

CONFIDENTIAL

ORIGINAL

KANSAS CORPORATION COMMISSION
OIL & GAS CONSERVATION DIVISION
WELL COMPLETION FORM
WELL HISTORY - DESCRIPTION OF WELL & LEASE

Form ACO-1
September 1999
Form Must Be Typed

Handwritten notes: KCC, 8/10/08, 7/16/10

Operator: License # 8221 32211
Name: O'Brien Energy Resources Corp.
Address: 18 Congress Street, Suite 207
City/State/Zip: Portsmouth, NH 03801
Purchaser: National Cooperation Refinery Association
Operator Contact Person: Joseph Forma
Phone: (803) 427-2099
Contractor: Name: Duke Drilling Co. Inc.
License: 5929

Wellsite Geologist: Peter Debenham
Designate Type of Completion:
New Well Re-Entry Workover
Oil SWD SIOW Temp. Abd.
Gas ENHR SIGW
Dry Other (Core, WSW, Expl., Cathodic, etc.)

If Workover/Re-entry: Old Well Info as follows:
Operator:
Well Name: KCC
Original Comp. Date: Original Total Depth:
Deepening Re-perf. Conv. to Enhr./SWD
Plug Back Plug Back Total Depth
Commingled Docket No.
Dual Completion Docket No.
Other (SWD or Enhr.?) Docket No.
4/19/08 04/26/08 5/22/08
Spud Date or Date Reached TD Completion Date or
Recompletion Date

API No. 15 - 119-21196-0000
County: Meade
SW NW Sec. 20 Twp. 33 S. R. 29 East West
1980' feet from S (N) Line of Section
660' feet from E (W) Line of Section

Footages Calculated from Nearest Outside Section Corner:
(circle one) NE SE (NW) SW
Lease Name: Rickers Ranch Well #: 1-20
Field Name: UNNAMED

Producing Formation: CHESTER
Elevation: Ground: 2658' Kelly Bushing: 2670'
Total Depth: 6075' Plug Back Total Depth:
Amount of Surface Pipe Set and Cemented at 1580' 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 AHTNH 9-3-08
(Data must be collected from the Reserve Pit)
Chloride content 3,400 ppm Fluid volume 4 bbls
Dewatering method used Haul free water, natural evap.
cover with 36 inch min.
Location of fluid disposal if hauled offsite:
Operator Name: Drill Co. Fluid Service
Lease Name: Feldman License No.: 9491
Quarter Sec. 18 Twp. 34 S. R. 28 East West
County: Meade Docket No.: C-23094

INSTRUCTIONS: An original and two copies of this form shall be filed with the Kansas Corporation Commission, 130 S. Market - Room 2078, Wichita, Kansas 67202, within 120 days of the spud date, recompletion, workover or conversion of a well. Rule 82-3-130, 82-3-106 and 82-3-107 apply. Information of side two of this form will be held confidential for a period of 12 months if requested in writing and submitted with the form (see rule 82-3-107 for confidentiality in excess of 12 months). One copy of all wireline logs and geologist well report shall be attached with this form. ALL CEMENTING TICKETS MUST BE ATTACHED. Submit CP-4 form with all plugged wells. Submit CP-111 form with all temporarily abandoned wells.

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.

Signature: [Handwritten Signature]
Title: PRESIDENT Date: 7/16/08
Subscribed and sworn to before me this 16 day of July
Notary Public: [Handwritten Signature]
Date Commission Expires:

PATRICIA A. O'BRIEN
Notary Public - New Hampshire
My Commission Expires May 18, 2010

KCC Office Use ONLY
Letter of Confidentiality Received
If Denied, Yes Date:
Wireline Log Received
Geologist Report Received
UIC Distribution
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JUL 22 2008

CONSERVATION DIVISION
WICHITA, KS

Operator Name: O'Brien Energy Resources Corp. Lease Name: Rickers Ranch Well #: 1-20
 Sec. 20 Twp. 33 S. R. 29 East West County: Meade

INSTRUCTIONS: Show important tops and base 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. Attach copy of all Electric Wireline Logs surveyed. Attach final geological well site report.

Drill Stem Tests Taken <i>(Attach Additional Sheets)</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Log	Formation (Top), Depth and Datum	<input type="checkbox"/> Sample
Samples Sent to Geological Survey	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Name	Top	Datum
Cores Taken	<input type="checkbox"/> Yes <input type="checkbox"/> No	Heebner	4450'	-1780'
Electric Log Run <i>(Submit Copy)</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Toronto	4471'	-1801'
List All E. Logs Run:		Lansing	4597'	-1927'
		Marmaton	5268'	-2598'
		Cherokee	5443'	-2773'
		Atoka	5704'	-3034'
		Morrow	5748'	-3078'
		Mississippi Chester	5863'	-3193'

Dual Induction, Dual Compensated Porosity, Microresistivity

CASING RECORD <input checked="" 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
Surface	12 1/4	8 5/8, J55	24/R	1580'	AAZ	650	450 A-CON, 200 Class A
Production	7 7/8	4 1/2, J55	10.5#	6075'	AZZ	140	

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				

Shots Per Foot	PERFORATION RECORD - Bridge Plugs Set/Type Specify Footage of Each Interval Perforated	Acid, Fracture, Shot, Cement Squeeze Record (Amount and Kind of Material Used)	Depth
2	5977-5980		
2	5958-5972		

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TUBING RECORD	Size <u>2 3/8</u>	Set At <u>5906</u>	Packer At <u>5910</u>	Liner Run <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Date of First, Resumerd Production, SWD or Enhr.	Producing Method <input checked="" type="checkbox"/> Flowing <input type="checkbox"/> Pumping <input type="checkbox"/> Gas Lift <input type="checkbox"/> Other (Explain)			
<u>5/22/2008</u>				
Estimated Production Per 24 Hours	Oil Bbls. <u>350</u>	Gas Mcf <u>135</u>	Water Bbls. <u>0</u>	Gas-Oil Ratio <u>1-.38</u> Gravity <u>40</u>

Disposition of Gas Vented Sold Used on Lease *(If vented, Submit ACO-18.)*

METHOD OF COMPLETION Open Hole Perf. Dually Comp. Commingled

Production Interval Other (Specify) _____

BASIC

energy services, L.P.

TREATMENT REPORT

Customer: <i>D. Bruce Energy</i>	Lease No.:	Date: <i>4-26-08</i>
Lease: <i>Pickens Ranch</i>	Well #: <i>1-20</i>	
Field Order #: <i>20613</i>	Station: <i>Liberal</i>	Casing: <i>4 1/2</i>
Type Job: <i>4 1/2 L.S.</i>	Formation: <i>CNW</i>	Depth: <i>6083</i>
		County: <i>Mcade</i>
		State: <i>Ks</i>
		Legal Description: <i>20-33-29</i>

PIPE DATA		PERFORATING DATA		FLUID USED		TREATMENT RESUME		
Casing Size	Tubing Size	Shots/Ft	<i>140 sk</i>	Acid	<i>AA2 - 10% s214 - 1/4</i>	RATE	PRESS	ISIP
Depth	Depth	From	<i>5 #</i>	Pre Pad	<i>6.150 #19 c</i>	Max		<i>5 Min.</i>
Volume	Volume	From	<i>1.44 #19 c</i>	Pad	<i>6.20 gal / sk @ 15 #</i>	Min		<i>10 Min.</i>
Max Press	Max Press	From	<i>15 sk</i>	Frac	<i>same for Rat</i>	Avg		<i>15 Min.</i>
Well Connection	Annulus Vol.	From	<i>10 sk</i>		<i>same for mouse hole</i>	HHP Used		Annulus Pressure
Plug Depth	Packer Depth	From		To	Flush	Gas Volume		Total Load

Customer Representative: <i>R. Pearson</i>	Station Manager: <i>J. Bennett</i>	Treater: <i>M. Cochran</i>
Service Units: <i>21755 8122 19553 19905 19883</i>		
Driver Names: <i>Cochran Gerald M. Cochran</i>		

Time	Casing Pressure	Tubing Pressure	Bbls. Pumped	Rate	Service Log
<i>16:45</i>					<i>on loc / Held safety meeting</i>
<i>18:00</i>					<i>Casing on Bottom Cir. w/ Rig</i>
<i>19:00</i>	<i>200</i>		<i>4 + 2.5</i>	<i>2</i>	<i>Plug Rat + mouse holes 15 sk R 10 sk B</i>
<i>19:19</i>	<i>2000</i>				<i>Test Pump + Lines</i>
<i>19:21</i>	<i>300</i>		<i>5</i>	<i>5</i>	<i>Start Fresh H₂O</i>
<i>19:22</i>	<i>400</i>		<i>12</i>	<i>5</i>	<i>Start Super Flush</i>
<i>19:25</i>	<i>450</i>		<i>5</i>	<i>5</i>	<i>Start Fresh H₂O</i>
<i>19:27</i>	<i>475</i>		<i>36</i>	<i>5</i>	<i>Start CNT 1405 sk @ 15 #</i>
<i>19:35</i>					<i>Shut down + Wash up</i>
<i>19:38</i>					<i>Drop Plug</i>
<i>19:40</i>	<i>350</i>		<i>0</i>	<i>6</i>	<i>Start Disp. w/ 100 KCL H₂O</i>
<i>19:55</i>	<i>750</i>		<i>90</i>	<i>2.5</i>	<i>Slow Rate</i>
<i>19:58</i>	<i>1500</i>		<i>96.5</i>	<i>2.5</i>	<i>Bump Plug</i>
<i>19:59</i>	<i>1000</i>		<i>96.5</i>	<i>0</i>	<i>Release / float Held</i>
<i>20:00</i>					<i>End Job</i>

800 Pressure before Plug landed

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energy services, L.P.

TREATMENT REPORT

Customer <i>O'Brien Energy Resources</i>		Lease No.		Date <i>4-19-08</i>	
Lease <i>Bakers Ranch</i>		Well # <i>V-20</i>			
Field Order # <i>20611</i>	Station <i>Liberal</i>	Casing <i>8 5/8</i>	Depth <i>1578</i>	County <i>Meade</i>	State <i>Ks</i>
Type Job <i>8 5/8 sur.</i>		Formation <i>41-2NW</i>		Legal Description <i>20-33-29</i>	

PIPE DATA		PERFORATING DATA		FLUID USED		TREATMENT RESUME	
Casing Size	Tubing Size	Shots/Ft	<i>450sk</i>	Acid	<i>3% CC - 14" Cell</i>	RATE	PRESS
Depth	Depth	From	<i>2.43 4 3/8</i>	Pre Pad	<i>14.41 gal/sk @ 12.2"</i>	Max	<i>5 Min.</i>
Volume	Volume	From	<i>200sk</i>	Pad	<i>Premium 2% CC - 1/2" Cell</i>	Min	<i>10 Min.</i>
Max Press	Max Press	From	<i>1.53 4 3/8</i>	Frac	<i>6.33 gal/sk @ 15"</i>	Avg	<i>15 Min.</i>
Well Connection	Annulus Vol.	From	To			HHP Used	Annulus Pressure
Plug Depth	Packer Depth	From	To	Flush		Gas Volume	Total Load

Customer Representative <i>R. Pearson</i>				Station Manager <i>J. Bennett</i>				Treater <i>M. Cochran</i>			
Service Units	<i>21755</i>	<i>8122</i>	<i>19553</i>	<i>19805</i>	<i>19883</i>	<i>19928</i>	<i>19682</i>				
Driver Names	<i>Cochran</i>	<i>W. Gerard</i>	<i>J. Arrington</i>	<i>T. Mariotti</i>							

Time	Casing Pressure	Tubing Pressure	Bbls. Pumped	Rate	Service Log
<i>17:30</i>					<i>on Loc. / Held Safety Meeting</i>
<i>18:40</i>					<i>Start Casing</i>
<i>19:45</i>					<i>Casing on Bottom / Cir w/ Rig Pump</i>
<i>20:10</i>					<i>Held Safety Meeting w/ Rig Crew</i>
<i>20:18</i>	<i>2000</i>				<i>Test Pump + Lines</i>
<i>20:21</i>	<i>250</i>		<i>5</i>	<i>4</i>	<i>Start fresh H₂O Ahead</i>
<i>20:23</i>	<i>500</i>		<i>195</i>	<i>5</i>	<i>Start Lead Cmt 450sk @ 12.2"</i>
<i>21:02</i>	<i>500</i>		<i>47</i>	<i>5</i>	<i>Start Tail Cmt 200sk @ 15"</i>
<i>21:03</i>					<i>Shut down + Drop Plug</i>
<i>21:15</i>	<i>150</i>		<i>0</i>	<i>5</i>	<i>Start Disp w/ Fresh H₂O</i>
<i>21:33</i>	<i>600</i>		<i>89</i>	<i>2</i>	<i>Slow Rate</i>
<i>21:38</i>	<i>1400</i>		<i>99</i>	<i>2</i>	<i>Bump Plug</i>
<i>21:39</i>	<i>0</i>		<i>99</i>	<i>0</i>	<i>Release / Post Held</i>
<i>21:45</i>					<i>End Job</i>
					<i>Circulated Cmt to the Pit</i>
	<i>650</i>				<i>Pressure Before Plug Landed</i>

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Considered a Geo Rpt. per Steve B. by Steve B. KCU 7/24/08

O'Brien Energy Resources, Inc.

Rickers Ranch No. 1-20

Section 20, T33S, R29W

Meade County, Kansas

April, 2008

Well Summary

The O'Brien Energy Resources, Corporation, Rickers Ranch No. 1-20 was drilled as a wildcat to a total depth of 6075' in the Mississippi Chester Formation.

The closest offset was the Gulf Oil Corporation, Shinogle "B" No. 1, approximately 1400' to the South. The Lansing came in 14' high relative to this well. The Marmaton, Cherokee and Atoka ran 9' high. The Morrow and Chester, 6' high.

Excellent hydrocarbon shows occurred during the drilling of this test. The Morrow(5814'-5830') consists of a Sandstone – Light brown, white, clear to translucent, firm to hard, friable, fine upper to fine lower, well sorted, subround grains, calcareous cement, slightly glauconitic, fair intergranular porosity, mottled yellow gold hydrocarbon fluorescence(most Sandstone, 40% spl), fair streaming cut, trace light brown oil stain, good oil/gas odor and with traces of a translucent, friable Sandstone with bright yellow hydrocarbon fluorescence and excellent intergranular porosity. A 320 Unit gas kick occurred.

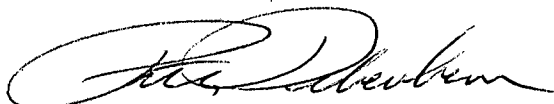
This interval was drillstem tested and recovered gas to surface in 5 minutes and gauged at 845 thousand cubic feet per day and with a virgin formation pressure of 1894 PSI. Sandstone noted on logs from 5797' to 5803' may have contributed to this recovery.

The Lower Chester Sandstone(5958'-5972'): Medium brown, friable, fine upper to fine lower, well sorted subround grains, siliceous cement, slightly calcareous, clean, excellent intergranular porosity, occasional fine vuggy porosity, excellent brown matrix oil stain, even goldbrown hydrocarbon fluorescence(all Sandstone), excellent streaming cut, abundant live oil.

Additional minor shows occurred in the Mississippi Limestone's and Upper Lansing(attached mudlog).

4 ½" production casing was run on the Rickers Ranch No. 1-20.

Respectfully Submitted,



Peter Debenham

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WELL DATA

Operator: O'Brien Energy Resources, Inc., John Forma – Portsmouth, NH
Geologist: Paul Wiemann – Denver, CO

Prospect Geologist: Ed Schuett, Denver, Land: Gordon Beamguard

Well: Rickers Ranch No. 1-20, Wildcat

Location: 1980' FNL & 660' FWL, Section 20, T33S, R29W, Meade County, Kansas – East of Plains.

Elevation: Ground Level 2658', Kelly Bushing 2670'

Contractor: Duke Drilling Rig No. 6, Type: Double jackknife, triple stand, Toolpusher Rick Schollenbarger, Drillers: Jessie Howell, Danny White, Mike Brewer

Company Man: Roger Pearson – Liberal, Kansas

Spud Date: 4/18/08

Total Depth: 4/25/08, Driller 6075', Logger 6082', Chester Fm.

Casing Program: 38 joints of 8 5/8", J55, 24Lbs/ft, set at 1580'. 4 1/2" production casing to TD.

Mud Program: Mud Co./Service Mud Inc., Engineer Tony Maestas, mud up 4000'.

Wellsite Consultant: Peter Debenham with mudlogging trailer, Call depth 3000', Box 350, Drake, CO 80515, 720/220-4860.

Samples: 30' to 4600', 20' to 5200', 10' to TD. Zones of interest saved.

Electric Logs: Log-Tech, Engineer Justin Loffredi, 1)Dual Induction 2) Compensated Neutron Litho Density 3) Microlog

Status: 4 1/2 " production casing to TD on 4/26/08.

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WELL CHRONOLOGY

6 AM			
<u>DATE</u>	<u>DEPTH</u>	<u>FOOTAGE</u>	<u>RIG ACTIVITY</u>
4/18	330'	330'	Move to location and rig up rotary tools. Mix spud mud. Drill rat and mousehole. Spud in 12 14" surface and drill to 330'.
4/19	1580'	1250'	Run surveys(1/2 deg.). Drill Glorietta and redbeds. Drill to 1580' and circulate. Trip and lay down 8" drill collars. Rig up casing crew and run and cement 38 joints of 8 5/8" surface casing set at 1580'. Wait on cement.
4/20	2375'	795'	Wait on cement. Nipple up and pressure test BOP. Drill cement and plug and drill 7 7/8" hole to 2375'.
4/21	3405'	1030'	Clean suction. Drilling ahead at 1030'.
4/22	4705'	1300'	Service rig and drilling ahead.
4/23	5832'	1127'	To 5832' and circulate for samples.
4/24	5832'	0'	Short trip for drill stem test. Stuck pipe at 3800'. Spot 60 bbls of oil and work pipe – pulled free 1 pm. Finish 37 stand short trip and break circulation at 4950' and circulate on bottom. Trip out for DST No. 1(5735'-5832'), Morrow Fm.
4/25	6075'TD	243'	Run test – gas to surface in 5 minutes. Pull and lay down test tool. Trip to bottom and circulate hole clean. Drill to 6075'TD and circulate.
4/26	TD		Trip out for elogs and run logs. Trip to bottom and circulate. Trip out laying down. Run and cement 4 1/2" production casing to TD. Rig down.

BIT RECORD

<u>NO.</u>	<u>MAKE</u>	<u>TYPE</u>	<u>SIZE</u>	<u>OUT</u>	<u>FOOTAGE</u>	<u>HOURS</u>
1	STC	FDSTC	12 1/4"	1580'	1580'	21 3/4
2	HTC	HC 5062'	7 7/8"	6075'	5925'	87
Total Rotating Hours:						108 3/4
Average:						55.86 Ft/hr

DEVIATION RECORD - degree

518' 1/2, 1005' 1/2

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MUD PROPERTIES

<u>DATE</u>	<u>DEPTH</u>	<u>WT</u>	<u>VIS</u>	<u>PV</u>	<u>YP</u>	<u>pH</u>	<u>WL</u>	<u>CL</u>	<u>LCM-LBS/BBL</u>
4/18	well water							100	
4/19	1188'	9.3	30	3	7	7.0	n/c	100	4
4/21	2900'	9.2	30	3	8	7.0	n/c	14K	½
4/22	3940'	9.7	34	5	9	7.0	n/c	9.1K	2
4/23	5346'	9.0	52	15	18	11.0	6.4	2.6K	4
4/24	5832'	9.3	56	16	22	10.5	7.2	3K	4
4/25	5832'	9.3	57	17	21	9.0	7.2	3.4	4

DRILL STEM DATA

DST NO. 1: (5735'-5832'), Morrow Fm.

Type: Conventional Bottom Hole Test Times: 15-30-45-120

<u>PERIOD</u>	<u>TIME</u>	<u>PSI</u>
IH		2717
IF	15	192 - 152
ISI	30	1894
FF	45	158 - 169
FSI	120	1885
FH		2823

BHT: 123 deg. F.

BLOWS: IF – Strong, off bottom of bucket immediate, gas to surface in 5 minutes. FF – Strong throughout, gauged 845 mcf/d.

RECOVERY: Gas rate gauged at 845 mcf/d, 95' of mud with a scum of oil.

Sample Chamber: 1000 ml mud with a scum of oil, 1800 PSI, 30 cf gas.

ELECTRIC LOG FORMATION TOPS- KB Elev. 2654'

<u>FORMATION</u>	<u>DEPTH</u>	<u>DATUM</u>	<u>*Shinogle "B" No. 1</u>	
			<u>DATUM</u>	<u>POSITION</u>
Heebner	4450'	-1780'		
Toronto	4471'	-1801'		
Lansing	4597'	-1927'	-1941'	+14'
Marmaton	5268'	-2598'	-2607'	+9'
Cherokee	5443'	-2773'	-2781'	+8'
Atoka	5704'	-3034'	-3043'	+9'
Morrow	5748'	-3078'	-3083'	+5'
Mississippi Chester	5863'	-3193'	-3199'	+6'
TD	6082'	-3412'		

*Gulf Oil Corp., Shinogle "B" No. 1, 1400' to the South, K.B. Elev. 2651'.

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LITHOLOGY DESCRIPTION

SAMPLES ARE LAGGED
CORRECTED E-LOG FORMATION TOPS
*INDICATES HYDROCARBON SHOW

3840-3920 LIMESTONE: Dk mottled gray brown micr fine crystalline hard dense marly sndy in part fossils carbonaceous tight no show interbed with SHALE: Dk brown to gray black hard blocky calcareous carbonaceous with LIMESTONE: Med to dark gray biomicr micxln argillaceous to clean fossils occasional trace porosity no fluorescence no stain or cut

3920-3980 LIMESTONE: Dk mottled gray brown micr fine crystalline hard dense marly sndy in part fossils carbonaceous tight no show interbed with SHALE: Dk brown to gray black hard blocky calcareous carbonaceous with LIMESTONE: Med to dark gray biomicr micxln argillaceous to clean fossils occasional trace porosity no fluorescence no stain or cut

3980-4070 SHALE: Dk brown to gray black firm sbfis to blocky carbonaceous calcareous sndy in part

4070-4110 LIMESTONE: Dk mottled gray brown micr fine crystalline hard dense marly sndy in part fossils carbonaceous tight no show interbed with SHALE: Dk brown to gray black hard blocky calcareous carbonaceous with LIMESTONE: Med to dark gray biomicr micxln argillaceous to clean fossils occasional trace porosity no fluorescence no stain or cut

4110-4205 SHALE: Med to dark mottled brown to gray black hard blocky carbonaceous calcareous silty interbed with LIMESTONE: Dk mottled gray brown micr fine crystalline hard dense marly sndy in part fossils carbonaceous tight no show

4205-4300 LIMESTONE: Dk mottled brown biomicr crpxln hard dense argillaceous to marly fossils poor vis porosity no fluorescence no stain ro cut interbed with SHALE: Dk brown blocky hard calcareous carbonaceous

4300-4410 SHALE: Dk brown black dark gray hard sbfis to blocky carbonaceous

4410-4442 LIMESTONE: SHALE: Dk brown gray black firm sbfis carbonaceous clastic interbed with LIMESTONE: Dk to mrd brown gray occasional black fine crystalline hard dense argillaceous silica tight no show

Heebner 4450'

4442-4465 SHALE: Blk firm sbfis carbonaceous interbed with LIMESTONE: Dk to mrd brown gray occasional black fine crystalline hard dense argillaceous silica tight no show

Toronto 4471'

4465-4565 LIMESTONE: Lt to medium mottled brown gray tan fine crystalline hard dense silica clean to argillaceous fossils tight no show interbed with SHALE: Blk dark gray firm sbfis waxy carbonaceous silty trace CHRT: Mlky gray hard crystalline

4565-4590 SHALE: Blk firm sbfis carbonaceous

Lansing 4597'

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4590-4630 LIMESTONE: Med brown gray tan mottled crpxln hard dense occasional soft and sbchky fossils tight no show interbed with SHALE: as above CHRT: as above

4630-4680 LIMESTONE: Lt brown buff micxln micsuc sbchky in part clean brittle fossils poor vis porosity occasional moldic trace bright mottled blue hydrocarbon fluorescence(1% sample) faint cut no stain weak show

4680-4715 LIMESTONE: Lt to medium brown biomicr fine crystalline micsuc in part clean brittle fossils trace moldic and intxln porosity no fluorescence no stain or cut LIMESTONE: Crpxln hard dense silica tight interbed with SHALE: Dk gray black firm sbfis carbonaceous

4715-4760 LIMESTONE: Med brown micr micxln micsuc brittle clean fossils trace moldic and intxln porosity no show

4760-4805 LIMESTONE: Med to dark brown biomicr crpxln hard dense argillaceous fossils silica tight no show with trace LIMESTONE: as above trace moldic and intxln porosity micsuc in part npo show

4805-4860 SHALE: Dk brown to gray black firm sbfis to blocky carbonaceous silty with LIMESTONE: Brn biomicr micxln trace moldic and intxln porosity no show trace CHRT: Gy to brown mlky hard crystalline

4860-4915 LIMESTONE: Brn tan crpxln hard dense silica clean very oolites with occasional moldic porosity no show trace CHRT: as above

4915-4950 SHALE: Dk brown to gray black firm sbfis to blocky carbonaceous silty with LIMESTONE: Brn biomicr micxln trace moldic and intxln porosity no show trace CHRT: Gy to brown mlky hard crystalline

4950-5015 LIMESTONE: Mot brown gray crpxln hard dense silica fossils silica tight no show occasional sbchky and firm

5015-5030 SHALE: Blk hard blocky carbonaceous calcareous silty

5030-5040 LIMESTONE: Dk mottled brown micr crpxln hard dense argillaceous to marly in part tight no show

5040-5110 LIMESTONE: Mot brown oomicr fine crystalline clean brittle very oolites well/exc oomoldic porosity no fluorescence no stain or cut

5110-5120 SHALE: Blk firm sbfis carbcalc

5120-5145 LIMESTONE: Dk mottled brown micr crpxln hard dense argillaceous to marly in part tight no show

5145-5220 LIMESTONE: Mot brown oomicr micxln brittle clean very oolites exc oomoldic porosity no fluorescence no stain or cut

5220-5260 SHALE: Dk gray black gygn firm blocky carbonaceous interbed with LIMESTONE: Med to light mottled brown buff oomicr fine crystalline micsuc sbchky in part clean to argillaceous sndy

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oolites with occasional oomoldic porosity no fluorescence no stain or cut

Marmaton 5268'

5260-5316 SHALE: Dk gray black gygn firm blocky carbonaceous interbed with LIMESTONE: Med to light mottled brown buff oomicr fine crystalline micsuc sbchky in part clean to argillaceous sndy oolites with occasional oomoldic porosity no fluorescence no stain or cut

5316-5364 LIMESTONE: Med mottled brown dark brown micr crpxln hard dense silica clean to argillaceous fossils tight no show

5364-5390 SHALE: Blk dark brown to gray firm sbfis to blocky carbonaceous silty interbed with LIMESTONE: Dk brown black crpxln hard dense silica argillaceous carbonaceous fossils tight no show trace CHRT

5390-5410 LIMESTONE: Dk brown black micr crpxln hard dense silica marly fossils carbonaceous tight no show trace CHRT: Milky gray brown hard crystalline

5410-5436 SHALE: Blk dark brown to gray firm sbfis to blocky carbonaceous silty interbed with LIMESTONE: Dk brown black crpxln hard dense silica argillaceous carbonaceous fossils tight no show trace CHRT

Cherokee 5443'

5436-5476 SHALE: Dk brown black hard sbfis to blocky carbonaceous calcareous silty occasional interbed with LIMESTONE: Dk mottled brown to gray black crpxln hard dense marly tight no show

5476-5500 SHALE: Dk brown black hard sbfis to blocky carbonaceous calcareous silty occasional interbed with LIMESTONE: Dk mottled brown to gray black crpxln hard dense marly tight no show

5500-5554 SHALE: Blk firm sbfis carbonaceous silty calcareous interbed with LIMESTONE: Med to dark mottled brown micr crpxln dense argillaceous to marly tight no show

5554-5576 SHALE: Blk dark brown gray firm sbfis to blocky carbonaceous calcareous silty Tr CHRT: Milky gray hard crystalline

5576-5606 SHALE: Blk firm sbfis carbonaceous silty calcareous interbed with LIMESTONE: Med to dark mottled brown micr crpxln dense argillaceous to marly tight no show trace CHRT: as above

5606-5624 LIMESTONE: Dk to medium brown crpxln hard dense clean to argillaceous poor vis porosity no show

5624-5636 SHALE: Blk very dark brown firm sbfis to blocky carbonaceous calcareous silty

5636-5666 LIMESTONE: Dk to medium brown crpxln hard dense clean to argillaceous poor vis porosity no show interbed with SHALE: Blk very dark brown firm sbfis to blocky carbonaceous calcareous silty

5666-5694 LIMESTONE: Dk to medium brown crpxln hard dense clean to argillaceous poor vis porosity no show interbed with SHALE: Blk very dark brown firm sbfis to blocky carbonaceous calcareous silty

Atoka 5704'

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5694-5716 SHALE: Blk firm fissile carbonaceous with LIMESTONE: Dk mottled gray black fine crystalline hard dense marly tight no show

5716-5750 LIMESTONE: Dk mottled brown to gray occasional black micr crpxln hard dense silica marly fossils tight no show interbed with SHALE: Blk firm fissile carbonaceous trace CHRT

Morrow 5748'

5750-5754 LIMESTONE: Med to dark mottled brown gray occasional black crpxln hard dense argillaceous to marly tight no show

5754-5776 SHALE: Blk firm fissile carbonaceous with LIMESTONE: Mot brown gray occasional black as above poor vis porosity no show

5776-5796 SANDSTONE: Dk mottled gray brown hard dense very fine well sorted sbrnd grains calcareous and clay cement glauconitic poor vis porosity to clay infill no fluorescence no stain or cut

5796-5808 SHALE: Gy black firm blocky sndy

5808-5824 SHALE: Dk mottled brown gray hard blocky sndy glauconitic fossils tight no show

5824-5840 *320 Unit gas kick, SANDSTONE: Lt brown white clear occasional translucent firm to hard slightly friable fine well sorted sbrnd grains calcareous and occasional clay cement slightly glauconitic trace intgran porosity mottled yellow to gold and occasional bright yellow hydrocarbon fluorescence(most SANDSTONE, 40% sample) fair strmg cut poss light brown oil stain gd oil/gas odor no free oil

5840-5856 *Tr SANDSTONE: Clr light gray very fine well sorted grains silica cement clean trace ntgran porosity trace light oil stain bright yellow fluorescence gd cut(1% sample) trace coarse uncons sbang grains with SHALE: Blk dark gray firm carbonaceous fossils very calcareous and grndg to a marly LIMESTONE occasional dark brown and silica tight

Chester 5863'

5856-5900 *LIMESTONE: Dk mottled brown gray micr crpxln hard dense silica marly sndy fossils tight no show occasional sbchky and gray marly chalky poor vis porosity trace pale blue hydrocarbon fluorescence faint cut trace SANDSTONE incls to very marly in part calcareous tight infill no show

5900-5912 SHALE: Gy firm to soft waxy fissile

5912-5918 *LIMESTONE: Lt mottled brown to gray buff biomier micxln sbchky clean fossils sndy occasional trace pale yellow blue hydrocarbon fluorescence faint cut very soft and chalky in part

5918-5950 *SHALE: Med gray soft firm waxy fissile with LIMESTONE: Lt mottled brown to gray buff biomier micxln sbchky clean fossils sndy occasional trace pale yellow blue hydrocarbon fluorescence faint cut very soft and chalky in part

Lower Chester Sandstone

5950-5972 **SANDSTONE: Med brown friable fu/fl well sorted sbrnd grains silica cement clean gd intgran porosity occasional fine vug porosity exc brown matrix oil stain even gold brown hydrocarbon fluorescence(all SANDSTONE) exc strmg cut abt live oil with SHALE: Med gray soft waxy fissile

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5972-6002 LIMESTONE: Dk brown gray hard crpxln fossils marly tight no show interbed with
SHALE: as above

6002-6052 SHALE: Dk gray soft to firm waxy fissile occasional interbed with LIMESTONE: Lt
brown buff soft chalky fossils sndy no show

6052-6074 LIMESTONE: Mot brown biomicr fine crystalline sbchky in part fossils tight no show with
SHALE: Med mottled red to maroon brick red green varic soft waxy

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