



KANSAS CORPORATION COMMISSION 1086511
OIL & GAS CONSERVATION DIVISION

Form ACO-1
June 2009
Form Must Be Typed
Form must be Signed
All blanks must be Filled

WELL COMPLETION FORM
WELL HISTORY - DESCRIPTION OF WELL & LEASE

OPERATOR: License # 4058
Name: American Warrior, Inc.
Address 1: 3118 Cummings Rd
Address 2: PO BOX 399
City: GARDEN CITY State: KS Zip: 67846 + _____
Contact Person: Joe Smith
Phone: (620) 275-2963
CONTRACTOR: License # 31548
Name: Discovery Drilling
Wellsite Geologist: Jeff Lawler
Purchaser: None

Designate Type of Completion:
 New Well Re-Entry Workover
 Oil WSW SWD SLOW
 Gas D&A ENHR SIGW
 OG GSW Temp. Abd.
 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 ENHR Conv. to SWD
 Conv. to GSW
 Plug Back: _____ Plug Back Total Depth
 Commingled Permit #: _____
 Dual Completion Permit #: _____
 SWD Permit #: _____
 ENHR Permit #: _____
 GSW Permit #: _____

06/06/2012	06/13/2012	06/14/2012
Spud Date or Recompletion Date	Date Reached TD	Completion Date or Recompletion Date

API No. 15 - 15-063-21984-00-00
Spot Description: 50' N & 14' W
NW NE SW SE Sec. 18 Twp. 15 S. R. 26 East West
1040 Feet from North / South Line of Section
1664 Feet from East / West Line of Section

Footages Calculated from Nearest Outside Section Corner:
 NE NW SE SW
County: Gove
Lease Name: GARVEY Well #: 4-18
Field Name: _____

Producing Formation: None
Elevation: Ground: 2476 Kelly Bushing: 2489
Total Depth: 4353 Plug Back Total Depth: _____
Amount of Surface Pipe Set and Cemented at: 221 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: 16000 ppm Fluid volume: 400 bbls
Dewatering method used: Evaporated
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

Letter of Confidentiality Received
Date: _____
 Confidential Release Date: _____
 Wireline Log Received
 Geologist Report Received
 UIC Distribution
ALT I II III Approved by: Deanna Garrison Date: 07/09/2012



1086511

Operator Name: American Warrior, Inc. Lease Name: GARVEY Well #: 4-18
 Sec. 18 Twp. 15 S. R. 26 East West County: Gove

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 complete copy of all Electric Wire-line Logs surveyed. Attach final geological well site report.

Drill Stem Tests Taken <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <i>(Attach Additional Sheets)</i> Samples Sent to Geological Survey <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Cores Taken <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Electric Log Run <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Electric Log Submitted Electronically <input type="checkbox"/> Yes <input type="checkbox"/> No <i>(If no, Submit Copy)</i> List All E. Logs Run:	<input type="checkbox"/> Log Formation (Top), Depth and Datum <input type="checkbox"/> Sample Name Attached Top Attached Datum Attached
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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	12.250	8.625	23	221	Common	150	3%CC,2%gel

ADDITIONAL CEMENTING / SQUEEZE RECORD				
Purpose:	Depth Top Bottom	Type of Cement	# Sacks Used	Type and Percent Additives
<input checked="" 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

TUBING RECORD: Size: _____ Set At: _____ Packer At: _____ Liner Run: Yes No

Date of First, Resumed Production, SWD or ENHR: _____ Producing Method: Flowing Pumping Gas Lift Other (Explain) _____

Estimated Production Per 24 Hours	Oil Bbls.	Gas Mcf	Water Bbls.	Gas-Oil Ratio	Gravity
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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) (Submit ACO-4)</i> <input type="checkbox"/> Other (Specify) _____	PRODUCTION INTERVAL: _____ _____
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Form	ACO1 - Well Completion
Operator	American Warrior, Inc.
Well Name	GARVEY 4-18
Doc ID	1086511

Tops

Anhy	1913'	-577
B/Anhy	1954'	-536
Topeka	3463'	-973
Heebner	3709	-1219
Toronto	3728'	-1238
Lansing	3749'	-1259
B/KC	4044	-1554
Ft.Scott	4245	-1755
Mississippian	4349	-1859

ALLIED OIL & GAS SERVICES, LLC 053652

REMIT TO P.O. BOX 31
RUSSELL, KANSAS 67665

SERVICE POINT:
Great Bend, 10

DATE <u>6-2-17</u>	SEC <u>18</u>	TWP <u>15S</u>	RANGE <u>26W</u>	CALLED OUT	ON LOCATION	JOB START <u>7:30am</u>	JOB FINISH <u>2:30pm</u>
LEASE <u>Sorver</u>	WELL # <u>4.18</u>	LOCATION <u>Union, KS, 3/4 west, 3</u>	COUNTY <u>Sevier</u>	STATE <u>KS</u>			
OLD OR NEW (Circle one) <u>NEW</u>			North to 5 1/2 W 1/2 N 1/2 W north into				

CONTRACTOR Discovery 21

TYPE OF JOB Surf Seal

HOLE SIZE 12 1/4 T.D. 221

CASING SIZE 5 7/8 DEPTH 221

TUBING SIZE DEPTH

DRILL PIPE DEPTH

TOOL DEPTH

PRES. MAX MINIMUM

MEAS. LINE SHOE JOINT

CEMENT LEFT IN CSG. 15 FT

PERFS.

DISPLACEMENT 15.12 bbl

OWNER American Warrior

CEMENT AMOUNT ORDERED 150 sks Class A
2 1/2 cc 2 1/2 gel

EQUIPMENT

PUMP TRUCK CEMENTER Craig D

766 HELPER Kevin E

BULK TRUCK DRIVER Kevin W

378

BULK TRUCK DRIVER

#

COMMON	@	_____
POZMIX	@	_____
GEL	@	_____
CHLORIDE	@	_____
ASC	@	_____
_____	@	_____
_____	@	_____
_____	@	_____
_____	@	_____
_____	@	_____
_____	@	_____
_____	@	_____
HANDLING	@	_____
MILEAGE	@	_____
TOTAL		_____

REMARKS:

Done on bottom circulate casing
with Sorver Hook up cement,
150 sks Class A 2 1/2 cc
2 1/2 gel Displacement 15.12 bbl
Kevin W driver in cement
ALL CITE. 21st Jan
Aug 2017 @ 3:45, Jan

CHARGE TO: American Warrior

STREET _____

CITY _____ STATE _____ ZIP _____

SERVICE

DEPTH OF JOB _____

PUMP TRUCK CHARGE _____

EXTRA FOOTAGE @ _____

MILEAGE @ _____

MANIFOLD @ _____

_____ @ _____

_____ @ _____

TOTAL _____

PLUG & FLOAT EQUIPMENT

_____ @ _____

_____ @ _____

_____ @ _____

_____ @ _____

_____ @ _____

TOTAL _____

To: Allied Oil & Gas Services, LLC.
You are hereby requested to rent cementing equipment and furnish cementer and helper(s) to assist owner or contractor to do work as is listed. The above work was done to satisfaction and supervision of owner agent or contractor. I have read and understand the "GENERAL TERMS AND CONDITIONS" listed on the reverse side.

SALES TAX (If Any) _____

TOTAL CHARGES _____

DISCOUNT _____ IF PAID IN 30 DAYS

PRINTED NAME X CLIFF MARYFIELD

SIGNATURE X [Signature]
Thank You!

ALLIED OIL & GAS SERVICES, LLC 056426

REMIT TO P.O. BOX 31
RUSSELL, KANSAS 67665

SERVICE POINT:
Russell Ks.

DATE <u>6-14-12</u>	SEC. <u>18</u>	TWP. <u>15</u>	RANGE <u>26</u>	CALLED OUT	ON LOCATION	JOB START	JOB FINISH <u>9:45 AM</u>
LEASE <u>Garvey</u> WELL# <u>4-18</u> LOCATION <u>Utica Ks. 3W 6N</u>						COUNTY <u>Greene</u>	STATE <u>Kansas</u>
OLD OR NEW (Circle one)							

CONTRACTOR Discovery Dale Rig #1 OWNER _____

TYPE OF JOB Rotary Plug

HOLE SIZE 7 7/8 T.D. 4353 CEMENT AMOUNT ORDERED 220 SK x 40 4% Gel

CASING SIZE 8 5/8 Section DEPTH 221 4# FIC-8 3/4 RB SA

TUBING SIZE _____ DEPTH _____

DRILL PIPE 9 5/8 x H @ DEPTH 1945

TOOL _____ DEPTH _____

PRES. MAX _____ MINIMUM _____

MEAS. LINE _____ SHOE JOINT _____

CEMENT LEFT IN CSG. _____

PERFS. _____

DISPLACEMENT _____

EQUIPMENT

PUMP TRUCK CEMENTER Edward G.

417 HELPER Woody O.

BULK TRUCK _____

4 DRIVER Cody H.

BULK TRUCK _____

_____ DRIVER _____

REMARKS:

25 SK @ 1945'
40 SK @ 906'
40 SK @ 221'
10 SK @ 40'
30 SK @ RAT Hole
15 SK @ Mouse Hole

CHARGE TO: American Warrior Tax
STREET _____
CITY _____ STATE _____ ZIP _____

To: Allied Oil & Gas Services, LLC.
You are hereby requested to rent cementing equipment and furnish cementer and helper(s) to assist owner or contractor to do work as is listed. The above work was done to satisfaction and supervision of owner agent or contractor. I have read and understand the "GENERAL TERMS AND CONDITIONS" listed on the reverse side.

PRINTED NAME CLIFF MAYFIELD

SIGNATURE Cliff Mayfield

CEMENT AMOUNT ORDERED 220 SK x 40 4% Gel
4# FIC-8 3/4 RB SA

COMMON _____ @ _____
POZMIX _____ @ _____
GEL _____ @ _____
CHLORIDE _____ @ _____
ASC _____ @ _____
_____ @ _____
_____ @ _____
_____ @ _____
_____ @ _____
HANDLING _____ @ _____
MILEAGE _____

TOTAL _____

SERVICE

DEPTH OF JOB _____
PUMP TRUCK CHARGE _____
EXTRA FOOTAGE _____ @ _____
MILEAGE _____ @ _____
MANIFOLD _____ @ _____
_____ @ _____

TOTAL _____

PLUG & FLOAT EQUIPMENT

CS/Rundvik Plug @ _____
_____ @ _____
_____ @ _____
_____ @ _____

TOTAL _____

SALES TAX (If Any) _____
TOTAL CHARGES _____
DISCOUNT _____ IF PAID IN 30 DAYS

Scale 1:240 Imperial

Well Name: GARVEY #4-18
 Surface Location: NE SW SE Sec. 18- 15S - 26W
 Bottom Location:
 API: 15-063-21984-0000
 License Number: 4058
 Spud Date: 6/6/2012 Time: 11:30 AM
 Region: GOVE
 Drilling Completed: 2/2/2011 Time: 5:50 PM
 Surface Coordinates: 1040' FSL & 1664' FEL
 Bottom Hole Coordinates:
 Ground Elevation: 2482.00ft
 K.B. Elevation: 2490.00ft
 Logged Interval: 0.00ft To: 0.00ft
 Total Depth: 0.00ft
 Formation:
 Drilling Fluid Type: Chemical/Fresh Water Gel

OPERATOR
 Company: AMERICAN WARRIOR, INC.
 Address: 3118 CUMMINGS ROAD
 P.O. BOX 399
 GARDEN CITY, KS 67846
 Contact Geologist: CECIL O'BRATE
 Contact Phone Nbr: (620) 275-2963
 Well Name: GARVEY #4-18
 Location: NE SW SE Sec. 18- 15S - 26W API: 15-063-21984-0000
 Pool: Field: GARVEY RANCH
 State: KANSAS Country: USA

SURFACE CO-ORDINATES

Well Type: Vertical
 Longitude: -100.2509426 Latitude: 38.7441648
 N/S Co-ord: 1040' FSL
 E/W Co-ord: 1664' FEL

LOGGED BY



Company: SOLUTIONS CONSULTING
 Address: 108 W 35TH
 HAYS, KS 67601
 Phone Nbr: (785)259-3737
 Logged By: Geologist Name: JEFF LAWLER

CONTRACTOR

Contractor: DISCOVERY DRILLING CO., INC.
 Rig #: 1
 Rig Type: MUD ROTARY
 Spud Date: 6/6/2012 Time: 11:30 AM
 TD Date: 2/2/2011 Time: 5:50 PM
 Rig Release: Time:

ELEVATIONS

K.B. Elevation: 2490.00ft Ground Elevation: 2482.00ft
 K.B. to Ground: 8.00ft

NOTES

DST #1 LKC "H"

DRILL STEM TEST REPORT

American Warrior 18-15s-26w Gove Co. KS
 P.O. Box 300 Garvey #4-18
 Garden City, KS 67040 Job Ticket: 45027 DST# 1
 ATTN: Jeff Lawler Test Date: 2012.06.10 @ 10:48.00

GENERAL INFORMATION

Formation: LKC "H"
 Deviated: No Whipstock: (K/B)
 Time Test Opened: 18:47:25
 Time Test Ended: 23:42:33
 Interval: 3896.00 ft (K/B) To 3930.00 ft (K/B) (TVD)
 Total Depth: 3930.00 ft (K/B) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Good
 Reference Elevations: 2490.00 ft (K/B)
 2482.00 ft (G/F)
 KD to CRUCIF: 8.00 ft

Serial #: 8552 Inside
 Press @ Run Depth: 74.21 psig @ 3899.00 ft (K/B) Capacity: 6000.00 psig
 Start Date: 2012.06.10 End Date: 2012.06.10 Last Calc: 2012.06.10
 Start Time: 16:48:00 End Time: 23:42:33 Time On Circ: 2012.06.10 @ 18:44.10
 Time Off Str: 2012.06.10 @ 21:52.00

TEST COMMENT: F - Weak Surface Blow Built to 2 1/4"
 G - No Blow
 FF - Weak Surface Blow Built to 2"
 FG - No Blow

PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1022.43	112.76	Initial Hydro-static
4	47.25	112.52	Open To Flow(1)
51	60.11	113.42	Chut-in(1)
03	833.68	115.41	End Chut-in(1)
04	63.06	115.16	Open To Flow(2)
126	74.21	119.24	Chut-in(2)
103	799.26	118.23	End Chut-in(2)
185	1083.42	110.64	Final Hydro-static


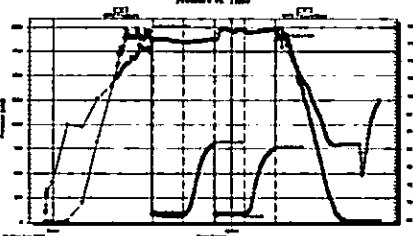
Recovery			Gas Rates		
Length (ft)	Description	Velocity (m/hr)	Unchecked	Pressure (psig)	Gas Rate (m³/d)
64.00	CGWCM 2%wt 12%g 20%w 60%r	0.62			
6.00	OO 8%g 92%wt	0.11			

Trilobite Testing, Inc

Ref No: 45887

Printed: 2012.06.11 @ 15:14:06

DST #2 LKC "I-J"


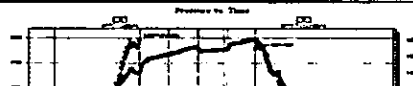
 TRILOBITE TESTING, INC	DRILL STEM TEST REPORT																																					
	American Warrior P.O. Box 339 Garden City KS 67846 ATTN: Jeff Lawler	18-15a-26w Gove Co. KS Garvey #4-18 Job Ticket: 45620 DOT#: 2 Test Chart: 2012.06.11 @ 08:52:00																																				
GENERAL INFORMATION: Formation: LKC "I & J" Deviated: No Whipstock ft (KB) Time Tool Opened: 10:39:55 Time Test Ended: 14:30:54 Interval: 3345.00 ft (KB) To 3390.00 ft (KB) (TVI) Total Depth: 3390.00 ft (KB) (TVI) Hole Diameter: 7.86 inches-Hole Condition: Good Test Type: Conventional Bottom Hole (Reset) Tester: WJ MacLean Unit No: 40 Reference Elevations: 2420.00 ft (KB) 2482.00 ft (CF) KB to GRCP: 8.00 ft																																						
Serial #: 8652 Inside Press@Run/Depth: 86.63 psig @ 3346.00 ft (KB) Start Date: 2012.06.11 End Date: 2012.06.11 Start Time: 08:52:00 End Time: 14:30:54 Capacity: 6000.00 psig Last Cells: 2012.06.11 Time On Btm: 2012.06.11 @ 10:37:55 Time Off Btm: 2012.06.11 @ 12:44:25																																						
TEST COMMENT: Flow went down lagged bottom about 4 1/2' up, put that joint in the mouse hole put the head on went back down the tool opened and it slid as the way down, so we pulled it up put another joint on, blind it off went back to bottom had a 2" blow, opened the 2" valve blind it off came back as a weak surface blow FF: 1/2" blow in 3 min																																						
		PRESSURE SUMMARY <table border="1"> <thead> <tr> <th>Time (Min)</th> <th>Pressure (psig)</th> <th>Temp (deg F)</th> <th>Annotation</th> </tr> </thead> <tbody> <tr><td>0</td><td>1953.03</td><td>113.71</td><td>Initial Hydro-static</td></tr> <tr><td>2</td><td>86.65</td><td>116.04</td><td>Open To Flow (1)</td></tr> <tr><td>33</td><td>79.17</td><td>115.45</td><td>Chut-In(1)</td></tr> <tr><td>63</td><td>79.41</td><td>116.25</td><td>End Chut-In(1)</td></tr> <tr><td>65</td><td>82.78</td><td>116.04</td><td>Open To Flow (2)</td></tr> <tr><td>96</td><td>85.63</td><td>116.03</td><td>Chut-In(2)</td></tr> <tr><td>127</td><td>754.27</td><td>118.09</td><td>End Chut-In(2)</td></tr> <tr><td>127</td><td>1862.57</td><td>119.42</td><td>Final Hydro-static</td></tr> </tbody> </table>	Time (Min)	Pressure (psig)	Temp (deg F)	Annotation	0	1953.03	113.71	Initial Hydro-static	2	86.65	116.04	Open To Flow (1)	33	79.17	115.45	Chut-In(1)	63	79.41	116.25	End Chut-In(1)	65	82.78	116.04	Open To Flow (2)	96	85.63	116.03	Chut-In(2)	127	754.27	118.09	End Chut-In(2)	127	1862.57	119.42	Final Hydro-static
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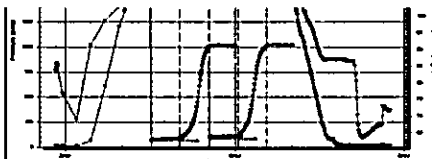
Trilobite Testing, Inc

Ref No: 45890

Printed: 2012.06.11 @ 14:50:50

DST #3 LKC "I-L"

 TRILOBITE TESTING, INC	DRILL STEM TEST REPORT																	
	American Warrior P.O. Box 339 Garden City KS 67846 ATTN: Jeff Lawler	18-15a-26w Gove Co. KS Garvey #4-18 Job Ticket: 45623 DOT#: 3 Test Chart: 2012.06.12 @ 02:00:00																
GENERAL INFORMATION: Formation: LKC "I - L" Deviated: No Whipstock ft (KB) Time Tool Opened: 04:30:55 Time Test Ended: 06:45:09 Interval: 3954.00 ft (KB) To 4080.00 ft (KB) (TVI) Total Depth: 4080.00 ft (KB) (TVI) Hole Diameter: 7.86 inches-Hole Condition: Good Test Type: Conventional Bottom Hole (Reset) Tester: WJ MacLean Unit No: 40 Reference Elevations: 2420.00 ft (KB) 2482.00 ft (CF) KB to GRCP: 8.00 ft																		
Serial #: 8652 Inside Press@Run/Depth: 104.84 psig @ 3952.00 ft (KB) Start Date: 2012.06.12 End Date: 2012.06.12 Start Time: 02:50:00 End Time: 06:45:09 Capacity: 6000.00 psig Last Cells: 2012.06.12 Time On Btm: 2012.06.12 @ 04:30:25 Time Off Btm: 2012.06.12 @ 06:33:25																		
TEST COMMENT: F- Surface Blow BURL to BOB in 14 34min CF- No Blow FF- Strong Surface Blow BURL to BOB in 40sec PD- No Blow																		
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Time (Min)	Pressure (psig)	Temp (deg F)	Annotation															
0	1953.03	100.04	Initial Hydro-static															
1	56.86	100.03	Open To Flow (1)															
31	85.10	115.63	Chut-In(1)															



62	1002.07	117.95	End CHU-h(1)
63	87.92	117.01	Open To Flow (2)
93	104.84	117.11	CHU-h(2)
123	1002.69	120.11	End CHU-h(2)
123	1876.73	120.54	Final Hydro-static

Recovery		
Length (ft)	Description	Volume (bbl)
82.00	OGCM 2%col 12%g 66%lm	0.60
82.00	OGCM 5%col 18%g 77%lm	0.67
40.00	OGCM 4%col 8%g 66%lm	0.56
0.00	558' of GP	0.00

Gas Rates		
Choke (inch)	Pressure (psig)	Gas Rate (Mc/d)

Trisbee Testing, Inc

Ref No. 45699

Printed 2012.08.12 @ 09:25:29

DST #4 MISSISSIPPIAN

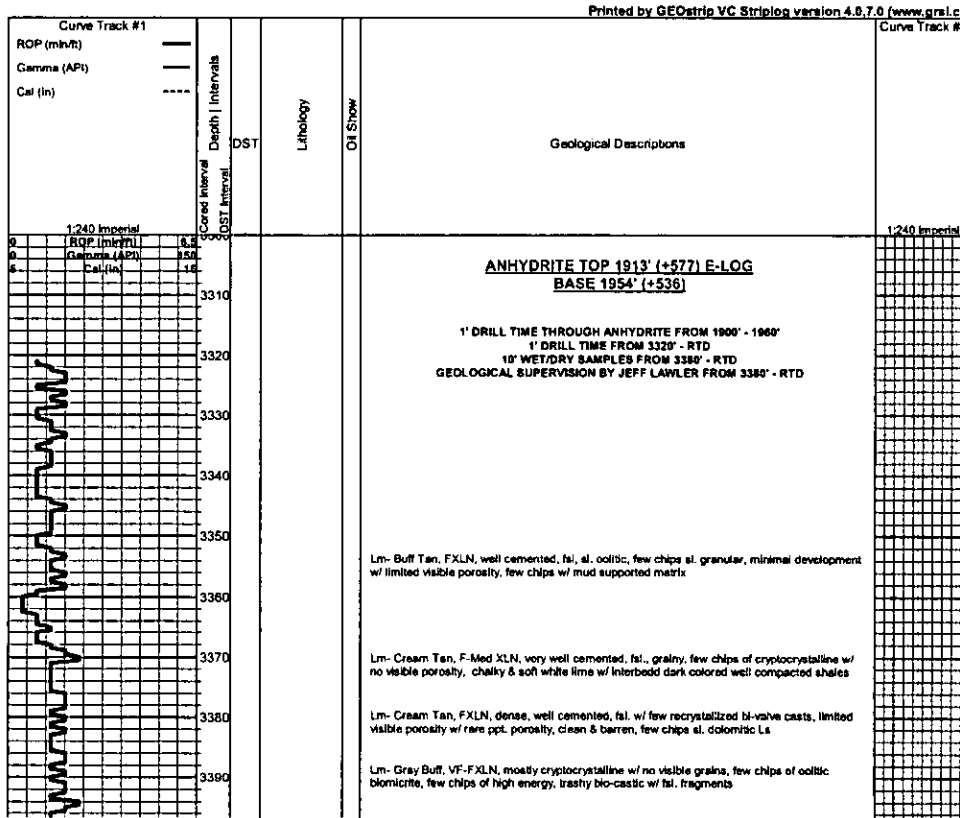
WELL COMPARISON SHEET

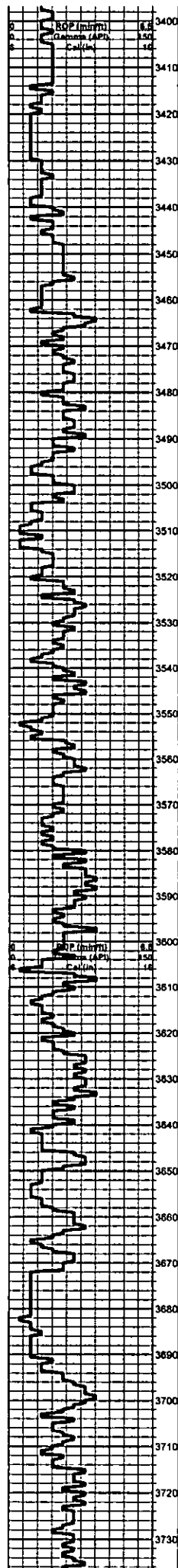
FORMATION	PETA 118-1998 GARVEY "C" #2 NE SW 18-18-26				PETA 7-1000 GARVEY "C" #1 NE SW 18-18-26				AMERICAN WARRIOR GARVEY "C" (HUALA) NE SW 18-18-26				KJ OM COMP. GARVEY RANCH #1 NE SW 18-18-26			
	DEPTH	DATE	DEPTH	DATE	DEPTH	DATE	DEPTH	DATE	DEPTH	DATE	DEPTH	DATE	DEPTH	DATE		
ANHYDRITE TOP	1913	5/7	1913	5/7	1913	5/7	1913	5/7	1913	5/7	1913	5/7	1913	5/7		
TABNO	1954	5/8	1954	5/8	1954	5/8	1954	5/8	1954	5/8	1954	5/8	1954	5/8		
HONEYARD	2329	8/29	2329	8/29	2329	8/29	2329	8/29	2329	8/29	2329	8/29	2329	8/29		
TOPKIA	3463	4/7	3463	4/7	3463	4/7	3463	4/7	3463	4/7	3463	4/7	3463	4/7		
HETBER SHALE	3709	12/19	3709	12/19	3709	12/19	3709	12/19	3709	12/19	3709	12/19	3709	12/19		
TORONTO	3738	12/18	3738	12/18	3738	12/18	3738	12/18	3738	12/18	3738	12/18	3738	12/18		
LEC	3749	12/19	3749	12/19	3749	12/19	3749	12/19	3749	12/19	3749	12/19	3749	12/19		
BRIDGE CREEK SH	3889	1/19	3889	1/19	3889	1/19	3889	1/19	3889	1/19	3889	1/19	3889	1/19		
STAIN SHALE	3989	1/19	3989	1/19	3989	1/19	3989	1/19	3989	1/19	3989	1/19	3989	1/19		
MC	4054	1/15	4054	1/15	4054	1/15	4054	1/15	4054	1/15	4054	1/15	4054	1/15		
PAVINE	4185	1/19	4185	1/19	4185	1/19	4185	1/19	4185	1/19	4185	1/19	4185	1/19		
FL SCOTT	4246	1/15	4246	1/15	4246	1/15	4246	1/15	4246	1/15	4246	1/15	4246	1/15		
CHALK SHALE	4274	1/19	4274	1/19	4274	1/19	4274	1/19	4274	1/19	4274	1/19	4274	1/19		
CONGLOMERATE	4313	1/19	4313	1/19	4313	1/19	4313	1/19	4313	1/19	4313	1/19	4313	1/19		
MARYSMITHAN	4349	1/19	4349	1/19	4349	1/19	4349	1/19	4349	1/19	4349	1/19	4349	1/19		
APRICKILL	4350	1/19	4350	1/19	4350	1/19	4350	1/19	4350	1/19	4350	1/19	4350	1/19		
RTD																

ROCK TYPES					
CH vari	Lmst fw7>	shale, gry	Carbon Sh	Ss	
Dolprim	shale, gm	Shblk	shale, red		

ACCESSORIES	
STRINGER	TEXTURE
Chart	C Chalky
green shale	

OTHER SYMBOLS	
DST	
DST Int	
DST alt	





Ln- Buff, VF gm., sl fsl, very well cemented argillaceous Ls w/ no visible grains or porosity

Ln- Buff Gray, FXLN, semi-brittle, biomicrite w/ fusulnids, few fragments, bio-clastic

Sh- Gray Red Lm Green Brown, soft, smooth & rounded, gritty & earthy, few sandy lime

Ln- Lt & Drk Gray, FXLN, semi-brittle, trashy biomicrite, mostly fsl fragments, few fusulnids

Sh- Drk & Lt Gray, soft smooth, sl. sandy & gritty, sticky lt gray clumps

TOPEKA 3453 (-973) E-LOG Ln- Cream, FXLN, densely packed, oolitic, well cemented w/ clear siliceous cementation, poorly developed w/ little to no visible porosity

Ln- Cream Tan, mix of fine gr. mudsupported, oolitic biomicrite, cherty in part, and VF-FXLN, cryptocrystalline w/ no visible grains or visible porosity

Ln- Gray Buff, FXLN, dense, semi-brittle, fsl w/ fusulnids & crinoids, bio-clasts, few w/ ectrd fsl fragments

Sh- Gray Red, soft, smooth, blocky & waxy red chips

Ln- Cream Tan, Med-Coarse XLN, granular, oolitic, loosely cemented, ppt porosity, sl. unconsolidated, abundant fenestral porosity

Chert- Gray, mottled w/ white specks, sl fsl, sharp angular bedded chert, few chips gritty & sl dolomitic

Sh- Gray Lm Green Black Red, soft smooth, fissile, calcareous chalk, few gritty sl sandy shale chips

Ln- Cream, Med XLN, gritty & grainy, sl. dolomitic, ectrd ppt porosity, sl fsl & oolitic, clean & barren, loosely cemented, few chips w/ sl mineral for., no well cut

Ln- Buff Cream, F-Med XLN, gritty & grainy, mottled, sl friable, clean & barren

Ln- Tan Buff, F-Med XLN, well cemented, tight, fsl packstone, limited visible porosity w/ interbedded shales

Ln- Cream Tan, Med XLN, gritty & grainy, fsl, scattered whitish recrystallization, well cemented, few chips of dense mudstone, few chips of gray/white bedded chert

Sh- Black Gray Red, very well compacted carbonaceous chips, soft & smooth gray & red chips

Ln- Cream Tan, fine gr., cherty, mud supported matrix, modCod, sl. fsl

Ln- Tan Brown, FXLN, sl oolitic, densely packed w/ tight, well cemented siliceous matrix, sl cherty, dense XLN porosity, some weathered in appearance w/ ectrd secondary porosity

Sh/Ss- Gray Lm Green Dove Gray, few chips of soft smooth shale Ss- Dove Gray, VF gm, consolidated & loosely cemented, few chips of sandy lime, all clean & barren

Ln- Cream, F-Med XLN, mix of gritty & granular loosely cemented w/ chips of densely packed oolitic cryptocrystalline, ectrd ppt porosity, few chips of densely packed oolitic chert

Ln- Buff Gray, VF gm., dense, well cemented, algal Ls, tight

Ln/Chert- Cream Lt Gray, sl fsl, mix of biomicrite and fsl chert, sl weathered appearance

Sh- Dove Gray Lm Green White, soft smooth, few sl. unconsolidated, sticky calcareous white clumps

Chert- Cream, fsl, fusulnids, sharp angular bedded chert w/ conchoidal fracturing

Ln- Cream Off White, Med XLN, granular & massive, well cemented, ectrd recrystallization inclusions, small spherical oolites, few w/ dense siliceous matrix, clean & barren

Ln- Cream Tan, F-Med XLN, fsl, oolitic biomicrite w/ dense matrix, sub-XLN porosity w/ ectrd secondary fenestral porosity, clean & barren

Ln- Cream Tan, Med XLN, fsl, oolitic, massive, tight siliceous cementation, mostly w/ no visible matrix porosity, ectrd interparticle porosity, sl cherty

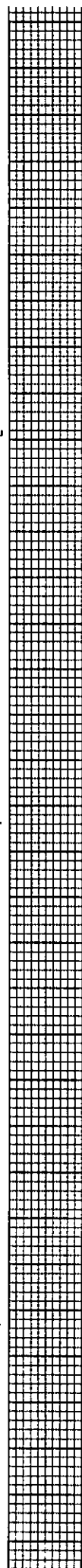
Chert- Egg Shell White, gritty, massive, dolomitic chert, sl fsl, rough weathered appearance, slow bubble HCl effervescence

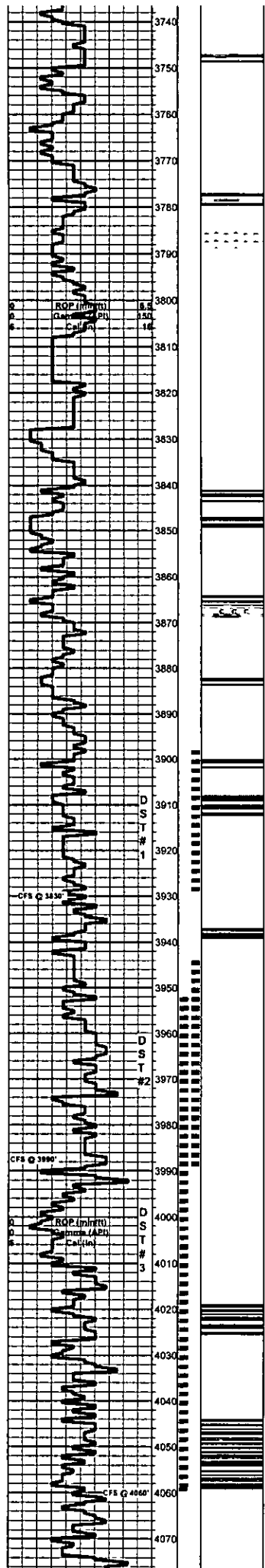
Ln- Brown Black, fine gm., trashy biomicrite w/ fusulnids, cherty in part, some w/ mud supported matrix, mix of whole & fragments of fusulnids

HEEBNER 3709 (-1219) E-LOG Sh- Black Lm Green, very dense & compacted, fissile, carbonaceous

Sh- Gray, sticky calcareous clumps

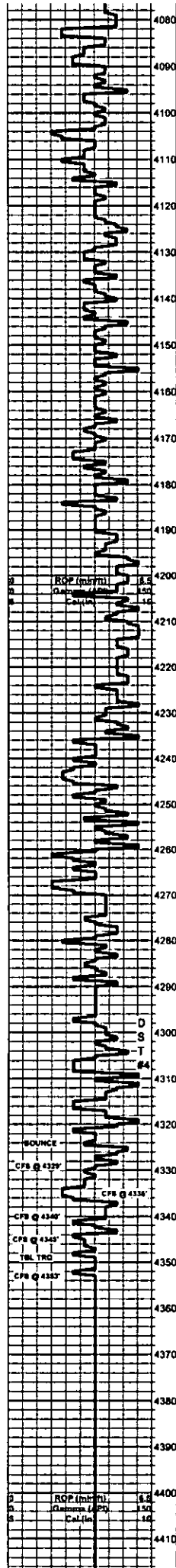
TORONTO 3729 (-1238) E-LOG Chert- Cream Off White, mix of sharp angular bedded fsl chert, sl cherty Ls, and decal fsl chert w/ recrystallization inclusions. Reworked- ectrd ppt porosity, LT GSY SCTRDR STN, FEW GAS DISSOLUTION BUBBLES UPON CRUSH, THON





GSY GREEN IN CUP, FNT LT GSY ODR, NO FLOR UNTL CRUSH, SLOW STRM WET CUT
 Lm- Cream Off White, FXLN, fs, dense, sub-XLN, tight w/ scdtd ppt porosity, few chips of buff gritty & grainy, sl dolomitic Ls
LKC 3749' (-1259) E-LOG Lm- Cream Off White, VF-FXLN, oolitic, no visible matrix porosity, sub-cryptocrystalline w/ clear siliceous matrix
 Lm- Cream Off White, FXLN, mix of fs XLN Ls, tight w/ scdtd ppt porosity, VRY LT GSY SCTRD STN, VRY SL SFO UPON CRUSH, FNT ODR UPON CRUSH, and very fine, micro-sucroic dolomitic Ls, well cemented w/ dense micro porosity, few chips w/ possible secondary porosity
 Sh- Gray Lm Green Maroon, soft, smooth, gritty & earthy
 Chert- Smokey Gray Semi-Translucent Bone White, sharp angular bedded chert w/ conchoidal fracturing.
 Lm- Cream Tan, FXLN, dense very well cemented matrix, massive, sl, granular, tightly packed oolites, sl, siliceous w/ no visible interoolite porosity, few chips of tan bedded chert w/ clear veins
 Lm- Cream Tan, VF-FXLN, tight, mostly cryptocrystalline w/ no visible grains or porosity
 Lm- Cream Tan, FXLN, A/A, w/ fs/ alagal Ls, well cemented w/ no visible porosity, mud matrix, trace of white calcareous chert
 Lm- Cream Off White, FXLN, mostly cryptocrystalline w/ minimal visible porosity, few w/ recrystallization inclusions, few chips of massive, loosely cemented oolitic grainstone, sub-granular
 Lm- Cream Tan Semi-Translucent, A/A w/ a few chips of gritty, loosely cemented w/ constant ppt porosity, secondary fractured porosity, clean & barren, thin gray interbedded shale lenses
 Sh- Gray, well compacted, waxy silvers, few sl, unconsolidated
 Dolomite- Cream Semi-Translucent, FXLN, micro sucroic, visible euhedral rhombs under increased magnification, ppt porosity, few w/ dense secondary porosity, clean & barren
 Dolomite- Buff Tan, Med XLN, very well cemented, dense, sucroic w/ micro XLN porosity, clean & barren
 Sh- Gray Lm Green White, thin dense silvers, white chalky clumps
 Lm- Cream Tan, mostly dense, well cemented w/ al Ls, few chips of FXLN sucroic dolomite, few chips of bedded chert, all clean & barren
 Lm- Buff Gray Cream, FXLN, mostly dense, semi-brittle sub-cryptocrystalline, few chips of oolitic biomorite, few chips of gray sharp angular bedded chert
 Sh- Black, very well compacted, sl fossiliferous, blocky, carbonaceous
 Sh- Gray, sticky argillaceous clumps
 Lm- Cream Buff, F-Med XLN, fs, scdtd oolites, scdtd interstitial porosity, some solution recrystallization w/ solution veins, few chips of densely packed oolitic biomorite w/ well cemented matrix, few chips of very well cemented sl, oolitic packstone w/ scdtd recrystallization inclusions, all w/ LT GSY SCTRD STN, FEW CHIPS W/ FEW GAS DISSOLUTION BUBBLES, SL SFO, FNT ODR, SLOW STRM WET CUT, 2 CHIPS W/ SAT. STN W/ SCTRD BLEEDING FO
 Sh- Red Gray Lm Green, soft, smooth, earthy
 Lm- Cream Tan, FXLN, oolitic packstone, densely packed oolites w/ tightly cemented matrix, limited visible porosity, chalky in part, few chips of sub-cryptocrystalline, all clean & barren
 Lm- Cream Tan, FXLN, sl oolitic, few chips well developed w/ constant ppt porosity throughout, LT GSY STN, SL SFO, FAST STRM WET CUT & FLOR few chips of dolomitic Ls, sucroic, SCTRD LT GSY STN, NO SFO, SLOW STRM WET CUT & FLOR, FR GSY ODR, few chips of semi-translucent bedded chert
 Lm- Cream Tan, VF-FXLN, dense, well cemented, some sub-cryptocrystalline w/ very limited visible porosity, mostly w/ scdtd development, micro porosity, SCTRD LT STN, SL SFO, FNT ODR, SLOW STRM WET CUT & FLOR
 Lm- Cream Tan, FXLN, mostly dense, well cemented, few chips sl, fs, tight, poorly developed w/ minimal visible porosity, clean & barren
 Lm- Cream Tan, FXLN, scdtd development, sl, fs, few chips w/ scdtd ppt porosity, SCTRD LT STN, NO SFO, FNT ODR
STARK SHALE 3989' (-1491) E-LOG Sh- Black Gray, fossiliferous, stony, carbonaceous, soft sticky argillaceous gray clumps
 Lm-Chert- Off White Brown, mix of cryptocrystalline brown Ls & very well cemented argillaceous Ls w/ no visible grains, Chert- Off White, some sl dolomitic & gritty, some sharp angular bedded chert w/ conchoidal fracturing
 Lm- Buff White, Crs XLN, sl, chalky, granular w/ constant ppt porosity, oolitic w/ scdtd spherical pores, intact w/ no apparent skeletal dissolution, some sl dolomitic, well developed, SAT GSY STN, THIN GSY FILM IN CUP, GSY FO, STRONG GSY ODR, DULL FLOR W/ SLW STNG STRM WET CUT
 Sh- Black Gray, soft, fossiliferous, carbonaceous, smooth gray silvers, some sticky argillaceous clumps
 Lm- Li Gray, F-Med XLN, mostly cryptocrystalline, semi-brittle & tight, few chips w/ abundant secondary porosity, semi-translucent, possibly fractured, white siltstone, very loosely cemented, few chips of gritty & grainy sl dolomitic Ls, SCTRD LT GST STN, NO SFO, FR GSY ODR, chips of egg shell white bedded chert & gritty dolomitic chert
 Lm- Tan Brown, VF-FXLN, dense, semi-brittle, sub-cryptocrystalline, scdtd solution veins associated w/ recrystallization and secondary porosity w/in, limited visible matrix porosity, SCTRD LT STN, NO SFO, FNT ODR
BKC 4044' (-1544) E-LOG Sh- Red Gray, dense, well compacted, blocky, soft gray chips
 Sh- Black Dk & Li Gray, well compacted, calcareous, few sl, unconsolidated, gray wash and sticky argillaceous clumps
 Sh- Gray Lm Green, massive, blocky & dense, few sl unconsolidated

SHORT TRIP SURVEY 1 dgr.
 DST #1
 LKC "H"
 3888 - 3930
 STRAP +0.18
 DST #2
 LKC "H"
 3845 - 3990
 DST #3
 LKC "H"
 3951 - 4060



Sh- Brown Drk Maroon, sticky argillaceous brown clumps and maroon sandy lime, friable & consolidated

○ Lm- Cream Buff Tan, mix of VFXLN, sub-cryptocrystalline w/ scdtrd secondary porosity & recrystallization w/in solution veins, dense wcl cemented algal La, and Med gm, sl fal, chalky in part, crumbly La, SCTRD LT STN, NO SFO, NO ODR

La Conglomerate- Buff Gray, mix of shale mottled sl. fal La, pcs of fal detrital XLN, loosely cemented

Lm- Cream Brown, mix of FXLN, semi-brittle sl. cherty La w/ scdtrd secondary porosity and oolitic biomicrite, loosely cemented, some interbedded gray shale lenses

La Conglomerate- mix of various dark colored shales, chalky mud supported La, various colored dense algal La, & densely packed sl. cherty oolitic La w/ tight matrix, few chips of fusulines packstone w/ calcareous cement

○ Lm- Tan Cream, more densely packed oolitic sl. cherty La, no visible matrix porosity, few chips sl. granular w/ oolite inclusions, mud supported matrix, loosely cemented w/ scdtrd interstitial porosity, 1-2 chips w/ SCTTRD DRK STN, NO SFO, NO ODR, DULL FLOR.

Sh- Gray Black Lm Green Maroon, dense, wcl compacted, sl. waxy shivers

Lm- Cream Buff Tan, MF-FXLN, tight, wcl cemented, mostly sub-cryptocrystalline w/ no visible matrix porosity, few chips sl. fal, wcl cemented, semi-brittle w/ dense fenestral secondary porosity, clean & barren

Lm- Cream Tan, FXLN, mostly dense, minimal development, sub-cryptocrystalline, some w/ scdtrd micro porosity, some gritty, w/ gm., sl. sandy w/ calcareous cementation

Lm- Cream Buff, FXLN, dense, sub-cryptocrystalline w/ no to very minimal visible porosity, few chips of sl. fal algal La

PAWNEE 4185 (-1731) Sh- Drk & Lt Gray Lm Green Maroon Off White, fissile, carbonaceous, semi-friable, sl. unconsolidated & pebbly, gritty & sandy, gray & lt maroon wash shale, soft sandy calcareous lime

Lm/Chert- Tan Cream, VFXLN, brittle, very wcl cemented, cherty ls., some w/ small densely packed oolites, dense matrix, slick & porcelain like, chips of sharp angular bedded chert w/ conchoidal fracturing

Lm- Buff Gray, VFXLN, brittle, cryptocrystalline w/ no visible grains, scdtrd dense secondary micro XLN porosity, few chips of cream sl. fal mudstone, very wcl cemented w/ no visible porosity

Lm- Gray Buff, Fine gm., dense poorly cemented algal La, soft

Sh- Drk & Lt Gray Lm Green, soft, smooth, few calcareous off white chips

Sh- Black Gray Lime Green, fissile, carbonaceous, sl. unconsolidated & pebbly, waxy

○ FT, SCOTT 4245 (-1755) F-LOQ Lm- Cream Tan, FXLN, oolitic, mostly dense, slick w/ tightly cemented matrix & minimal visible porosity, LT SCTRD STN, THIN GSY SHEEN, SL GSY SFO, FNT THIN GSY ODR, few chips of oolitic biomicrite, loosely cemented w/ scdtrd intracoolite porosity, few chips of dense, lithified mud matrix, no visible porosity

○ Lm- Tan, F-Med XLN, oolitic biomicrite w/ sparry cementation, semi-brittle, fairly consistent intracoolite porosity, LT GSY STN, SL GSY SFO UPON CRUSH, FR ODR UPON CRUSH, DULL FLOR, NO STRM WET CUT

○ Lm- Cream Tan, Med XLN, oolitic, well developed w/ ppt & scdtrd vugular porosity, dense fenestral porosity, LT GSY STN, THIN GSY SHEEN UPON CRUSH, FNT ODR, DULL FLOR, SLOW DULL STRM WET CUT

CHEROKEE SHALE 4274 (-1784) F-LOQ Sh- Black, fissile carbonaceous, slatey

○ Lm- Mix of Cream FXLN, dense, loosely cemented, sl. fal w/ scdtrd ppt porosity w/ LT GOLDEN SCTRD STN, SL SH OF LIVELY FO UPON CRUSH and Off White fine gr., gritty, very well cemented, chalky in part, scdtrd planar solution veins w/ sl recrystallization w/in, DRK BLK STN ALONG PLANAR EDGES, SL GILSONTIC, NO SFO, FNT ODR IN CUP

Lm- Cream Tan, FXLN, mostly sub-cryptocrystalline w/ minimal visible grains, semi-brittle, few chips of crumbly, sl. chalky La, w/ scdtrd ppt porosity

Sh- Black, fissile, carbonaceous, thin shivers, sl gritty

○ Lm- Cream Tan, F-Med XLN, scdtrd development, sl. fal, scdtrd ppt porosity, few chips w/ scdtrd wuggy porosity, LT GSY STN, GSY FO UPON CRUSH, LT GSY ODR

○ Lm- Cream Tan, mix of FLXN, semi-brittle, sl. fal, dense XLN porosity, SCTRD LT BRWN STN, SL SFO UPON CRUSH, NO ODR, lithified, well cemented, mudstone, marzhae, and chips of bedded chert w/ scdtrd whalpy inclusions

Lm, Tan, FXLN, semi-brittle, very dense secondary XLN porosity, LT GSY STN, SL SFO UPON CRUSH, FNT ODR UPON CRUSH, few sand clusters, clear-frosted, friable, one w/ LT STN, NO SFO, NO ODR, chalky

Sh- Abundant white sticky chalk

Sh- Lm Green Maroon Gray, waxy, sl. unconsolidated shivers, maroon wash

Ss- Clear, VF Gm., white non-Ce cemented matrix, very friable, consolidated, sub-angular

MISSISSIPPIAN 4341 (-1851) F-LOQ Dolomite- White- Buff, FXLN, sucrose, wcl cemented & consolidated, good consistent ppt porosity throughout, SCTRD GOLDEN BRWN STN, FEW CHIPS W/ LIVELY FO UPON CRUSH, FR ODR

40" Smp- A/A, mostly barren porosity, few chips w/ STN A/A, FNT ODR

