Confidentiality Requested:
☑ Yes ☐ No

KANSAS CORPORATION COMMISSION
OIL & GAS CONSERVATION DIVISION

1245693

Form ACO-1
August 2013
Form must be Typed
Form must be Signed
All blanks must be Filled

WELL COMPLETION FORM
WELL HISTORY - DESCRIPTION OF WELL & LEASE

OPERATOR: License # 4767
Name: Ritchie Exploration, Inc.
Address 1: 8100 E 22ND ST N # 700
Address 2: BOX 783188
City: WICHITA State: KS Zip: 67278 + 3188
Contact Person: Peter Fiorini
Phone: (316) 691-9500
CONTRACTOR: License # 33575
Name: WW Drilling, LLC
Wellsite Geologist: Ted Jochems
Purchaser:

Designate Type of Completion:

☑ New Well ☐ Re-Entry ☐ Workover

☑ Oil ☐ WSW ☐ SWD ☐ SIOW
☐ 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
☐ Plug Back ☐ Conv. to GSW ☐ Conv. to Producer

☐ Commingled Permit #:
☐ Dual Completion Permit #:
☐ SWD Permit #:
☐ ENHR Permit #:
☐ GSW Permit #:

12/02/2014	12/14/2014	12/14/2014
Spud Date or Recompletion Date	Date Reached TD	Completion Date or Recompletion Date

API No. 15 - 15-101-22550-00-00
Spot Description: 35'N & 115'W of
_ - S2 - SE - SE Sec. 34 Twp. 17 S. R. 30 ☐ East ☑ West
365 Feet from ☐ North / ☑ South Line of Section
775 Feet from ☑ East / ☐ West Line of Section

Footages Calculated from Nearest Outside Section Corner:
☐ NE ☐ NW ☑ SE ☐ SW

GPS Location: Lat: *(e.g. xx.xxxxx)* , Long: *(e.g. -xxx.xxxxx)*
Datum: ☐ NAD27 ☐ NAD83 ☐ WGS84
County: Lane
Lease Name: Glenn 34D Well #: 1
Field Name:
Producing Formation: Middle Creek
Elevation: Ground: 2854 Kelly Bushing: 2859
Total Vertical Depth: 4650 Plug Back Total Depth: 4617
Amount of Surface Pipe Set and Cemented at: 216 Feet
Multiple Stage Cementing Collar Used? ☑ Yes ☐ No
If yes, show depth set: 2139 Feet
If Alternate II completion, cement circulated from: 0
feet depth to: 2139 w/ 275 sx cmt.

Drilling Fluid Management Plan
(Data must be collected from the Reserve Pit)

Chloride content: 12300 ppm Fluid volume: 820 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

☑ **Confidentiality Requested**
Date: 03/16/2015
☑ **Confidential Release Date:** 03/15/2017
☑ **Wireline Log Received**
☑ **Geologist Report Received**
☐ **UIC Distribution**
ALT ☐ I ☑ II ☐ III **Approved by:** NAOMI JAMES **Date:** 03/16/2015

[redacted]

1245693

Operator Name: Ritchie Exploration, Inc. Lease Name: Glenn 34D Well #: 1

Sec. 34 Twp. 17 S. R. 30 ☐ East ☑ West County: Lane

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 ☑ Yes ☐ No
(Attach Additional Sheets)

Samples Sent to Geological Survey ☑ Yes ☐ No

Cores Taken ☐ Yes ☑ No

Electric Log Run ☑ Yes ☐ No

List All E. Logs Run:

Dual Induction Log
Compensated Density/Neutron Log

☐ Log Formation (Top), Depth and Datum ☑ Sample

Name	Top	Datum
See Attached		

CASING RECORD ☑ New ☐ 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	12.25	8.625	23	216	Common	165	3% cc, 2% gel
Production	7.875	5.5	15.5	4646	OWC	175	10% salt, 2% gel, 5# per sack Kolseal an

ADDITIONAL CEMENTING / SQUEEZE RECORD

Purpose:	Depth Top Bottom	Type of Cement	# Sacks Used	Type and Percent Additives
___ Perforate				
___ Protect Casing	-			
___ Plug Back TD				
___ Plug Off Zone	-			

Did you perform a hydraulic fracturing treatment on this well? ☐ Yes ☑ No *(If No, skip questions 2 and 3)*

Does the volume of the total base fluid of the hydraulic fracturing treatment exceed 350,000 gallons? ☐ Yes ☐ No *(If No, skip question 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)*

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
4	4230.5' - 4232.5		

TUBING RECORD: Size: 2.875 Set At: 4584 Packer At:

Liner Run: ☐ Yes ☑ No

Date of First, Resumed Production, SWD or ENHR. 02/05/2015

Producing Method: ☐ Flowing ☑ Pumping ☐ Gas Lift ☐ Other *(Explain)*

Estimated Production Per 24 Hours	Oil Bbls.	Gas Mcf	Water Bbls.	Gas-Oil Ratio	Gravity
	1.94		58.56		

DISPOSITION OF GAS:
☐ Vented ☐ Sold ☐ Used on Lease
(If vented, Submit ACO-18.)

METHOD OF COMPLETION:
☐ Open Hole ☑ Perf. ☐ Dually Comp. *(Submit ACO-5)* ☐ Commingled *(Submit ACO-4)*
☐ Other *(Specify)*

PRODUCTION INTERVAL:

Form	ACO1 - Well Completion
Operator	Ritchie Exploration, Inc.
Well Name	Glenn 34D 1
Doc ID	1245693

Casing

Purpose Of String	Size Hole Drilled	Size Casing Set	Weight	Setting Depth	Type Of Cement	Number of Sacks Used	Type and Percent Additives
Surface	12.25	8.625	23	216	Common	165	3% cc, 2% gel
Production	7.875	5.5	15.5	4646	OWC	175	10% salt, 2% gel, 5# per sack Kolseal and 1/4% CD-26

RITCHIE
EXPLORATION, INC.
Wichita, Kansas

#1 Glenn 34D
365' FSL & 775' FEL
35' N & 115' W of S/2 SE SE Section 34-17S-30W
Lane County, Kansas
API# 15-101-22550-0000
Elevation: 2854' GL, 2859' KB

Sample Tops			Ref. Well
Anhydrite	2213'	+646	-2
B/Anhydrite	2236'	+623	+1
Stotler	3504'	-645	Flat
Heebner	3885'	-1026	+3
Toronto	3911'	-1052	+3
Lansing	3928'	-1069	+1
Muncie Shale	4098'	-1239	-2
Stark Shale	4197'	-1338	-1
Hush	4230'	-1371	+2
Middle Creek	4232'	-1373	+3
BKC	4280'	-1421	+1
Marmaton	4312'	-1453	+3
Altamont	4330'	-1471	+1
Pawnee	4400'	-1541	+2
Myrick	4434'	-1575	Flat
Fort Scott	4449'	-1590	+2
Cherokee Shale	4470'	-1611	+2
Johnson	4514'	-1650	+5
Mississippian	4540'	-1681	+1
RTD	4650'	-1791	

P.O. Box 783188
Wichita, Kansas 67278-3188

(316) 691-9500
Fax (316) 691-9550
rei@ritchie-exp.com

8100 E. 22nd St. N., Bldg. 700
Wichita, Kansas 67226-2328

ALLIED OIL & GAS SERVICES, LLC 063798

15520

Federal Tax I.D. # 20-8651475

REMIT TO P.O. BOX 93999
SOUTHLAKE, TEXAS 76092

SERVICE POINT:
Dodge KS

DATE 12/2/14	SEC. 34	TWP. 17	RANGE 30	CALLED OUT	ON LOCATION	JOB START 8:00pm	JOB FINISH 9:00pm
LEASE Glenn 3-10	WELL # 1		LOCATION Healy 5½ S into			COUNTY Lane	STATE KS
OLD OR NEW (Circle one)							

CONTRACTOR WW 8
TYPE OF JOB Surface
HOLE SIZE 12¼ T.D. 217
CASING SIZE 8⅝ DEPTH 217
TUBING SIZE DEPTH
DRILL PIPE 4½ DEPTH
TOOL DEPTH
PRES. MAX MINIMUM
MEAS. LINE SHOE JOINT
CEMENT LEFT IN CSG. 15
PERFS.
DISPLACEMENT 13.86 BBL H2O

OWNER Same

CEMENT
AMOUNT ORDERED 165 sk 3%CC 2%gel

EQUIPMENT

PUMP TRUCK CEMENTER Ryan
423-281 HELPER Kevin Ryan
BULK TRUCK
816 DRIVER Ricardo (11.33)
BULK TRUCK
DRIVER

COMMON	165	@ 17.90	2953.50
POZMIX		@	
GEL	3 10	@ .90	153.00
CHLORIDE	465	@ 1.10	511.50
ASC		@	
Material Total		@	3600.00
(236.00/30%)		@	
		@	
		@	
		@	
		@	
HANDLING	178 412	@ 2.48	442.46
MILEAGE 2¢ Tn/mile 8.143		TON	1231.63
		TOTAL	

REMARKS:
Ran Csg, Circulate, Mix Cement, Displace Cement, Shut in
Cement did Circulate
Thank You
Marksberry Ricardo

SERVICE

DEPTH OF JOB	217		
PUMP TRUCK CHARGE			1512.25
EXTRA FOOTAGE		@	
MILEAGE	55	@ 5.20	423.50
MANIFOLD		@	
Wellhead	55	@ 4.40	242.00
		@	
(170.36/30%)		TOTAL	3351.01

CHARGE TO: A-Tech
STREET
CITY STATE ZIP

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 7,531.04
DISCOUNT 1506.36 (30%) IF PAID IN 30 DAYS
6,025.41 Net

PRINTED NAME Sid Deutscher
SIGNATURE

1607
1558

Invoice #802746

CONSOLIDATED
Oil Well Services, LLC

PO Box 884, Chanute, KS 66720
620-431-9210 or 800-467-8676

TICKET NUMBER 47844
LOCATION Oakley Ks.
FOREMAN Cory Davis
Jerry H

FIELD TICKET & TREATMENT REPORT

CEMENT

KS

DATE	CUSTOMER #	WELL NAME & NUMBER	SECTION	TOWNSHIP	RANGE	COUNTY
12/19/14	7173	Glenn 340 #1	34	17	30	Lane

CUSTOMER: Ritchie
MAILING ADDRESS:
CITY: STATE: ZIP CODE:

Hwy Ks. S. on Dodge 5½ miles w. into

TRUCK #	DRIVER	TRUCK #	DRIVER
399	Jeremy R.		
	Larry H		
Helper	Josh		

JOB TYPE Port collar HOLE SIZE HOLE DEPTH CASING SIZE & WEIGHT
CASING DEPTH DRILL PIPE TUBING 2 7/8 OTHER PC. at 2139'
SLURRY WEIGHT 12.5 SLURRY VOL 1.59 WATER gal/sk 8 CEMENT LEFT in CASING 1
DISPLACEMENT 11 BBL DISPLACEMENT PSI MIX PSI RATE

REMARKS: Safety meeting rigup on K&M w.s. test casing to 1200 Psi open port collar tool @ 2139 Mix 275 sks 60/40 poz mix 6% gel ¼# Flosea1 500# Cottonseed Hulls. Displace 11 BBL water. shut tool wash up pump and lines test tool to 1200 Psi. ran 5 joints in circulate 30 BBL water wash up tubing rig down

Thank cory Davis & Crew

ACCOUNT CODE	QUANITY or UNITS	DESCRIPTION of SERVICES or PRODUCT	UNIT PRICE	TOTAL
5401 B	1	PUMP CHARGE	1,785.00	1785.00
5406	100	MILEAGE	5.25	525.00
5407A	11.83	Ton mileage Delivery	1.15	2,010.25
1131	275 sks.	60/40 Poz mix	15.86	4,361.50
1118 B	1'419#	Bentonite (Gel)	.27	383.13
1107	69	Flo seal	2.97	204.93
1105	500#	Cottonseed Hulls.	.58	290.00
			sub total	9,619.81
			10% less	961.98
			sub total	8,657.82
			SALES TAX	337.19
			ESTIMATED TOTAL	8995.01

Ravin 3737

AUTHORIZTION TITLE DATE

I acknowledge that the payment terms, unless specifically amended in writing on the front of the form or in the customer's account records, at our office, and conditions of service on the back of this form are in effect for services identified on this form.

1553
1502

CONSOLIDATED
Oil Well Services, LLC

INVOICE # 802703

TICKET NUMBER 47842
LOCATION Oakley Ks.
FOREMAN Cory Davis
Jerry P.

PO Box 884, Chanute, KS 66720
620-431-9210 or 800-467-8676

FIELD TICKET & TREATMENT REPORT
CEMENT

KS

DATE	CUSTOMER #	WELL NAME & NUMBER	SECTION	TOWNSHIP	RANGE	COUNTY
12/14/14	7173	Glenn 340 #1	34	17	30	Lane

CUSTOMER: Ritchie E.
MAILING ADDRESS:
CITY / STATE / ZIP CODE:

Scott City E to RD Dodge rd 4 North west into

TRUCK #	DRIVER	TRUCK #	DRIVER
731	Jeremy R.		
460	Larry H		

JOB TYPE Production HOLE SIZE 7 7/8 HOLE DEPTH 4646 CASING SIZE & WEIGHT 5 1/2 15.5
CASING DEPTH 4645 DRILL PIPE TUBING OTHER
SLURRY WEIGHT 14.8 SLURRY VOL 1.42 WATER gal/sk 6.97 CEMENT LEFT in CASING 21.3
DISPLACEMENT 110 DISPLACEMENT PSI MIX PSI RATE

REMARKS: Safty meeting - rig upon w/s - run casing and flote equment turbolizer on Joint 1, 2, 3, 5, 7, 11, 55, 57 and 67 Basket on 8, 56 and 69 shoe joint 21.31 Port coller at 2153' Joint 56 - Circulate 1 hour with rig pump - Hook up to pump truck pump 5 BBL ahead Mix Mud flush 5 BBL water Behind - Mix 30 sks in rat hole thin 175 sks o.w.c 5# Kolseal cd1 26 CAF 38 Down hole - wash up pump and lines - relese plug - Displace 110 BBL Water - Ball went through at 400 PSI
Rig down
Lift 1,000 psi
land 1,500 psi

Thanks Cory Davis & Crew

ACCOUNT CODE	QUANITY or UNITS	DESCRIPTION of SERVICES or PRODUCT	UNIT PRICE	TOTAL
5401 C	1	PUMP CHARGE	3,175.00	3,175.00
5406	50	MILEAGE	5.25	262.50
5407A	11.38	Ton Mileage Delivery	1.75	995.75
1126	205	OWC	23.70	4,858.50
1110A	1,025	Kolseal	.56	574.00
1137	51	CDI 26	10.20	520.20
1146	29	CAF-38	10.20	295.80
1144G	500 gal	DV 1100 (Mud flush)	1.00	500.00
4159	1	Float shoe 5 1/2	433.75	433.75
4454	1	Latch down & Plug 5 1/2	567.00	567.00
4136	9	5 1/2 Turbolizer	75.75	681.75
4104	3	5 1/2 Basket	290.00	870.00
4285	1	Port coller	2,178.75	2,178.75
			subtotal	15,913.00
			10% less	1,591.30
			subtotal	14,321.70
			SALES TAX	710.81
			ESTIMATED TOTAL	15,032.53

Ravin 3737

AUTHORIZTION Cory Rowe TITLE DATE

I acknowledge that the payment terms, unless specifically amended in writing on the front of the form or in the customer's account records, at our office, and conditions of service on the back of this form are in effect for services identified on this form.

HEADER

WellSight Systems

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

Well Name: #1 GLENN 34D
Well Id:
Location: sec 34 - twp 17S - rge 30W LANE COUNTY
License Number: API #15-101-22,550 Region: KANSAS
Spud Date: 02 DEC 2014 Drilling Completed: 14 DEC 2014
Surface Coordinates: 365' FSL & 775' FEL
35' N & 115' W of C S2 - SE - SE
Bottom Hole Coordinates: DEVIATION SURVEYS: 0.5 degree @ 217, 0.75 degree @ 4,000, 0.75 degree @ 4,250, 1" @ 4,650
Ground Elevation (ft): 2,854 K.B. Elevation (ft): 2,859
Logged Interval (ft): 3,400 To: 4,650 Total Depth (ft): 4,650
Formation: ADMIRE to MISSISSIPPIAN
Type of Drilling Fluid: CHEMICAL: displace @ 3,367

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

OPERATOR

Company: Ritchie Exploration, Inc. KLN 4767
Address: P.O. Box 783188
Wichita, Kansas 67278-3188

GEOLOGIST

Name: Ted Jochems, Jr.
Company: Consulting Geologist
Address: 212 North Market ste 517
Wichita, Kansas 67202

COMMENTS

CONTACTOR: W W Drilling, rig #8 (toolpusher Sid Duetscher)
MUD: Mud-Co (Reid Atkins)
DRILL STEM TESTS: Trilobite Testing (Justin Harris)
ELECTRIC LOGS: Nabors Services (Ian Mabb)
(DIL & CDL/CNL)
SURFACE CASING: 8.625" @ 217
PRODUCTION CASING: 5" to Mississippian

DAILY PENETRATION

DATE	DEPTH		
02 DEC 2014	308	0700 hours	SPUD
03 DEC	2,540	"	"
04 DEC	3,235	"	"
05 DEC	3,785	"	"
06 DEC	3,965	"	"
07 DEC	4,000	"	DST #1
08 DEC	4,035	"	"
09 DEC	4,133	"	"
10 DEC	4,249	"	"
11 DEC	4,298	"	DST #6
12 DEC	4,376	"	DST #7
13 DEC	4,469	"	DST #8
14 DEC	4,650	"	RTD

DRILL STEM TEST #1

3,965 - 4,000 30 - 45 - 45 - 60 LKC D zone
IFP: weak surface blow built to 2.5" / 30 min
ISIP: no return
FFP: weak surface blow
FSIP: no return
COMMENT: 120' of drill collars above tool
REC: 15' OCM (10% O, 90% M)
126' OCM (5% O, 95% M)(drill collars)
141' total fluid
FP: 14 - 44# / 45 - 73#
SIP: 1,034 - 1,022#
HP: 1,918 - 1,862#
BHT: 111 degrees F
COMMENT: shut-in curves indicate excellent permeability.

DRILL STEM TEST #2

3,999 - 4,030 30 - 45 - 45 - 60 LKC E & F zones
IFP: weak surface blow built to 2" / 30 min
ISIP: no return
FFP: weak surface blow
FSIP: no return
COMMENT: 120' of drill collars above tool
REC: 8' CO (100% O)
126' OCM (20% O, 80% M) (drill collars)
134' total fluid
GRAVITY: 28 degrees API
FP: 12 - 38# / 40 - 68#
SIP: 1,001 - 990#
HP: 1,926 - 1,918#
BHT: 112 degrees F
COMMENT: shut-in curves indicate good to very good permeability.

DRILL STEM TEST #3

4,030 - 4,045 30 - 45 - 30 - 45
base LKC F & top LKC G zones (both with shows of oil)
IFP: BOB / 5 min
ISIP: no return
FFP: BOB / 6 min
FSIP: no return
COMMENT: 120' of drill collars above tool
REC: 20' OWCM (5% O, 35% W, 60% M)
504' MCW (97% W, 3% M)
252' MCW (95% W, 5% M)
126' MCW (85% W, 15% M) (drill collars)
902' total fluid
Rw: 0.23 ohms @ 50 degrees F
CHLORIDES: 40,000 ppm recovery (2,800 ppm system)
FP: 34 - 267# / 213 - 432#
SIP: 1,044 - 1,008#
HP: 1,940 - 1,916#
BHT: 123 degrees F
COMMENT: shut-in curves indicate excellent permeability.

DRILL STEM TEST #4

4,136 - 4,164 30 - 45 - 45 - 60 LKC I zone
IFP: BOB / 27 min
ISIP: no return
FFP: weak blow built to 11" / 45 min
FSIP: no return
COMMENT: 120' of drill collars above tool
REC: 20' MCW w/ oil spots (95% W, 5% M)
189' MCW (90% W, 10% M)
126' WCM (40% W, 60% M) (drill collars)
335' total fluid
Rw: 0.30 ohms @ 38 degrees F
CHLORIDES: 40,000 ppm recovery (2,700 ppm system)
FP: 17 - 101# / 84 - 174#
SIP: 861 - 843#
HP: 2,006 - 1,925#
BHT: 122 degrees F
COMMENT: shut-in curves indicate good permeability

DRILL STEM TEST #5

4,226 - 4,250 30 - 45 - 45 - 60
MIDDLE CREEK & LKC L zone
IFP: BOB / 2 min
ISIP: weak surface blow
FFP: BOB / 5 min
FSIP: weak surface blow
COMMENT: 120' of drill collars above tool
REC: 136' CO (40% G, 60 %O)
378' GMCO (40% G, 50% O, 10% M)
504' OMCW (2% O, 93% W, 5% M) (drill pipe)
126' OMCW (2% O, 93% W, 5% M) (drill collars)
316' GIP
1,144' total fluid
GRAVITY: 31 degrees API
Rw: 0.25 ohms @ 37 degrees F
CHLORIDES: 50,000 ppm recovery (2,700 ppm system)
FP: 66 - 407# / 422 - 593#
SIP: 661 - 662#
HP: 2,067 - 1,967#
BHT: 126 degrees F
COMMENT: shut-in curves indicate excellent permeability.

DRILL STEM TEST #6

4,277 - 4,298 30 - 30 - 45 - 60 PLEASANTON
IFP: weak surface blow died / 8 min
ISIP: no return
FFP: no blow - flush tool @ 5 min: packer re-established seat, got blow to BOB. blow decreased to 6" / 45 min
FSIP: no return
COMMENT: 120' of drill collars above tool
REC: 199' SOCM (2% O, 98% M) (drill pipe)
126' DM w/ oil spots (100% M) (drill collars)
325' total fluid
FP: 12 - 19# / 16 - 171#
SIP: 685 - 704#
HP: 2,090 - 2,064#
BHT: 113 degrees F
COMMENT: shut-in curves indicate poor to fair permeability during initial shut-in, somewhat better during final shut-in.

DRILL STEM TEST #7

4,296 - 4,376 30 - 45 - 30 - 45
MARMATON to ALTAMONT 'B'
IFP: BOB / 2.5 min
ISIP: no return
FFP: weak surface blow built to 5"
FSIP: no return
COMMENT: 120' of drill collars above tool
REC: 220' MCW (50% W, 50% M)
315' MCW (60% W, 40% M)
315' MCW (70% W, 30% M)
126' MCW (90% W, 10% M)
oil spots in top of tool
976' total fluid
Rw: 0.21 ohms @ 47 degrees F
CHLORIDES: 50,000 ppm recovery (3,800 ppm system)
FP: 75 - 398# / 406 - 424#
SIP: 424 - 427#
HP: 2,086 - 2,010#
BHT: 121 degrees F
COMMENT: initial shut-in curve indicates poor to fair permeability.

DRILL STEM TEST #8

4,390 - 4,469 30 - 45 - 60
PAWNEE - MYRICK STATION - FORT SCOTT
IFP: weak surface blow built to 2.5" / 30 min
ISIP: no return
FFP: weak surface blow built to 3.5" / 45 min
FSIP: no return
COMMENT: 120' of drill collars above tool
REC: 63' GOCM (10% G, 20% O, 70% M) (drill collars)
63' total fluid
FP: 15 - 28# / 39 - 37#
SIP: 172 - 312#
HP: 2,127 - 2,071#
BHT: 115 degrees F
COMMENT: shut-in curves are concave and indicate extremely poor permeability.

MUD REPORT

displace @ 3,367

RPT	DEPTH	WT	VIS	FIL	pH	PV	YP	GELS	CHLOR	SOLIDS	BTMS UP
2	2,614	9.0	29	n/c	7.0	-	-	-	24,000	3.2%	24 min
3	3,305	9.2	30	n/c	7.0	-	-	-	22,000	5.0%	31 min
4	3,810	8.9	58	6.8	11.0	22	16	6/23	2,200	4.4%	36 min
5	4,000	9.1	52	7.2	10.0	18	17	11/23	2,800	5.5%	37 min
6	4,045	9.1	49	8.8	10.0	14	16	10/30	3,000	5.3%	38 min
7	4,146	9.1	52	8.0	10.5	17	15	9/25	2,700	5.4%	39 min
8	4,250	9.2	55	7.2	11.0	20	16	7/23	4,000	5.8%	40 min
9	4,298	9.2	52	6.8	10.5	16	19	11/30	3,800	5.9%	40 min
10	4,376	9.2	55	8.0	11.0	17	21	12/28	4,400	5.7%	41 min
11	4,469	9.2	52	6.4	10.5	14	16	9/20	4,000	5.8%	42 min
12	4,625	9.2	52	6.4	11.0	18	15	10/22	3,000	5.9%	43 min

ROCK TYPES

Anhy, Bent, Brec, Cht, Clyst, Coal, Congl, Dol, Gyp, Igne, Lmst, Meta, Mrlst, Salt, Shale, Shcol, Shgy, Sltst, Ss, Till

OTHER SYMBOLS

OIL SHOW: Even, Spotted, Ques, Dead, Gas
INTERVAL: Core, Dst
EVENT: Conn, Rft, Sidewall

Curve Track 1 ROP (min/ft)	Depth	Lithology	Oil Shows	Geological Descriptions	REMARKS

DEPTH 2,150

DEPTH 2,200

anhydrite top and base picked from drill time: no samples collected.

DEPTH 2,250

examine samples wet for color, shows & description; dry for porosity & dry stain. descriptions are lagged up to true depth using mud engineer's calculation for bottoms up.

drilling with 418' of drill collars

REMARKS: "cal floodd" is synonymous with "lithographic" or "dense." this is pervasive replacement by calcite.
"cal overgrths" includes calcite crusts (calcite analogue to tripolitic chert), druzy calcite, calcite veinlets and local recrystallization of larger fossils or clasts.
"rextlzd" = recrystallized.
"sil" = siliceous: introduction of moderate to abundant silica - original color and texture preserved.
"cht" describes very heavy silicification - original color and texture altered.
displace @ 3,367

LS: gry & off wht, microxtln, sl cal floodd, loc chalky. no / poor vis por. tr minute amber flecks (no odor, no cut), NSO

LS: gry & off wht, microxtln, cal floodd, loc ool. no vis por. minor minute amber flecks & stns (no odor, no cut), NSO

SH: gry, argil, silty, cal inclusions, stringers of SLTST (pale grn, calc, poor por, NS)

SH: gry & maroon, argil, silty, earthy hematite, stringers of LS (gry, microxtln, pelletal), NVP NS

LS: lt gry, microxtln, fossl, pelletal, chalky partings. v poor vis por. rare minute amber flecks (no odor, NSO

LS: gry to dk gry, microxtln, shaly, silty, fossl, loc chalky. v poor vis por. NS

SH: lt gry, v silty, v calc, minor mica, tr blk plant fragments. — vis 54 wt 8.9

LS: wht, microxtln, variably chalky, loc wkly cal floodd, relict forams, tr cal overgrths. no / poor vis por. NS

LS: gry to dk gry, microxtln, loc cal floodd, loc v silty & shaly. v poor por. rare minute amber flecks (no odor), NSO

LS: gry > tan, microxtln, wkly cal floodd, minor relict fossls, wk cal crusts. no vis por. tr minute amber & blk stns (no odor, no cut), NSO

LS: off wht to pale gry, microxtln, variably chalky, loc wkly rextlzd, relict forams. no / poor vis por. NS

LS: gry & off wht, loc rextlzd, loc cal floodd, variably chalky, loc relict fossls. poor vis por. tr minute brn stns (no odor, no cut), NSO

LS: off wht, micro-vfgr xtln, loc rextlzd, variably chalky, loc silcfd to cht (lt gry, micro- vfgr xtln, loc fossl). no / poor vis por. NS — vis 56 wt 8.8

LS: gry & off wht, micro-vfgr xtln, silty, loc microxtln py, loc fossl. no vis por (tr ooc). tr brn stns (no odor, no cut), NSO

LS: lt gry & lt brn, microxtln, variably chalky, tr cht (wht, cryptxtln). v poor por. tr brn stns (no odor), NSO

LS: off wht, lt brn & brn, microxtln, cal floodd, loc rextlzd & chalky, tr gry cht (microxtln, relict fossls). no / poor vis por. NS

LS: off wht & lt brn to brn, microxtln, cal floodd, loc chalky, loc relict fossls. no / poor vis por. tr brn stns (no odor), NSO

SH: blk, carb, micac, wht cal inclusions.

LS: off wht, micro-vfgr xtln, wkly rextlzd, variably chalky, relict forams. poor vis por. minor brn stns (no odor, no cut, ?hematite?), NSO

SH: grn, red-brn & gry, silty, argil, earthy & specular hematite, loc sandy (poor por, NS)

LS: lt to dk gry, microxtln, abt forams, loc sl chalky, pelletal, loc sl cal floodd. no / poor vis por. NS

LS: off wht, microxtln, sl rextlzd, chalky (loc mushy), forams. very poor vis por. NS

SH: gry, argil, silty. — vis 53 wt 8.9 lcm 0.5#

LS: pale to lt gry, microxtln, cal floodd, loc rextlzd & chalky, loc cht (wht, cryptxtln). no / poor vis por. rare brn stns (no odor), NS

LS: lt gry to gry, micro-vfgr xtln, cal floodd, loc rextlzd & chalky, loc cht (wht, cryptxtln). no / poor vis por. some brn stns (no odor), NSO

SH: lt to dk gry, red-brn & lt maroon, argil, loc v silty & micac, earthy & specular hematite, tr py, blk & carb @ base.

LS: gry to brn, microxtln, cal floodd, loc chalky, relict fossls. no vis por. NS — vis 58 wt 8.9 lcm 1#

LS: wht to off wht, loc rextlzd, variably chalky. poor vis por. NS

LS: off wht, cal floodd, loc chalky, abt forams, loc cht (pale gry, cryptxtln). no / poor vis por. brn stns (no odor, no cut), NSO

LS: wht to tan, micro-vfgr xtln, rextlzd, chalky (loc mushy), stringer(s) of SH (grn & red-brn, argil, earthy hematite, silty). no / poor vis por. NS

LS: lt gry to off wht, microxtln, rextlzd, v chalky. v poor vis por. abt brn & blk stns & flakes (no odor, no cut), NSFO on brk.

LS: off wht to lt brn, micro-vfgr xtln, rextlzd, v chalky, loc smears of blk carb sh (shale diapir). poor por. abt brn stns (no odor), NSO

SH: blk, carb, micac, tr py, wht & pink cal inclusions.

LS: brn, microxtln, cal floodd, wk cal crusts, loc silty, fusulinids, loc hmt (some cubes). no vis por. minor brn stns (no odor, no cut), NSO

SH: grn, gry & red-brn, argil (loc mushy), loc silty / sdy, earthy hematite.

LS: wht, microxtln, cal floodd, loc chalky, loc abt relict forams (?ool?), loc cht (wht to pale gry, cryptxtln, forams & spicules). no / poor vis por. no odor, NS

LS: lt brn, microxtln, cal floodd, wk cal crusts, forams & phylloid algae, loc cht (lt brn, cryptxtln, fossl). no vis por. no odor, NS

SH: grn, gry & red-brn, argil, silty, earthy hematite.

LS: brn, microxtln, cal floodd + rextlzd, sl chalky, fossl, cal crusts. no vis por. tr brn stns (no odor, no cut), NS

LS: crm, tan & brn, microxtln, cal floodd, relict forams & crinoids, loc abt vfgr - mgr py, tr druzy cal, abt cht (wht, lt gry & brn, cryptxtln, fusulinids). no vis por. no odor, NS

SH: gry to dk gry, grn & red-brn, argil, micac, earthy hematite, tr py, rock granules.

LS: crm, microxtln, cal floodd, loc rextlzd (vfgr), loc chalky, relict forams, minor cal crusts & overgrths, loc sil / cht (tan & off wht, cryptxtln, fossl), coatings of dk brn microxtln hmt (no cut), tr py. no / poor vis por. no odor, NS

SH: grn, gry & red-brn, v silty, argil, earthy & specular hematite. — DST #1 3,965 - 4,000 REC 141' OCM SIP 1,034 - 1,022# details above

LS: crm, microxtln, variably cal floodd, loc ool, tr vfgr py, loc cht (wht, cryptxtln, vfgr py). no vis por. no odor, NS

LS: wht, microxtln, v chalky, bivalve casts. poor vis por. no odor, NS

LS: crm, microxtln, hvyly cal floodd, fgr druzy cal, minor relict fossls, tr py. fair-good intxtln por in druzy cal only. v wk SO in druzy cal (dk brn, no / v wk odor, fair flash cut, 18 show pcs, wk to good patchy lt brn dry stn, no show energy). — strap pipe @ 4,000 board 4,028.67 strap 4,028.38 board long 0.29

LS: wht, microxtln, v chalky, bivalve casts. poor vis por. NS — vis 60+ wt 9.3 lcm 2# after DST #1

SH: grn & red-brn, argil, earthy hematite, py, rock granules, minor crinoids.

LS: brn, lt gry & crm, microxtln, cal floodd, dns, cal crusts, druzy cal, loc ool, minor fossls, tr py, cht @ base (pale gry, cryptxtln). no matrix por, wk-fair por in secondary cal. wk SO (dk brn, tiny drplts, fair-good odor, wk-fair cut, 16 show pcs, patchy brn dry stn, no show energy) — DST #2 3,999 - 4,030 REC 8' CO & 126' OCM SIP 1,001 - 990# details above

SH: grn, gry & red-brn, argil, earthy hematite, lepidodendron.

LS: crm, micro-vfgr xtln, rextlzd, chalky, loc ool, microxtln druzy cal, cal crusts. wk-fair intool por & intxtln por in secondary cal. fair SO (dk brn, fair - good odor, 15 show pcs, patchy to satd brn-dk brn dry stn, v wk show energy)

9 show pcs below test intv. first appearence of dolomite as below. — DST #3 4,030 - 4,045 REC 20' OWCM & 882' MCW SIP 1,044 - 1,022# details above

SH: grn, gry & red-brn, argil, earthy hematite, minor py.

DOL: tan, vfgr xtln, rextlzd, sucr. poor por. 1 show pc (SSO w/ patchy dry stn)

LS: tan > brn, microxtln, hvyly cal floodd (dns), abt vfgr-mgr druzy cal & cal crusts, ool, abt chalk partings (mushy), rare py. no matrix por, wk-fair ooc & intxtln por in secondary cal. wk-fair SO (dk brn, wk-fair odor, wk-good cut, 11 show pcs, dk brn patchy to satd dry stn, no show energy)

4,045 - 53: first sample (before bottoms up) shows crm ls (cal floodd + chalky) w/ 2 - 3 show pcs & wk odor, presumed to be from the DST #3 intv.

LS: crm, microxtln, cal floodd, minor-moderate vfgr druzy cal, loc chalky. no / poor vis por. NS — pump clutch fails @ 4,053: WOP for ~3.5 hours.

LS: crm & pale gry, microxtln, cal floodd, abt chalk partings, minor cal overgrths, minor microxtln hmt / py. no / poor vis por. tr blk & dk brn stns & flakes (1 pc gave wk cut: ?caving?)(no odor), NSO

LS: pale gry, microxtln, cal floodd, minor druzy cal & cal crusts. no vis por. NS

LS: wht to off wht, microxtln, sl rextlzd, chalky. no / poor vis por. NS

LS: pale gry to gry, microxtln, cal floodd, minor druzy cal & cal crusts, loc wht & chalky, minor specular hematite. no / poor por. tr brn stns (no odor, no cut - ?hematite?), NSO — vis 50 wt 9.2 lcm 1#

LS: gry, microxtln, cal floodd, cal crusts, loc wht & chalky. no / poor vis por. NS

SH: blk, carb, micac, wht cal inclusions.

LS: brn, microxtln, hvyly cal floodd, cal crusts, loc cht (dk brn, crypt - microxtln, forams & spicules), minor blk smears of hmt (no cut), tr py, 1 pc w/ sphalerite. no vis por. no odor, NS

SH: grn, gry & red-brn, argil, micac, earthy & specular hematite.

LS: crm & pale gry, microxtln, cal floodd, loc sl rextlzd & chalky, cal crusts, tr druzy cal, tr brn hmt, tr py, loc cht (wht, crypt-micro xtln, tr relict fossls). no / poor vis por. no odor, NS

LS: off wht to wht, microxtln, chalky, sl rextlzd, bivalve casts. poor vis por. no odor, NS

LS: gry, off wht & wht, microxtln, cal floodd + sl rextlzd, chalky partings, relict fossls. no / poor vis por. NS

LS: brn, microxtln, cal floodd, cal crusts. no vis por. NS

SH: grn, gry, maroon & red-brn, argil, micac, earthy & specular hematite, py, blk & carb @ top of unit, rock granules, stringer of brn, cal floodd, pyr LS (NVP, NS) — DST #4 4,136 - 4,164 REC 20' MCW w/ oil spots, 189' MCW, 126' WCM SIP 861 - 843# details above

LS: crm to tan, variably cal floodd, mgr ool @ top, vfgr druzy cal, cal crusts. poor intool & intxtln por. wk-fair SO (dk brn, fair-good odor, dk brn patchy dry stn, 17 show pcs, v low show energy)

LS: peach to lt brn, microxtln, loc rextlzd, cal floodd, relict fossls. no vis por. no odor, NS — vis 52 wt 9.1 before DST #4

SH: gry & dk grn > maroon, argil, silty, minor py, blk hematite vnlts, rock granules. — vis 54 wt 9.2 lcm 2# after DST #4

LS: brn, gry & tan, microxtln, mod to hvyly cal floodd, cal crusts, chalk partings, minor blk hematite smears. no vis por. NS

LS: lt gry & crm, microxtln, cal floodd, ool, druzy cal in casts, loc v chalky. wk to fair ooc por. v wk SO (dk brn, wk-fair fleeting odor, wk cut, 9 show pcs, patchy dk brn dry stn, few drplts FO in tray)

LS: gry, microxtln, cal floodd, cal crusts, loc ool, loc silcfd to cht (pale gry, cryptxtln, fossl). no vis por. NS

LS: gry, cal floodd a/a after cfs: spl had wk odor (prob ooc cavings), but NS

SH: blk, carb, micac, pyr, wht cal inclusions, fragments of concentric algae.

LS: dk brn, microxtln, hvyly cal floodd, abt cal crusts. no vis por. wk odor (prob ooc cavings), NS — vis 60 wt 9.2 lcm 1#

LS: crm, microxtln, cal floodd + rextlzd & chalky, druzy cal, cal crusts, loc silcfd to cht (pale blue & wht, cryptxtln, fossl). wk intxtln por in secondary cal only. wk SO (brn, wk odor, wk-fair cut, 6 show pcs, tr FO drplts, patchy to satd brn dry stn)

LS: crm to wht, rextlzd, v chalky, bivalve casts, loc silcfd to cht (wht, gry & pale blue, crypt - microxtln, fossl). poor vis por. NS — vis 56 wt 9.2 lcm 1#

SH: blk, carb, micac, wht & pink cal inclusions. — DST #5 4,226 - 4,250 REC 136' CO, 378' GMCO, 630' OMCW

LS: brn & gry, microxtln, hvyly cal floodd, cal crusts, druzy cal, spines. wk intxtln por in secondary cal. wk SO (brn, wk-fair odor, fair cut, 3 show pcs, satd brn stn). — SIP 661 - 662# details above

LS: gry, crypt-microxtln, cal floodd, fgr-mgr druzy cal, cal crusts, loc chalky, blk hematite coatings, loc relict fossls. no vis por. no odor, NS — vis 54 wt 9.2 lcm 1#

LS: off wht & pale gry, microxtln, chalky, loc wkly cal floodd. no / poor vis por. tr brn stns (no odor, no dry stn; prob hmt), NSO

LS: crm, off wht & lt gry, microxtln, chalky (loc mushy), sl rextlzd, loc cal floodd, minor cal overgrths, minor hmt stns, loc relict fossl. poor vis por. no odor, NS

LS: lt gry, lt brn & off wht, microxtln, rextlzd + cal floodd, loc chalky, minor cal crusts, tr pelletal, rare py, loc cht (brn & gry, cryptxtln, microxtln hmt). no / poor vis por. no odor, NS — DST #6 4,277 - 4,298 REC 199' SOCM, 126' DM w/ oil spots SIP 685 - 704# details above

SH: dk grn to gry, argil, tr py.

LS: brn, microxtln, cal floodd, cal crusts. no vis por. NS

LS: crm, micro-vfgr xtln, rextlzd + cal floodd, abt micro-fgr xtln secondary cal (crusts, druzy & massive), relict forams. wk-fair vug, ppt & intfossl por. wk SO (tiny brn drplts, wk-fair odor, wk - fair cut, minor gas bbls, brn patchy dry stn, 32 show pcs). show horizon is in drill break. — vis 52 wt 9.2 lcm 1#

LS: lt gry, tan & lt brn, microxtln, cal floodd, cal crusts, loc relict fossls. no vis por. 1 pc questionable wk SO (?caving?), no odor.

SH: grn, gry & red-brn, argil, silty, loc micac, earthy & specular hematite, micro-vfgr py, rndd rock granules, lepidodendron, blk plant fragments.

stringers of SLTST: lt grn, silt-vfgr gran, friable, v calc, argil, rndd & angl rock granules. poor por. NS — brassy ingredients in pipe dope adhere to show pcs.

LS: lt brn to tan, microxtln, sl rextlzd, loc cal floodd, abt relict forams & fossls (?ool?), minor cal crusts, tr-minor massive secondary cal. v poor vis por. minor brn stns (no odor, no cut, 3 pcs w/ brn patchy dry stn), NSFO

SH: gry, argil, silty, sl micac.

LS: crm to pale gry, microxtln, cal floodd, chalk partings, abt relict fossls (incl bryozoans), minor cal crusts, tr glauc. no / poor vis por. no odor, NS — vis 54 wt 9.3 lcm 2# DST #7 4,296 - 4.376 REC 976' MW w/ oil spots SIP 424 - 427# details above

SH: gry, grn & maroon, argil, loc micac, earthy & specular hmt, loc blk & carb.

LS: gry & maroon, microxtln, cal floodd, cal crusts, loc abt forams / fossls, abt glauc, yel limonite stn, hmt coatings & xtals. poor por. tr minute brn flecks (no odor, no cut), NSO

SH: gry, grn & maroon, argil, silty, specular hmt, loc blk & carb. — vis 50 wt 9.2 lcm 2#

SH: grn, argil, rock granules & pebbles.

LS: lt brn, microxtln, cal floodd, abt druzy cal & cal crusts, ?autobrecciated? relict fossls. wk-fair vug & intxtln por in cal crusts. wk-fair SO (brn, minute drplts, wk fleeting odor, 29 show pcs, brn patchy dry stn, no show energy).

LS: maroon, microxtln, variably cal floodd, abt stns, coatings & psuedomorphs of earthy hematite. poor vis por. no odor, NS

SH: red-brn & maroon, abt earthy hematite.

SH: gry & red-brn, argil, sl silty, earthy hmt, plant fragments, rock granules.

LS: tan to lt brn, microxtln, cal floodd, minor microxtln druzy cal & cal crusts, minor cht (orange, brn & wht, microxtln). no vis por. 5 pcs w/ v wk patchy brn dry stn (no odor, no cut), NSFO

SH: gry, grn, red-brn & maroon, v argil, silty, earthy hmt, rock granules, tr yel limonite stn, tr blk & carb.

LS: off wht, microxtln, cal floodd, chalk partings, microxtln druzy cal, relict fossls, loc cht (wht, cryptxtln), tr py & hmt. no / poor vis por (wk por in druzy cal). wk SO (minute brn flecks & blk ?gils?, fnt odor, wk-fair cut, 5 show pcs, wk patchy lt brn dry stn, no energy)

LS: brn, microxtln, cal floodd, abt cht (brn, cryptxtln), vfgr druzy cal, cal crusts, minor py. no matrix por, prob fracture por (druzy cal), rare vug por. wk-fair SO in druzy cal (tiny brn drplts, fnt odor, 3 show pcs, patchy brn dry stn, no energy)

SH: blk, carb, sl micac, wht cal inclusions, tr cgr py, durable. — DST #8 4,390 - 4,469 REC 63' GOCM SIP 172 - 312# details above

LS: gry-brn, microxtln, hvyly cal floodd, cal crusts, cht (brn & blk, cryptxtln). no vis por. NS

SH: gry & grn, argil, sl silty, py.

LS: crm to pale gry, microxtln, cal floodd, chalky, loc vfgr druzy cal, sl marly, py & hmt, fusulinids, minor cht (lt gry, cryptxtln, spicules). wk-fair intxtln & vug por in druzy cal only. wk SO (minute brn drplts, wk to fair odor, wk cut, 17 show pcs, wk lt brn dry stn, rare gas bbls)

SH: blk, carb, micac, wht cal inclusions, sl pyr, loc finely bdd.

LS: crm & gry-brn, microxtln, cal floodd, fgr-mgr ool in microxtln cal matrix. minor poor intool por. v wk SO (minute brn stns, wk cut, tr gas bbls, v wk lt brn patchy dry stn, 5 show pcs)

LS: dk brn-gry, microxtln, variably cal floodd, cal crusts, loc chalky, somewhat marly, relict fossls, tr py, minor cht (brn, cryptxtln, xlscnt). no vis por. NS

LS: off wht & gry, microxtln, sl rextlzd, loc chalky, loc lt brn & cal floodd. v poor vis por. NS

SH: blk, carb, micac, wht cal inclusions + lime grn & maroon, argil w/ yel limonite stn. — vis 48 wt 9.2 lcm 1#

LS: gry, mgr-cgr ool in microxtln cal matrix (loc chalky). v wk intool por. 3 pcs give wk lt brn dry stn (no odor, no cut, NSFO)

LS: gry, microxtln, variably cal floodd, minor druzy cal, loc chalky, minor relict fossls. no matrix por, minor vug por w/ druzy cal. wk SO (minute brn drplts, wk odor, wk cut, 4 show pcs, wk lt brn patchy dry stn)

LS: gry-brn, mgr ool in microxtln cal matrix, loc microxtln druzy cal, minor py. wk intxtln por in matr. wk-fair SO (tiny brn drplts, no odor, wk lt brn patchy dry stn, 7 show pcs)

SH: gry, grn, red-brn & maroon, v argil (loc mushy), silty (loc occuring as grn SLTST: argil, glauc, v poor por, NS), micac, earthy hematite, pyr, plant fragments, loc blk & carbonaceous.

intbdd LS: gry, brn & off wht, microxtln, cal floodd, chalky, minor relict fossls. no / poor vis por. no odor, NS

LS: gry, brn & off wht, microxtln, cal floodd, cal crusts, micro-fgr xtln druzy cal, minor py/hmt, tr fusulinids. no / poor matrix por, wk vug por. wk SO (minute brn drplts, fnt odor, wk cut, 16 show pcs, wk lt brn to brn patchy dry stn, blk tarry gilsonite) — vis 53 wt 9.2 lcm 1#

SH: gry, grn & brn, argil, silty, py, rock granules.

CONG: wht, vfgr-mgr rndd qtz & rock grns w/ 25% mgr-cgr rndd-angl blk rock grns (?shale?), cal cmt, competent, cht granules & pebbles (limonite stn). poor por. NS underlain by SS: pale grn & wht, vfgr rndd, sl friable. poor por. NS — NOTE REVERSE GRADING.

grn, gry & red-brn SH with wht, crm, clr & tan CHT: weathered Mississippian.

LS: lt brn to gry-brn, crypt-micro xtln, cal floodd, loc relict ool & chalky, tr glauc, loc silcfd to cht (smoky brn, cryptxtln, xlscnt). no / poor vis por. NS

LS: tan & brn, micro-vfgr xtln, chalky, sl rextlzd, relict ool, sanded, tr glauc, loc silcfd to cht (wht, blue & clr, crypt-micro xtln, pyr). v poor vis por. NS

LS: crm to tan, microxtln, chalky, vfgr-fgr sanded, relict ool, tr glauc, loc cht (wht, micro-vfgr xtln, fossl). poor vis por. NS — vis 50 wt 9.3 lcm 1#

LS: crm, microxtln, chalky, relict ool, vfgr sanded, loc cht (wht & gry, vfgr xtln, fossl). poor vis por. NS

LS: crm & gry, crypt-micro xtln, cal floodd, loc cht (wht & smoky gry, cryptxtln). no vis por. NS

LS: crm to tan, microxtln, cal floodd, fgr ool, loc sil, loc silcfd to cht (wht, micro-vfgr xtln: abundant). no vis por. NS

LS: tan to brn, microxtln, cal floodd, fgr-mgr ool, wkly developed cal crusts. no vis por. NS

DOL: tan to brn, micro-vfgr xtln, sucr, vfgr-fgr rhombs. fair to good intxtln & vug por. no odor, NS

DOL: tan to brn, micro-vfgr xtln, sucr, tr microxtln py. fair-good intxtln & vug por. no odor, NS

DOL: brn (mottled gry), micro-vfgr xtln, relict fossls (incl gastropods) & oolites. good intxtln & vug por. NS

DOL: gry-brn (mottled gry), microxtln, sucr, loc calc, relict ool, minor mgr-cgr clr druzy dol, loc silicified to cht (gry, microxtln). poor por. NS

DOL: brn, microxtln, sucr, dk gry forams (?oolites? - no grain contact), chalk partings. fair to good por. NS

RTD 4,650
LTD 4,650