Opening Strong blow off bottom of bucket in 8 min.
2nd Opening Strong blow off bottom of bucket in 15 min.

RECOVERY

Total Feet 365
Recovered 365 feet of Gas cut muddy oil

CALCULATED RECOVERY

Gas 40.15 Oil 165.85 Water 85 Mud 74
Gravity (Oil) 37 Test Water Chlorides 30,000 PPM
Test Area Temperature 108F Mud System Chlorides 31,000 PPM

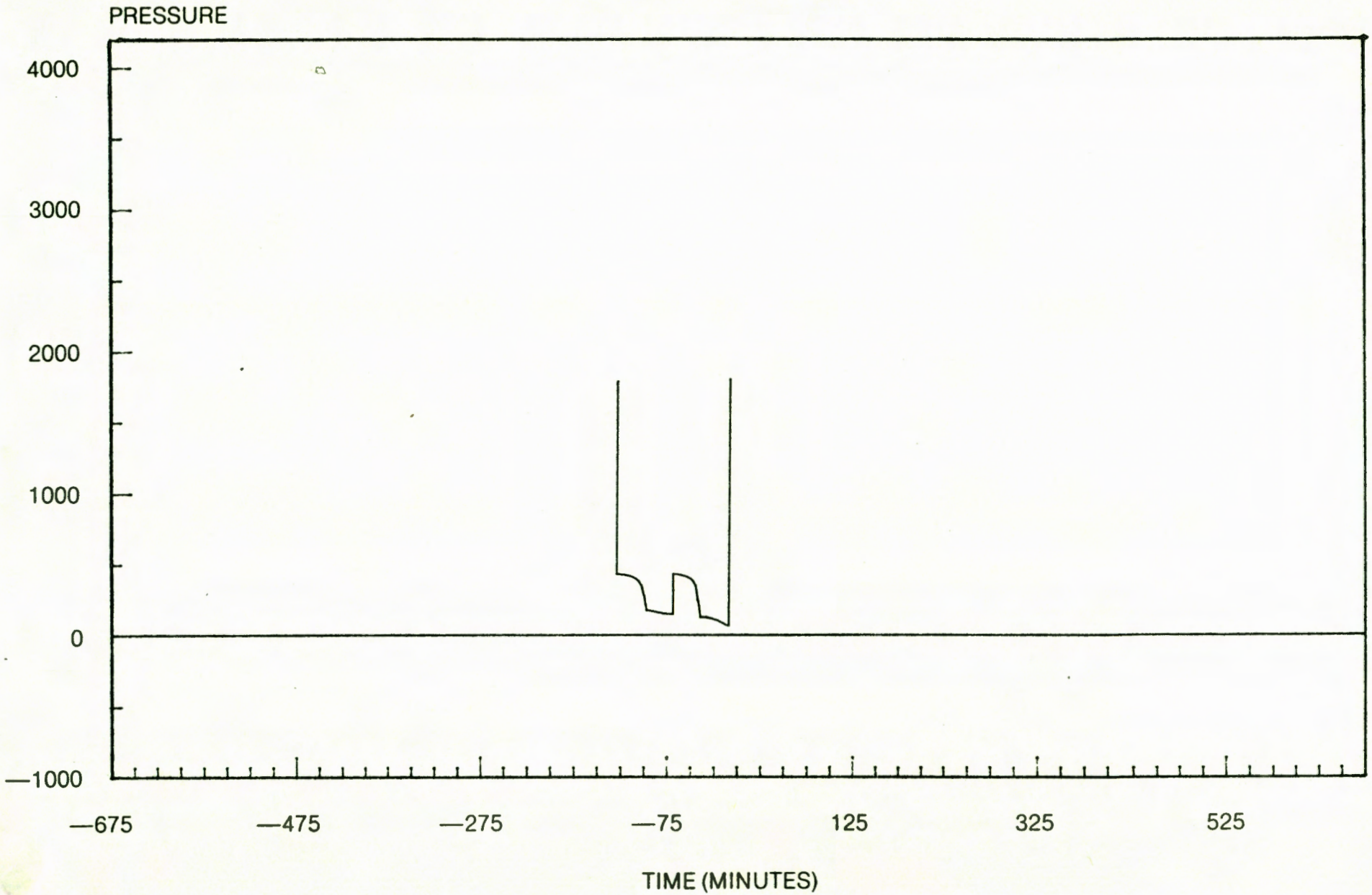
PRESSURE

	FIELD READING	OFFICE READING	
(A) Initial Hydrostatic Mud	1809	1812	PSI
(B) First Initial Flow Pressure	70	70	PSI
(C) First Final Flow Pressure	128	129	PSI
(D) Initial Closed-In Pressure	432	436	PSI
(E) Second Initial Flow Pressure	151	150	PSI
(F) Second Final Flow Pressure	175	176	PSI
(G) Final Closed-In Pressure	432	431	PSI
(H) Final Hydrostatic Mud	1786	1792	PSI

CRUDE OIL TESTING INC.

FOR: A. Scott Ritchie TEST 4633

DST 1 09/16/84



PRESSURE BREAKDOWN

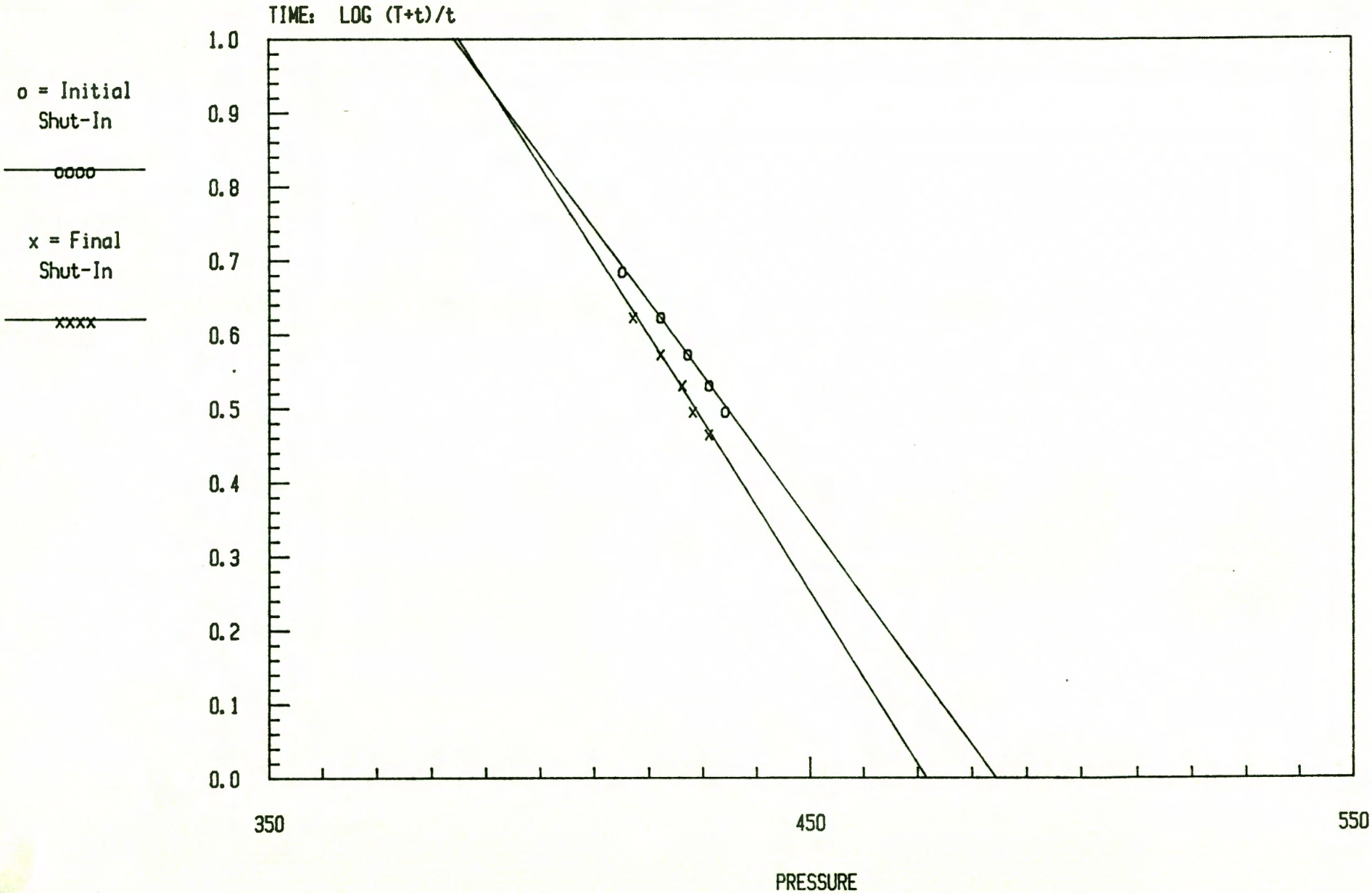
TEST TICKET NO. 4633

DST Number: 1 Recorder Number: 13255 Clock Number: 25113

First Flow Pressure		Initial Shut-In		Second Flow Pressure		Final Shut-In	
Mins.	Press.	Mins.	Press.	Mins.	Press.	Mins.	Press.
0	69	0	129	0	150	0	175
3	76	3	244	3	151	3	280
6	87	6	358	6	152	6	354
9	96	9	388	9	154	9	384
12	108	12	404	12	158	12	400
15	113	15	415	15	161	15	410
18	120	18	422	18	165	18	417
21	124	21	427	21	170	21	422
24	128	24	431	24	173	24	426
27	129	27	434	27	175	27	428
30	129	30	435	28	175	30	431
						33	431

CRUDE OIL TESTING INC TEST 4633 DST 1

FOR: A. Scott Ritchie 9/16/84



ZONE EVALUATION - Page 1

DST NUMBER 1 TEST TICKET NO. 4633

Company: A. Scott Ritchie Date: 9/16/84

Drill Collar Feet	Drill Collar ID	Weight Pipe Feet	Weight Pipe ID	Drill Pipe Feet	Drill Pipe ID	Average ID	Gals/ Foot
118	2.250	0	0.000	48	3.800	2.6972	0.297

Bbls Recovered/Test = 1.2125 Est Bbls/Day = 30.1029 T = 58

Initial Shut-In

PRESS.	TIME	T/t	(T+t)/t	LOG T/t	LOG (T+t)/t
434	27	2.148	3.148	0.33206	0.49806
431	24	2.417	3.417	0.38322	0.53360
427	21	2.762	3.762	0.44121	0.57541
422	18	3.222	4.222	0.50816	0.62554
415	15	3.867	4.867	0.58734	0.68723

Final Shut-In

Press.	Time	T/t	(T+t)/t	Log T/t	Log (T+t)/t
431	30	1.933	2.933	0.28631	0.46736
428	27	2.148	3.148	0.33206	0.49806
426	24	2.417	3.417	0.38322	0.53360
422	21	2.762	3.762	0.44121	0.57541
417	18	3.222	4.222	0.50816	0.62554

Time Option is Log (T+t)/t

IP(0)	IP(1)	FP(0)	FP(1)	M	Kh/B	DR	Q1	Pts
479.1	388.6	466.3	390.8	75.5	64.846	1.587	47.765	1,3
479.2	388.6	465.8	390.8	75.0	65.281	1.591	47.883	1-3
481.3	386.7	468.6	387.9	80.7	60.652	1.549	46.622	1-4
484.5	384.0	471.7	384.9	86.8	56.374	1.510	45.457	1-5

Graph Data For Points

Initial Time	Initial Pressure	Final Time	Final Pressure
0.4980	434	0.4673	431
0.5336	431	0.4980	428
0.5754	427	0.5336	426
0.6255	422	0.5754	422
0.6872	415	0.6255	417

Graph Data For Lines

0	484.50	0	471.69
1	383.98	1	384.86

ZONE EVALUATION - Page 2

DST Number 1 TEST TICKET NO. 4633

Company: A. Scott Ritchie Date: 9/16/84

P.S.I. Slope Cycle (From Log $\frac{T + t}{t}$)

$M = G_0 - G_1$ 86.83

Damage Ratio:

$DR = .183 \frac{Ps - Pf}{M}$ 1.51

Effective Pay:

$\frac{Kh}{B} = \frac{162.6\ Q}{M}$ 56.37 Md. Ft.

Theoretical Potential With
Damage Removed (for DR greater than 1):

$Q_1 = Q\ DR$ 45.46 Bbls/Day

Production: 1.21 Bbls/Hour

$Q = \frac{1440\ R}{T}$ 30.10 Bbls/Day

These calculations are based upon information furnished by you and taken from drill stem test pressure charts and are furnished for your information. In furnishing such calculations and evaluations, Crude Oil Testing Inc. is merely expressing an opinion. You agree that Crude Oil Testing Inc. makes no warranty as to the accuracy of such calculations or opinions, and Crude Oil Testing Inc. shall not be liable for any loss or damage, whether due to negligence or otherwise in connection with such calculations and opinions.

EQUIPMENT DATA

TOOL SEQUENCE REPORT

DST Number: 1 TEST TICKET NO. 4633

WELL NAME: #4 Harger A WELL LOCATION: 18-11S-22W

Tool #	Tool	Length	I.D.	O.D.
1	Drill Pipe - 4.5"	3332.00	3.826	4.50
4	Drill Collar - 6"	118.00	2.250	6.00
8	Circulating Sub	1.00	3.000	5.00
7	Changeover Sub	2.00	3.000	5.00
9	Shut-In Tool	5.45	0.870	5.00
10	Hydraulic Tool	5.60	1.000	5.00
14	Packer	5.35	1.530	6.75
14	Packer	5.35	1.530	6.75
6	Anchor	55.00	2.750	5.00
15	Recorder Carrier	1.00		5.00
16	Bull Plug	2.00		5.00
	Total Depth	3532.75		

CALCULATED RECOVERY ANALYSIS

DST Number: 1 TEST TICKET NO. 4633

Sample #	Total Feet	***** Gas %	**** Feet	***** Oil %	**** Feet	***** Mud %	**** Feet
1	5	35.00	1.75	5.00	0.25	40.00	2.00
2	60	30.00	18.00	10.00	6.00	35.00	21.00
3	60	15.00	9.00	30.00	18.00	30.00	18.00
4	60	10.00	6.00	40.00	24.00	20.00	12.00
5	60	5.00	3.00	55.00	33.00	15.00	9.00
6	60	2.00	1.20	68.00	40.80	10.00	6.00
7	60	2.00	1.20	73.00	43.80	10.00	6.00
TOTAL	365	11.00	40.15	45.44	165.85	20.27	74.00

Sample #	**** Water %	*** Feet	Chlorides (PPM)	Resistivity (Ohms)	Temperature (Deg)
1	20.00	1.00			
2	25.00	15.00			
3	25.00	15.00			
4	30.00	18.00	30,000		
5	25.00	15.00			
6	20.00	12.00			
7	15.00	9.00			
TOTAL	23.29	85.00			

CRUDE OIL TESTING, INC.

DATE 9/17/84 TEST TICKET NO. 4634

Company: A. Scott Ritchie
Company Address: 125 N. Market Suite 950 Wichita KS 67202
Location: Sec. 18 Twp. 11S Range 22W Co. Trego State KS
Well Name & Number: #4 Harger A Code E6

ENGINEERING DATA

Elevation	2259 KB	Drill Pipe Length	3396 ID 3.8 "
Mud Viscosity	44	Weight Pipe Length	
Mud Weight	9.4	Drill Collar Length	118 ID 2.25"
Water Loss	12	Top Packer Depth	3535
Type of Mud	Starch	Bottom Packer Depth	
Anchor Length	45	Tool Joint Size	4.5 XH
Hole Size	7 7/8	Test Tool Size	5 1/2
Casing Size	8 5/8	Packer Size	6 3/4
Surface Choke	3/4	Reversed Out	No
Bottom Choke	3/4	Recorder #	13255
Extra Equipment		None	

REMARKS DST #2

FORMATION

Lansing Zone 35' & 50' Test Type Conventional
Interval 3535 To 3580 Total Depth 3580
Open 30 Shut In 30 Open 30 Shut In 30
Packer(s) Set 02:13PM Started Off Bottom 04:15PM
Blow 1st Opening Strong blow off bottom of bucket in 8 min.
2nd Opening Strong blow off bottom of bucket in 9 min.

RECOVERY

Total Feet 335
Recovered 335 feet of See grindout sheet

CALCULATED RECOVERY

Gas 94.5 Oil 44.25 Water 125.75 Mud 70.5
Gravity (Oil) Test Water Chlorides 64,000 PPM
Test Area Temperature 108F Mud System Chlorides 30,000 PPM

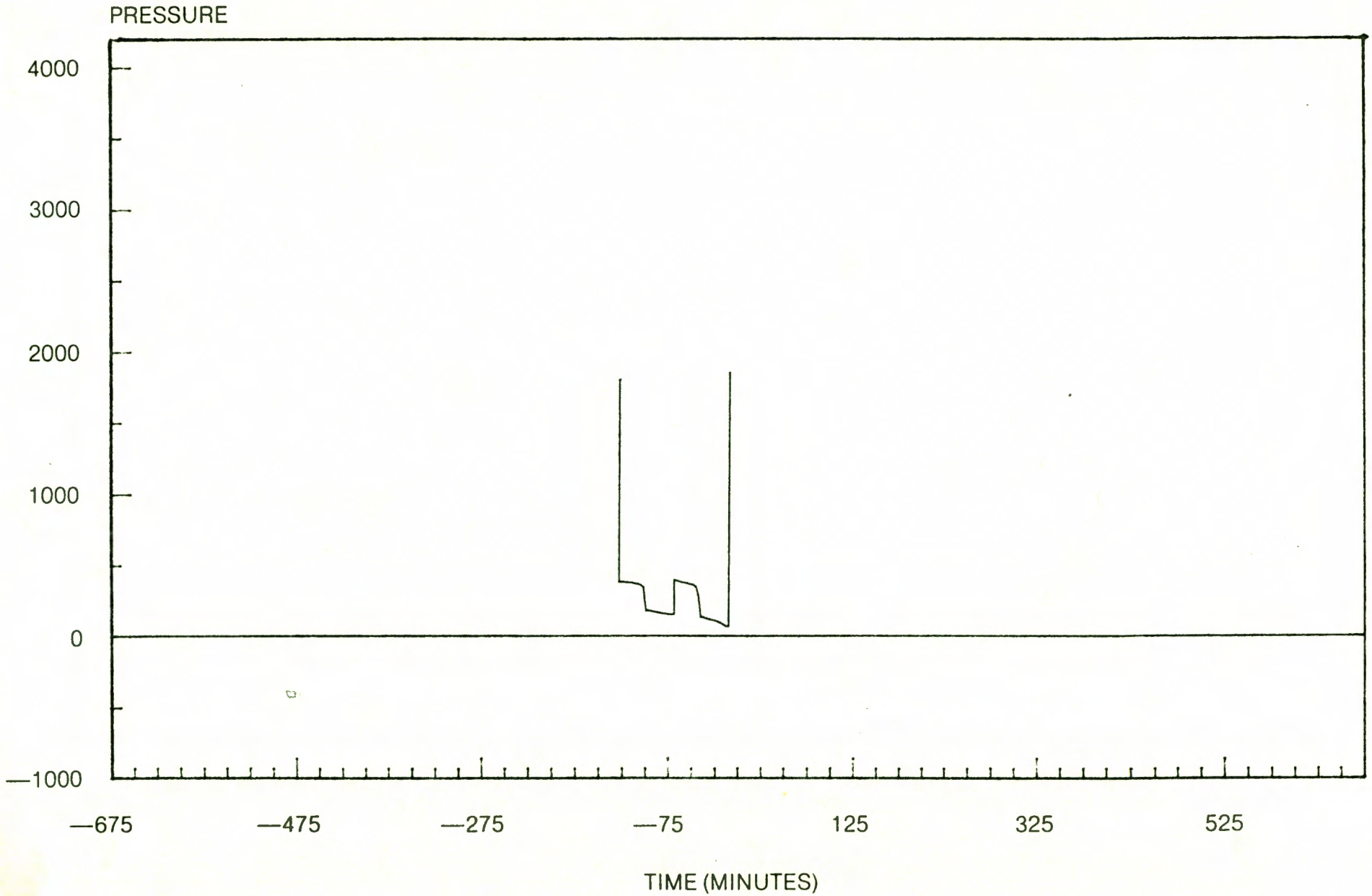
PRESSURE

	FIELD READING	OFFICE READING	
(A) Initial Hydrostatic Mud	1844	1851	PSI
(B) First Initial Flow Pressure	58	59	PSI
(C) First Final Flow Pressure	128	128	PSI
(D) Initial Closed-In Pressure	385	390	PSI
(E) Second Initial Flow Pressure	140	145	PSI
(F) Second Final Flow Pressure	175	174	PSI
(G) Final Closed-In Pressure	373	375	PSI
(H) Final Hydrostatic Mud	1821	1800	PSI

CRUDE OIL TESTING INC.

FOR: A. Scott Ritchie TEST 4634

DST 2 09/17/84



PRESSURE BREAKDOWN

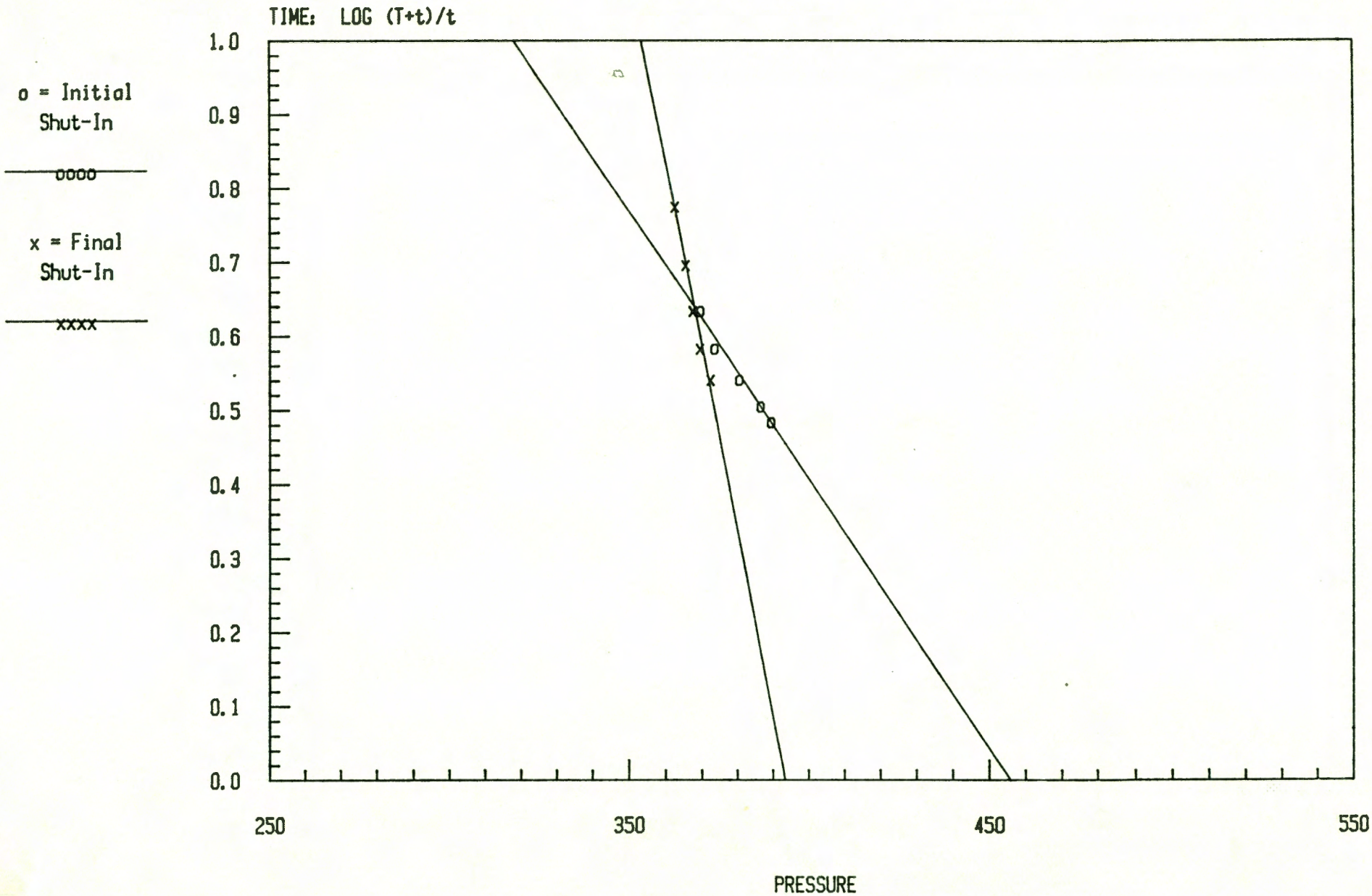
TEST TICKET NO. 4634

DST Number: 2 Recorder Number: 13255 Clock Number: 25113

First Flow Pressure		Initial Shut-In		Second Flow Pressure		Final Shut-In	
Mins.	Press.	Mins.	Press.	Mins.	Press.	Mins.	Press.
0	59	0	128	0	144	0	173
3	64	3	282	3	144	3	336
6	75	6	343	6	145	6	352
9	85	9	355	9	149	9	359
12	94	12	359	12	152	12	362
15	101	15	365	15	156	15	365
18	106	18	369	18	158	18	367
21	110	21	373	21	163	21	369
24	117	24	380	24	167	24	372
27	123	27	386	27	171	27	373
30	128	29	389	30	173	30	374

CRUDE OIL TESTING INC TEST 4634 DST 2

FOR: A. Scott Ritchie 9/17/84



ZONE EVALUATION - Page 1

DST NUMBER 3 TEST TICKET NO. 4635

Company: A. Scott Ritchie Date: 9/18/84

Drill Collar Feet	Drill Collar ID	Weight Pipe Feet	Weight Pipe ID	Drill Pipe Feet	Drill Pipe ID	Average ID	Gals/ Foot
118	2.250	0	0.000	233	3.800	3.2789	0.439

Bbls Recovered/Test = 3.8588 Est Bbls/Day = 97.4859 T = 57

Initial Shut-In

PRESS.	TIME	T/t	(T+t)/t	LOG T/t	LOG (T+t)/t
318	27	2.111	3.111	0.32451	0.49292
315	24	2.375	3.375	0.37566	0.52827
313	21	2.714	3.714	0.43366	0.56988
308	18	3.167	4.167	0.50060	0.61979
303	15	3.800	4.800	0.57978	0.68124

Final Shut-In

Press.	Time	T/t	(T+t)/t	Log T/t	Log (T+t)/t
319	30	1.900	2.900	0.27875	0.46240
317	27	2.111	3.111	0.32451	0.49292
317	24	2.375	3.375	0.37566	0.52827
314	21	2.714	3.714	0.43366	0.56988
310	18	3.167	4.167	0.50060	0.61979

Time Option is Log (T+t)/t

IP(0)	IP(1)	FP(0)	FP(1)	M	Kh/B	DR	Q1	Pts
350.0	285.1	333.0	302.7	30.4	522.105	1.772	172.700	1,3
349.5	285.1	332.3	302.7	29.6	536.178	1.792	174.727	1-3
355.6	279.4	338.4	296.2	42.2	375.545	1.555	151.586	1-4
357.4	277.9	344.6	290.0	54.6	290.221	1.429	139.295	1-5

Graph Data For Points

Initial Time	Initial Pressure	Final Time	Final Pressure
0.4929	318	0.4623	319
0.5282	315	0.4929	317
0.5698	313	0.5282	317
0.6197	308	0.5698	314
0.6812	303	0.6197	310

Graph Data For Lines

0	357.37	0	344.60
1	277.90	1	289.98

ZONE EVALUATION - Page 2

DST Number 3 TEST TICKET NO. 4635

Company: A. Scott Ritchie Date: 9/18/84

P.S.I. Slope Cycle (From Log $\frac{T + t}{t}$)

$M = G_0 - G_1$ 54.62

Damage Ratio:

$DR = .183 \frac{Ps - Pf}{M}$ 1.43

Effective Pay:

$\frac{Kh}{B} = \frac{162.6\ Q}{M}$ 290.22 Md. Ft.

Theoretical Potential With
Damage Removed (for DR greater than 1):

$Q_1 = Q\ DR$ 139.29 Bbls/Day

Production: 3.86 Bbls/Hour

$Q = \frac{1440\ R}{T}$ 97.49 Bbls/Day

These calculations are based upon information furnished by you and taken from drill stem test pressure charts and are furnished for your information. In furnishing such calculations and evaluations, Crude Oil Testing Inc. is merely expressing an opinion. You agree that Crude Oil Testing Inc. makes no warranty as to the accuracy of such calculations or opinions, and Crude Oil Testing Inc. shall not be liable for any loss or damage, whether due to negligence or otherwise in connection with such calculations and opinions.

EQUIPMENT DATA

TOOL SEQUENCE REPORT

DST Number: 2 TEST TICKET NO. 4634

WELL NAME: #4 Harger A WELL LOCATION: 18-11S-22W

Tool #	Tool	Length	I.D.	O.D.
1	Drill Pipe - 4.5"	3396.00	3.826	4.50
4	Drill Collar - 6"	118.00	2.250	6.00
8	Circulating Sub	1.00	3.000	5.00
7	Changeover Sub	2.00	3.000	5.00
9	Shut-In Tool	5.45	0.870	5.00
10	Hydraulic Tool	5.60	1.000	5.00
14	Packer	5.35	1.530	6.75
6	Anchor	41.00	2.750	5.00
15	Recorder Carrier	1.00		5.00
16	Bull Plug	2.00		5.00
	Total Depth	3577.40		

CALCULATED RECOVERY ANALYSIS

DST Number: 2 TEST TICKET NO. 4634

Sample #	Total Feet	***** Gas %	**** Feet	***** Oil %	**** Feet	***** Mud %	**** Feet
1	35	30.00	10.50	15.00	5.25	30.00	10.50
2	60	25.00	15.00	15.00	9.00	30.00	18.00
3	60	35.00	21.00	15.00	9.00	25.00	15.00
4	60	30.00	18.00	15.00	9.00	25.00	15.00
5	60	25.00	15.00	10.00	6.00	10.00	6.00
6	60	25.00	15.00	10.00	6.00	10.00	6.00
TOTAL	335	28.21	94.50	13.21	44.25	21.04	70.50

Sample #	**** Water %	*** Feet	Chlorides (PPM)	Resistivity (Ohms)	Temperature (Deg)
1	25.00	8.75			
2	30.00	18.00			
3	25.00	15.00			
4	30.00	18.00			
5	55.00	33.00			
6	55.00	33.00	64,000		
TOTAL	37.54	125.75			

CRUDE OIL TESTING, INC.

DATE 9/18/84 TEST TICKET NO. 4635

Company: A. Scott Ritchie
Company Address: 125 N. Market Suite 950 Wichita KS 67202
Location: Sec. 18 Twp. 11S Range 22W Co. Trego State KS
Well Name & Number: #4 Harger A Code E6

ENGINEERING DATA

Elevation	2259 KB	Drill Pipe Length	3442 ID 3.8 "
Mud Viscosity	44	Weight Pipe Length	
Mud Weight	9.4	Drill Collar Length	118 ID 2.25"
Water Loss	12	Top Packer Depth	3576
Type of Mud	Starch	Bottom Packer Depth	
Anchor Length	19	Tool Joint Size	4.5 XH
Hole Size	7 7/8	Test Tool Size	5 1/2
Casing Size	8 5/8	Packer Size	6 3/4
Surface Choke	3/4	Reversed Out	No
Bottom Choke	3/4	Recorder #	13255
Extra Equipment		None	

REMARKS

DST #3
Gas to surface on 1st shutin.

FORMATION

Lansing Zone 70' Test Type Conventional
Interval 3576 To 3595 Total Depth 3595
Open 30 Shut In 30 Open 30 Shut In 30
Packer(s) Set 01:28AM Started Off Bottom 03:30AM
Blow 1st Opening Strong off bottom in less than 1 minute.
2nd Opening Strong off bottom in less than 1 minute.

RECOVERY

Total Feet 530
Recovered 530 feet of Clean gassy oil

CALCULATED RECOVERY

Gas 179 Oil 351 Water Mud
Gravity (Oil) 42 Test Water Chlorides PPM
Test Area Temperature 108F Mud System Chlorides 30,000 PPM

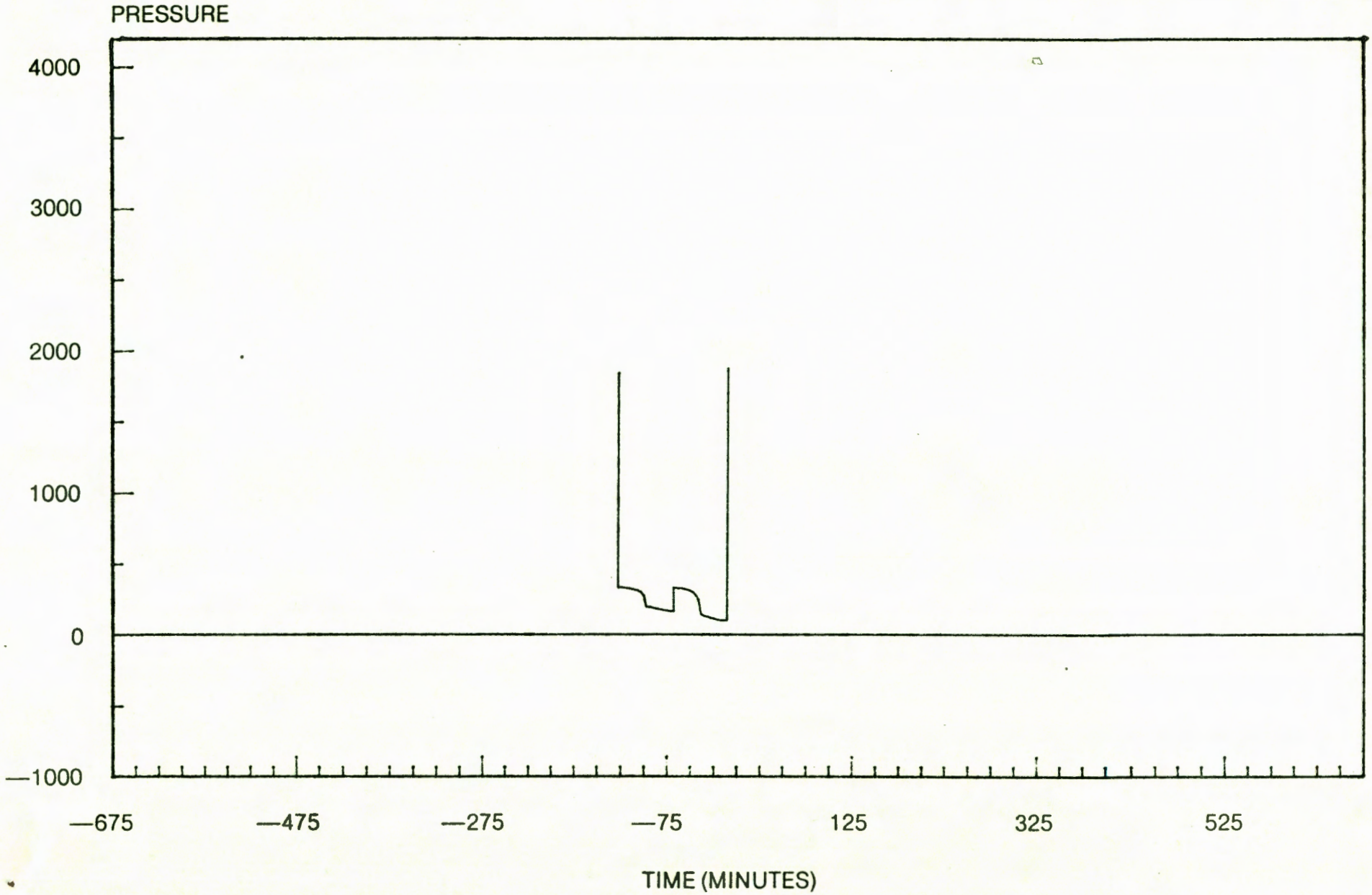
PRESSURE

	FIELD READING	OFFICE READING	
(A) Initial Hydrostatic Mud	1844	1865	PSI
(B) First Initial Flow Pressure	70	85	PSI
(C) First Final Flow Pressure	116	129	PSI
(D) Initial Closed-In Pressure	303	319	PSI
(E) Second Initial Flow Pressure	140	150	PSI
(F) Second Final Flow Pressure	175	183	PSI
(G) Final Closed-In Pressure	303	320	PSI
(H) Final Hydrostatic Mud	1821	1833	PSI

CRUDE OIL TESTING INC.

FOR: A. Scott Ritchie TEST 4635

DST 3 09/18/84



PRESSURE BREAKDOWN

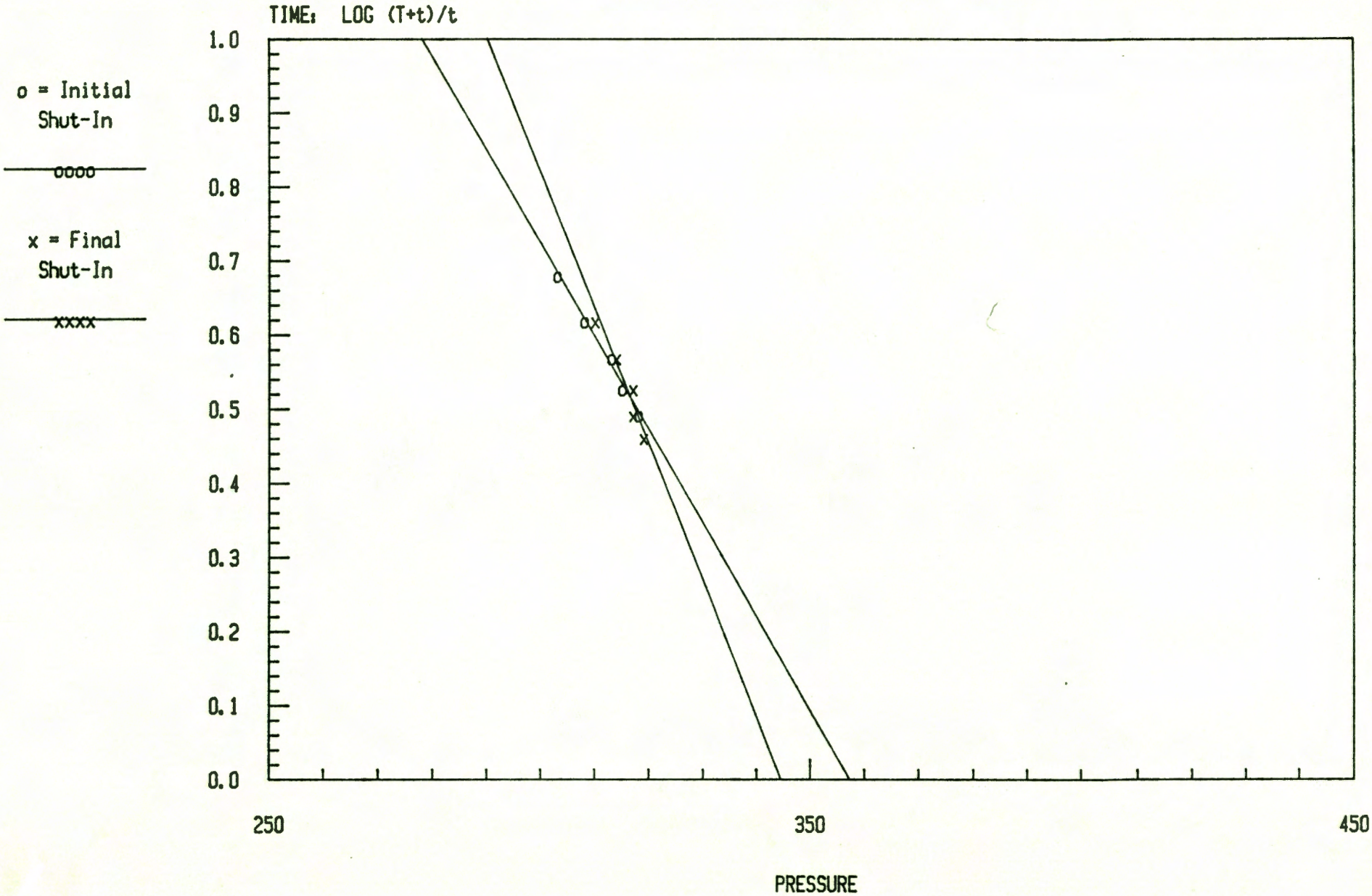
TEST TICKET NO. 4635

DST Number: 3 Recorder Number: 13255 Clock Number: 25113

First Flow Pressure		Initial Shut-In		Second Flow Pressure		Final Shut-In	
Mins.	Press.	Mins.	Press.	Mins.	Press.	Mins.	Press.
0	85	0	129	0	150	0	182
3	85	3	234	3	151	3	263
6	86	6	267	6	154	6	284
9	89	9	285	9	157	9	295
12	94	12	295	12	160	12	301
15	100	15	303	15	164	15	307
18	104	18	308	18	168	18	310
21	113	21	313	21	173	21	314
24	117	24	315	24	179	24	317
27	125	27	318	27	181	27	317
28	129	30	318	29	182	30	319
						31	319

CRUDE OIL TESTING INC TEST 4635 DST 3

FOR: A. Scott Ritchie 9/18/84



ZONE EVALUATION - Page 1

DST NUMBER 2 TEST TICKET NO. 4634

Company: A. Scott Ritchie Date: 9/17/84

Drill Collar Feet	Drill Collar ID	Weight Pipe Feet	Weight Pipe ID	Drill Pipe Feet	Drill Pipe ID	Average ID	Gals/ Foot
44	2.250	0	0.000	0	3.800	2.2500	0.207

Bbls Recovered/Test = 0.2176 Est Bbls/Day = 5.2227 T = 60

Initial Shut-In

PRESS.	TIME	T/t	(T+t)/t	LOG T/t	LOG (T+t)/t
389	29	2.069	3.069	0.31575	0.48699
386	27	2.222	3.222	0.34679	0.50816
380	24	2.500	3.500	0.39794	0.54407
373	21	2.857	3.857	0.45593	0.58627
369	18	3.333	4.333	0.52288	0.63682

Final Shut-In

Press.	Time	T/t	(T+t)/t	Log T/t	Log (T+t)/t
372	24	2.500	3.500	0.39794	0.54407
369	21	2.857	3.857	0.45593	0.58627
367	18	3.333	4.333	0.52288	0.63682
365	15	4.000	5.000	0.60206	0.69897
362	12	5.000	6.000	0.69897	0.77815

Time Option is Log (T+t)/t

IP(0)	IP(1)	FP(0)	FP(1)	M	Kh/B	DR	Q1	Pts
465.8	308.1	401.3	347.4	53.9	15.754	1.642	8.574	1,3
466.4	307.7	400.8	347.4	53.4	15.892	1.647	8.603	1-3
468.3	305.9	395.3	351.4	43.9	19.326	1.787	9.334	1-4
455.9	317.4	393.4	352.7	40.7	20.851	1.849	9.658	1-5

Graph Data For Points

Initial Time	Initial Pressure	Final Time	Final Pressure
0.4869	389	0.5440	372
0.5081	386	0.5862	369
0.5440	380	0.6368	367
0.5862	373	0.6989	365
0.6368	369	0.7781	362

Graph Data For Lines

0	455.93	0	393.43
1	317.40	1	352.70

ZONE EVALUATION - Page 2

DST Number 2 TEST TICKET NO. 4634

Company: A. Scott Ritchie Date: 9/17/84

P.S.I. Slope Cycle (From Log $\frac{T + t}{t}$)

$M = G_0 - G_1$ 40.73

Damage Ratio:

$DR = .183 \frac{Ps - Pf}{M}$ 1.85

Effective Pay:

$\frac{Kh}{B} = \frac{162.6\ Q}{M}$ 20.85 Md. Ft.

Theoretical Potential With
Damage Removed (for DR greater than 1):

$Q_1 = Q\ DR$ 9.66 Bbls/Day

Production: 0.22 Bbls/Hour

$Q = \frac{1440\ R}{T}$ 5.22 Bbls/Day

These calculations are based upon information furnished by you and taken from drill stem test pressure charts and are furnished for your information. In furnishing such calculations and evaluations, Crude Oil Testing Inc. is merely expressing an opinion. You agree that Crude Oil Testing Inc. makes no warranty as to the accuracy of such calculations or opinions, and Crude Oil Testing Inc. shall not be liable for any loss or damage, whether due to negligence or otherwise in connection with such calculations and opinions.

EQUIPMENT DATA

TOOL SEQUENCE REPORT

DST Number: 3 TEST TICKET NO. 4635

WELL NAME: #4 Harger A WELL LOCATION: 18-11S-22W

Tool #	Tool	Length	I.D.	O.D.
1	Drill Pipe - 4.5"	3442.00	3.826	4.50
4	Drill Collar - 6"	118.00	2.250	6.00
8	Circulating Sub	1.00	3.000	5.00
7	Changeover Sub	2.00	3.000	5.00
9	Shut-In Tool	5.45	0.870	5.00
10	Hydraulic Tool	5.60	1.000	5.00
14	Packer	5.35	1.530	6.75
6	Anchor	15.00	2.750	5.00
15	Recorder Carrier	1.00		5.00
16	Bull Plug	2.00		5.00
	Total Depth	3597.40		

CALCULATED RECOVERY ANALYSIS

DST Number: 3 TEST TICKET NO. 4635

Sample #	Total Feet	***** Gas %	**** Feet	***** Oil %	**** Feet	***** Mud %	**** Feet
1	50	10.00	5.00	90.00	45.00	0.00	0.00
2	60	45.00	27.00	55.00	33.00	0.00	0.00
3	60	30.00	18.00	70.00	42.00	0.00	0.00
4	60	25.00	15.00	75.00	45.00	0.00	0.00
5	60	40.00	24.00	60.00	36.00	0.00	0.00
6	60	45.00	27.00	55.00	33.00	0.00	0.00
7	60	40.00	24.00	60.00	36.00	0.00	0.00
8	60	35.00	21.00	65.00	39.00	0.00	0.00
9	60	30.00	18.00	70.00	42.00	0.00	0.00
TOTAL	530	33.77	179.00	66.23	351.00	0.00	0.00

Sample #	**** Water %	*** Feet	Chlorides (PPM)	Resistivity (Ohms)	Temperature (Deg)
1	0.00	0.00			
2	0.00	0.00			
3	0.00	0.00			
4	0.00	0.00			
5	0.00	0.00			
6	0.00	0.00			
7	0.00	0.00			
8	0.00	0.00			
9	0.00	0.00			
TOTAL	0.00	0.00			

CRUDE OIL TESTING, INC.

DATE 9/19/84 TEST TICKET NO. 4636

Company: A. Scott Ritchie
Company Address: 125 N. Market Suite 950 Wichita KS 67202
Location: Sec. 18 Twp. 11S Range 22W Co. Trego State KS
Well Name & Number: #4 Harger A Code E6

ENGINEERING DATA

Elevation	2259 KB	Drill Pipe Length	3496 ID 3.8 "
Mud Viscosity	39	Weight Pipe Length	
Mud Weight	9.5	Drill Collar Length	118 ID 2.25"
Water Loss	10	Top Packer Depth	3630
Type of Mud	Starch	Bottom Packer Depth	3635
Anchor Length	70	Tool Joint Size	4.5 XH
Hole Size	7 7/8	Test Tool Size	5 1/2
Casing Size	8 5/8	Packer Size	6 3/4
Surface Choke	3/4	Reversed Out	No
Bottom Choke	3/4	Recorder #	13255
Extra Equipment		None	

REMARKS DST #4

FORMATION

Lansing/KC Zone 140 160 180 Test Type Conventional
Interval 3635 To 3705 Total Depth 3705
Open 30 Shut In 30 Open 30 Shut In 30
Packer(s) Set 01:28AM Started Off Bottom 03:30AM
Blow 1st Opening Weak blow died in 15 min.
2nd Opening No blow.

RECOVERY

Total Feet 5
Recovered 5 feet of Drilling mud

CALCULATED RECOVERY

Gas Oil Water Mud 5
Gravity (Oil) Test Water Chlorides PPM
Test Area Temperature 112F Mud System Chlorides 29,000 PPM

PRESSURE

	FIELD READING	OFFICE READING	
(A) Initial Hydrostatic Mud	1947		PSI
(B) First Initial Flow Pressure	58		PSI
(C) First Final Flow Pressure	58		PSI
(D) Initial Closed-In Pressure	70		PSI
(E) Second Initial Flow Pressure	58		PSI
(F) Second Final Flow Pressure	58		PSI
(G) Final Closed-In Pressure	70		PSI
(H) Final Hydrostatic Mud	1924		PSI

EQUIPMENT DATA

TOOL SEQUENCE REPORT

DST Number: 4 TEST TICKET NO. 4636

WELL NAME: #4 Harger A WELL LOCATION: 18-11S-22W

Tool #	Tool	Length	I.D.	O.D.
1	Drill Pipe - 4.5"	3496.00	3.826	4.50
4	Drill Collar - 6"	118.00	2.250	6.00
8	Circulating Sub	1.00	3.000	5.00
7	Changeover Sub	2.00	3.000	5.00
9	Shut-In Tool	5.45	0.870	5.00
10	Hydraulic Tool	5.60	1.000	5.00
14	Packer	5.35	1.530	6.75
14	Packer	5.35	1.530	6.75
6	Anchor	66.00	2.750	5.00
15	Recorder Carrier	1.00		5.00
16	Bull Plug	2.00		5.00
	Total Depth	3707.75		

CRUDE OIL TESTING, INC.

DATE 9/19/84 TEST TICKET NO. 4637

Company: A. Scott Ritchie
Company Address: 125 N. Market Suite 950 Wichita KS 67202
Location: Sec. 18 Twp. 11S Range 22W Co. Trego State KS
Well Name & Number: #4 Harger A Code E19

ENGINEERING DATA

Elevation	2259 KB	Drill Pipe Length	3258	ID 3.8 "
Mud Viscosity	42	Weight Pipe Length		
Mud Weight	9.6	Drill Collar Length	118	ID 2.25"
Water Loss	10.2	Top Packer Depth	3699	
Type of Mud	Starch	Bottom Packer Depth	3704	
Anchor Length	51	Tool Joint Size	4.5 XH	
Hole Size	7 7/8	Test Tool Size	5 1/2	
Casing Size	8 5/8	Packer Size	6 3/4	
Surface Choke	3/4	Reversed Out	No	
Bottom Choke	3/4	Recorder #	13255	
Extra Equipment		None		

REMARKS DST #5

FORMATION

Lansing/KC Zone Base Test Type Conventional
Interval 3704 To 3755 Total Depth 3755
Open 30 Shut In 30 Open 30 Shut In 30
Packer(s) Set 03:13PM Started Off Bottom 05:15PM
Blow 1st Opening Weak died in 4 min.
2nd Opening No blow.

RECOVERY

Total Feet 5
Recovered 5 feet of Mud - no show of oil

CALCULATED RECOVERY

Gas Oil Water Mud 5
Gravity (Oil) Test Water Chlorides PPM
Test Area Temperature 110F Mud System Chlorides 29,000 PPM

PRESSURE

	FIELD READING	OFFICE READING	
(A) Initial Hydrostatic Mud	1947		PSI
(B) First Initial Flow Pressure	58		PSI
(C) First Final Flow Pressure	58		PSI
(D) Initial Closed-In Pressure	210		PSI
(E) Second Initial Flow Pressure	58		PSI
(F) Second Final Flow Pressure	58		PSI
(G) Final Closed-In Pressure	70		PSI
(H) Final Hydrostatic Mud	1924		PSI

EQUIPMENT DATA

TOOL SEQUENCE REPORT

DST Number: 5 TEST TICKET NO. 4637

WELL NAME: #4 Harger A WELL LOCATION: 18-11S-22W

Tool #	Tool	Length	I.D.	O.D.
1	Drill Pipe - 4.5"	3258.00	3.826	4.50
4	Drill Collar - 6"	118.00	2.250	6.00
8	Circulating Sub	1.00	3.000	5.00
7	Changeover Sub	2.00	3.000	5.00
9	Shut-In Tool	5.45	0.870	5.00
10	Hydraulic Tool	5.60	1.000	5.00
14	Packer	5.35	1.530	6.75
14	Packer	5.35	1.530	6.75
6	Anchor	47.00	2.750	5.00
15	Recorder Carrier	1.00		5.00
16	Bull Plug	2.00		5.00
	Total Depth	3450.75		

CRUDE OIL TESTING, INC.

DATE 9/20/84 TEST TICKET NO. 4638

Company: A. Scott Ritchie
Company Address: 125 N. Market Suite 950 Wichita KS 67202
Location: Sec. 18 Twp. 11S Range 22W Co. Trego State KS
Well Name & Number: #4 Harger A Code E19

ENGINEERING DATA

Elevation	2259 KB	Drill Pipe Length	3430 ID 3.8 "
Mud Viscosity	46	Weight Pipe Length	
Mud Weight	9.7	Drill Collar Length	118 ID 2.25"
Water Loss	10	Top Packer Depth	3844
Type of Mud	Starch	Bottom Packer Depth	3849
Anchor Length	41	Tool Joint Size	4.5 XH
Hole Size	7 7/8	Test Tool Size	5 1/2
Casing Size	8 5/8	Packer Size	6 3/4
Surface Choke	3/4	Reversed Out	No
Bottom Choke	3/4	Recorder #	13255
Extra Equipment		None	

REMARKS

DST #6
Chlorides 39000 ppm mud system

FORMATION

Marmaton Zone Test Type Conventional
Interval 3849 To 3890 Total Depth 3890
Open 30 Shut In 45 Open 30 Shut In 45
Packer(s) Set 10:38AM Started Off Bottom 01:10PM
Blow 1st Opening Fair building, 6 inches in bucket.
2nd Opening Fair building, 6 inches in bucket.

RECOVERY

Total Feet 154
Recovered 154 feet of Gassy mud cut oil

CALCULATED RECOVERY

Gas 21.6 Oil 92.5 Water 15.4 Mud 24.5
Gravity (Oil) Test Water Chlorides PPM
Test Area Temperature 114F Mud System Chlorides 42,000 PPM

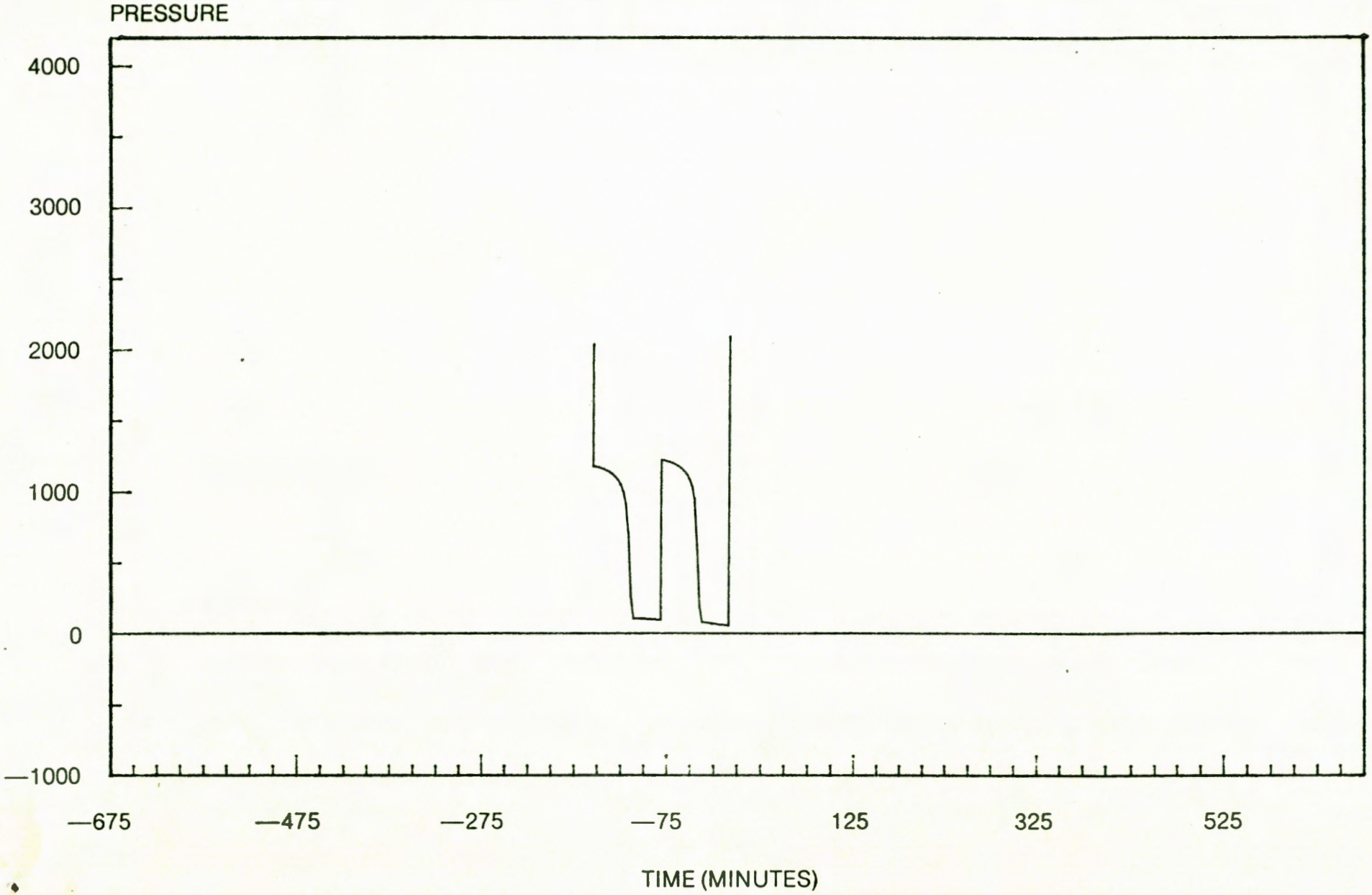
PRESSURE

	FIELD READING	OFFICE READING	
(A) Initial Hydrostatic Mud	2073	2083	PSI
(B) First Initial Flow Pressure	46	41	PSI
(C) First Final Flow Pressure	58	64	PSI
(D) Initial Closed-In Pressure	1203	1211	PSI
(E) Second Initial Flow Pressure	70	79	PSI
(F) Second Final Flow Pressure	70	90	PSI
(G) Final Closed-In Pressure	1157	1165	PSI
(H) Final Hydrostatic Mud	2050	2028	PSI

CRUDE OIL TESTING INC.

FOR: A. Scott Ritchie TEST 4638

DST 6 09/20/84



PRESSURE BREAKDOWN

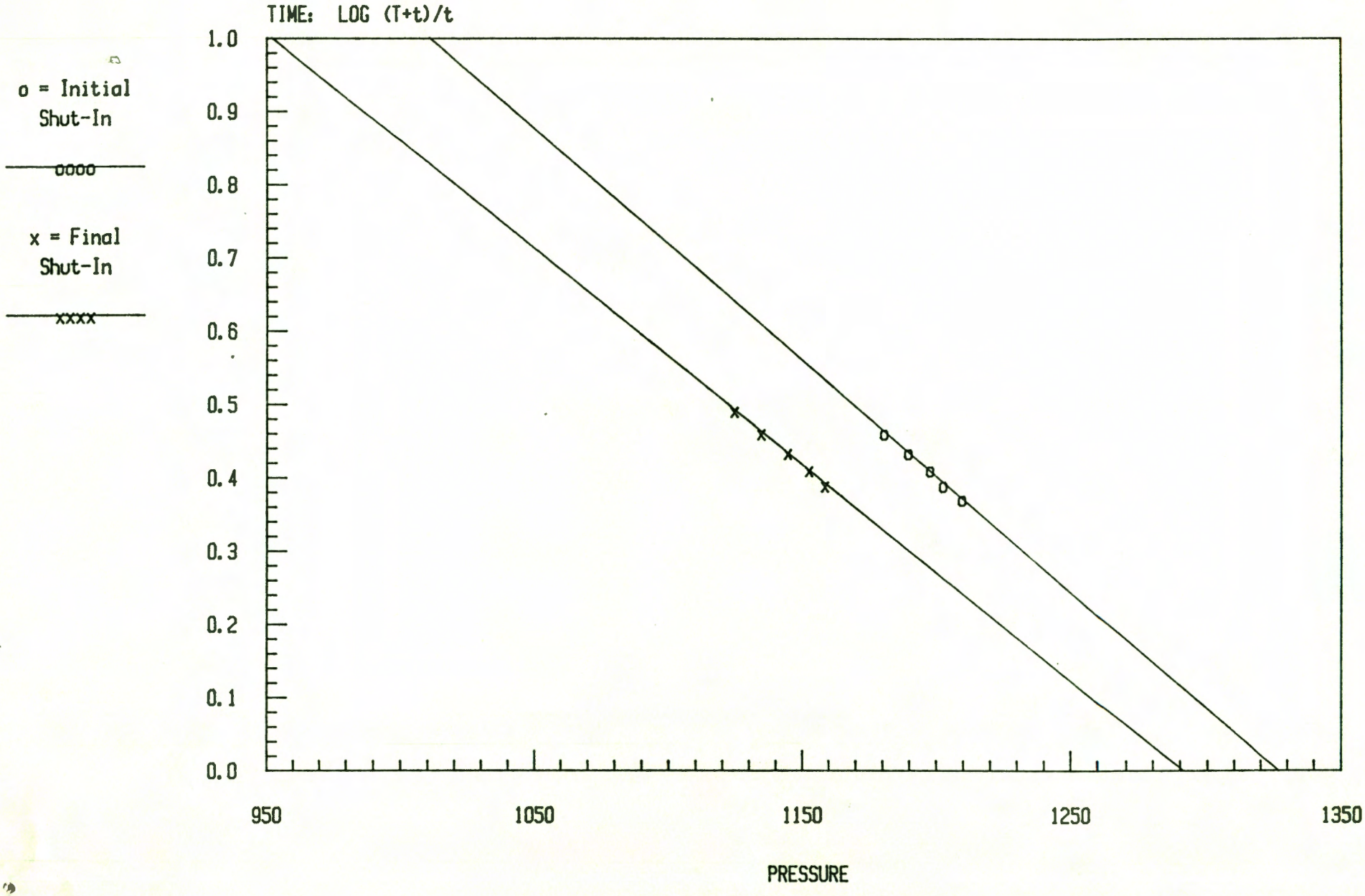
TEST TICKET NO. 4638

DST Number: 6 Recorder Number: 13255 Clock Number: 25113

First Flow Pressure		Initial Shut-In		Second Flow Pressure		Final Shut-In	
Mins.	Press.	Mins.	Press.	Mins.	Press.	Mins.	Press.
0	40	0	64	0	79	0	89
3	43	3	167	3	80	3	234
6	44	6	609	6	83	6	704
9	46	9	942	9	83	9	901
12	50	12	1031	12	85	12	991
15	53	15	1080	15	85	15	1041
18	54	18	1114	18	87	18	1071
21	58	21	1136	21	87	21	1093
24	61	24	1155	24	88	24	1111
27	64	27	1170	27	89	27	1124
28	64	30	1180	29	89	30	1134
		33	1189			33	1144
		36	1197			36	1152
		39	1202			39	1158
		42	1209			42	1163
		45	1211			45	1165

CRUDE OIL TESTING INC TEST 4638 DST 6

FOR: A. Scott Ritchie 9/20/84



ZONE EVALUATION - Page 1

DST NUMBER 6 TEST TICKET NO. 4638

Company: A. Scott Ritchie Date: 9/20/84

Drill Collar Feet	Drill Collar ID	Weight Pipe Feet	Weight Pipe ID	Drill Pipe Feet	Drill Pipe ID	Average ID	Gals/ Foot
93	2.250	0	0.000	0	3.800	2.2500	0.207

Bbls Recovered/Test = 0.4788 Est Bbls/Day = 12.0971 T = 57

Initial Shut-In

PRESS.	TIME	T/t	(T+t)/t	LOG T/t	LOG (T+t)/t
1209	42	1.357	2.357	0.13263	0.37239
1202	39	1.462	2.462	0.16481	0.39121
1197	36	1.583	2.583	0.19957	0.41218
1189	33	1.727	2.727	0.23736	0.43573
1180	30	1.900	2.900	0.27875	0.46240

Final Shut-In

Press.	Time	T/t	(T+t)/t	Log T/t	Log (T+t)/t
1158	39	1.462	2.462	0.16481	0.39121
1152	36	1.583	2.583	0.19957	0.41218
1144	33	1.727	2.727	0.23736	0.43573
1134	30	1.900	2.900	0.27875	0.46240
1124	27	2.111	3.111	0.32451	0.49292

Time Option is Log (T+t)/t

IP(0)	IP(1)	FP(0)	FP(1)	M	Kh/B	DR	Q1	Pts
1321.3	1019.7	1281.0	966.6	314.5	6.255	1.602	19.384	1,3
1320.4	1020.0	1281.4	966.5	315.0	6.245	1.601	19.372	1-3
1323.3	1015.4	1291.0	952.5	338.4	5.812	1.560	18.867	1-4
1326.7	1010.1	1291.5	951.8	339.6	5.792	1.558	18.843	1-5

Graph Data For Points

Initial Time	Initial Pressure	Final Time	Final Pressure
0.3723	1209	0.3912	1158
0.3912	1202	0.4121	1152
0.4121	1197	0.4357	1144
0.4357	1189	0.4623	1134
0.4623	1180	0.4929	1124

Graph Data For Lines

0	1326.70	0	1291.46
1	1010.14	1	951.83

ZONE EVALUATION - Page 2

DST Number 6 TEST TICKET NO. 4638

Company: A. Scott Ritchie Date: 9/20/84

P.S.I. Slope Cycle (From Log $\frac{T + t}{t}$)

$M = G_0 - G_1$ 339.63

Damage Ratio:

$DR = .183 \frac{Ps - Pf}{M}$ 1.56

Effective Pay:

$\frac{Kh}{B} = \frac{162.6\ Q}{M}$ 5.79 Md. Ft.

Theoretical Potential With
Damage Removed (for DR greater than 1):

$Q_1 = Q\ DR$ 18.84 Bbls/Day

Production: 0.48 Bbls/Hour

$Q = \frac{1440\ R}{T}$ 12.10 Bbls/Day

These calculations are based upon information furnished by you and taken from drill stem test pressure charts and are furnished for your information. In furnishing such calculations and evaluations, Crude Oil Testing Inc. is merely expressing an opinion. You agree that Crude Oil Testing Inc. makes no warranty as to the accuracy of such calculations or opinions, and Crude Oil Testing Inc. shall not be liable for any loss or damage, whether due to negligence or otherwise in connection with such calculations and opinions.

EQUIPMENT DATA

TOOL SEQUENCE REPORT

DST Number: 6 TEST TICKET NO. 4638

WELL NAME: #4 Harger A WELL LOCATION: 18-11S-22W

Tool #	Tool	Length	I.D.	O.D.
1	Drill Pipe - 4.5"	3430.00	3.826	4.50
4	Drill Collar - 6"	118.00	2.250	6.00
8	Circulating Sub	1.00	3.000	5.00
7	Changeover Sub	2.00	3.000	5.00
9	Shut-In Tool	5.45	0.870	5.00
10	Hydraulic Tool	5.60	1.000	5.00
14	Packer	5.35	1.530	6.75
14	Packer	5.35	1.530	6.75
6	Anchor	37.00	2.750	5.00
15	Recorder Carrier	1.00		5.00
16	Bull Plug	2.00		5.00
	Total Depth	3612.75		

CALCULATED RECOVERY ANALYSIS

DST Number: 6 TEST TICKET NO. 4638

Sample #	Total Feet	***** Gas %	**** Feet	***** Oil %	**** Feet	***** Mud %	**** Feet
1	30	10.00	3.00	50.00	15.00	30.00	9.00
2	62	20.00	12.40	60.00	37.20	10.00	6.20
3	62	10.00	6.20	65.00	40.30	15.00	9.30
TOTAL	154	14.03	21.60	60.06	92.50	15.91	24.50

Sample #	**** Water %	*** Feet	Chlorides (PPM)	Resistivity (Ohms)	Temperature (Deg)
1	10.00	3.00			
2	10.00	6.20			
3	10.00	6.20			
TOTAL	10.00	15.40			