

Confidentiality Requested:

Yes No

KANSAS CORPORATION COMMISSION
OIL & GAS CONSERVATION DIVISION

Form ACO-1

January 2018

Form must be Typed

Form must be Signed

All blanks must be Filled

WELL COMPLETION FORM
WELL HISTORY - DESCRIPTION OF WELL & LEASE

OPERATOR: License # _____

Name: _____

Address 1: _____

Address 2: _____

City: _____ State: _____ Zip: _____ + _____

Contact Person: _____

Phone: (_____) _____

CONTRACTOR: License # _____

Name: _____

Wellsite Geologist: _____

Purchaser: _____

Designate Type of Completion:

New Well Re-Entry Workover

Oil WSW SWD

Gas DH EOR

OG GSW

CM (Coal Bed Methane)

Cathodic Other (Core, Expl., etc.): _____

If Workover/Re-entry: Old Well Info as follows:

Operator: _____

Well Name: _____

Original Comp. Date: _____ Original Total Depth: _____

Deepening Re-perf. Conv. to EOR Conv. to SWD
 Plug Back Liner Conv. to GSW Conv. to Producer

Commingled Permit #: _____

Dual Completion Permit #: _____

SWD Permit #: _____

EOR Permit #: _____

GSW Permit #: _____

Spud Date or Date Reached TD Completion Date or Recompletion Date

API No.: _____

Spot Description: _____

_____ - _____ - _____ Sec. _____ Twp. _____ S. R. _____ East West

_____ Feet from North / South Line of Section

_____ Feet from East / West Line of Section

Footages Calculated from Nearest Outside Section Corner:

NE NW SE SW

GPS Location: Lat: _____, Long: _____
(e.g. xx.xxxxx) (e.g. -xxx.xxxxx)

Datum: NAD27 NAD83 WGS84

County: _____

Lease Name: _____ Well #: _____

Field Name: _____

Producing Formation: _____

Elevation: Ground: _____ Kelly Bushing: _____

Total Vertical Depth: _____ Plug Back Total Depth: _____

Amount of Surface Pipe Set and Cemented at: _____ Feet

Multiple Stage Cementing Collar Used? Yes No

If yes, show depth set: _____ Feet

If Alternate II completion, cement circulated from: _____

feet depth to: _____ w/ _____ sx cmt.

Drilling Fluid Management Plan

(Data must be collected from the Reserve Pit)

Chloride content: _____ ppm Fluid volume: _____ bbls

Dewatering method used: _____

Location of fluid disposal if hauled offsite:

Operator Name: _____

Lease Name: _____ License #: _____

Quarter _____ Sec. _____ Twp. _____ S. R. _____ East West

County: _____ Permit #: _____

AFFIDAVIT

I am the affiant and I hereby certify that all requirements of the statutes, rules and regulations promulgated to regulate the oil and gas industry have been fully complied with and the statements herein are complete and correct to the best of my knowledge.

Submitted Electronically

KCC Office Use ONLY

Confidentiality Requested

Date: _____

Confidential Release Date: _____

Wireline Log Received Drill Stem Tests Received

Geologist Report / Mud Logs Received

UIC Distribution

ALT I II III Approved by: _____ Date: _____

Operator Name: _____ Lease Name: _____ Well #: _____

Sec. _____ Twp. _____ S. R. _____ East West County: _____

INSTRUCTIONS: Show important tops of formations penetrated. Detail all cores. Report all final copies of drill stems tests giving interval tested, time tool open and closed, flowing and shut-in pressures, whether shut-in pressure reached static level, hydrostatic pressures, bottom hole temperature, fluid recovery, and flow rates if gas to surface test, along with final chart(s). Attach extra sheet if more space is needed.

Final Radioactivity Log, Final Logs run to obtain Geophysical Data and Final Electric Logs must be emailed to kcc-well-logs@kcc.ks.gov. Digital electronic log files must be submitted in LAS version 2.0 or newer AND an image file (TIFF or PDF).

Drill Stem Tests Taken <input type="checkbox"/> Yes <input type="checkbox"/> No <i>(Attach Additional Sheets)</i> Samples Sent to Geological Survey <input type="checkbox"/> Yes <input type="checkbox"/> No Cores Taken <input type="checkbox"/> Yes <input type="checkbox"/> No Electric Log Run <input type="checkbox"/> Yes <input type="checkbox"/> No Geologist Report / Mud Logs <input type="checkbox"/> Yes <input type="checkbox"/> No List All E. Logs Run:	<input type="checkbox"/> Log Formation (Top), Depth and Datum <input type="checkbox"/> Sample Name Top Datum
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CASING RECORD <input type="checkbox"/> New <input type="checkbox"/> Used							
Report all strings set-conductor, surface, intermediate, production, etc.							
Purpose of String	Size Hole Drilled	Size Casing Set (In O.D.)	Weight Lbs. / Ft.	Setting Depth	Type of Cement	# Sacks Used	Type and Percent Additives

ADDITIONAL CEMENTING / SQUEEZE RECORD				
Purpose:	Depth Top Bottom	Type of Cement	# Sacks Used	Type and Percent Additives
<input type="checkbox"/> Perforate <input type="checkbox"/> Protect Casing <input type="checkbox"/> Plug Back TD <input type="checkbox"/> Plug Off Zone				

1. Did you perform a hydraulic fracturing treatment on this well? Yes No *(If No, skip questions 2 and 3)*
2. Does the volume of the total base fluid of the hydraulic fracturing treatment exceed 350,000 gallons? Yes No *(If No, skip question 3)*
3. Was the hydraulic fracturing treatment information submitted to the chemical disclosure registry? Yes No *(If No, fill out Page Three of the ACO-1)*

Date of first Production/Injection or Resumed Production/Injection:	Producing Method: <input type="checkbox"/> Flowing <input type="checkbox"/> Pumping <input type="checkbox"/> Gas Lift <input type="checkbox"/> Other <i>(Explain)</i> _____				
Estimated Production Per 24 Hours	Oil Bbls.	Gas Mcf	Water Bbls.	Gas-Oil Ratio	Gravity

DISPOSITION OF GAS: <input type="checkbox"/> Vented <input type="checkbox"/> Sold <input type="checkbox"/> Used on Lease <i>(If vented, Submit ACO-18.)</i>	METHOD OF COMPLETION: <input type="checkbox"/> Open Hole <input type="checkbox"/> Perf. <input type="checkbox"/> Dually Comp. <input type="checkbox"/> Commingled <i>(Submit ACO-5)</i> <i>(Submit ACO-4)</i>	PRODUCTION INTERVAL: Top Bottom
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Shots Per Foot	Perforation Top	Perforation Bottom	Bridge Plug Type	Bridge Plug Set At	Acid, Fracture, Shot, Cementing Squeeze Record <i>(Amount and Kind of Material Used)</i>

TUBING RECORD:	Size:	Set At:	Packer At:	
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Customer <i>Hayes Oil + Gas</i>		Lease No. <i>22</i>		Date <i>10-1-2019</i>	
Lease <i>Kolzen - Haydenreids</i>		Well # <i># 1-10</i>			
Field Order # <i>18345</i>	Station <i>Pratt KS #1718</i>	Casing <i>2 7/8</i>	Depth	County <i>Barber</i>	State <i>Kansas</i>
Type Job <i>PTA</i>			Formation	Legal Description <i>10-335-1241</i>	

PIPE DATA		PERFORATING DATA		FLUID USED	TREATMENT RESUME		
Casing Size	Tubing Size	Shots/Ft		Acid	RATE	PRESS	ISIP
<i>3 1/2</i>	<i>3 1/2</i>			Pre Pad	Max		5 Min.
Depth <i>300</i>	Depth	From	To	Pad	Min		10 Min.
Volume	Volume	From	To	Frac	Avg		15 Min.
Max Press <i>150</i>	Max Press	From	To		HHP Used		Annulus Pressure
Well Connection	Annulus Vol.	From	To	Flush	Gas Volume		Total Load
Plug Depth <i>600</i>	Packer Depth	From	To				

Customer Representative <i>Rick D</i>	Station Manager <i>Walter Westerman</i>	Treater <i>Paul Baldi</i>
Service Units <i>27463 70959 19360</i>		
Driver Names <i>Ron G Darian F</i>		

Time	Casing Pressure	Tubing Pressure	Bbls. Pumped	Rate	Service Log
					<i>Have TCA + Rig up</i>
					<i>1st plug 600'</i>
<i>11:00 AM</i>	<i>100</i>		<i>8</i>	<i>4</i>	<i>start Freshwater</i>
	<i>100</i>		<i>12.75</i>	<i>4</i>	<i>Pump 50 sx 60:40:POZ</i>
			<i>4</i>	<i>3</i>	<i>Displace with fresh</i>
					<i>2nd Plug 350'</i>
	<i>50</i>		<i>7</i>	<i>4</i>	<i>start Freshwater</i>
	<i>50</i>		<i>12.75</i>	<i>4</i>	<i>Pump 50 sx 60:40:POZ</i>
			<i>1.25</i>	<i>3</i>	<i>Displace with fresh</i>
					<i>3rd Plug 60'</i>
			<i>5</i>	<i>3</i>	<i>Pump 20 sx cement</i>
			<i>7.64</i>	<i>3</i>	<i>Rate 30 sx</i>
<i>10:30 AM</i>			<i>5</i>	<i>3</i>	<i>MOOSE 20 SX</i>

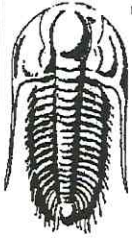
Customer <i>Harco Oil/Gas Co</i>	Lease No.	Date <i>8-23-2019</i>	
Lease <i>Kotzen-Sherwood</i>	Well # <i>1-10</i>		
Field Order # <i>18338</i>	Station <i>Pratt, KS - 1718</i>	Casing <i>8 3/8</i>	Depth
Type Job <i>Surface</i>	Formation	County <i>Barber</i>	State <i>KS</i>
		Legal Description <i>10-335-1711</i>	

PIPE DATA		PERFORATING DATA		FLUID USED		TREATMENT RESUME		
Casing Size	Tubing Size	Shots/Ft		Acid	RATE	PRESS	ISIP	
<i>3 1/2</i>	<i>3 1/2</i>	From	To	Pre Pad	Max		5 Min.	
Depth <i>315</i>	Depth	From	To	Pad	Min		10 Min.	
Volume <i>19</i>	Volume	From	To	Frac	Avg		15 Min.	
Max Press	Max Press	From	To		HHP Used		Annulus Pressure	
Well Connection	Annulus Vol.	From	To	Flush	Gas Volume		Total Load	
Plug Depth <i>295</i>	Packer Depth	From	To					

Customer Representative <i>[Signature]</i>	Station Manager <i>Justin Westerman</i>	Treater <i>Paul BDDW6</i>
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Service Units	<i>84930</i>	<i>70920</i>	<i>70959</i>	<i>79860</i>					
Driver Names	<i>Eddie</i>	<i>W</i>	<i>Clarence</i>	<i>Good</i>					

Time	Casing Pressure	Tubing Pressure	Bbls. Pumped	Rate	Service Log
<i>12:00 PM</i>					<i>on location safety meeting Dig on</i>
<i>1:15 PM</i>					<i>Ran 315 8 3/8 casing including L.T</i>
<i>1:30 PM</i>	<i>100</i>		<i>5</i>	<i>4</i>	<i>Break circulation with Pig Pump 5 Bbls Freshwater</i>
	<i>100</i>		<i>43</i>	<i>5</i>	<i>Mix 200 10 1000 Pz + additives</i>
	<i>150</i>		<i>19</i>	<i>3</i>	<i>Displace with 19 Bbls Freshwater</i>
<i>2:00 PM</i>					<i>low to cement in casing shut in cement Did circulate</i>
					<i>THANK YOU</i>



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Hayes Oil & Gas

Kotzen-Heydenreich #1-10

PO Box 108
Attica, KS 67009

10-33S-12W Barber,KS

ATTN: Tim Hedrick

Job Ticket: 65911

DST#: 1

Test Start: 2019.09.26 @ 17:30:00

GENERAL INFORMATION:

Formation: **Lansing**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 19:52:02

Time Test Ended: 00:44:02

Interval: **3823.00 ft (KB) To 3832.00 ft (KB) (TVD)**

Total Depth: 3832.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Good

Test Type: Conventional Bottom Hole (Initial)

Tester: Leal Cason

Unit No: 74

Reference Elevations: 1496.00 ft (KB)

1484.00 ft (CF)

KB to GR/CF: 12.00 ft

Serial #: 6751

Outside

Press@RunDepth: 1316.83 psig @ 3824.00 ft (KB)

Start Date: 2019.09.26

End Date: 2019.09.27

Start Time: 17:30:01

End Time: 00:44:02

Capacity: psig

Last Calib.: 2019.09.27

Time On Btm: 2019.09.26 @ 19:51:02

Time Off Btm: 2019.09.26 @ 22:55:02

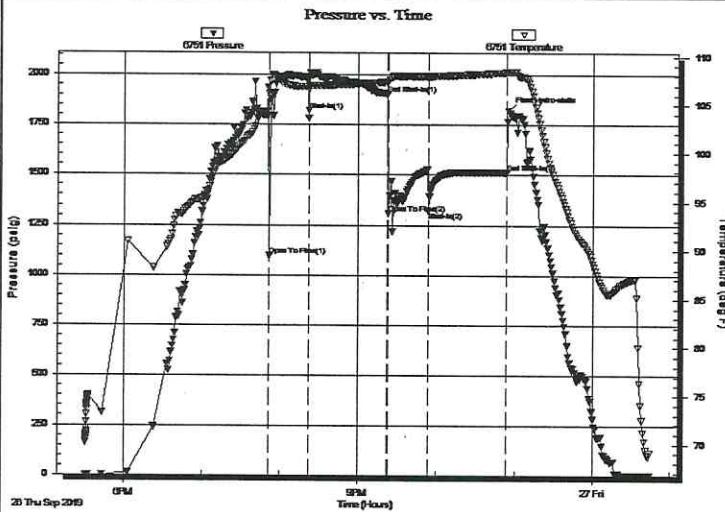
TEST COMMENT: IF: Slid 12' - Severe plugging - Weak 2/34 inch Blow, Died Off to 2 1/2 inch

IS: No Blow Back

FF: No Blow

FSI: No Blow Back

PRESSURE SUMMARY



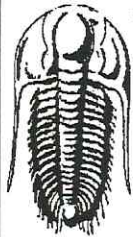
Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1933.21	103.89	Initial Hydro-static
1	1099.77	106.10	Open To Flow (1)
32	1819.56	106.91	Shut-In(1)
92	1903.57	107.38	End Shut-In(1)
92	1307.64	107.33	Open To Flow (2)
123	1316.83	107.93	Shut-In(2)
183	1511.10	108.39	End Shut-In(2)
184	1821.40	108.42	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
65.00	Mud	0.32

Gas Rates

Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

FLUID SUMMARY

Hayes Oil & Gas

Kotzen-Heydenreiech #1-10

PO Box 108
Attica, KS 67009

10-33S-12W Barber,KS

Job Ticket: 65911

DST#: 1

ATTN: Tim Hedrick

Test Start: 2019.09.26 @ 17:30:00

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

ppm

Viscosity: 54.00 sec/qt

Cushion Volume:

bbl

Water Loss: 8.78 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 4000.00 ppm

Filter Cake: 0.02 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
65.00	Mud	0.320

Total Length: 65.00 ft

Total Volume: 0.320 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

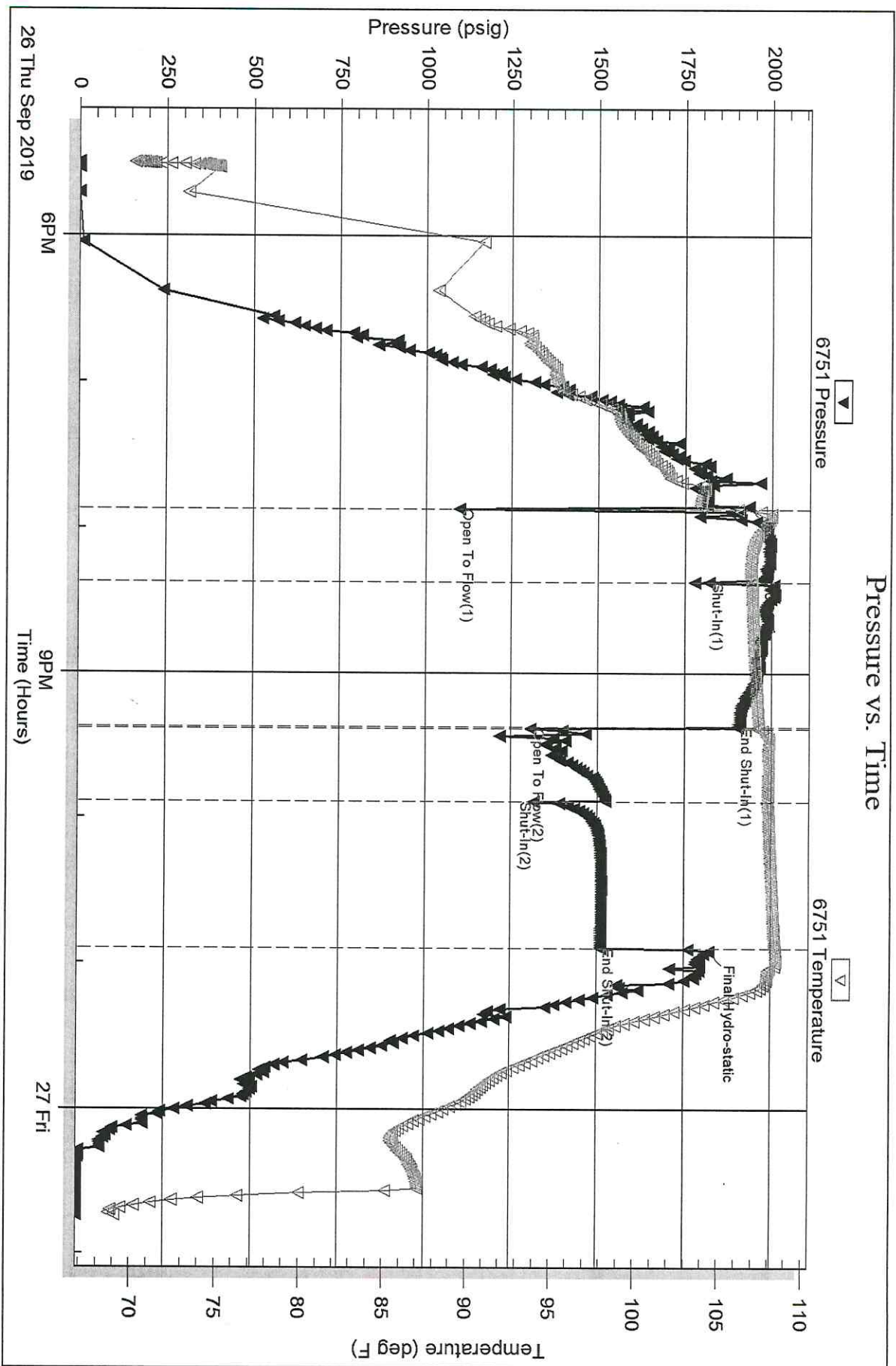
Recovery Comments:

Serial #: 6751

Outside Hayes Oil & Gas

10-33S-12W Barber KS

DST Test Number: 1



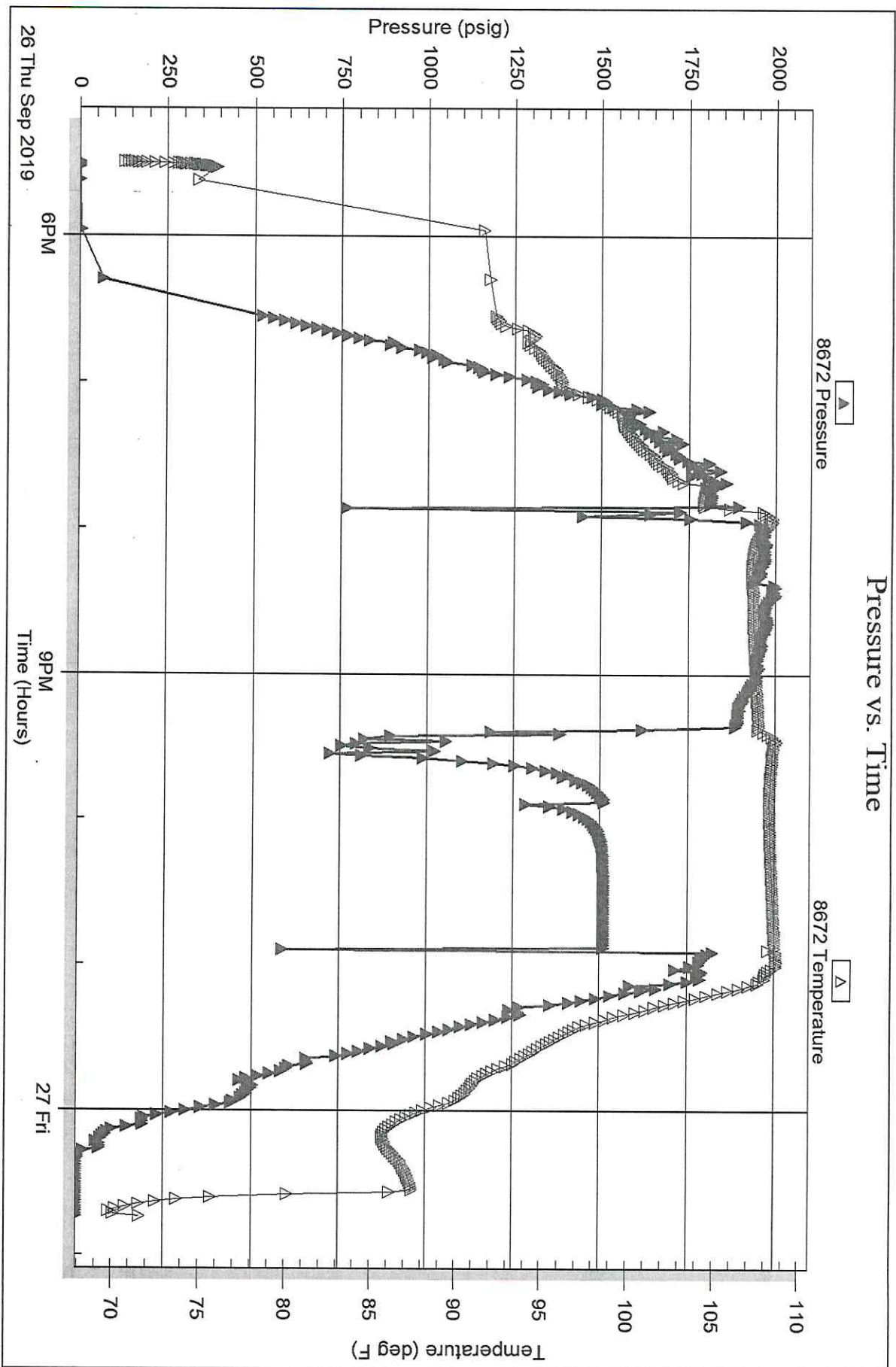
Serial #: 8672

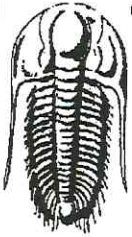
Inside

Hayes Oil & Gas

10-33S-12W Barber, KS

DST Test Number: 1





**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Hayes Oil & Gas

PO Box 108
Attica, KS 67009

ATTN: Tim Hedrick

Kotzen-Heydenreich 1-10

10-33S-12W Barber,KS

Job Ticket: 65913

DST#: 3

Test Start: 2019.09.28 @ 21:50:00

GENERAL INFORMATION:

Formation: **Mississippi**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 23:48:02

Time Test Ended: 03:36:02

Interval: **4423.00 ft (KB) To 4445.00 ft (KB) (TVD)**

Total Depth: 4445.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Good

Test Type: Conventional Bottom Hole (Reset)

Tester: Leal Cason

Unit No: 74

Reference Elevations: 1496.00 ft (KB)

1484.00 ft (CF)

KB to GR/CF: 12.00 ft

Serial #: 8672

Inside

Press@RunDepth: 19.58 psig @ 4424.00 ft (KB)

Start Date: 2019.09.28

End Date:

2019.09.29

Capacity:

psig

Start Time: 21:50:01

End Time:

03:36:02

Last Calib.:

2019.09.29

Time On Btm: 2019.09.28 @ 23:47:02

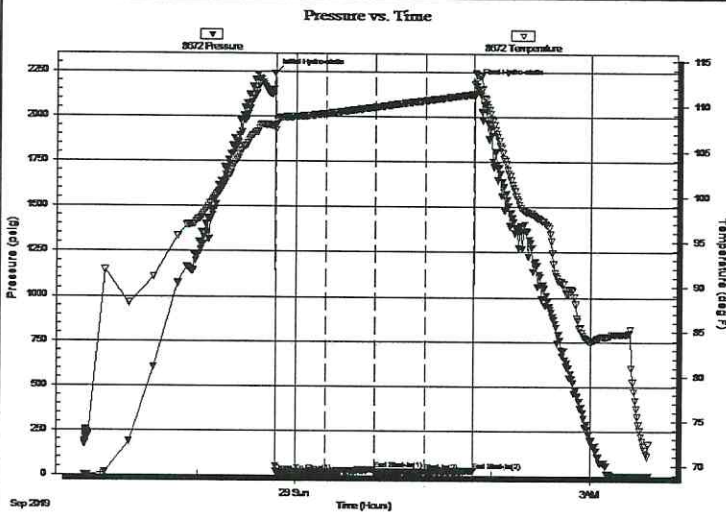
Time Off Btm: 2019.09.29 @ 01:49:17

TEST COMMENT: IF: Fair Blow , Built to 10 1/2 inches

IS: No Blow Back

FF: Weak 1/2 inch Blow

FSI: No Blow Back



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2241.25	107.79	Initial Hydro-static
1	17.78	107.87	Open To Flow (1)
32	18.98	109.14	Shut-In(1)
61	31.37	109.87	End Shut-In(1)
62	16.48	109.88	Open To Flow (2)
92	19.58	110.63	Shut-In(2)
122	26.39	111.36	End Shut-In(2)
123	2188.42	113.71	Final Hydro-static

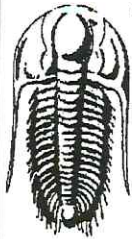
Recovery

Length (ft)	Description	Volume (bbl)
15.00	Mud	0.07

* Recovery from multiple tests

Gas Rates

Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

FLUID SUMMARY

Hayes Oil & Gas

Kotzen-Heydenreiech 1-10

PO Box 108
Attica, KS 67009

10-33S-12W Barber,KS

Job Ticket: 65913 **DST#: 3**

ATTN: Tim Hedrick

Test Start: 2019.09.28 @ 21:50:00

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

ppm

Viscosity: 62.00 sec/qt

Cushion Volume:

bbf

Water Loss: 7.99 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 6000.00 ppm

Filter Cake: 0.02 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbf
15.00	Mud	0.074

Total Length: 15.00 ft

Total Volume: 0.074 bbf

Num Fluid Samples: 0

Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:

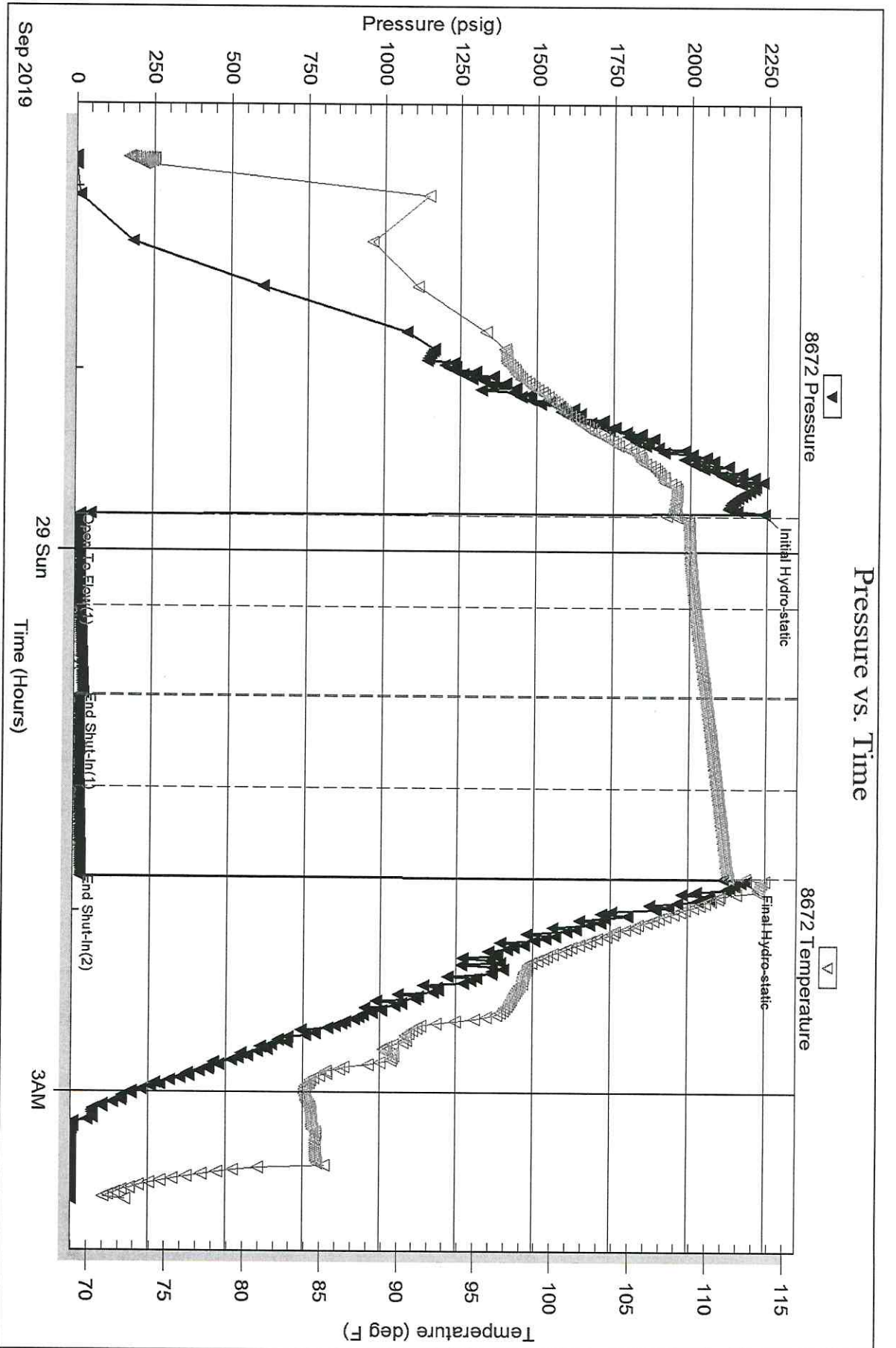
Serial #: 8672

Inside

Hayes Oil & Gas

10-33S-12W Barber, KS

DST Test Number: 3

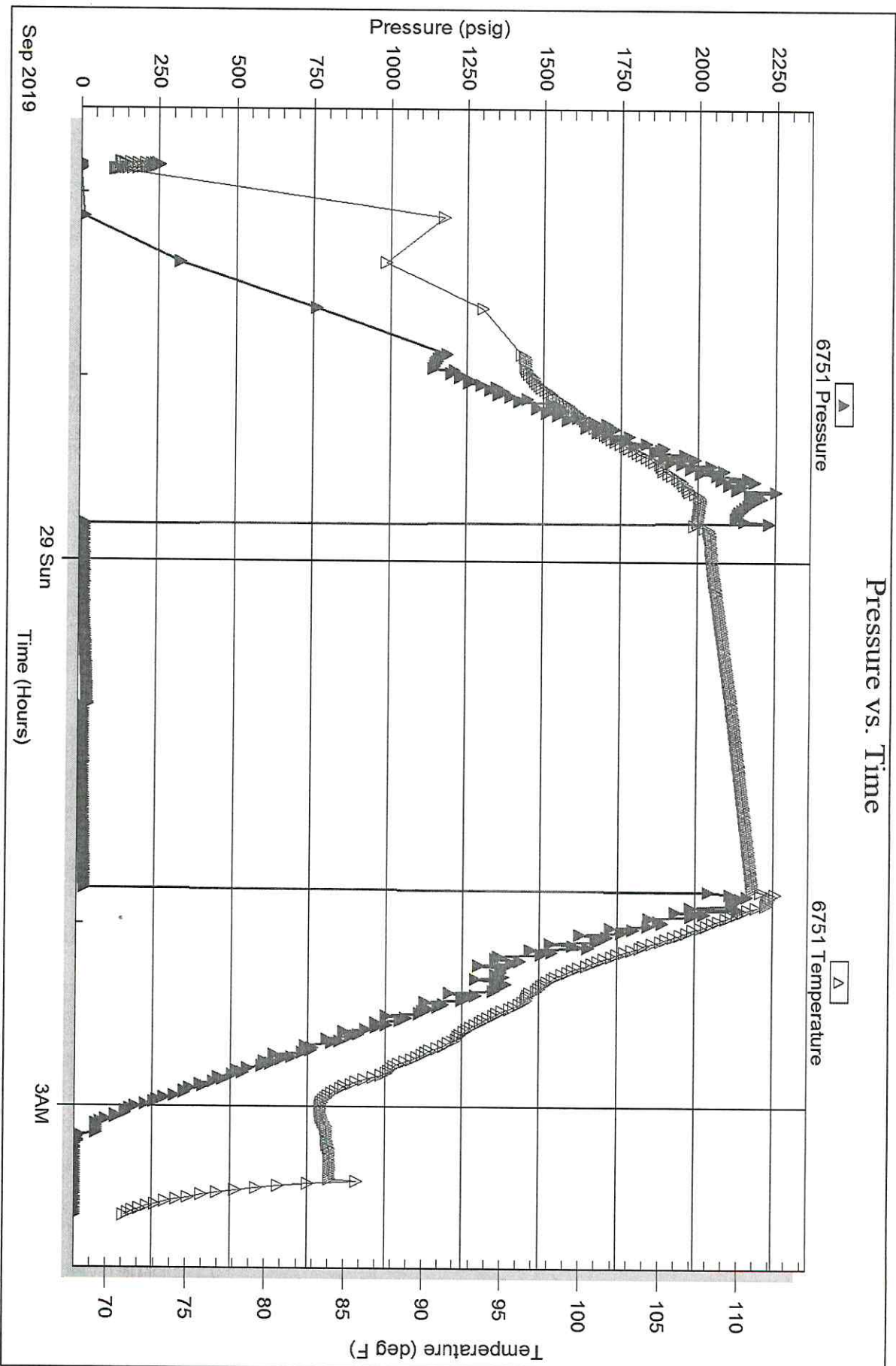


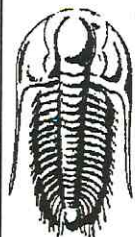
Serial #: 6751

Outside Hayes Oil & Gas

10-33S-12W Barber, KS

DST Test Number: 3





TRILOBITE
TESTING, INC

DRILL STEM TEST REPORT

FLUID SUMMARY

Hayes Oil & Gas

Kotzen-Heydenreich 1-10

PO Box 108
Attica, KS 67009

10-33S-12W Barber,KS

Job Ticket: 65912 **DST#: 2**

ATTN: Tim Hedrick

Test Start: 2019.09.28 @ 04:32:00

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

ppm

Viscosity: 63.00 sec/qt

Cushion Volume:

bbf

Water Loss: 9.79 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 7000.00 ppm

Filter Cake: 0.02 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbf
0.00	1976 GIP	0.000
65.00	GOCM 10%G 30%O 60%M	0.320

Total Length: 65.00 ft

Total Volume: 0.320 bbf

Num Fluid Samples: 0

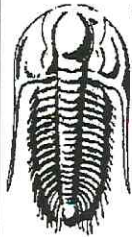
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Hayes Oil & Gas

PO Box 108
Attica, KS 67009

ATTN: Tim Hedrick

Kotzen-Heydenreich 1-10

10-33S-12W Barber,KS

Job Ticket: 65912

DST#: 2

Test Start: 2019.09.28 @ 04:32:00

GENERAL INFORMATION:

Formation: **Mississippi**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 07:20:47

Time Test Ended: 13:06:02

Test Type: Conventional Bottom Hole (Reset)

Tester: Leal Cason

Unit No: 74

Interval: **4357.00 ft (KB) To 4425.00 ft (KB) (TVD)**

Total Depth: 4425.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Good

Reference Elevations: 1496.00 ft (KB)

1484.00 ft (CF)

KB to GR/CF: 12.00 ft

Serial #: 8672

Inside

Press@RunDepth: 52.51 psig @ 4358.00 ft (KB)

Start Date: 2019.09.28

End Date: 2019.09.28

Capacity: psig

Last Calib.: 2019.09.28

Start Time: 04:32:01

End Time: 13:06:02

Time On Btm: 2019.09.28 @ 07:19:47

Time Off Btm: 2019.09.28 @ 11:10:47

TEST COMMENT: IF: Fair Blow , Built to 11 inches

IS: No Blow Back

FF: Strong Blow , BOB Immediate, Built to 71 3/4 inches

FSI: No Blow Back

PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2232.64	104.30	Initial Hydro-static
1	66.12	103.93	Open To Flow (1)
31	183.91	107.64	Shut-In(1)
91	1354.43	111.40	End Shut-In(1)
92	41.86	111.07	Open To Flow (2)
136	52.51	112.73	Shut-In(2)
226	1115.41	114.73	End Shut-In(2)
231	2151.58	115.22	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
0.00	1976 GIP	0.00
65.00	GOCM 10%G 30%O 60%M	0.32

* Recovery from multiple tests

Gas Rates

Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)

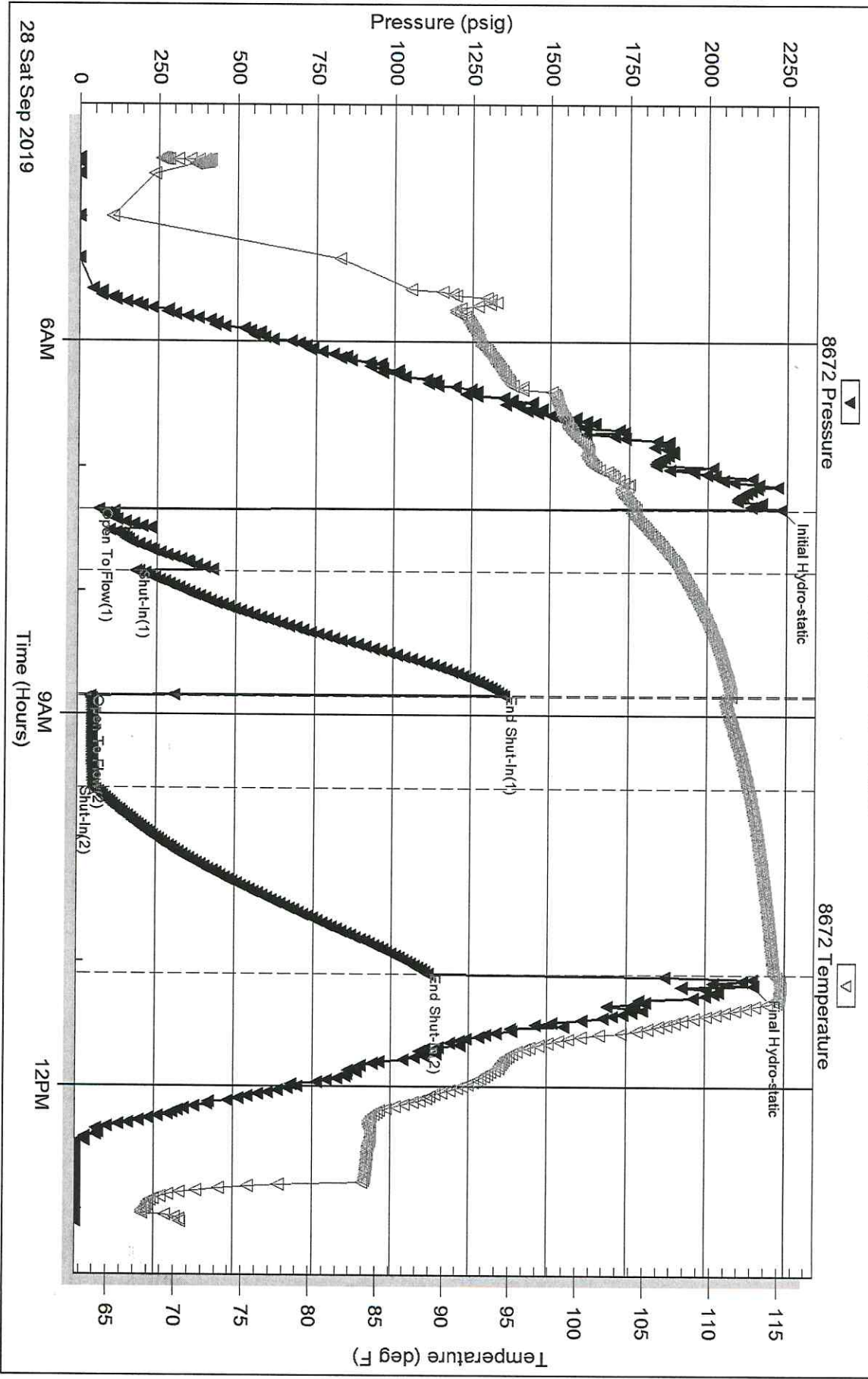
Serial #: 8672

Inside Hayes Oil & Gas

10-33S-12W Barber, KS

DST Test Number: 2

Pressure vs. Time

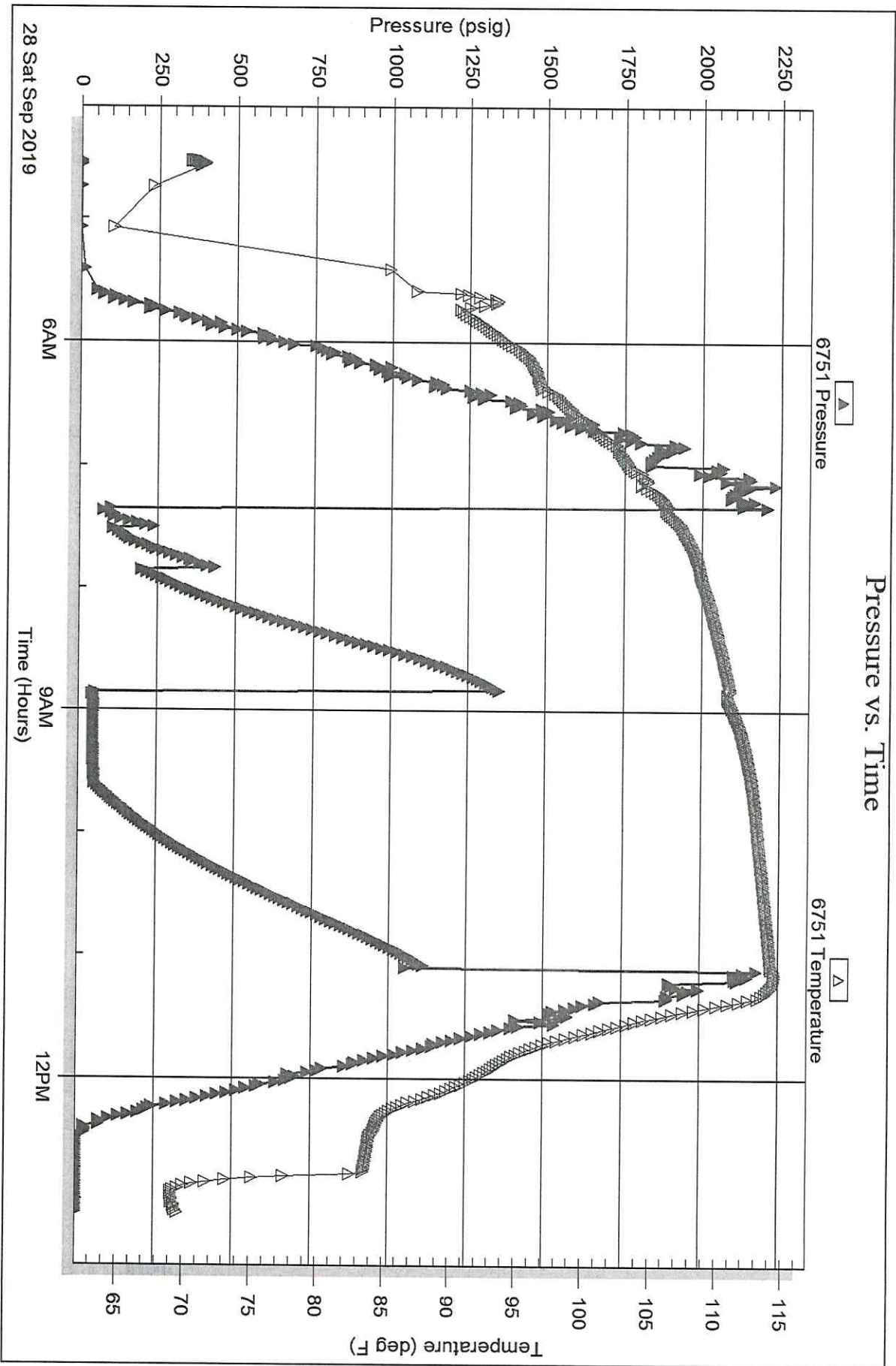


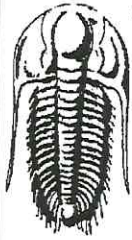
Serial #: 6751

Outside Hayes Oil & Gas

10-33S-12W Barber, KS

DST Test Number: 2





TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Hayes Oil & Gas

Kotzen-Heydenreich 1-10

PO Box 108
Attica, KS 67009

10-33S-12W Barber,KS

ATTN: Tim Hedrick

Job Ticket: 65914

DST#: 4

Test Start: 2019.09.30 @ 04:50:00

GENERAL INFORMATION:

Formation: **Simpson**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 07:26:17

Time Test Ended: 12:16:02

Test Type: Conventional Bottom Hole (Reset)

Tester: Leal Cason

Unit No: 74

Interval: 4780.00 ft (KB) To 4814.00 ft (KB) (TVD)

Reference Elevations: 1496.00 ft (KB)

Total Depth: 4814.00 ft (KB) (TVD)

1484.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Good

KB to GR/CF: 12.00 ft

Serial #: 8672

Inside

Press@RunDepth: 513.60 psig @ 4781.00 ft (KB)

Capacity: psig

Start Date: 2019.09.30

End Date: 2019.09.30

Last Calib.: 2019.09.30

Start Time: 04:50:01

End Time: 12:16:02

Time On Btm: 2019.09.30 @ 07:24:47

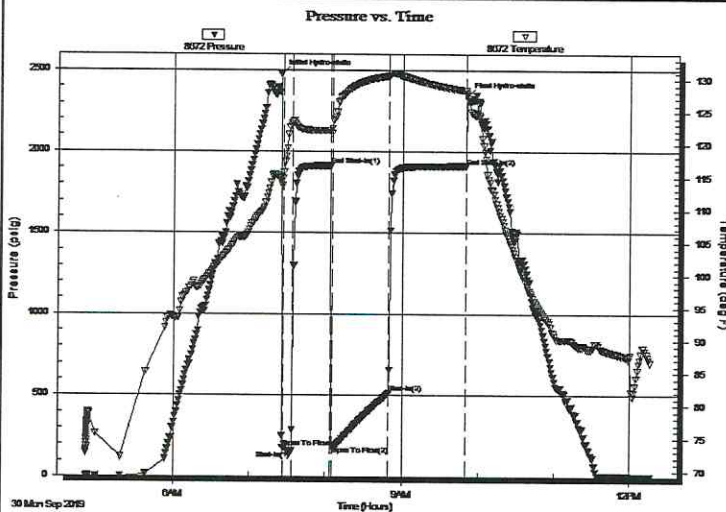
Time Off Btm: 2019.09.30 @ 09:50:47

TEST COMMENT: IF: Strong Blow, BOB in 2 minutes, Built to 61 inches

IS: No Blow Back

FF: Strong Blow, BOB in 4 minutes, Built to 115 inches

FS: 15 inch Blow Back



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2478.08	114.76	Initial Hydro-static
2	174.81	114.77	Open To Flow (1)
9	159.76	123.14	Shut-In(1)
39	1909.87	122.16	End Shut-In(1)
41	186.64	122.46	Open To Flow (2)
85	513.60	130.63	Shut-In(2)
145	1909.01	128.30	End Shut-In(2)
146	2344.20	127.90	Final Hydro-static

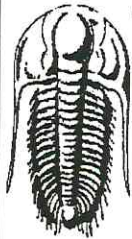
Recovery

Length (ft)	Description	Volume (bbl)
0.00	916 GIP	0.00
576.00	Water	6.98
128.00	OMCW 5%O 5%M 90%W	1.80
128.00	GOMCW 10%G 10%O 12%M 68%W	1.80
232.00	GOMCW 20%G 10%O 24%M 46%W	3.25

* Recovery from multiple tests

Gas Rates

Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Hayes Oil & Gas

PO Box 108
Attica, KS 67009

ATTN: Tim Hedrick

Kotzen-Heydenreich 1-10

10-33S-12W Barber,KS

Job Ticket: 65914 **DST#: 4**

Test Start: 2019.09.30 @ 04:50:00

GENERAL INFORMATION:

Formation: **Simpson**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 07:26:17

Time Test Ended: 12:16:02

Test Type: Conventional Bottom Hole (Reset)

Tester: Leal Cason

Unit No: 74

Interval: **4780.00 ft (KB) To 4814.00 ft (KB) (TVD)**

Total Depth: 4814.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Good

Reference Elevations: 1496.00 ft (KB)

1484.00 ft (CF)

KB to GR/CF: 12.00 ft

Serial #: 6751 Outside

Press@RunDepth: psig @ 4781.00 ft (KB)

Start Date: 2019.09.30

End Date: 2019.09.30

Capacity: psig

Last Calib.: 2019.09.30

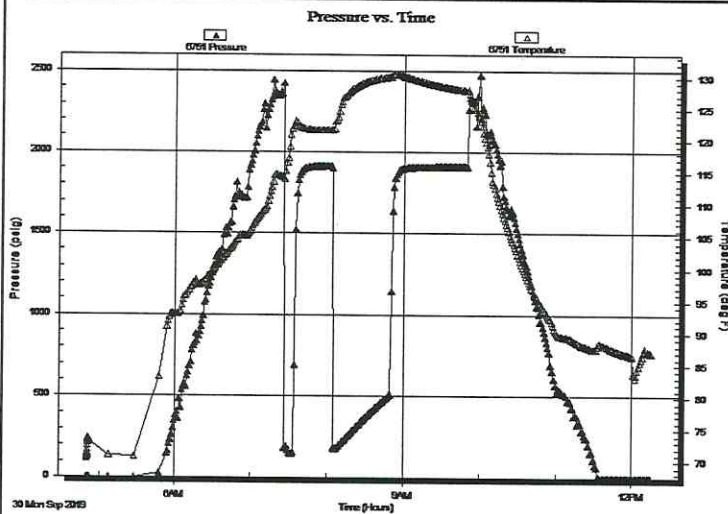
Start Time: 04:50:01

End Time: 12:16:02

Time On Btm:

Time Off Btm:

TEST COMMENT: IF: Strong Blow, BOB in 2 minutes, Built to 61 inches
 IS: No Blow Back
 FF: Strong Blow, BOB in 4 minutes, Built to 115 inches
 FS: 15 inch Blow Back



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation

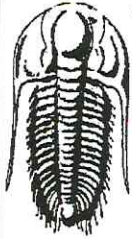
Recovery

Length (ft)	Description	Volume (bbl)
0.00	916 GIP	0.00
576.00	Water	6.98
128.00	OMCW 5%O 5%M 90%W	1.80
128.00	GOMCW 10%G 10%O 12%M 68%W	1.80
232.00	GOMCW 20%G 10%O 24%M 46%W	3.25

* Recovery from multiple tests

Gas Rates

Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Hayes Oil & Gas

Kotzen-Heydenreich 1-10

PO Box 108
Attica, KS 67009

10-33S-12W Barber,KS

ATTN: Tim Hedrick

Job Ticket: 65914

DST#: 4

Test Start: 2019.09.30 @ 04:50:00

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

76000 ppm

Viscosity: 57.00 sec/qt

Cushion Volume:

bbl

Water Loss: 11.19 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 7000.00 ppm

Filter Cake: 0.02 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
0.00	916 GIP	0.000
576.00	Water	6.978
128.00	OMCW 5%O 5%M 90%W	1.796
128.00	GOMCW 10%G 10%O 12%M 68%W	1.796
232.00	GOMCW 20%G 10%O 24%M 46%W	3.254

Total Length: 1064.00 ft

Total Volume: 13.824 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments: RW w as .09 @ 80 degrees

Serial #: 8672

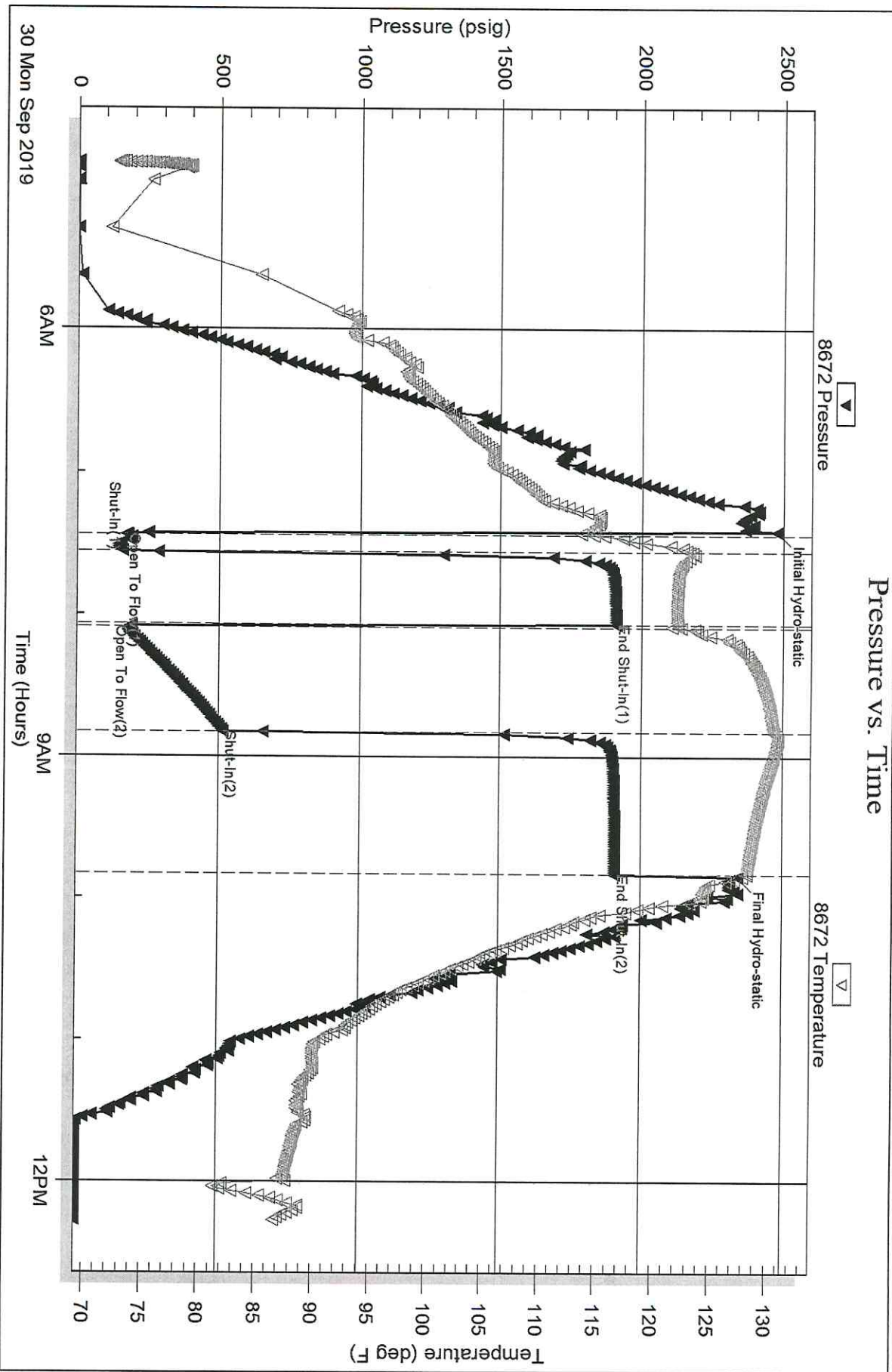
Inside

Hayes Oil & Gas

10-33S-12W Barber, KS

DST Test Number: 4

Pressure vs. Time

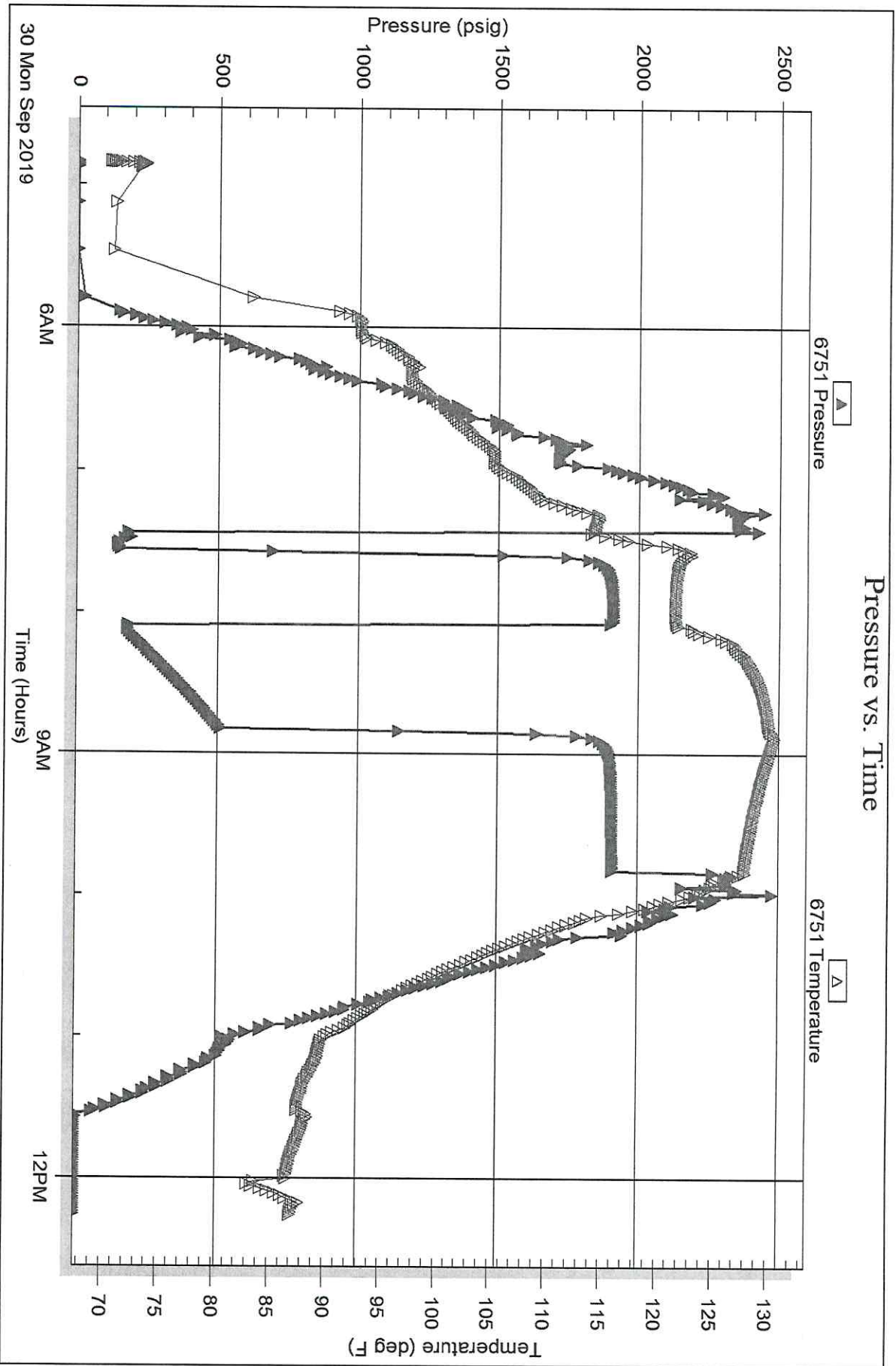


Serial #: 6751

Outside Hayes Oil & Gas

10-33S-12W Barber, KS

DST Test Number: 4





Scale 1:240 (5"=100') Imperial
Measured Depth Log

Well Name: Kotzen -Heydenreich # 1-10
Well Id:
Location: Sec 10 T33S R12W, Barber County, Kansas
License Number: 15-007-24358
Spud Date: Sept. 23, 2019
Surface Coordinates: 2310' FSL & 1750' FEL
Region:
Drilling Completed: Sept. 30, 2019

Bottom Hole
Coordinates:
Ground Elevation (ft): 1484' K.B. Elevation (ft): 1496'
Logged Interval (ft): 3600' To: 4925' Total Depth (ft): 4925'
Formation: VIOLA / SIMPSON
Type of Drilling Fluid: Natural Chemical

Printed by WellSight LogViewer from WellSight Systems 1-800-447-1534 www.WellSight.com

OPERATOR

Company: HAYES OIL & GAS LLC
Address: PO BOX 108
ATTICA, KS. 67009-0108

GEOLOGIST

Name: TIM HEDRICK
Company: EARTH TECH OGL, INC
Address: PO BOX 683
HOOKER, OKLA, 73945
OFF-580-652-3924 CELL 580-754-0062



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Hayes Oil & Gas
 PO Box 108
 Attica, KS 67009
 ATTN: Tim Hedrick

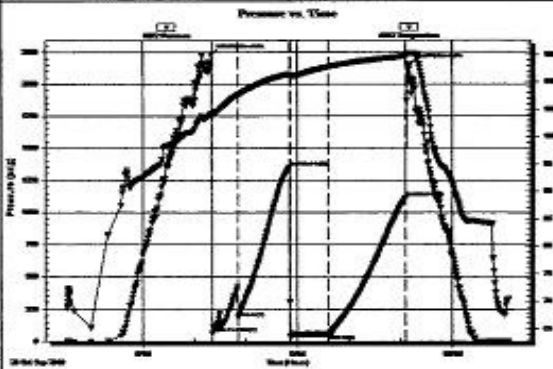
Kotzen-Heydenreich 1-10
10-33S-12W Barber, KS
 Job Ticket: 65912 DST#: 2
 Test Start: 2019.09.28 @ 04:32:00

GENERAL INFORMATION:

Formation: **Mississippi**
 Deviated: **No Whipstock** ft (KB)
 Time Tool Opened: 07:20:47
 Time Test Ended: 13:06:02
 Interval: **4357.00 ft (KB) To 4425.00 ft (KB) (TVD)**
 Total Depth: **4425.00 ft (KB) (TVD)**
 Hole Diameter: **7.88 inches** Hole Condition: **Good**
 Test Type: **Conventional Bottom Hole (Reset)**
 Tester: **Leal Cason**
 Unit No: **74**
 Reference Elevations: **1496.00 ft (KB)**
1484.00 ft (CF)
 KB to GRFCF: **12.00 ft**

Serial #: 8672 **Inside**
 Press@RunDepth: **52.51 psig @ 4358.00 ft (KB)** Capacity: psig
 Start Date: **2019.09.28** End Date: **2019.09.28** Last Calib.: **2019.09.28**
 Start Time: **04:32:00** End Time: **13:06:02** Time On Btm: **2019.09.28 @ 07:19:47**
 Time Off Btm: **2019.09.28 @ 11:10:47**

TEST COMMENT: F: Fair Blow, Built to 11 inches
 St No Blow Back
 FF: Strong Blow, BOB Immediate, Built to 71 3/4 inches
 FST No Blow Back



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2232.64	104.30	Initial Hydro-static
1	66.12	103.93	Open To Flow (1)
31	183.91	107.64	Shut-In(1)
91	1354.43	111.40	End Shut-In(1)
92	41.86	111.07	Open To Flow (2)
136	52.51	112.73	Shut-In(2)
226	1115.41	114.73	End Shut-In(2)
231	2151.58	115.22	Final Hydro-static

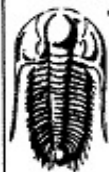
Recovery

Length (ft)	Description	Volume (bbl)
0.00	1976 GP	0.00
65.00	GOCM 10%G 30%O 60%M	0.32

* Recovery from multiple tests

Gas Rates

Choke (inches)	Pressure (psig)	Gas Rate (Mcf/D)



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Hayes Oil & Gas

Kotzen-Heydenreich 1-10

PO Box 108
Attica, KS 67009

10-33S-12W Barber, KS

Job Ticket: 65913 **DST#: 3**

ATTN: Tim Hedrick

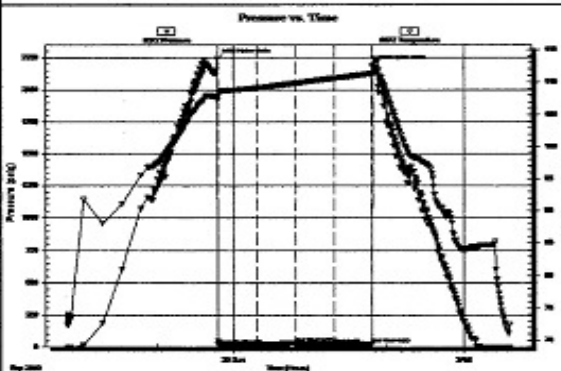
Test Start: 2019.09.28 @ 21:50:00

GENERAL INFORMATION:

Formation: **Mississippi**
 Deviated: No Whipstock: ft (KB)
 Test Type: Conventional Bottom Hole (Reset)
 Time Tool Opened: 23:48:02
 Tester: Leal Cason
 Time Test Ended: 03:36:02
 Unit No: 74
 Interval: **4423.00 ft (KB) To 4445.00 ft (KB) (TVD)**
 Reference Elevations: 1496.00 ft (KB)
 Total Depth: **4445.00 ft (KB) (TVD)**
 1484.00 ft (CF)
 Hole Diameter: 7.88 inches
 Hole Condition: Good
 KB to GR/CF: 12.00 ft

Serial #: **8672** Inside
 Press@RunDepth: 19.58 psig @ 4424.00 ft (KB) Capacity: psig
 Start Date: 2019.09.28 End Date: 2019.09.29 Last Calb.: 2019.09.29
 Start Time: 21:50:00 End Time: 03:36:02 Time On Btm: 2019.09.28 @ 23:47:02
 Time Off Btm: 2019.09.29 @ 01:49:17

TEST COMMENT: F: Fair Blow, Built to 10 1/2 inches
 E: No Blow Back
 FF: Weak 1/2 inch Blow
 FST: No Blow Back



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2241.25	107.79	Initial Hydro-static
1	17.78	107.87	Open To Flow (1)
32	18.98	109.14	Shut-in(1)
61	31.37	109.87	End Shut-in(1)
62	16.48	109.88	Open To Flow (2)
92	19.58	110.63	Shut-in(2)
122	26.39	111.36	End Shut-in(2)
123	2188.42	113.71	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
15.00	Mud	0.07

* Recovery from multiple tests

Gas Rates

Choke (inches)	Pressure (psig)	Gas Rate (Mc/d)



TRIBOLITE TESTING, INC.

DRILL STEM TEST REPORT

Hayes Oil & Gas
 PO Box 108
 Attica, KS 67009
 ATTN: Tim Hedrick

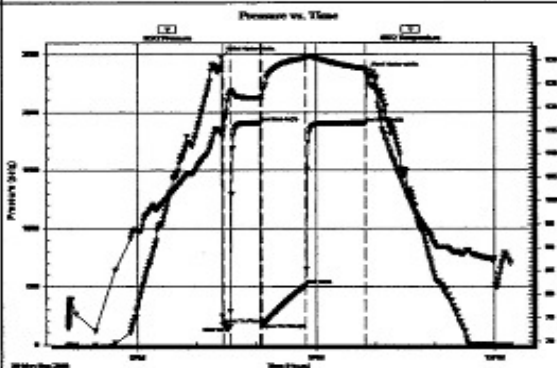
Kotzen-Heydenreich 1-10
10-33S-12W Barber, KS
 Job Ticket: 65914 DST#: 4
 Test Start: 2019.09.30 @ 04:50:00

GENERAL INFORMATION:

Formation: Simpson
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 07:26:17
 Time Test Ended: 12:16:02
 Interval: 4780.00 ft (KB) To 4814.00 ft (KB) (TVD)
 Total Depth: 4814.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Good
 Test Type: Conventional Bottom Hole (Reset)
 Tester: Leal Cason
 Unit No: 74
 Reference Elevations: 1496.00 ft (KB)
 1484.00 ft (CF)
 KB to GR/CF: 12.00 ft

Serial #: 8672 Inside
 Press@RunDepth: 513.60 psig @ 4781.00 ft (KB) Capacity: psig
 Start Date: 2019.09.30 End Date: 2019.09.30 Last Calib.: 2019.09.30
 Start Time: 04:50:00 End Time: 12:16:02 Time On Btm: 2019.09.30 @ 07:24:47
 Time Off Btm: 2019.09.30 @ 09:50:47

TEST COMMENT: IF: Strong Blow, BOB in 2 minutes, Built to 61 inches
 IS: No Blow Back
 FF: Strong Blow, BOB in 4 minutes, Built to 115 inches
 FST: 15 inch Blow Back



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2478.08	114.76	Initial Hydro-static
2	174.81	114.77	Open To Flow (1)
9	159.76	123.14	Shut-In(1)
39	1909.87	122.16	End Shut-In(1)
41	186.64	122.46	Open To Flow (2)
85	513.60	130.63	Shut-In(2)
145	1909.01	128.30	End Shut-In(2)
146	2344.20	127.90	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
0.00	916 GP	0.00
576.00	Water	6.98
128.00	GOMCW 5%O 5%M 90%W	1.80
128.00	GOMCW 10%G 10%O 12%M 68%W	1.80
232.00	GOMCW 20%G 10%O 24%M 46%W	3.25

* Recovery from multiple tests

Gas Rates

	Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)

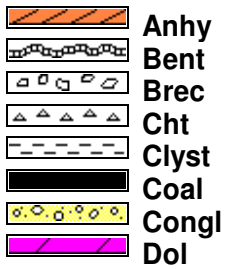
Tribolite Testing, Inc

Ref. No: 65914

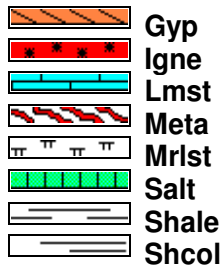
Printed: 2019.09.30 @ 12:23:22

DEPTH	DATE	WT	VIS	PV	YP	G5	PH	WL	CHL	CAL	LCM
2823	25-Sep	9.4	30	16	18	10 36	7	N/C	74K	HVY	0
3823	26-Sep	9.2	54	16	16	12 52	10.5	8.8	4K	80	2
4061	27-Sep	9.3	54	16	16	12 52	10.5	9.8	7K	80	2.5
4425	28-Sep	9.3	62	20	19	10 48	10.5	8	6K	80	2.5
18-Jul	29-Sep	9.4	57	15	15	14 52	10	11.2	7K	80	2.5
4814	30-Sep	9.4	58	17	21	11 52	10	10.4	5.5K	60	2.5

ROCK TYPES



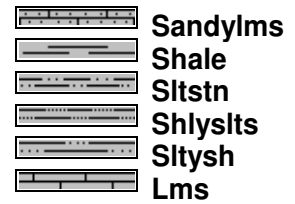
Anhy
Bent
Brec
Cht
Clyst
Coal
Congl
Dol



Gyp
Igne
Lmst
Meta
Mrlst
Salt
Shale
Shcol



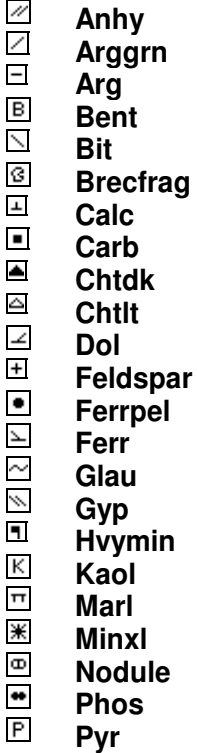
Shgy
Sltst
Ss
Till
Carb sh
Dol
Dtd
Gry sh



Sandylms
Shale
Sltstn
Shlyslts
Sitysh
Lms

ACCESSORIES

MINERAL

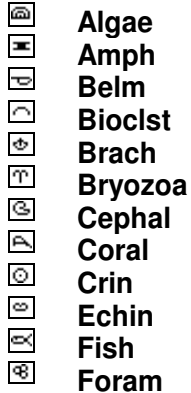


Anhy
Arggrn
Arg
Bent
Bit
Brecfrag
Calc
Carb
Chtdk
Chtlt
Dol
Feldspar
Ferrpel
Ferr
Glau
Gyp
Hvymin
Kaol
Marl
Minxl
Nodule
Phos
Pyr

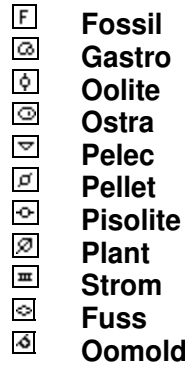


Salt
Sandy
Silt
Sil
Sulphur
Tuff
Chlorite
Dol
Sand
Sity

FOSSIL

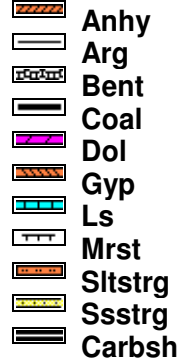


Algae
Amph
Belm
Bioclst
Brach
Bryozoa
Cephal
Coral
Crin
Echin
Fish
Foram



Fossil
Gastro
Oolite
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Pelec
Pellet
Pisolite
Plant
Strom
Fuss
Oomold

STRINGER

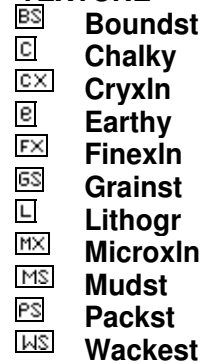


Anhy
Arg
Bent
Coal
Dol
Gyp
Ls
Mrst
Sltstrg
Ssstrg
Carbsh



Clystn
Dol
Grysh
Gryslt
Lms
Sandylms
Sh
Sltstn

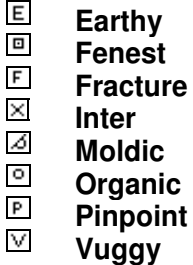
TEXTURE



Boundst
Chalky
Cryxln
Earthy
Finexln
Grainst
Lithogr
Microxln
Mudst
Packst
Wackest

OTHER SYMBOLS

POROSITY TYPE



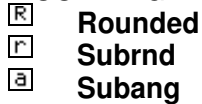
Earthy
Fenest
Fracture
Inter
Moldic
Organic
Pinpoint
Vuggy

SORTING



Well
Moderate
Poor

ROUNDING



Rounded
Subrnd
Subang



Angular

OIL SHOWS



Even
Spotted
Ques
Dead
Gas show

INTERVALS

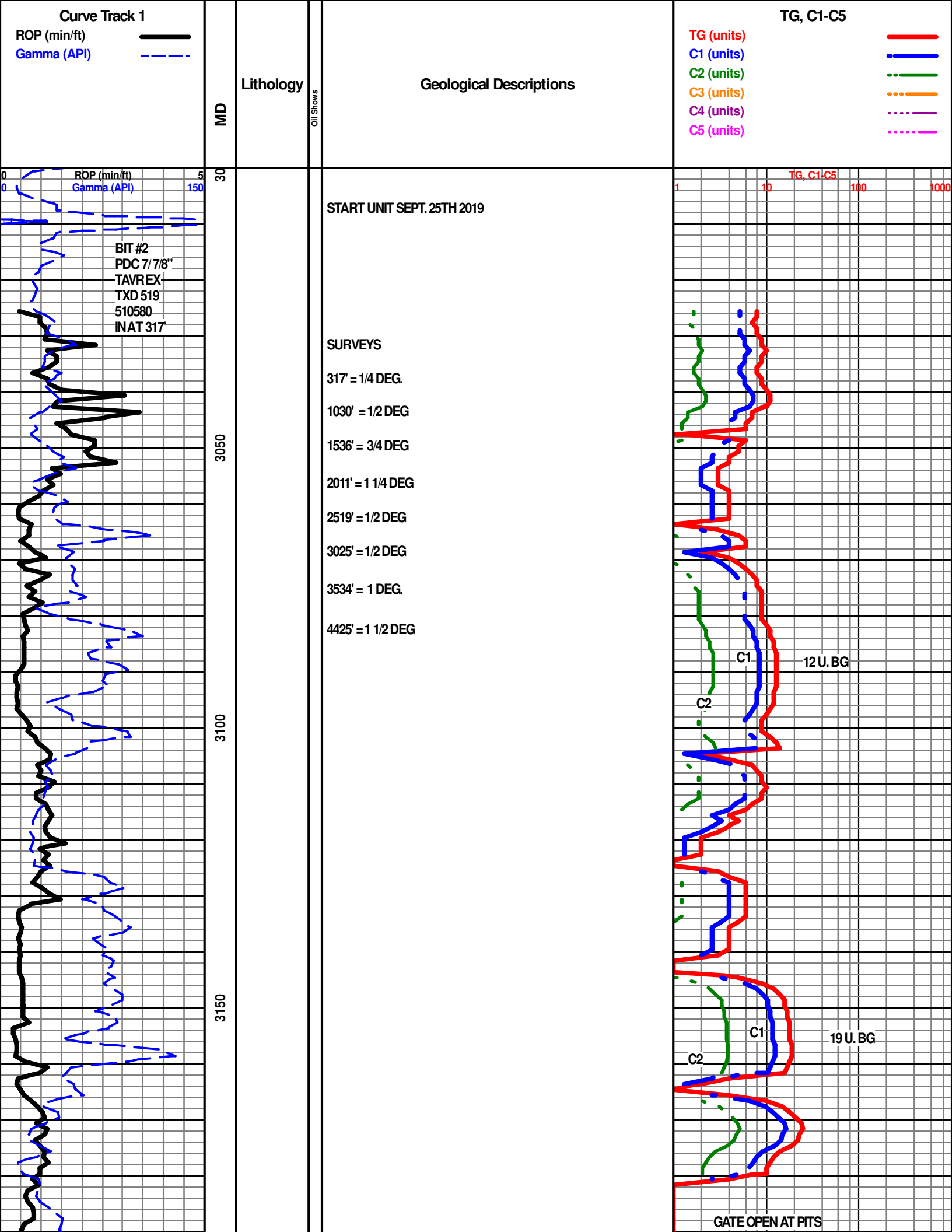


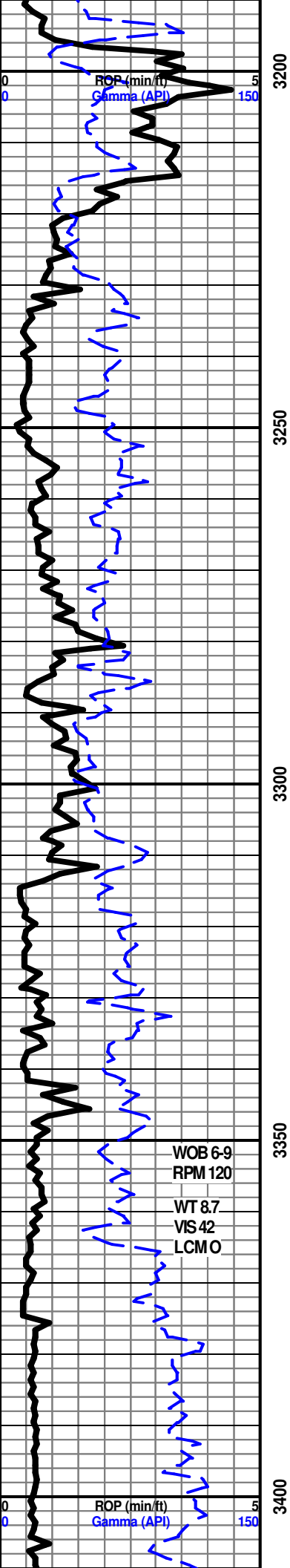
Core
Dst
Dst

EVENTS

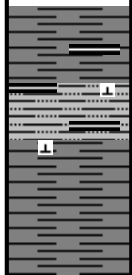


Rft
Sidewall



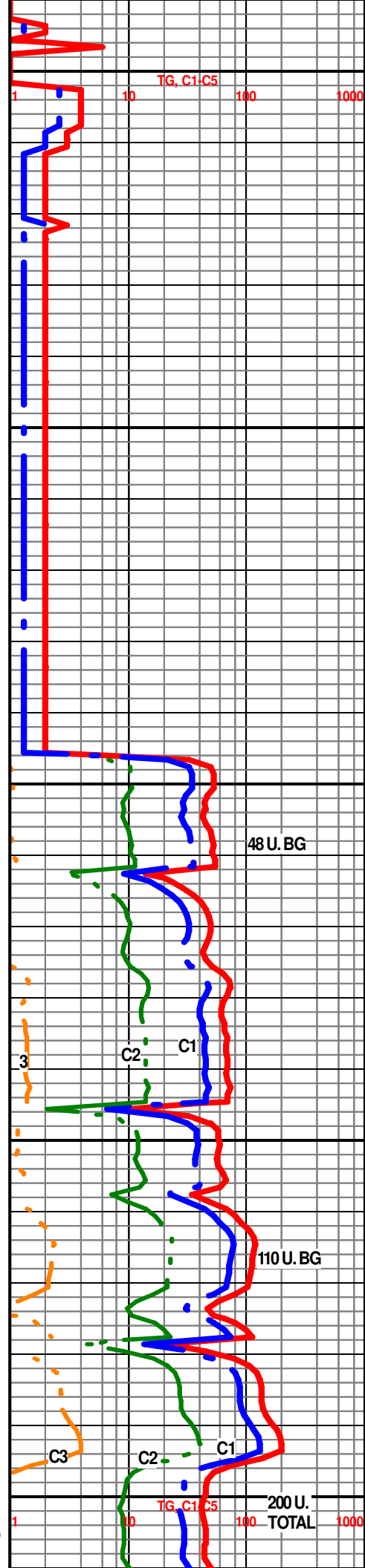


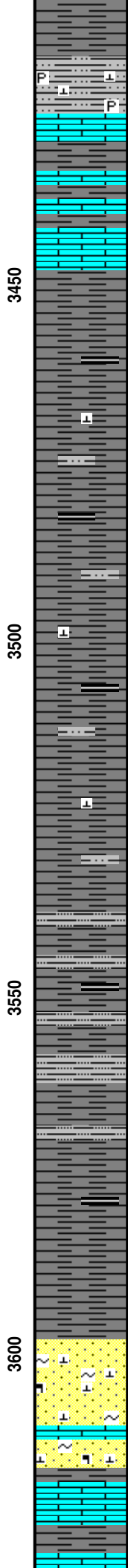
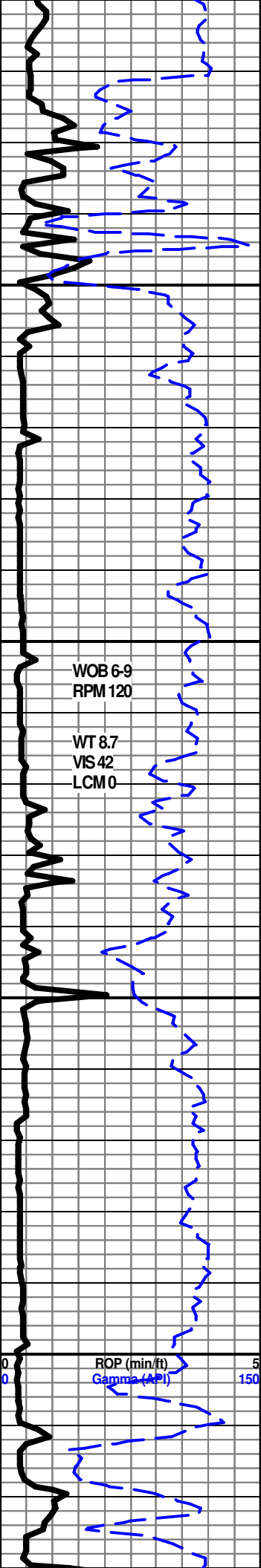
WOB 6.9
RPM 120
WT 8.7
VIS 42
LCMO



SH- V/ DK GRY TO BLK- FRM BLKY V/ GRNY TXT DISS BLK
CARB SH THRU, TR CALC IP

SH- LT TO MED GRY- FRM BLKY GRNY TXT , SLI TOV/ CALCTO
SILTY IP





SILST- LT TO MED GY- HD TT TO SFT IP, ABDT EMBED
 VV/FN-GRN QURTZ, V/ CALC IP, HVY MIN CONTENT, DISS PYR
 SCAT THRU, NOFLO, NO VISPOR, NO VISSHOW

LS- CRM LT GY IP, HD DNS TO BRITT, MED XLN TO SUCRO IP,
 IMBD LT GRY SH IP, LT BRIT YEL MIN FLO, NO VIS POR, NO VIS
 SHOW

SH- LT TO MED GRY-FRM BLKY SMOOTH TXT, SLI CAL IPTO SLI
 SILTY TR DISS BLK CARB SH IP

SHLSILTS- LT GRY TO GRY-FRM BLKY SMOOTH TXT TO
 GRNY IP, HVY TR IMBD DISS SH IP, TR DISS BLK CARB SH IP, NO
 FLO, NO VIS POR. NO VIS SHOW

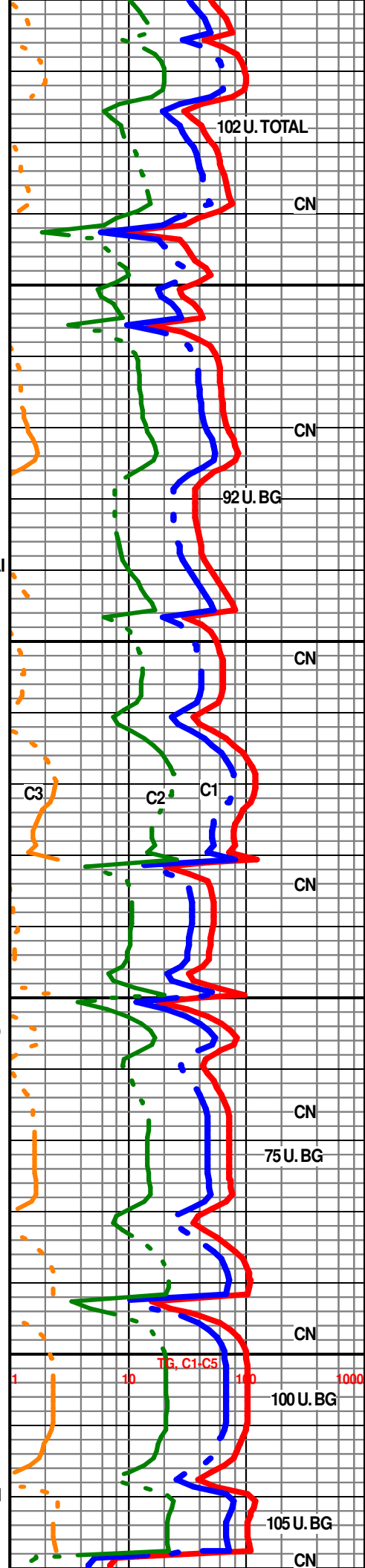
SS-CRM OFF WHT-HD TT TO V/ FRI IP, MED TO CRS GRNS, ANG
 TO S-ANG TR S-RND, FR SRT, FRSTY GRAINS, V/ CALC CMNT
 IPSIL CMNT IP, GLAUC IP, HVY MIN CNTNT IP, NO FLO, NO VIS
 POR, NO VIS SHOW

LS-CRM TNLT BRN- HD DNS TR BRITT, F-XLN TO CRYPTO-XLN
 IP, SLI TR SUCRO IP, NO FLO, NO VIS POR

WOB 6-9
 RPM 120

 WT 8.7
 VIS 42
 LCM 0

ROP (min/ft)
 Gamma (API)



102 U. TOTAL

CN

CN

92 U. BG

CN

C3

C2

C1

CN

CN

75 U. BG

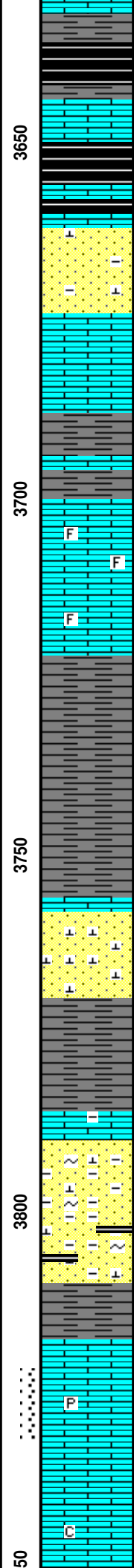
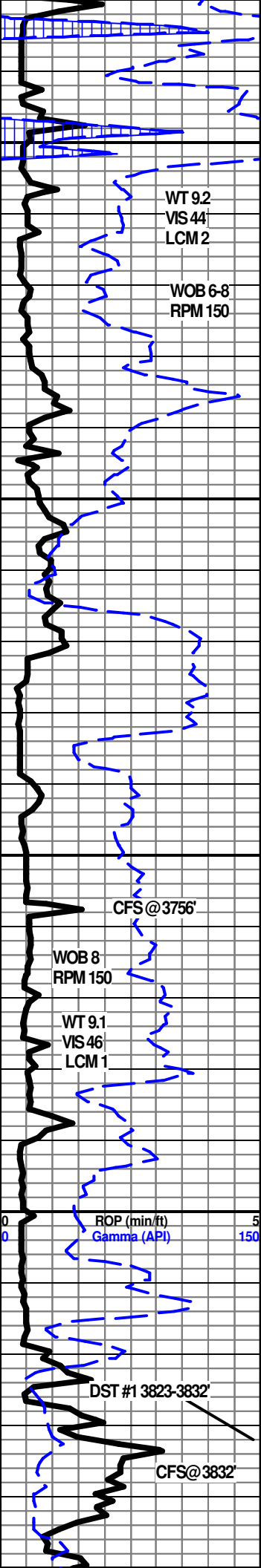
CN

100 U. BG

105 U. BG

CN

TG, C1-C5
 1 10 100 1000



SH- BLK SFT CARB

E-LOG HEEBNER 3642' -2146'

HEEBNER 3648' -2152'

SH- BLK SFT CARB

SS- FRSTY WHT- HD TT SLI TR FRI, F- V/FN-GRN, WELL SRT , ANG TO S-ANG, FRSTY GRAINS, SIL CMNT, SLI TR CALC CMNT, TR IMBD DISS SH IP, NO FLO, NO VIS POR, NO VIS SHOW OR CUT

LS- CRM LT TN TN - HD DNS, V/F-CRYPTO-XLN, TR IMBD LT SH IP, NO FLO, NO VIS POR, NO VIS SHOW OR CUT

LS- CRM LT TN OFF WHT - HD DNS, SLI TR BRITT IP, MED-FN -XLN RE-XLN MTRX IP, HVY TR S-CHLKY, IMBD SCAT FOSS FRGS IP, V/ DLL YEL MIN FLO, NO VIS POR, NO VIS SHOW OR CUT

SH- LT TO MED GY-FRM BLKY SMOOTH TXT

SS- FRSTY WHT CRM- HD TT TO FRI IP, F-MED GRN QURTZ, FRSTY GRAINS, ANG TO S-ANG, CALC TO LMY CMNT, TR SCAT IMBD DISS BLK CARB SH IP, SLI TR GLAUC, NO FLO, NO VIS POR, NO VIS SHOW

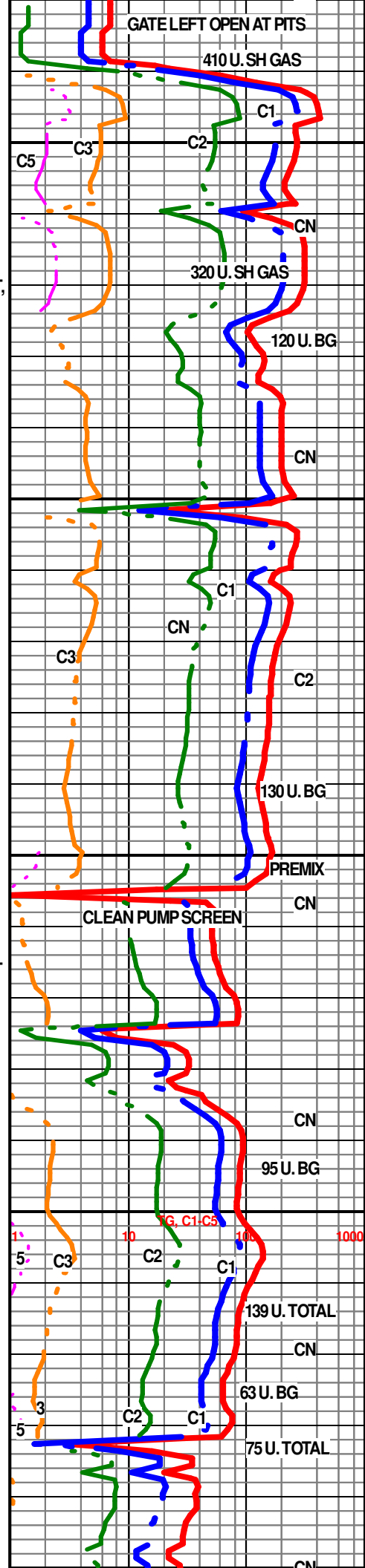
E-LOG DOUGLAS SS 3784'-2288'

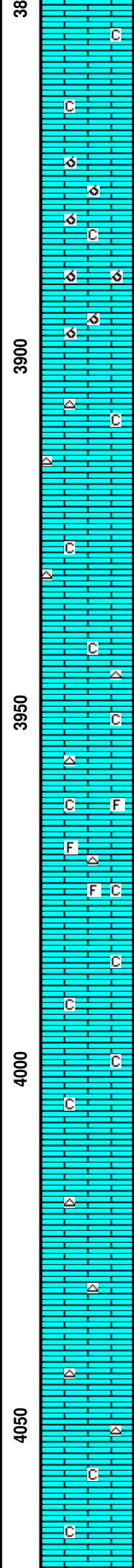
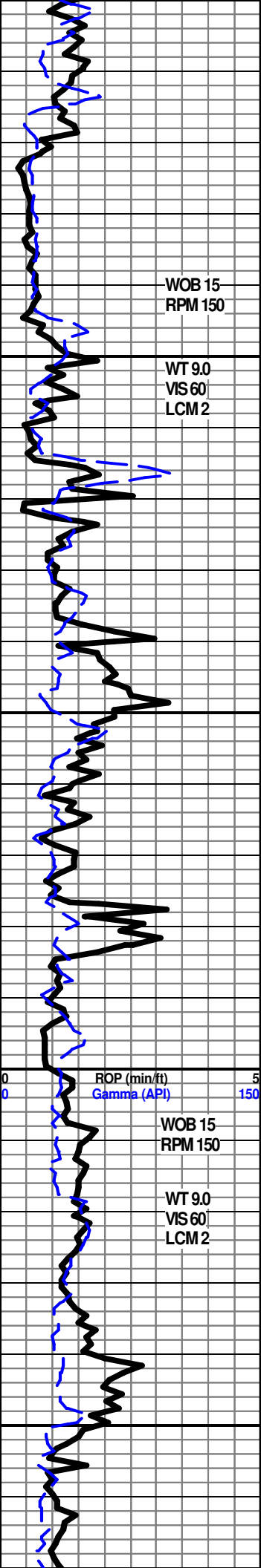
SS- OFF WHT FRSTY - HD TT TO FRI, F-MED GRN QURTZ, FRSTY GRAINS, S-ANG TO S-RND, CLEAR GRAINS, SIL TO CALC CMNT IP, SCAT IMBD DK GY TO DISS BLK CARB SH IP, GLAUC, NO FLO, NO VIS POR, NO VIS SHOW

E-LOG LANSING 3816' - 2320'

LANSING 3819' - 2323'

LS- CRM LT TN TN (TN OIL STN SCATTERED IN 70%) HD DNS, SLI TR BRITT, F-XLN, SLI SUCRO IP, IMBD SMLL CALC XLS IP, TR DISS PYR SCAT, BRIT YEL GLD FLO THRU, PR TO FR VIS MICRO PP POR, POSS FRACT POR IP, GD FLUSH CUT , GD SLO STRM CUT THRU, GD OIL ODOR,





LS- WHT OFF WHT CRM - HD DNS F-XLN TO V/S-CHLKY,ABDT FREE SFT WHT CHLK, V/ DLL YEL MIN FLO,NO VIS POR, NO VIS SHOW OR CUT

LS-OFF WHT CRM BFF- HD BRITT, MD-XLN TO SUCRO, RE-XLN MTRX, V/ OOLCAST TO SLI OOLITIC THRU, SMLL CALC XLS IN POR, HVY TR SFT WHT CHLK IP, LT BRIYEL MIN FLO, GD VIS SCATTERED OOLCAST POR & INTER-XLN POR IP, NO VIS SHOW OR CUT

LS- CRM TN OFF WHT- HD V/ BRITT, V/ SUCRO MTRX TO F-XLN, RE-XLN MTRX TR SFT WHT CHLK IP, TR FREE LRGE CALC XLS SCATTERED, HVY TR TAN CHERT IP, LT BRIT YEL MIN FLO, GD VIS VUG TO PP POR IP, NO VIS SHOW OR CUT

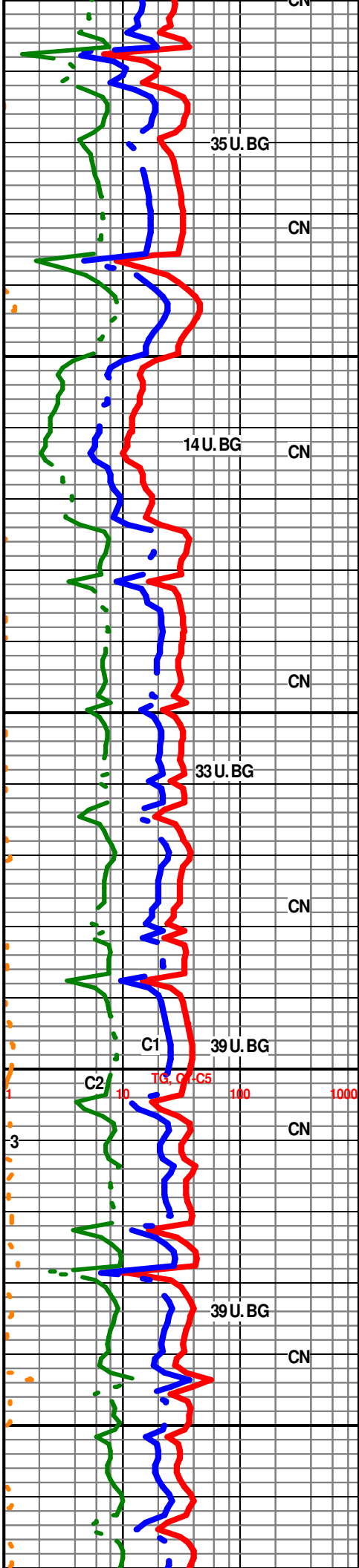
LS- CRM LT TN OFF - HD DNS TO TRACE BRITT , MED-XLN , S-CHLKY IP , TR FREE SFT CHLK, TAN TRANSLCNT CHERT, LT YEL MIN FLO,NO VIS POR, NO VIS SHOW OR CUT

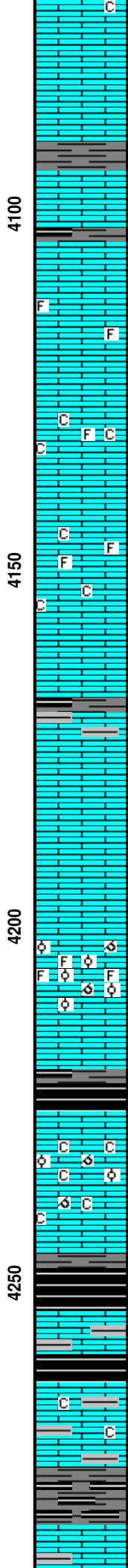
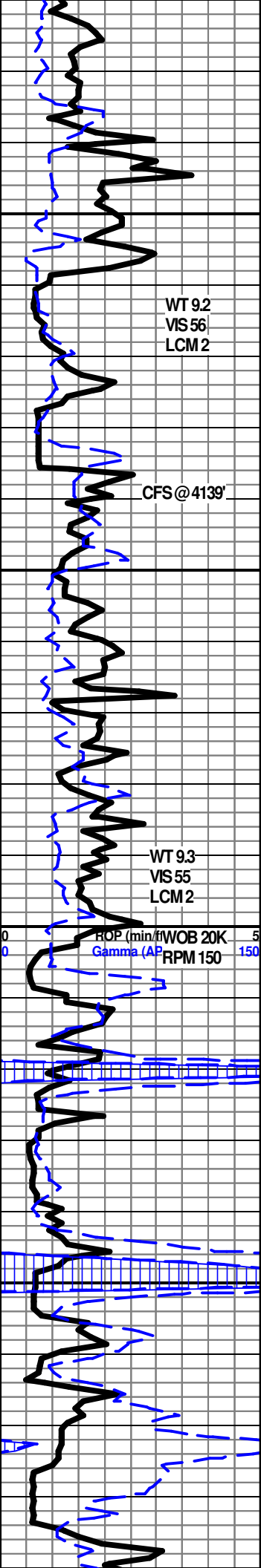
LS- OFF WHT CRM BFF- HD BRITT, MED-XLN RE-XLN MTRX ,ABDT EMBED FOSS FRGS IP, V/S-CHLKY IP, LT TAN CHERT IP, LT YEL MIN FLO, PR VIS INTER-XLN POR SCAT IP, NO VIS SHOW OR CUT

LS- OFF WHT CRM BFF- HD BRITT, SUCRO-S-CHLKY MTRX, TR FREE SFT WHT CHLK, TR FOSS FRGS,LT YEL MIN FLO IP, NO VIS POR, NO VIS SHOW OR CUT

LS- CRM LT TN BRN IP, HD DNS V/F-CRYPTO-XLN, TR TRANSLCNT CLR CHERT, LT BRIT YEL SCAT MIN FLO IP TO NO FLO, NO VIS POR, NO SHOW

LS- WHT OFF WHT CRM, FRM IP TO HD, F-XLN IP,ABDT FRM CHLK THRU , TR CHLKY OOLITES IP,SCATTERED LT YEL MIN FLO, NO VIS POR, NO VIS SHOW





SH- LT TO MED GY- FRM BLKY CALC IP SMOOTH TXT

4108-4118' LS-CRM BFF- HD V/ BRITT, MED-XLN TO SUCRO MTRX, SMLL ANGL LM GRNS THRU, SMLL CALC XLS IMBD THRU, LT BRIT YEL FLO THRU, V/ GD VIS INTER-XLN POR, TR MICRO VUG POR IP, V/ LT GSSY RING CUT

4127-4136' LS CRM BFF OFF WHT- HD DNS TO V/ BRITT, F-XLN TO CRYPTO-XLN, IMBD FOSS FRGS, TR LRGE CALC, SCATT IMBD SFT CHLK IP, LT BRIT YEL FLO THRU, PR SCAT VUG POR, FR SCAT INTER-XLN POR, NO VIS CUT OR SHOW

LS- CRM OFF WH - HD DNS TO BRITT, V/ TT SUCRO MTRX, V/ S-CHLKY, TR FOSS FRGS IP, NO FLO, NO VIS POR, NO VIS SHOW

LS- TN GY DK GY- HD DNS V/ TT SUCRO MTRX, V/ ARG TO SHLY, W/ TR IMBD BLK CARB SH IP, NO FLO, NO VIS POR, NO VIS SHOW OR CUT

LS- CRM LT TN BRN, HD DNS V/F-CRYPTO-XLN, SLI TR S-LITHO, DLL YEL MIN FLO IP, NO VIS POR, NO VIS SHOW

4203-4209' LS- LT TN BRN- HD V/ BRITT, MED-XLN, V/ RE-XLN MTRX, ABDT IMBD FOSS, MICRO OOLITIC THRU, SCATTERED MICRO OOLICAST THRU, TR LARG CALC XLS IMBD IP, NO FLO, V/ GD OOLICAST, MICRO VUGAND FR INTER-XLN POR THRU, NO VIS SHOW OR CUT

E-LOG STARK 4218' -2722'

STARK 4220' - 2724'

SH- BLK SFT CARB

SWOPE 4227' - 2731'

LS-OFF WHT WHT CRM- HD BRITT IP RE-XLN, V/ OOLICAST, SLO OOLITIC, ABDT SFT WHT CHLK IMBD & FREESFT WHT CHLK, TR LT BRIT MIN FLO, PR VIS OOLICAST POR, NO VIS CUT

E-LOG HUSHPUCKNEY 4246'-2750'

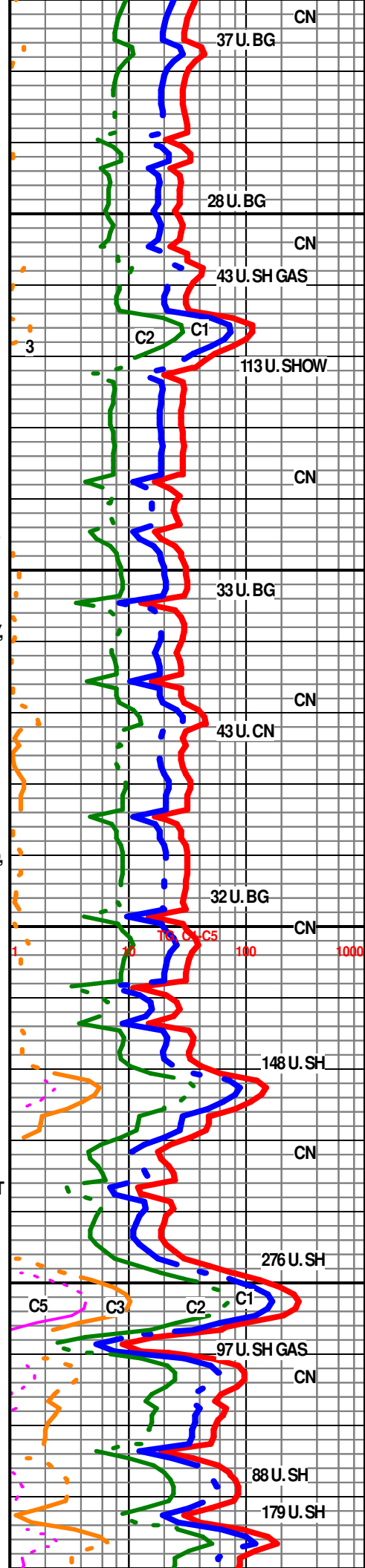
HUSHPUCKNEY 4247' - 2751'

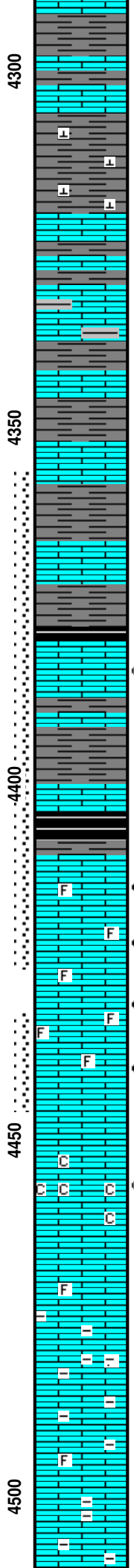
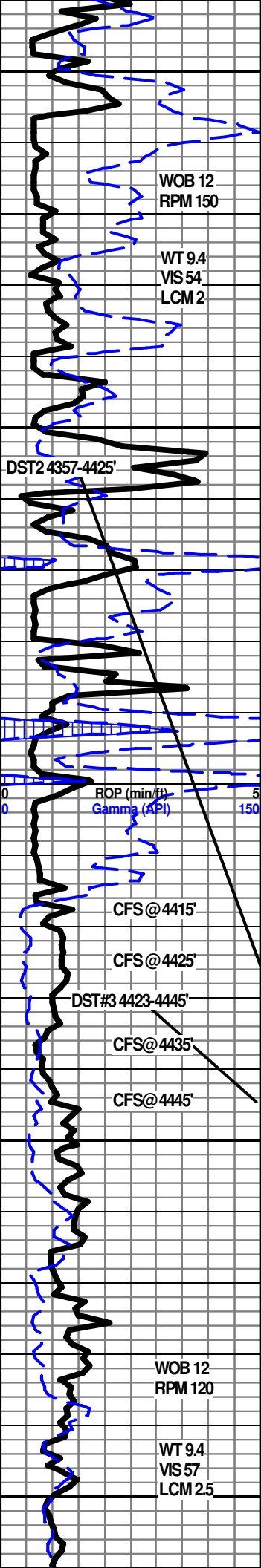
SH- BLK SFT CARB

LS- CRM LT TN LT GY- HD DNS TO BRITT, F-XLN TO SUCRO V/ S-CHLKY, TR IMBD LMNTD LT GY SH IP, DLL YEL MIN FLO, NO VIS POR, NO VIS SHOW

SH- BLK SFT CARB, SLI TO V/ CALC

LS- CRM LT TN BRN, HD DNS V/F-XLN TO CRYPTO-XLN, IMBD W/





LS- CRM IN LT BRN- HD DNS, F-XLN TO CRYPTO-XLN IP, W/ IMBD GY SH IP, NO FLO, NO VIS POR, NO VIS SHOW

SH- DK GY TO BLK SFT CARB IP, V/ CALC IP

LS- TN BRN GY- HD DNS MOTT IP, V/F-CRYPTO-XLN, IMBD DK GY SH IP, V/ DLL YEL FLO, NO VIS POR, NO VIS SHOW

SH- LT GREEN TO LT GY, SMOOTH WXY TXT, TR IMBD QURTZ GRNS IP, SLI CALC

LS- WHT OFF WHT CRM- HD DNS TR BRITT, F-CRYPTO-XLN, SLI TR S-LITHO IP, NO FLO, NO VIS POR, NO VIS SHOW

SH- LT GREEN FRM BLKY SMOOTH TXT TO BLK SFT CARB IP

E-LOG CHEROKEE 4368'-2872'

CHEROKEE 4372' - 2876'

LS-OFF WHT TN BLK (DUE TO ASPHT STN) HD DNS F-XLN TO V/ TT SUCRO MTRX, ABDT SCAT ASHPHLT STN NO FLO TO TR BRIT YELGLD GLO IN 10%, FR STRM CUT IN 50%

E-LOG MISS. 4414' -2918'

MISS 4410' - 2914'

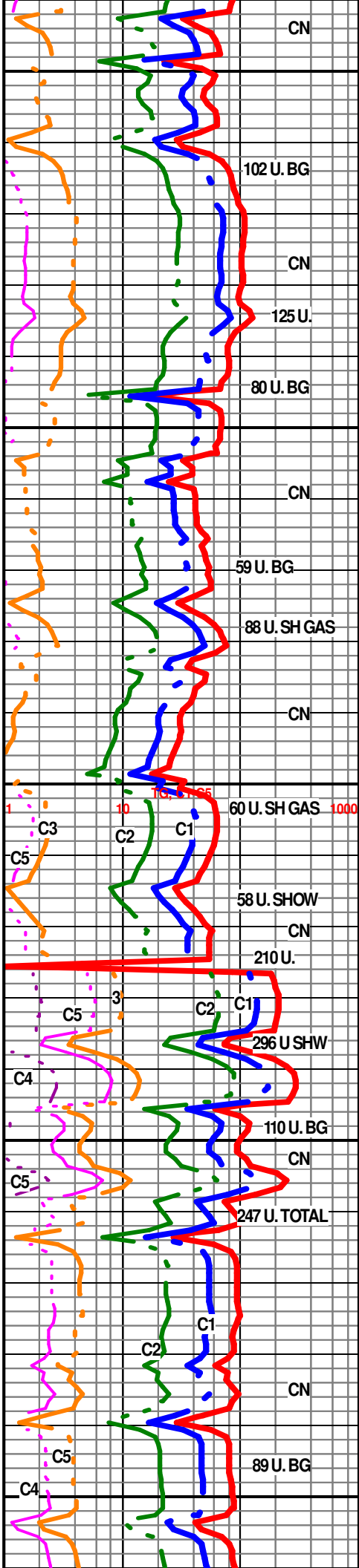
4410-4425' LS- OFF WHT CRM LT TN (DUE TO STN IN 60%) HD DNS TO V/ BRITT, MED-XLN, ANG LM GRNS IP, TR SCAT IMBD FOSS FRGS, TR WHT CHLK, TR CALC XLS IP, SCATTERED BRIT YEL GLD FLO IN 70%, PR VIS INTER-XLN POR IP, FR FLSH CUT TO FR TO GD SLO STRM CUT IN 60%, LT OIL ODOR, LIVE OIL DROPS IN SCATTERED THRU TRAY

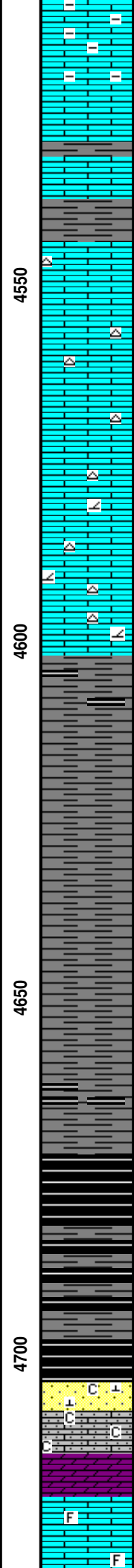
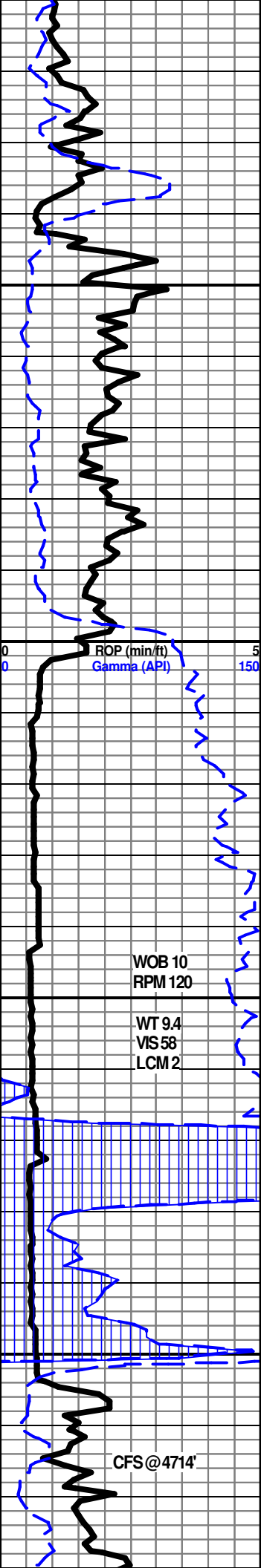
4425-4435' LS- CRM TN BRN DUE TO OIL STN IN 80%) ABDT LIVE OIL IN TRAY, HD V/ BRITT, MED-XLN ABDT MDANG LM GRNS IP TO V/ SUCRO MTRX, TR FOSS FRGS IP, BRIT YEL GLD FLO THRU, PR VIS MICRO PP POR, PR VIS INTER-XLN POR, FR TO GD FLSH TO V/GD SLOW STRM CUT IN 90%, FR OIL ODOR DRY, TN STN ON DISH

4435-4445' LS- CRM LT TN BRN DUE TO OIL STN IN 80%, HD V/ BRITT, V/ SUCRO MTRX IP, FN TO MDANG LM GRNS IP, TR FREE FOSS, BRIT YEL FLO THRU, ABDT LIVE OIL IN TRAY, BRIT YEL GLD FLO THRU, P R TO FR VIS MICRO PP POR, PR VIS INTER-XLN POR, EXCEL INST FLSH CUT THRU, EXCEL SLO STRM CUT THRU, TAN STN ON DISH LT OIL ODOR DRY

4455-4457' LS- OFF WHT TN TO BLK DUE TO DOS SCATTERED THRU, HD DNS V/ SUCRO S-CHLKY MTRX, TR FREE SFT WHT CHLK SCAT THRU, SMLL TO MED ANG LM GRNS IMBD IP, DLL YEL GLD FLO SCAT, NO VIS POR, FR FLSH CUT TO FR TO GD SLO STRM CUT, NO ODOR

LS-REDDISH BRN TO WHT - HD DNS V/ SUCRO MTRX, IMBD MED TO LRGANG WHT LM GRNS SCATTERED THRU, ABDT IMBD DISS REDDISH SH THRU, TR FOSS FRGS, NO FLO, NO VIS POR, NO VIS SHOW





SH- RED W/ LAMINATED GREEN SH THRU, V/ FRM SMOOTH TXT BLKY

LS- OFF WHT CRM- HD DNS TO BRITT, F-XLN IP TO SUCRO SLI S-CHLKY IP, WHT TRANLCNT CHERT IP, V/DLL YEL MIN FLO, NO VIS POR, NO VIS SHOW

LS- OFF WHT CRM BFF- HD DNS F-CRYPTO-XLN, S-SUCRO IP, SLI DOLO IP, ABDT WHT TRSLCNT CHERT, DLL YEL MIN FLO, NO VIS POR, NO VIS SHOW OR CUT

E-LOG KINDERHOOK 4598' - 3102'

KINDERHOOK SH. 4602' - 3106'

SH-LT TO MED GY-FRM BLKY SMOOTH TXT TO HVY TR V/DK GY TO BLK CARB IP

SH- LT TO MED GY-FRM BLKY SMOOTH TXT TO SLI TR GRNY TXT IP

SH- V/ DK GY- FR, BLKY SMOOTH TR GREEN SH IP

E-LOG CHATTANOOGA 4668' - 3172'

CHATTANOOGA SH 4672' - 3176'

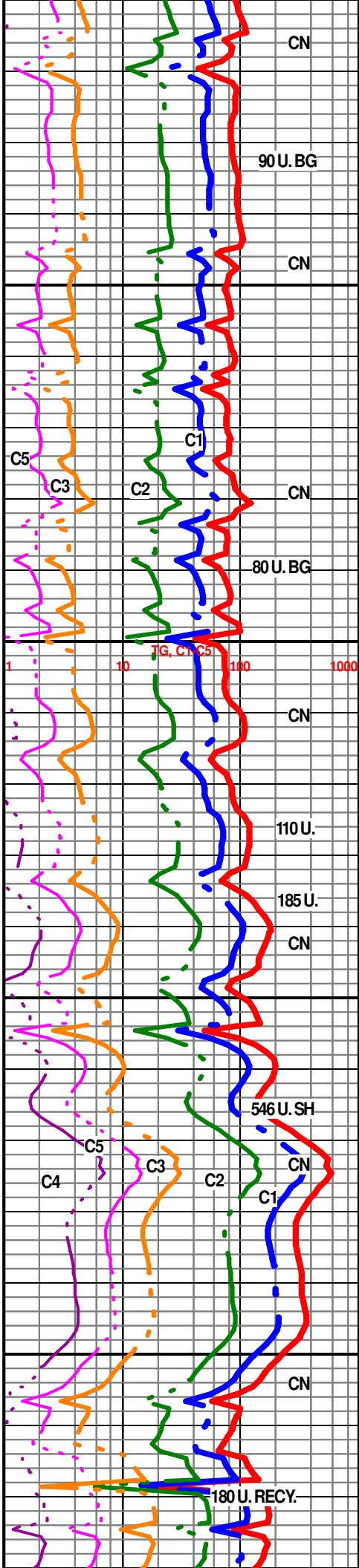
E-LOG MISENER 4700' - 3204'

MISENER 4704' - 3208'

4704-4708 SS- FRSTY WHT LT TN (TN STN IN 10% HD FR, FN MED TO TR CRS GRNS FRSTY QURTZ GRNS, PR SRT, ABDT IMBD SFT CHLK IN 80% , CALC CMNT TO SIL CMNT IP, BRT YEL GLD FLO IN 20% TO V/ DLL YEL FLO IN 70%, TR PR INTER-GRN POR IP, PR FLSH CUT IP TO PR SLO STRM CUT IN 50%, NO ODOR

4708-4714' LS-OFF WHT CRM, MED HD TO SFT, V/SUCRO S-CHLKY MTRX, W/ SCAT IMBD SMLL TO MED CLR QURTZ GRNS, TR FREE SFT WHT CHLK, NO FLO, NO VIS POR, NO VIS SHOW

4714-4720- DOLO- LT TN LT GY- HD DNS TO BRITT, V/ SUCRO MTRX ABNDT DOLO GRNS THRU, DISS LT GY SH THRU, NO FLO, NO VIS POR, V/ DLL YEL FLO IP, NO



ROP (min/ft)
Gamma (API)

WOB 10
RPM 120

WT 9.4
VIS 58
LCM 2

CFS@4714'

CN

90 U. BG

CN

CN

80 U. BG

CN

110 U.

185 U.

CN

546 U. SH

CN

CN

180 U. RECY.

C5

C3

C2

C1

1

10

100

1000

C4

C5

C3

C2

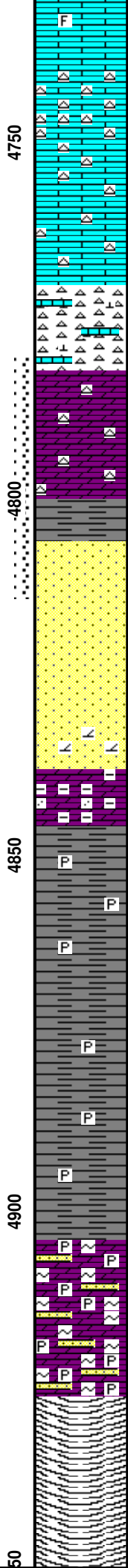
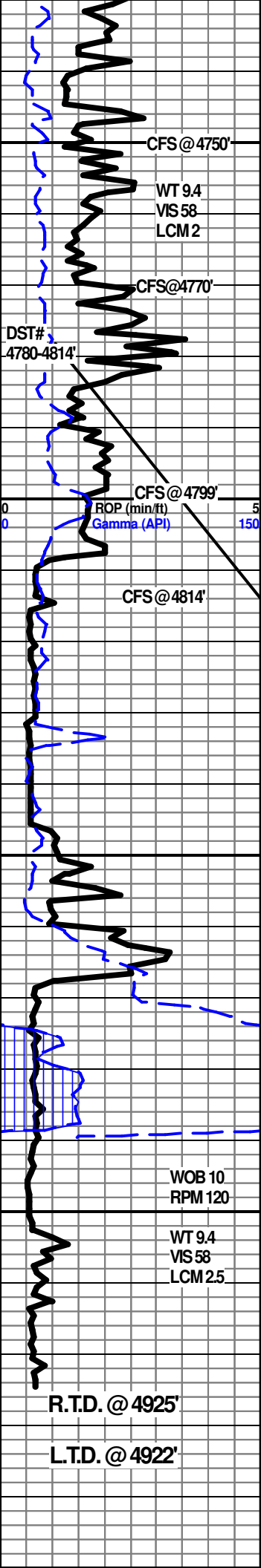
C1

1

10

100

1000



4720-4736' LS - CRM LT TN LT GY, HD TT TO BRIT MED-XLN FE XLN MTRX, IMBD FOSS FRGS, ANG LM GRNS, LMINTD DK GY SH IP, NO FLO, NO VIS POR, NO CUT OR SHOW
 4740-4750' LS- CRM LT TN TN, V/ SUCRO MTRX, W. ABDT SCATTERED WHT CHERT, TR FOSS FRGS IP, IMBD SMLL MICA IP, BRIT YEL GLD FLO IN 70%, TR PR MICRO PP POR, FR FL SH CUT TO FR SLO STRM CUT IN 70%, LT OIL ODOR, NO STN ON DISH
 4750-4770' LS- CRM LT TN TN, V/ SUCRO MTRX, W SCATTERED WHT CHERT, BRIT YEL GLD FLO IN 20% TR PR MICRO PP POR, FR FL SH CUT TO FR SLO STRM CUT IN 20%, NO ODOR, NO STN ON DISH
 4770-4782' CHERT- CRM TN BRN, MOTT, HD DNS RE-WORKED IP W/ LAMINATED SUCRO LS, NO FLO, NO VIS POR, NO VIS SHOW
 DOLO- TN BRN, V/ TT FINE SUCRO MTRX, V/ DLL YEL MIN FLO DRY, ABDT TN WHT CHERT IP, NO FLOWET, NO VIS CUT OR SHOW
E-LOG SIMPSON SH 4800' - 3304'
 SH-LT GREEN TO GREEN SMOOTH TXT
E-LOG SIMPSON SS 4804'-3308'
 SS- FRSTY WHT TO CLR (TAN STAIN IN 50%), HD TO V/ FRI, MED GRN QURTZ S-RND TO RND TO ANG S-ANG CLEAR GRNS, FR TO WELL SRT, SIL CMNT TO TR CALC CMNT IP, BRIT YEL GLD FLO TO DLL YEL GLD FLO IN 60%, V/GD TO EXCEL INTER-GRAIN POR SCAT THRU, FR FL SH CUT TO GD SLO STRM CUT IN 60%, FR OIL ODOR, TR LIVE OIL DROPS IN TRAY
 4831-4838-SS- LT TN TN DUE TO STN IN 100%, HD TT IP TO V/ FRI, FN MED QURTZ GRNS IP GRDING TO MED QURTZ GRNS FR TO WELL SRT CLR TO FRSTY GRNS, ANG S-ANG TO S-RND OCC IMBD, BRIT YEL GLD FLO THRU, FR VIS TO V/ GD VIS INTER-GRN POR IN 60%, V/GD OIL ODOR, SIL CMNT TO DOLO CMNT IP, V/GD FL SH CUT THRU TO EXCEL SLO STRM CUT IN 100% LT TN STN ON DISH
 4839-4836' DOLO-TN BRN- HD DNS TO TR BRIT, V/ SUCRO MTRX, SCATTERED IMBD DISS BLK SH SPCKS THRU, TR IMBD FN GRN QURTZ, V/ DLL YEL MIN FLO, NO VIS POR, TO POSS PR MICRO PP POR IP, NO VIS SHOW OR CUT
 4837-4868' SH- GY MED GRY FRM BLKY SMOOTH WXY TXT W/ IMBD PYR CLSTRS
 4868-4902- SH LT GREEN - FRM IP TO V/ PLTY, TR PYR CLSTRS IMBD IP
 4903-4925 - DOLO- HD TT V/ FN SUCRO MTRX W/ ABDT IMBD SCAT SMLL TO MED CLR S-RND QURTZ GRNS, ABDT IMBD DISS PYR & SCATT PYR CLSTRS, ABDT IMBD GLAUC & OR CHLORITE, NO FLO, NO VIS POR, NO VIS SHOW
 R.T.D @ 4:55 PM SEPT. 30TH 2019
 CTCH 1.5 HRS
 TOFL/ ELI LOGGING HAYS, KANSAS

