

THUNDERBIRD DRILLING, INC.

TESTING DIVISION

Box 18407

WICHITA, KANSAS

Company Thunderbird Drilling, Inc.

Lease and Well No. Hardman "D-1"

County Ness

State Kansas

Date 1-3-77

Formation Test No.	<u>1</u>	Total Depth	<u>4110'</u>	Elev.	
Interval Tested	<u>3975'</u>	To	<u>4110'</u>	Anchor Length	<u>135'</u>
Size Hole	<u>7 7/8"</u>	Size Drill Pipe	<u>4 1/2" XH FH</u>	Size Packer	<u>6 3/4"</u>
Mud Weight	<u>9.6</u>	Viscosity	<u>42</u>	Water Loss	<u>10.4</u>
				c.c. Bottom Hole Temp.	<u>115</u> °F
Chokes: Top	<u>1/2"</u>	Bottom	<u>1/2"</u>	Ticket No.	<u>739</u>

RECOVERY

Blow: Fair blow thru-out test.

recovery: 130' of mud with slight show of oil

Lease and Well No. Hardman "D-1" Sec 3 Twn 18-S Rg 25-W SW SW NW

Formation Test No.

1

Tool Open: 1st Flow ___ hr. 45 mins: Shut-in Initial ___ hr. 45 min: 2nd Flow ___ hr. 45 min: Shut-in Final ___ hr. 45 min.

	Field Reading	Corrected Reading
(A) Initial Hydrostatic Pressure	<u>2137</u>	<u>2135</u>
(B) Initial 1st Flow Pressure	<u>121</u>	<u>120</u>
(C) Final 1st Flow Pressure	<u>138</u>	<u>138</u>
(D) Initial Shut-in Pressure	<u>969</u>	<u>969</u>
(E) Initial 2nd Flow Pressure	<u>138</u>	<u>140</u>
(F) Final 2nd Flow Pressure	<u>138</u>	<u>140</u>
(G) Final Shut-in Pressure	<u>294</u>	<u>294</u>
(H) Final Hydrostatic Pressure	<u>2102</u>	<u>2108</u>

Ticket # 739

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WICHITA, KANSAS

Company Thunderbird Drilling, Inc.

Lease and Well No. Hardman "D-1"

County Ness State Kansas Date 1-4-77

Formation Test No. 2 Total Depth 4215' Elev. _____

Interval Tested 4167' To 4215' Anchor Length 48'

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

Mud Weight 9.4 Viscosity 44 Water Loss 8. c.c. Bottom Hole Temp. 115 °F

Chokes: Top 1/2" Bottom 1/2" Ticket No. 740

RECOVERY

Blow: Weak blow for 12 minutes.

Recovery: 8' of mud

Lease and Well No. Hardman "D-1" Sec 3 Twn 18-S Rg 25-W SW SW NW

Formation Test No. _____

2

Tool Open: 1st Flow ____ hr. 30 mins: Shut-in Initial ____ hr. 30 min: 2nd Flow ____ hr. 30 min: Shut-in Final ____ hr. 30 mins

	Field Reading	Corrected Reading
(A) Initial Hydrostatic Pressure	<u>2172</u>	<u>2170</u>
(B) Initial 1st Flow Pressure	<u>52</u>	<u>50</u>
(C) Final 1st Flow Pressure	<u>52</u>	<u>52</u>
(D) Initial Shut-in Pressure	<u>173</u>	<u>175</u>
(E) Initial 2nd Flow Pressure	<u>52</u>	<u>52</u>
(F) Final 2nd Flow Pressure	<u>52</u>	<u>52</u>
(G) Final Shut-in Pressure	<u>294</u>	<u>290</u>
(H) Final Hydrostatic Pressure	<u>2154</u>	<u>2158</u>

Tck. # 740

THUNDERBIRD DRILLING, INC.

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WICHITA, KANSAS

Company Thunderbird Drilling, Inc.

Lease and Well No. Hardman "D-1"

County Ness State Kansas

Date 1-5-76

Formation Test No. 3 Total Depth 4284' Elev. _____
Interval Tested 4245' To 4284' Anchor Length 39'
Size Hole 7 7/8" Size Drill Pipe 4 1/2" XH FH Size Packer 6 3/4"
Mud Weight 9.5 Viscosity 41 Water Loss 12. c.c. Bottom Hole Temp. 117 ° F
Chokes: Top 1/2" Bottom 1/2" Ticket No. 741

RECOVERY

Blow: Weak blow for 47 minutes.

Recovery: 70' of mud with show of oil.

Lease and Well No. Hardman "D-1" Sec 3 Twn 18-S Rg 25-W SW SW NW
Formation Test No. _____

3

Tool Open: 1st Flow hr. 45 mins: Shut-in Initial hr. 45 min: 2nd Flow hr. 45 min: Shut-in Final hr. 45 min

	Field Reading	Corrected Reading
(A) Initial Hydrostatic Pressure	<u>2207</u>	<u>2207</u>
(B) Initial 1st Flow Pressure	<u>35</u>	<u>35</u>
(C) Final 1st Flow Pressure	<u>35</u>	<u>35</u>
(D) Initial Shut-in Pressure	<u>917</u>	<u>918</u>
(E) Initial 2nd Flow Pressure	<u>61</u>	<u>60</u>
(F) Final 2nd Flow Pressure	<u>61</u>	<u>60</u>
(G) Final Shut-in Pressure	<u>709</u>	<u>710</u>
(H) Final Hydrostatic Pressure	<u>2172</u>	<u>2175</u>

Ticket # 741

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WICHITA, KANSAS

Company Thunderbird Drilling, Inc.

Lease and Well No. Hardman "D-1"

County Ness

State Kansas

Date 1-5-76

Formation Test No. 4 Total Depth 4289' Elev. _____
Interval Tested 4277' To 4289' Anchor Length 12'
Size Hole 7 7/8" Size Drill Pipe 4 1/2" XH FH Size Packer 6 3/4"
Mud Weight 9.4 Viscosity 46 Water Loss 12.2 c.c. Bottom Hole Temp. 117 ° F
Chokes: Top 1/2" Bottom 1/2" Ticket No. 742

RECOVERY

Blow: Fair to weak by end of test.

Recovery: 10' of free oil
120' of muddy oil

Lease and Well No. Hardman "D-1" Sec 3 Twn 18-S Rg 25-W SW SW NW
Formation Test No. _____

COMPANY Thunderbird Drilling, Inc. DATE 1-5-77

LEASE Hardman WELL NO. D-1 TEST NO. 4 TICKET NO. 742

	TIME	PSI
INITIAL HYDRO MUD PRESSURE		2241
INITIAL CLOSED IN PRESSURE	45 mins.	990
INITIAL FLOW	" "	42 to 42
FINAL FLOW	" "	69 to 69
FINAL CLOSED IN PRESSURE	" "	926
FINAL HYDRO MUD PRESSURE		2233

TOTAL DEPTH 4289'

PACKER DEPTH 4277'

BT. NO. 2162 DEPTH 4284

1ST FLOW PRESSURE		INITIAL CIP		2ND FLOW PRESSURE		FINAL CIP	
	42		42		69		69
	42		69		69		104
	42		260		69		260
	42		649		69		606
			796				744
			856				804
			900				839
			934				874
			969				900
			990				926
15 MINUTE INTERVAL		5 MINUTE INTERVAL		15 MINUTE INTERVAL		5 MINUTE INTERVAL	

REMARKS _____

SPECIAL PRESSURE DATA

Tool Open: 1st Flow 45 hr. 45 mins: Shut-in Initial 45 hr. 45 min: 2nd Flow 45 hr. 45 min: Shut-in Final 45 hr. 45 min.

	Field Reading	Corrected Reading
(A) Initial Hydrostatic Pressure	<u>2259</u>	<u>2241</u>
(B) Initial 1st Flow Pressure	<u>43</u>	<u>42^{mm}</u>
(C) Final 1st Flow Pressure	<u>43</u>	<u>42</u>
(D) Initial Shut-in Pressure	<u>995</u>	<u>990</u>
(E) Initial 2nd Flow Pressure	<u>78</u>	<u>69</u>
(F) Final 2nd Flow Pressure	<u>78</u>	<u>69</u>
(G) Final Shut-in Pressure	<u>934</u>	<u>926</u>
(H) Final Hydrostatic Pressure	<u>2233</u>	<u>2233</u>

Ticket # 742

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WICHITA, KANSAS

Company Thunderbird Drilling, Inc.

Lease and Well No. Hardman "D-1"

County Ness State Kansas

Date 1-6-77

Formation Test No. 5 Total Depth 4293' Elev. _____
Interval Tested 4283' To 4293' Anchor Length 10'
Size Hole 7 7/8" Size Drill Pipe 4 1/2" XH FH Size Packer 6 3/4"
Mud Weight 9.5 Viscosity 46 Water Loss 12.2 c.c. Bottom Hole Temp. 119 ° F
Chokes: Top 1/2" Bottom 1/2" Ticket No. 743

RECOVERY

Blow: Fair blow decreasing to weak by end of test

Recovery: (38 gra. corrected)
120' of gas
30' of clean gassy oil
180' of slightly muddy gassy oil (Est. 90% oil)
60' of muddy gassy oil with trace of water.

Lease and Well No. Hardman "D-1" Sec 3 Twn 18-S Rg 25-W SW SW NW
Formation Test No. 5

Tool Open: 1st Flow hr. 45 mins: Shut-in Initial hr. 45 min: 2nd Flow hr. 45 min: Shut-in Final hr. 45 min.

	Field Reading	Corrected Reading
(A) Initial Hydrostatic Pressure	<u>2259</u>	<u>2250</u>
(B) Initial 1st Flow Pressure	<u>52</u>	<u>57</u>
(C) Final 1st Flow Pressure	<u>78</u>	<u>83</u>
(D) Initial Shut-in Pressure	<u>727</u>	<u>727</u>
(E) Initial 2nd Flow Pressure	<u>112</u>	<u>121</u>
(F) Final 2nd Flow Pressure	<u>121</u>	<u>130</u>
(G) Final Shut-in Pressure	<u>675</u>	<u>678</u>
(H) Final Hydrostatic Pressure	<u>2250</u>	<u>2233</u>

Ticket # 743