



FOX TESTING, CO.

P.O. Box 1826
Dodge City, Kansas 67801
(316) 225-0224

Date 3/23/85 No. 1281
 Company Name MUREIN DRILL CO. Elevation 2582 K.B.
 Mailing Address 250 N. Water Suite 300 Wichita Ks 67202 No. of Copies 5
 Billing Address SAME No. of Copies 2
 Lease Name NORTON 1-4 County CLARK State Ks Sec. 4 Twp. 30S Rge. 25W
 Test No. 1 Test Interval 5292' to 5316' Total Depth 5316' Formation MORROW S.

PACKER DEPTH		RECORDERS		
1. <u>5287'-6^{3/4"}</u>	2. <u>5292'-6^{3/4"}</u>	Top Depth <u>5295'</u>	No. <u>21946</u>	Cap. <u>3925</u> lbs. (inside)
3. _____	4. _____	Bottom Depth <u>5303'</u>	No. <u>22150</u>	Cap. <u>3925</u> lbs. (outside)
		Straddle Depth _____	No. _____	Cap. _____ Below Straddle

PRESSURES		DATA	
Initial Hyd <u>2688</u>	Tool on Bottom <u>4:15 P.M.</u>	Drill Collars <u>547</u> ft.	I.D. <u>2.2</u> in. Type <u>4 1/2 XH</u>
IFP <u>105</u> psi to <u>114</u> psi	<u>30</u> min.	Wt. pipe length _____ ft.	I.D. _____ in. Type _____
ISIP <u>866</u> psi	<u>45</u> min.	Drill pipe length <u>4718</u> ft.	I.D. <u>3.8</u> in. Type <u>4 1/2 XH</u>
FFP <u>134</u> psi to <u>134</u> psi	<u>60</u> min.	Test tool length <u>27</u> ft.	I.D. <u>5.0</u> in. BHT <u>118°</u>
FSIP <u>256</u>	<u>90</u> min.	Anchor length <u>24</u> ft.	<u>4.75</u> I.D.
Final Hyd <u>2649</u>	Tool off Bottom <u>8:00 P.M.</u>	Choke size: Surface <u>1"</u> Bottom <u>5/8"</u>	Hole size <u>7 1/8"</u> Tool joint size <u>4.5</u>
		Arrival time <u>8:45</u> a.m./p.m.	Pick-up tool <u>12:45</u> a.m./p.m.

RECOVERY		1ST FLOW C.F.P.O		2ND FLOW C.F.P.O	
<u>30' HO + GCM</u>		<u>10min. 3/4"</u>	<u>227,000</u>	<u>10min. 3/4"</u>	<u>227,000</u>
<u>120' FROGGY OCM</u>		<u>20min. 3/4" - 245,000</u>		<u>20min. 3/4"</u>	<u>227,000</u>
<u>610' FROGGY MCO</u>		<u>25min. 3/4" - 227,000</u>		<u>30min. 3/4"</u>	<u>227,000</u>
<u>60' GCMO 50% oil 3570G 490M 1170W</u>		<u>30min. 3/4" - 227,000</u>		<u>40min. 3/4"</u>	<u>227,000</u>
<u>820' TOTAL FLUID</u>				<u>50min. 3/4"</u>	<u>227,000</u>
				<u>60min. 3/4"</u>	<u>227,000</u>

REMARKS CHLORIDES 33,000

1st Blow STRONG BLOW G.T. 5 in 15 min.
 2nd Blow STRONG BLOW GAUGED 227,000 C.F.P.O

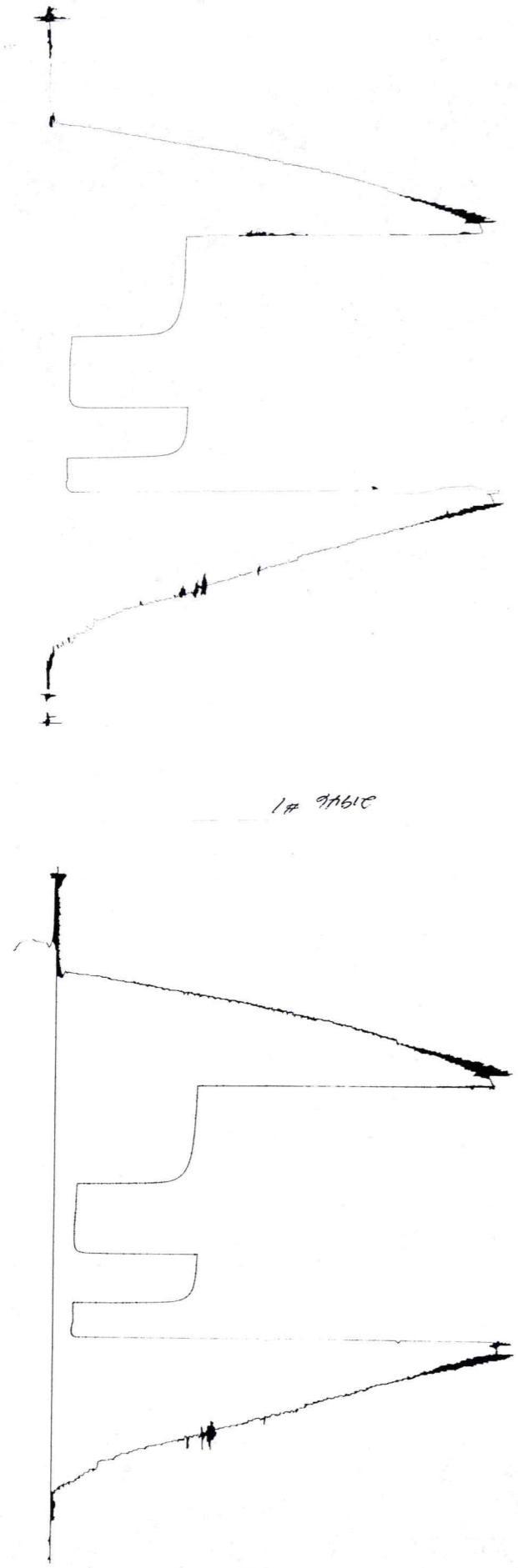
Drig. Cont. MUREIN #19 Rig No. 862-5958
 Mud type STARLH Filtrate 9.6 cc.
 Weight 9.1 Viscosity 56
 Chlorides 34,000 P.P.M. MAVERICK 11:00 A.M.
 Jars BOWEN Serial No. 1609
 Did Well flow YES Reversed out YES

OPEN HOLE INSURANCE AVAILABLE
 \$35,000 limit per hole, \$2,000 fishing limit, \$2,500 deductible
 Operator pays deductible.
 Deductible applies to total loss including tool and fishing limits.
 I want the open hole insurance I do not want the open hole insurance
 Customer Signature _____

Test Approved By: X Steve Dyke
 Fox Representative: X Danell L. Clapham

FIELD INVOICE		
Telecopy	\$ _____	\$ _____
Open hole test	\$ _____	Jars \$ _____
Straddle test	\$ _____	Safety jt. \$ _____
Hookwall test	\$ _____	Circ. Sub. \$ _____
Unsuccessful test	\$ _____	Extra packer \$ _____
Service chg.	\$ _____	Fluid samp. \$ _____
Stand by chg.	\$ _____	Extra reports \$ _____
Insurance	\$ _____	Mileage <u>40</u> \$ _____
Evaluation	\$ _____	TOTAL \$ _____

COMPANY TERMS: Fox Testing, Co. shall not be liable for damages of any kind to the property or personnel of the party for whom the test is run, or for any loss suffered, directly or indirectly, through the use of it's equipment or it's statements or opinions concerning the results of any test. Tools lost or damaged in the hole shall be paid at cost by the party for whom the test is made. All charges are due one month from date of invoice. All charges one month past due are subject to service finance charges computed at a periodic rate of 1 1/2% per month, which is an annual rate of 18%.



County **CLARK** State **KS.** Sec **4** Twp **30W** Rge **25W**
 Formation **MORROW SAND** Interval **5292'** to **5316'** DST No. **1**
 Total Depth **5316'** Type Test **CONVENTIONAL** Elevation **2582 K.B.**
 Packer Depth 1. **5287' - 6 3/4"** 2. **5292' - 6 3/4"** 3. _____ 4. _____
 Anchor Length **24'** Size **4.75 I.D.**
 Surface Choke **1"** Bottom Choke **5/8"** BHT **118°**

Recorder No. **22150** Cap. **3925 lbs.**

Computed Pressures		Given Times	Computed Times
Initial Hydrostatic	2795 psi	4:15 pm	Tool on Bottom
IFP	109 psi to 118 psi	30 min.	IFP 31 min.
ISIP	864 psi	45 min.	ISIP 45 min.
FFP	130 psi to 137 psi	60 min.	FFP 63 min.
FSIP	854 psi	90 min.	FSIP 90 min.
Final Hydrostatic	2740 psi	8:04 pm	Tool off Bottom

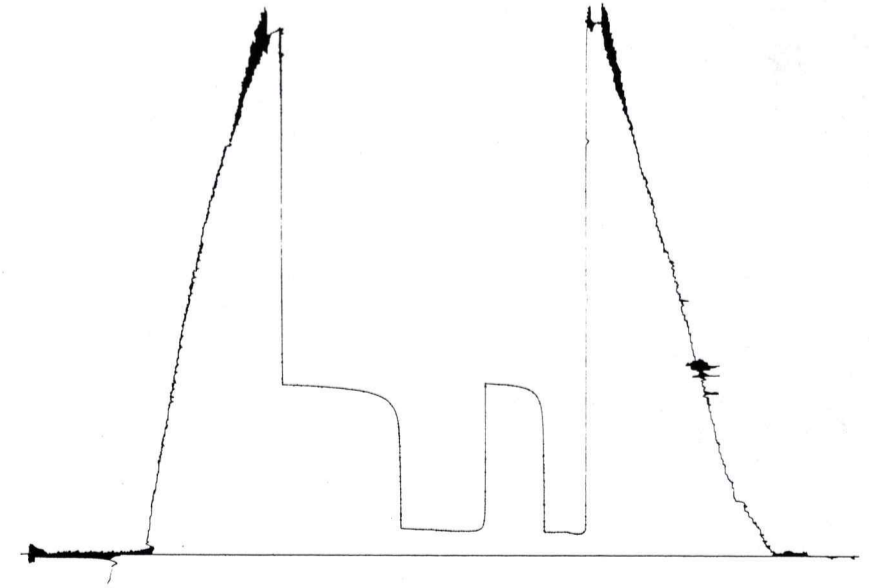
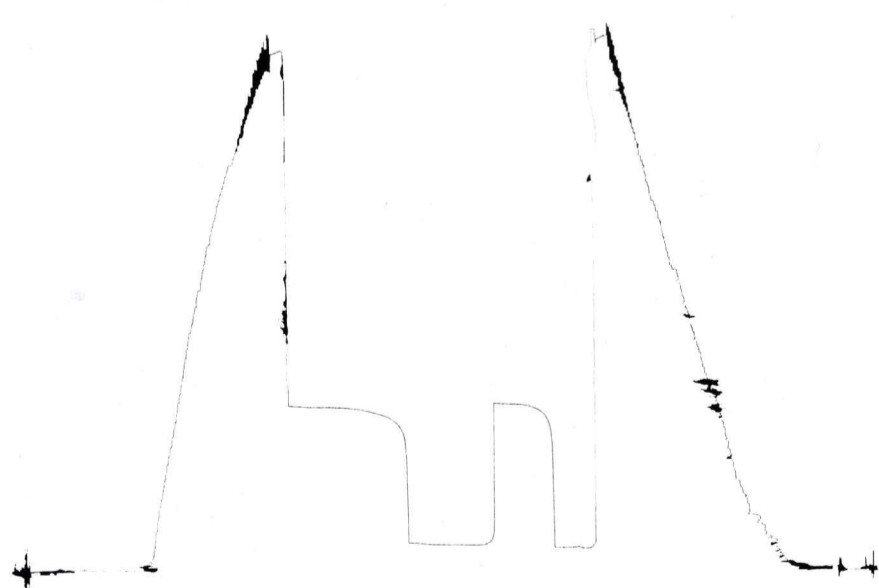
Recorders			
Top Depth	5295'	No. 21946	Cap. 3925 lbs. (inside)
Bottom Depth	5303'	No. 22150	Cap. 3925 lbs. (outside)
Straddle Depth	_____	No. _____	Cap. _____ Below Straddle

Recovery	
30'	HO&GCM
120'	FROGGY OCM
610'	FROGGY MCO
60'	GCMO 50% OIL; 35% Gas; 4% MUD; 11% WATER:
820'	TOTAL FLUID
	CHLORIDES 33,000
1st Blow	STRONG BLOW G.T.S. IN 15 MIN.
2nd Blow	STRONG BLOW GAUGED 227,000 C.F.P.D.

Sampler Data	Gas Pressures - 2" Merla Well Tester							
	1st flow min	Gauge	Orifice	Gas Vol. MCF/D	2nd flow min	Gauge	Orifice	Gas Vol. MCF/D
Pressure					10		3/4"	227,000
Gas	20		3/4"	245,000				
Total Fluid					20		3/4"	227,000
Oil	25		3/4"	227,000				
Mud					30		3/4"	227,000
Water	30		3/4"	227,000				
Oil Gravity					40		3/4"	227,000
Gas/Oil Ratio								
Chlorides					50		3/4"	227,000
					60		3/4"	227,000

0 min		0 min 118	0 min		0 min 137
5 min	109	3 min 742	5 min		3 min 670
10 min	113	6 min 794	10 min		6 min 738
15 min	118	9 min 819	15 min		9 min 763
20 min	118	12 min 833	20 min		12 min 782
25 min	118	15 min 841	25 min		15 min 792
30 min	118	18 min 846	30 min		18 min 802
35 min		21 min 850	35 min		21 min 808
40 min		24 min 852	40 min		24 min 815
45 min		27 min 854	45 min		27 min 819
50 min		30 min 856	50 min		30 min 823
55 min		33 min 858	55 min		33 min 827
60 min		36 min 860	60 min		36 min 829
65 min		39 min 862	65 min		39 min 831
70 min		42 min 862	70 min		42 min 833
75 min		45 min 864	75 min		45 min 835
80 min		48 min	80 min		48 min 837
85 min		51 min	85 min		51 min 839
90 min		54 min	90 min		54 min 841
95 min		57 min	95 min		57 min 843
100 min		60 min	100 min		60 min 844
105 min		63 min	105 min		63 min 846
110 min		66 min	110 min		66 min 848
115 min		69 min	115 min		69 min 848
120 min		72 min	120 min		72 min 850
125 min		75 min	125 min		75 min 850
130 min		78 min	130 min		78 min 852
135 min		81 min	135 min		81 min 852
140 min		84 min	140 min		84 min 852
145 min		87 min	145 min		87 min 854
150 min		90 min	150 min		90 min 854
155 min		93 min	155 min		93 min
160 min		96 min	160 min		96 min
165 min		99 min	165 min		99 min
170 min		102 min	170 min		102 min
175 min		105 min	175 min		105 min
180 min		108 min	180 min		108 min
185 min		111 min	185 min		111 min
190 min		114 min	190 min		114 min
195 min		117 min	195 min		117 min
200 min		120 min	200 min		120 min

*K Printing
 ||| Datu Con Mai Billi Lea: Test ||| 1.5 3. ||| Initial IFP- ISIP- FFP- FSIP- Final ||| 31 12 44 82 REM ||| 1st B 2nd E ||| Drig. Mud Weight Chlor Jars- Did V ||| Test / Fox F COMP, person, the use, damage, one m, compu





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 Billing Address SAME No. of Copies 2
 Lease Name NORTON 1-4 County CLARK State Ks Sec. 4 Twp. 30S Rge. 25W
 Test No. 2 Test Interval 5345' to 5379' Total Depth 5379' Formation MISS

PACKER DEPTH		RECORDERS		
1. <u>5340'-6 3/4"</u>	2. <u>5345'-6 3/4"</u>	Top Depth <u>5348'</u>	No. <u>21946</u>	Cap. <u>3925</u> lbs. (inside)
3. _____	4. _____	Bottom Depth <u>5356'</u>	No. <u>22150</u>	Cap. <u>3925</u> lbs. (outside)
		Straddle Depth _____	No. _____	Cap. _____ Below Straddle

PRESSURES		Times		DATA	
Initial Hyd. <u>2748</u>	Tool on Bottom <u>6:25 P.M.</u>	Drill Collars <u>547</u> ft.	I.D. <u>2.2</u> in.	Type <u>4 1/2 XH</u>	
IFP <u>47</u> psi to <u>47</u> psi	<u>30</u> min.	Wt. pipe length _____ ft.	I.D. _____ in.	Type _____	
ISIP <u>421</u> psi	<u>45</u> min.	Drill pipe length <u>4771</u> ft.	I.D. <u>3.8</u> in.	Type <u>4 1/2 XH</u>	
FFP <u>57</u> psi to <u>67</u> psi	<u>30</u> min.	Test tool length <u>27</u> ft.	I.D. <u>5.0</u> in.	BHT <u>120°</u>	
FSIP <u>536</u>	<u>60</u> min.	Anchor length <u>34</u> ft.	I.D. <u>4.75</u>		
Final Hyd. <u>2679</u>	Tool off Bottom _____	Choke size: Surface <u>1"</u>	Bottom <u>5/8"</u>	Hole size <u>7 1/8"</u>	Tool joint size <u>4.5</u>
		Arrival time <u>1:45</u> a.m. (p.m.)	Pick-up tool <u>3:00</u> a.m. (p.m.)		

60' mud

RECOVERY

REMARKS

1st Blow WEAK BLOW SLOWLY DYING 1/4" TO 1/8"

2nd Blow NO BLOW FLISHE TOOL AFTER APPROX: 20min. RECEIVED WEAK BLOW OFF TOP OF WATER

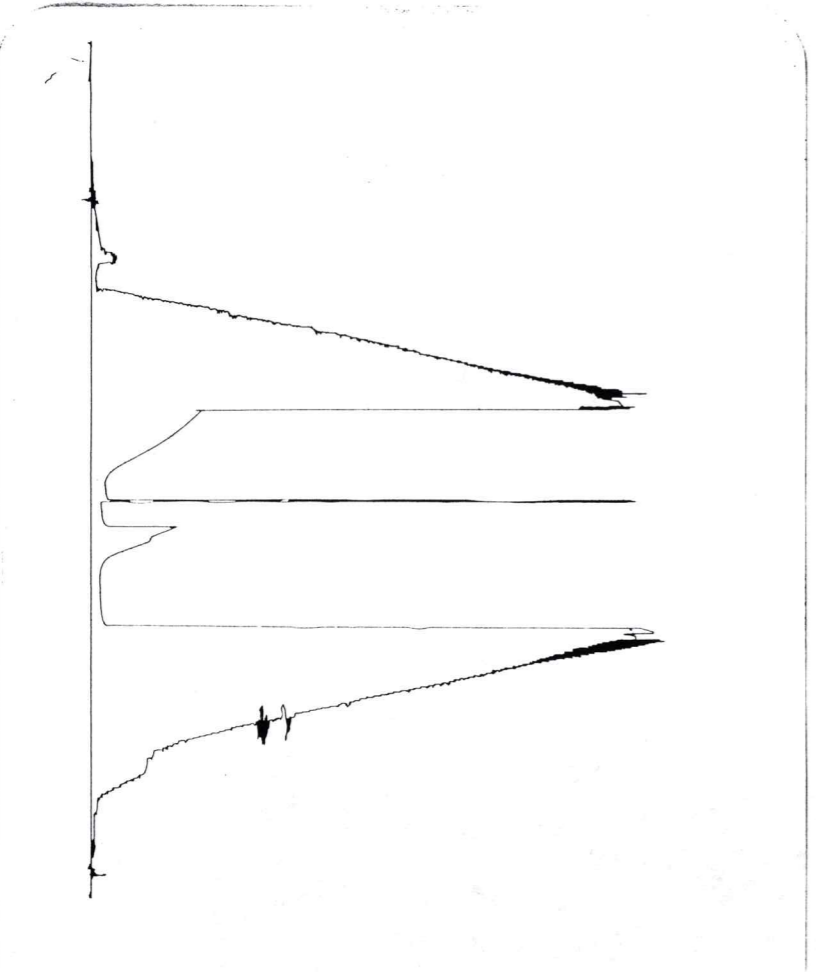
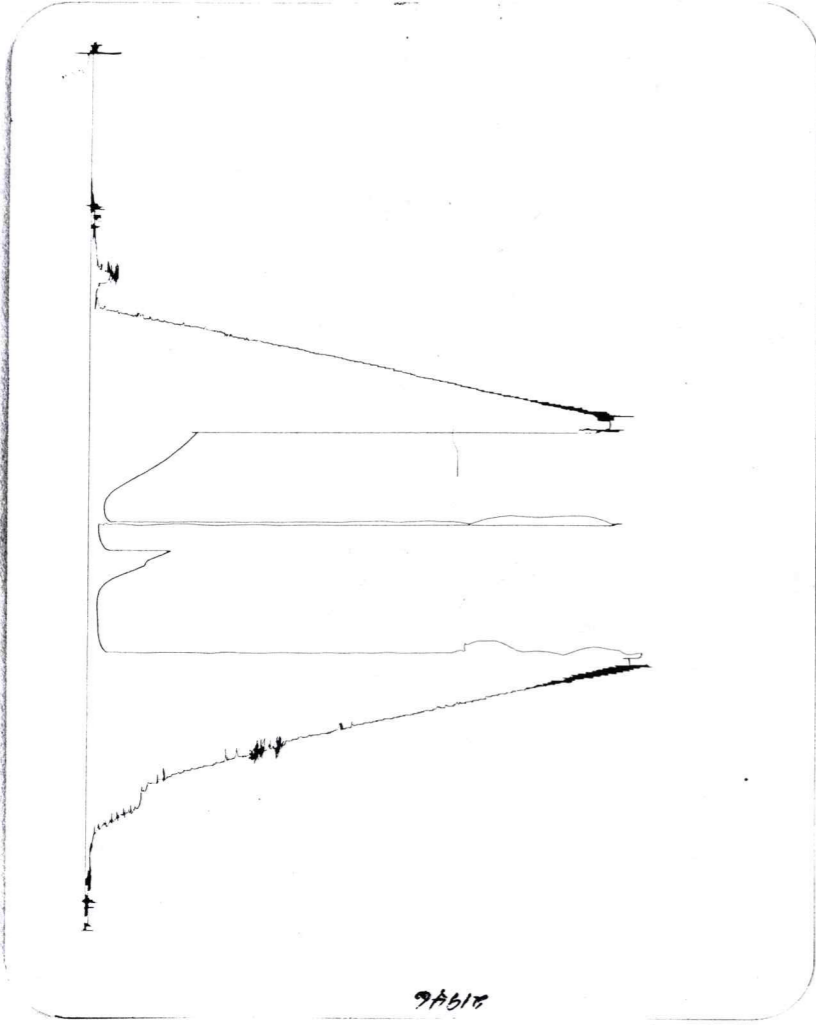
Drig. Cont. Co tools # 19 Rig No. 862-5958
 Mud type STARCH Filtrate N/A cc.
 Weight N/A - No CHECK Viscosity N/A
 Chlorides N/A P.P.M. MAVERICK N/A
 Jars 1 Serial No. _____
 Did Well flow No Reversed out No

OPEN HOLE INSURANCE AVAILABLE
 \$35,000 limit per hole, \$2,000 fishing limit, \$2,500 deductible
 Operator pays deductible.
 Deductible applies to total loss including tool and fishing limits.
 I want the open hole insurance I do not want the open hole insurance
 Customer Signature _____

Test Approved By: X Kenneth Julian
 Fox Representative: X Danell L. Clapham

FIELD INVOICE		
Telecopy	\$ _____	\$ _____
Open hole test	\$ _____	Jars \$ _____
Straddle test	\$ _____	Safety jt. \$ _____
Hookwall test	\$ _____	Circ. Sub. \$ _____
Unsuccessful test	\$ _____	Extra packer \$ _____
Service chg.	\$ _____	Fluid samp. \$ _____
Stand by chg.	\$ _____	Extra reports \$ _____
Insurance	\$ _____	Mileage <u>N/C</u> \$ _____
Evaluation	\$ _____	TOTAL \$ _____

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FOX TESTING • DRILL STEM TEST REPORT - OFFICE READINGS • DODGE CITY, KANSAS 67801
 P.O. BOX 1826 TICKET NO. 1282 TESTER DARRELL CLAPHAN (316) 225-0224

County CLARK State KS. Sec 4 Twp 30s Rge 25W
 Formation MISSISSIPPI Interval 5345' to 5379' DST No. 2
 Total Depth 5379' Type Test CONVENTIONAL Elevation 2582 K.B.
 Packer Depth 1.5340' - 6 3/4" 2.5345' - 6 3/4" 3. 4.
 Anchor Length 34' Size 4.75 I.D.
 Surface Choke 1" Bottom Choke 5/8" BHT 120°

Recorder No. 22150 Cap. 3925

Computed Pressures		Given Times		Computed Times	
Initial Hydrostatic	<u>2822</u> psi		<u>6:25 pm</u>	Tool on Bottom	
IFP	<u>53</u> psi to <u>42</u> psi		<u>30</u> min.	IFP	<u>30</u> min.
ISIP	<u>421</u> psi		<u>45</u> min.	ISIP	<u>46</u> min.
FFP	<u>63</u> psi to <u>74</u> psi		<u>30</u> min.	FFP	<u>30</u> min.
FSIP	<u>546</u> psi		<u>60</u> min.	FSIP	<u>60</u> min.
Final Hydrostatic	<u>2738</u> psi		<u>9:11 pm</u>	Tool off Bottom	

0 min		0 min	<u>42</u>	0 min		0 min	<u>74</u>
5 min	<u>53</u>	3 min	<u>42</u>	5 min	<u>63</u>	3 min	<u>74</u>
10 min	<u>49</u>	6 min	<u>42</u>	10 min	<u>55</u>	6 min	<u>76</u>
15 min	<u>47</u>	9 min	<u>42</u>	15 min	<u>51</u>	9 min	<u>86</u>
20 min	<u>45</u>	12 min	<u>45</u>	20 min	<u>51</u>	12 min	<u>105</u>
25 min	<u>44</u>	15 min	<u>51</u>	25 min	<u>78</u>	15 min	<u>126</u>
30 min	<u>42</u>	18 min	<u>61</u>	30 min	<u>74</u>	18 min	<u>162</u>
35 min		21 min	<u>74</u>	35 min		21 min	<u>195</u>
40 min		24 min	<u>111</u>	40 min		24 min	<u>229</u>
45 min		27 min	<u>159</u>	45 min		27 min	<u>260</u>
50 min		30 min	<u>208</u>	50 min		30 min	<u>302</u>
55 min		33 min	<u>262</u>	55 min		33 min	<u>333</u>
60 min		36 min	<u>291</u>	60 min		36 min	<u>365</u>
65 min		39 min	<u>304</u>	65 min		39 min	<u>392</u>
70 min		42 min	<u>360</u>	70 min		42 min	<u>417</u>
75 min		46 min	<u>421</u>	75 min		45 min	<u>442</u>
80 min		48 min		80 min		48 min	<u>467</u>
85 min		51 min		85 min		51 min	<u>488</u>
90 min		54 min		90 min		54 min	<u>511</u>
95 min		57 min		95 min		57 min	<u>523</u>
100 min		60 min		100 min		60 min	<u>546</u>
105 min		63 min		105 min		63 min	
110 min		66 min		110 min		66 min	
115 min		69 min		115 min		69 min	
120 min		72 min		120 min		72 min	
125 min		75 min		125 min		75 min	
130 min		78 min		130 min		78 min	
135 min		81 min		135 min		81 min	
140 min		84 min		140 min		84 min	
145 min		87 min		145 min		87 min	
150 min		90 min		150 min		90 min	
155 min		93 min		155 min		93 min	
160 min		96 min		160 min		96 min	
165 min		99 min		165 min		99 min	
170 min		102 min		170 min		102 min	
175 min		105 min		175 min		105 min	
180 min		108 min		180 min		108 min	
185 min		111 min		185 min		111 min	
190 min		114 min		190 min		114 min	
195 min		117 min		195 min		117 min	
200 min		120 min		200 min		120 min	

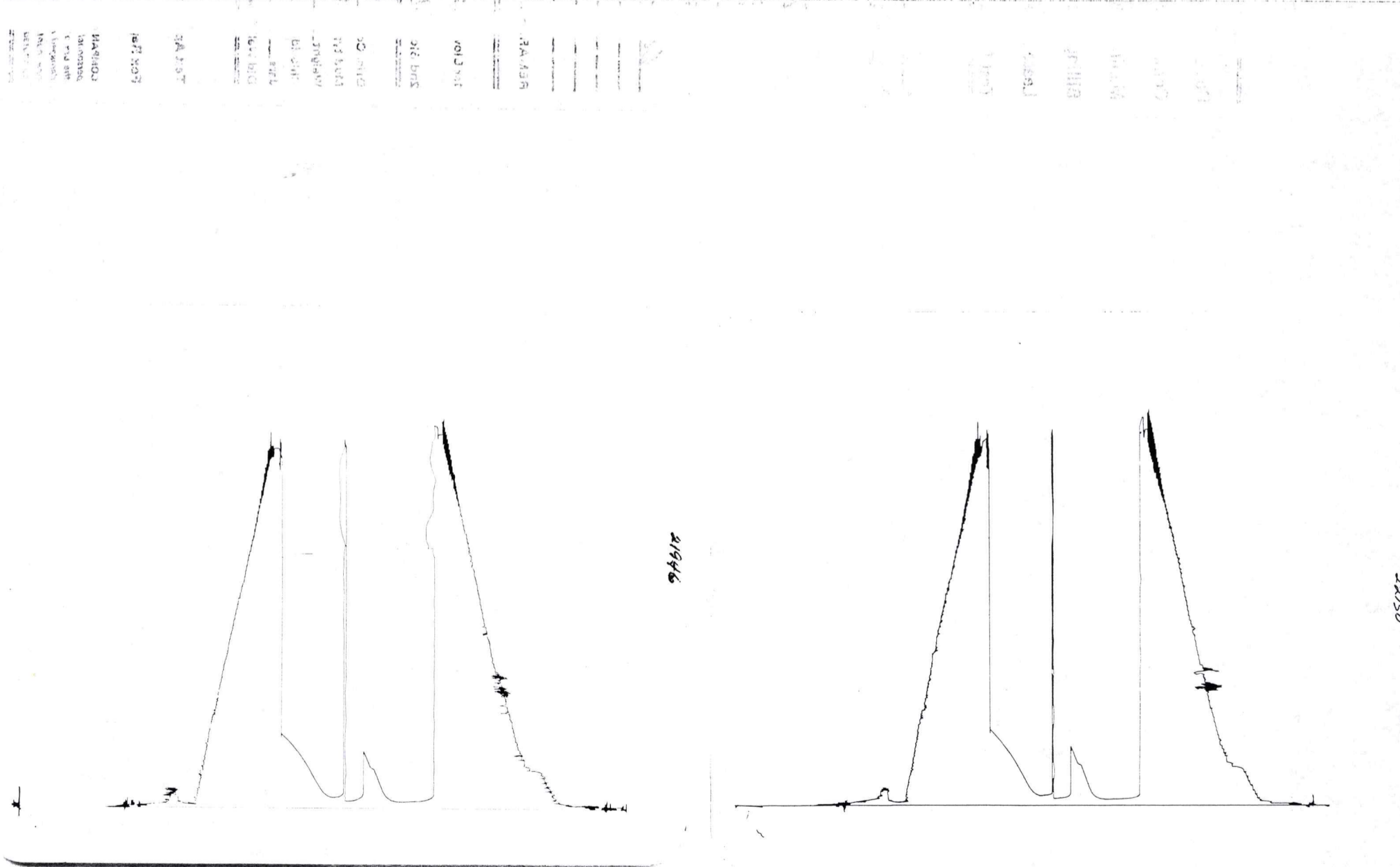
Top Depth 5348' No. 21946 Cap. 3925 lbs. (inside)
 Bottom Depth 5356' No. 22150 Cap. 3925 lbs. (outside)
 Straddle Depth _____ No. _____ Cap. _____ Below Straddle

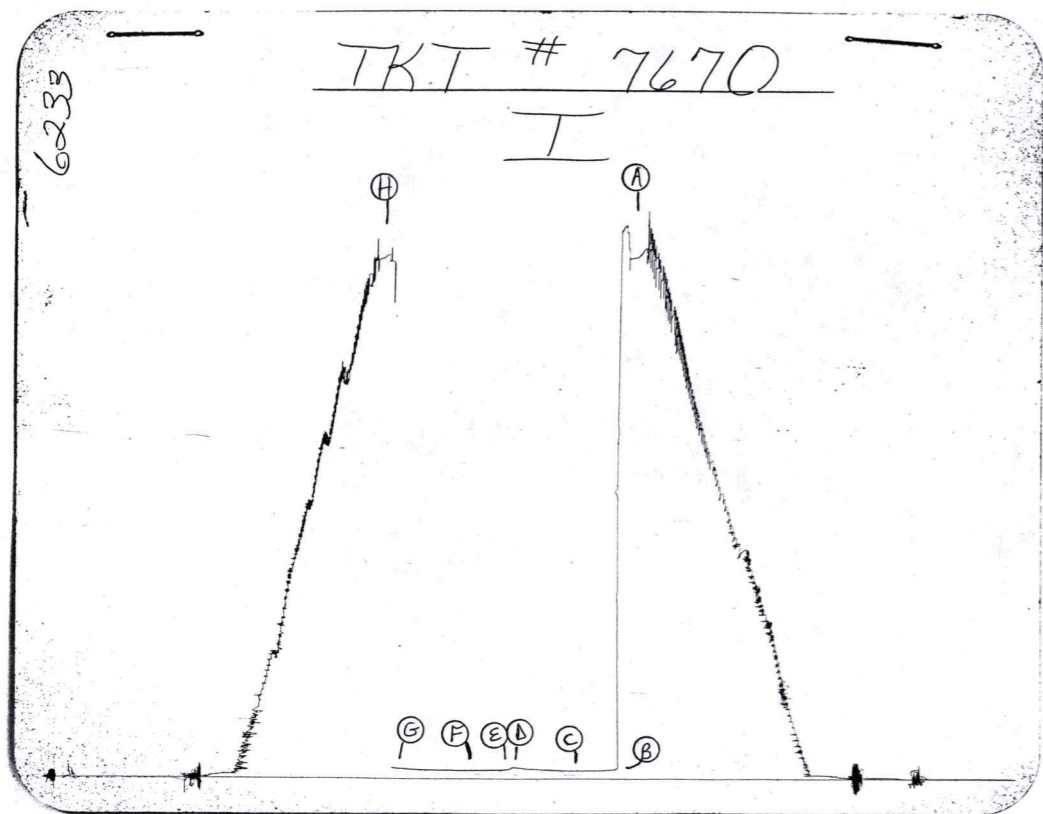
Recovery
60' MUD

1st Blow WEAK BLOW SLOWLY DYING 1/4" TO 1/8"
 2nd Blow NO BLOW FLUSHED TOOL AFTER APPRX. 20 MIN. RECEIVED WEAK BLOW

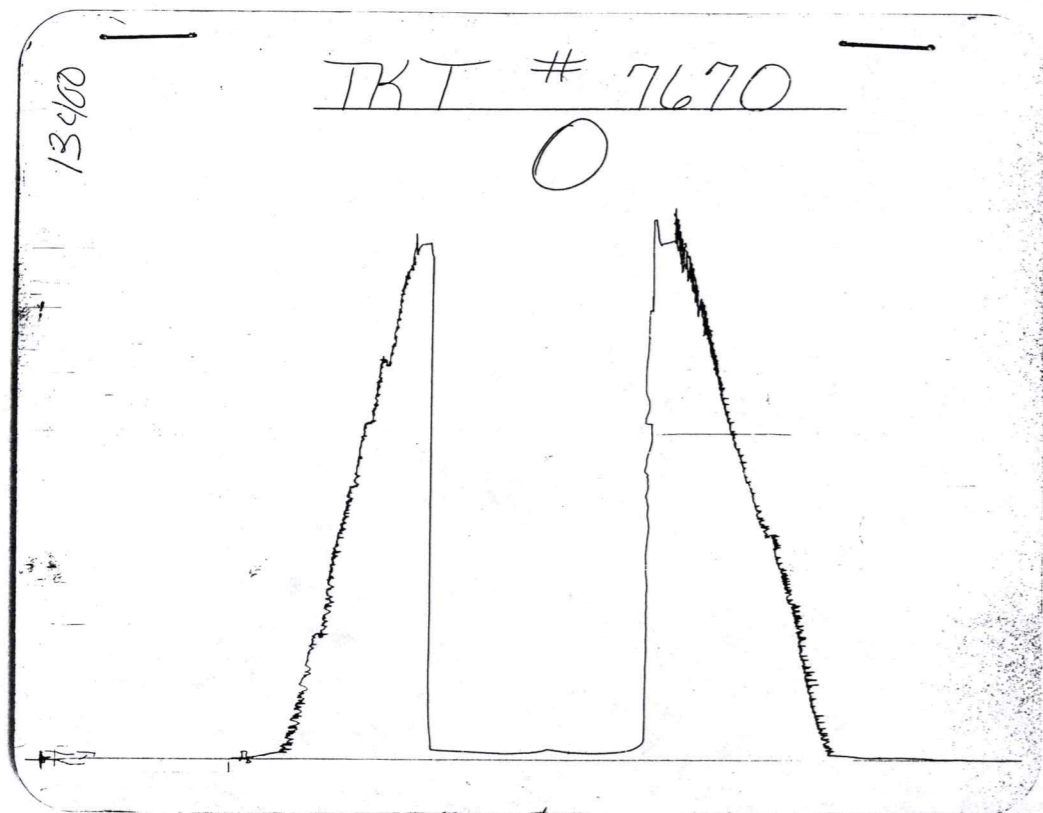
Sampler Data	Gas Pressures - 2" Merla Well Tester							
	1st flow min	Gauge	Orifice	Gas Vol. MCF/D	2nd flow min	Gauge	Orifice	Gas Vol. MCF/D
Pressure								
Gas								
Total Fluid								
Oil								
Mud								
Water								
Oil Gravity								
Gas/Oil Ratio								
Chlorides								

*KPrinting
 || Da Cc Mi Bi Le Te || 1- 3- || Init IFP ISIP FFI FSI Fin || || || || REI || 1st 2nc || Dri Mur Wel Chi Jarr Did || Tes Fox CON pers the t dam one corn ||





Inside Recorder

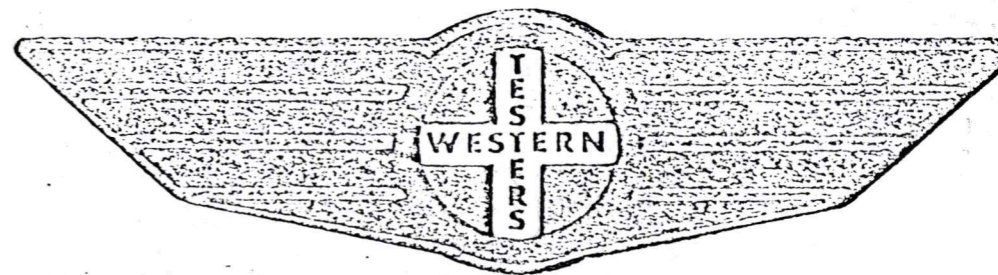


Outside Recorder

FORMATION

TEST

REPORT



Home Office:

Wichita, Kansas 67201

P.O. Box 1599

Phone (316) 262-5861

MURFIN DRILLING COMPANY Lease & Well No. #1-10 "B" TEDFORD Sec. 10 Twp. 30S Rge. 25W Test No. 2 Date 6/8/85

15-025-20890

4-30-25W

Well:

Norton 1-4 (15-025-20890)

	from, ft	to, ft	thickness, ft
DST range:	5292	5316	24
Pay SD#1			
Pay SD#2	5289	5294	5
Pay SD#3			
Morrow pay			5

	entered data
	read from correlations
	read from Horner plot
	calculation

Reservoir gas properties:

Sp gr. =	0.73	gas specific gravity (avg from 3 samples)
Tpc =	386 R	pseudocritical temp
Ppc =	660 psia	pseudocritical pressure

DST analysis - Gas using SPE Monograph method:

Pi =	886 psi	
m =	104 psi/cycle	
Qg =	227 Mcfd	
Pwf =	137 psi	(related to Qg - end of second flow)
P I hr =		

Transmissibility:

$Kh/\mu = 162.6 \cdot Qg \cdot Bg/m$

$Bg = Psc \cdot Tr \cdot 1000 \cdot Z / (p \cdot Tsc \cdot 5.614)$

Psc =	14.65 psi	pr at standard conditions
Tr =	578 R	Res temp = 118 F
Tsc =	520 R	Std temp in R
p = (Pi+Pwf)/2	511.5 psi	avg of static and flowing pressure

Tpr =	1.50	pseudo reduced temp
Ppr =	0.80	pseudo reduced pressure
Z =	0.92	compressibility factor at p and Tr

$Bg = 5.22 \text{ RB/Mcf}$

$Kh/\mu = 1851.5906 \text{ md-ft/cp}$

Permeability:

$h = 5 \text{ ft pay}$

Mol wt of air =	29 lb/lb mole	
Mol wt of gas =	21.17 lb/lb mole	
mu @ 1 atm =	0.0111 cp	(@ res temp)
Vis ratio =	1 cp	at Tpr and Ppr approx outside range

gas vis (mu) = 0.0111 cp

$K = 4.1 \text{ md}$

DST analysis - Gas using Low pressure gas method:

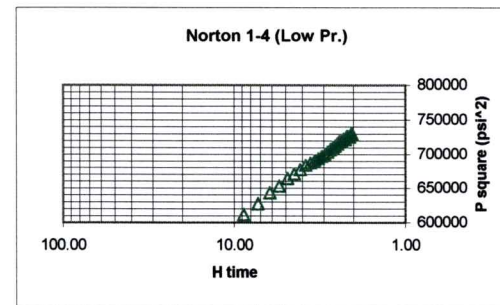
Mg =	166000 psi ² /cycle
Qg =	227 Mcfd

Transmissibility:

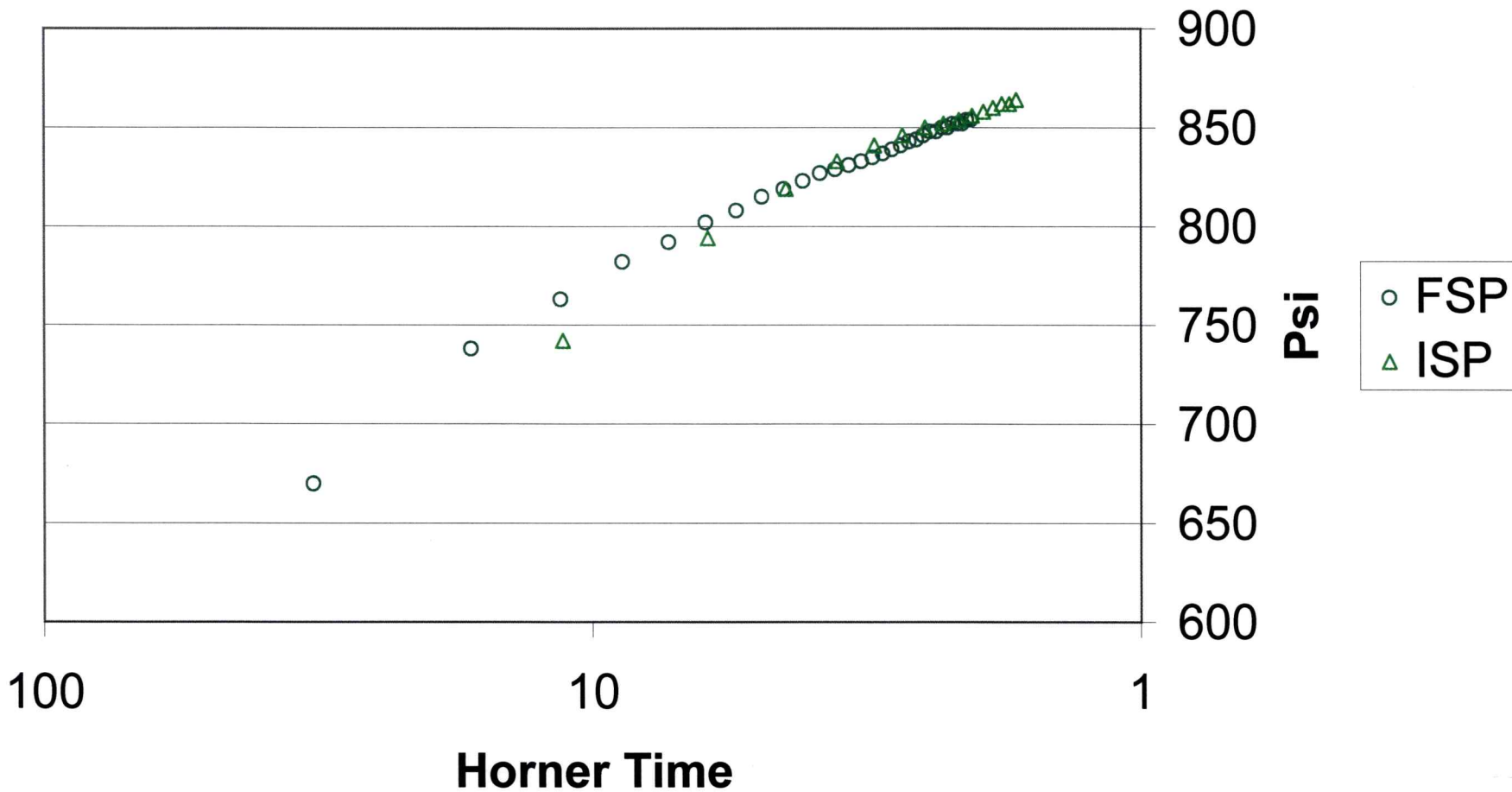
$Kh/\mu = 1637 \cdot Qg \cdot Tr \cdot Z/Mg$

$Kh/\mu = 1190.370387 \text{ md-ft/cp}$

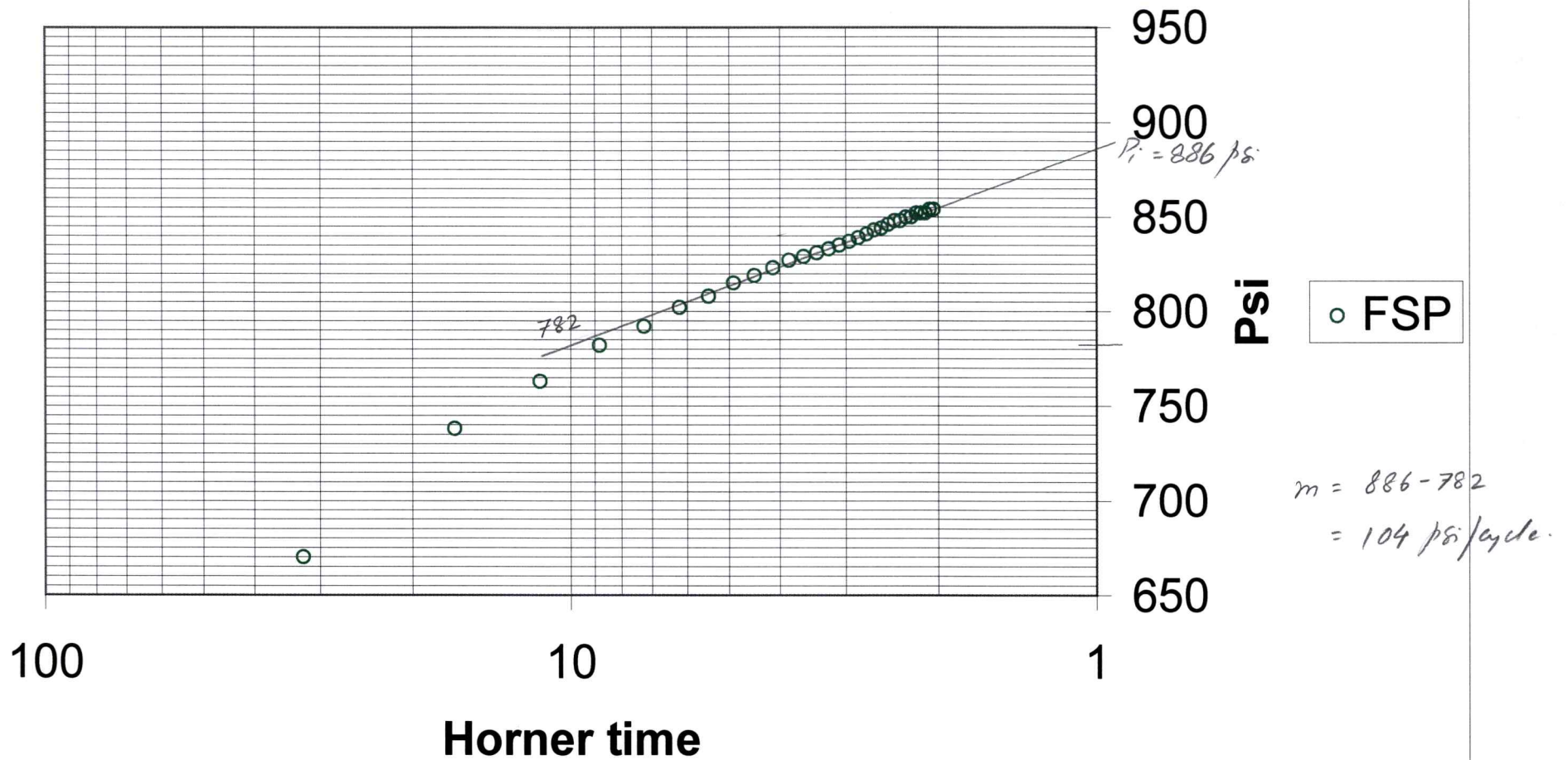
$K = 2.6 \text{ md}$



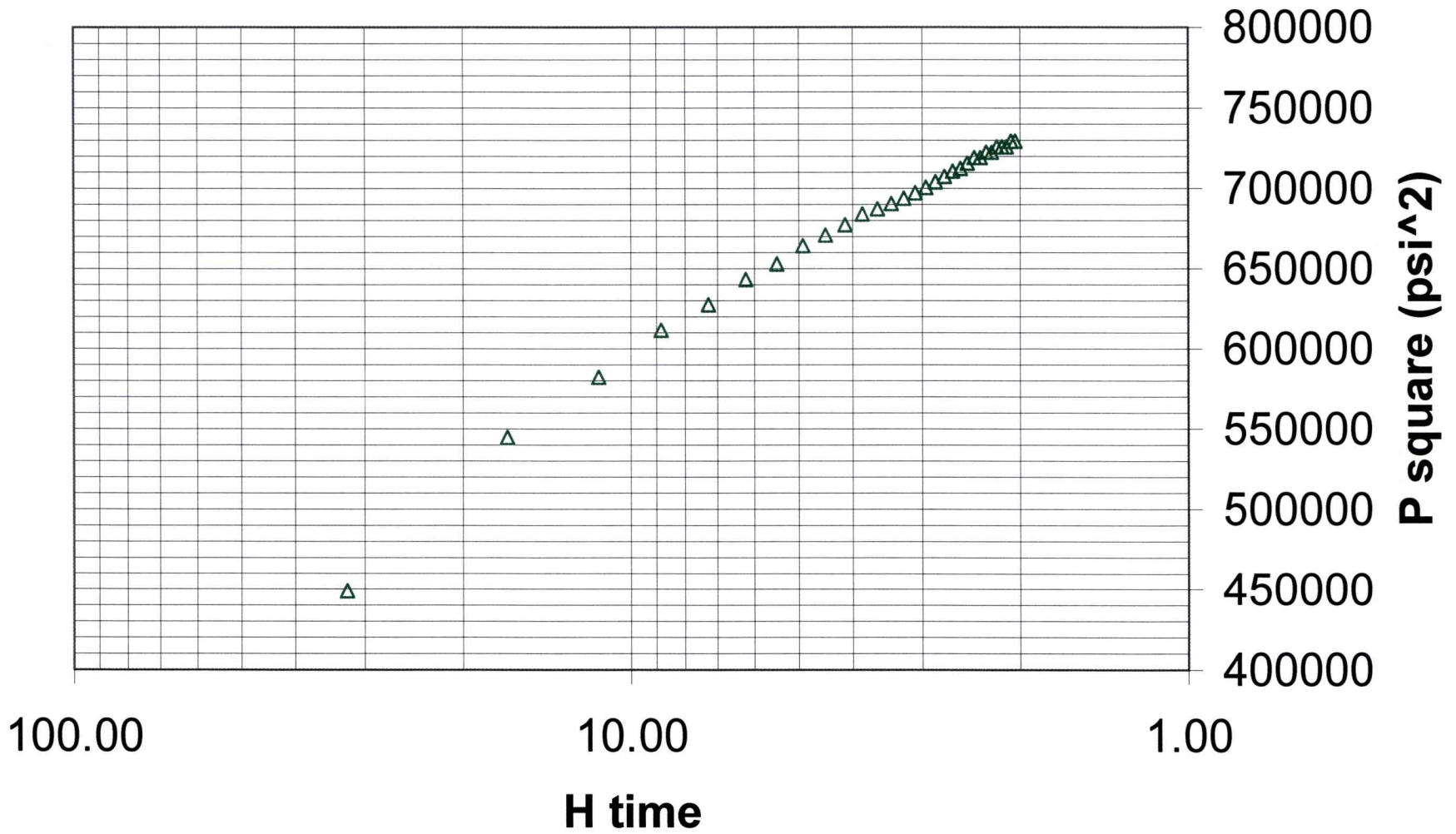
Norton 1-4 (15-025-20890) 5292-5316 ft



Norton 1-4 (15-025-20890) 5292-5316 ft



Norton 1-4 (Low Pr.)



Norton 1-4 (Low Pr.)

