



COAL LABS

Englewood, Colorado
1-800-853-5113
FAX 303-617-8956

FORMATION EVALUATION LOG

SCALE: 1:240 (1"=20', 5" = 100')

COMPANY: Heartland Oil and Gas, Inc
WELL: Georg 16-12
FIELD: Wildcat
COUNTY: Nemaha **STATE:** KS

API #: 131-20180-00-00
LOCATION: se nw se se
810 fsl 810 fel
Sec 12 Twp 3S Rge 14E

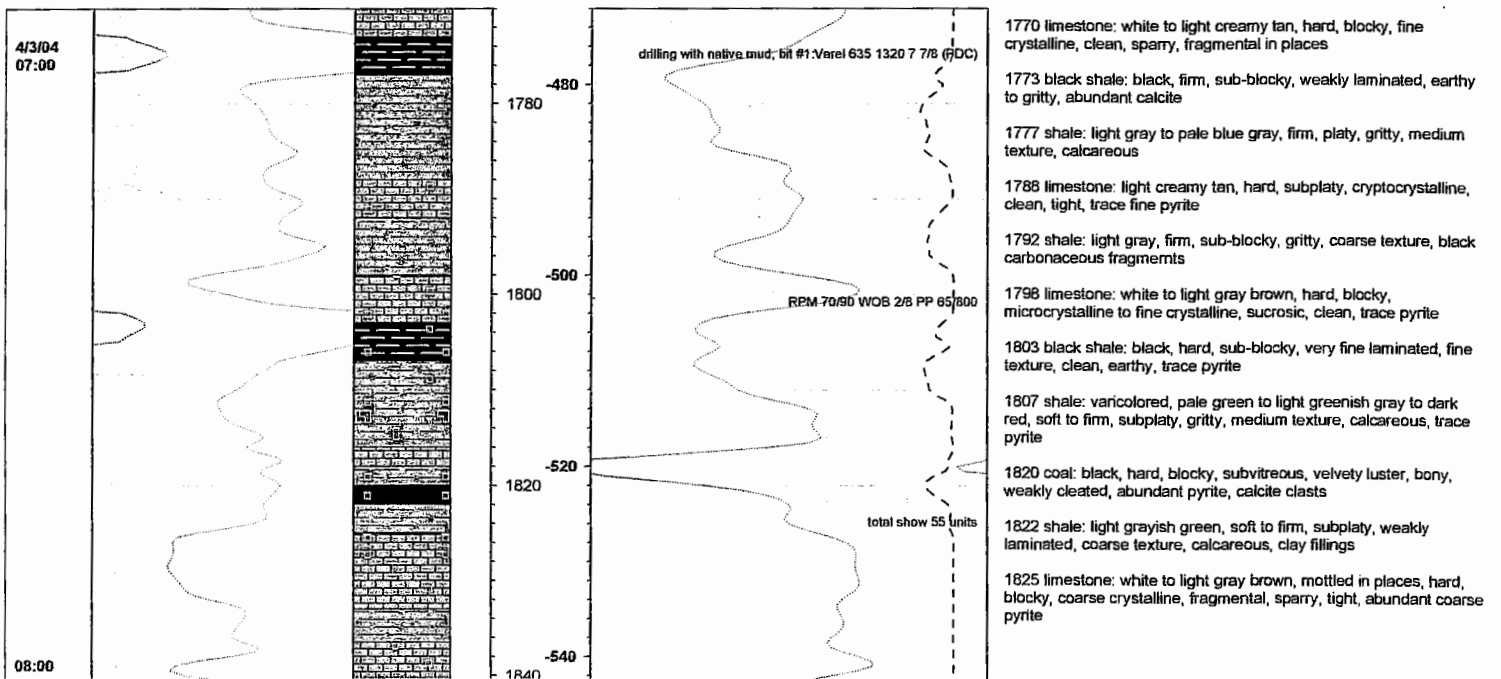
ELEV GL: 1290
ELEV KB: 1298
Log Measured from: KB

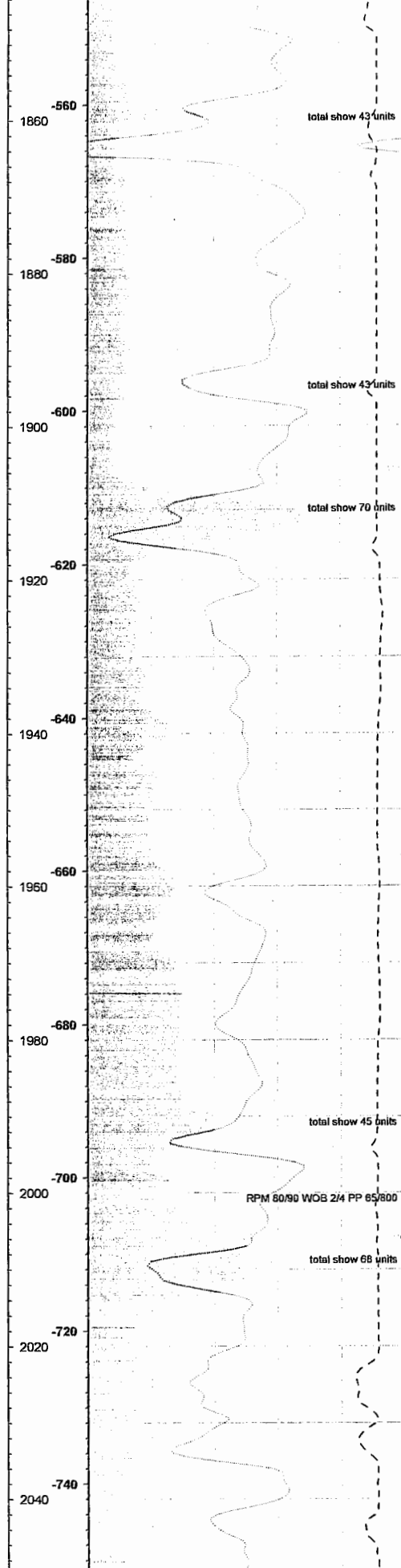
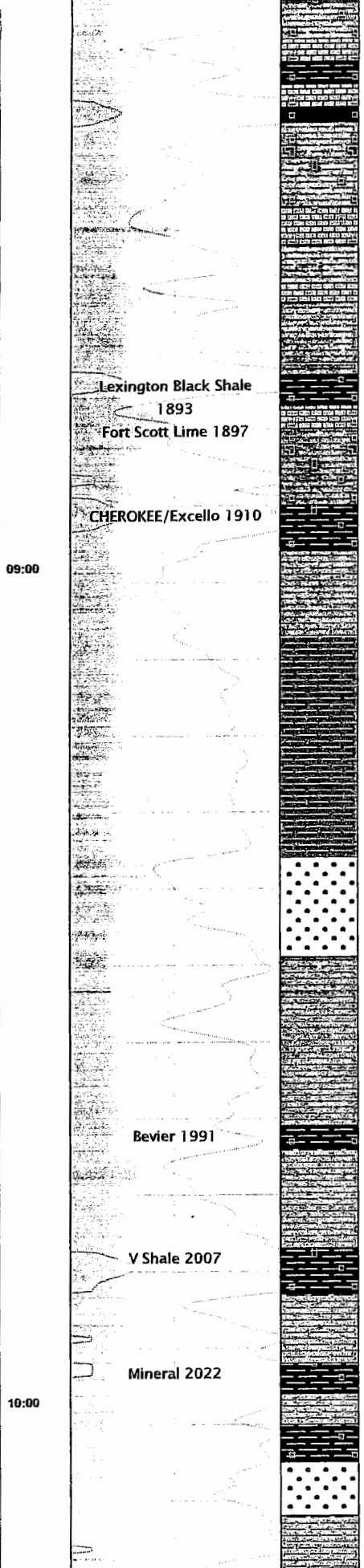
Spud Date	April 1, 2004
Surface Casing	8 5/8" 0 - 268 ft
Hole Size	7 7/8
Total Depth	2760 ft
Logging Dates	April 3 - , 2004
Interval Logged	1770 - 2760 ft
Drilling Fluid	native mud, bentonite gel
Mud Pumps	Skytop-Brewster 6x14
Drilling Contractor	Gulick Drilling, Inc.
Rig Pusher	Ron Gulick RECEIVED KANSAS CORPORATION COMMISSION
Company Geologist	Bill Hayworth SEP 29 2004
Company Engineer	Layle Robb
Logging Geologist	Chris Ryan CONSERVATION DIVISION WICHITA, KS

LEGEND

	LIMESTONE		BRECCIA		FOSSILS
	SHALE		SILTY SHALE		
	SAND		BLACK SHALE		GLAUCONITE
	DOLOMITE		COAL		
	OOOLITIC LIMESTONE		CHERT		PYRITE
	LIMEY SHALE		SILTSTONE		
	SANDY SILT		CLAY		BENTONITE

DATE/TIME	PEN. RATE (MIN/FT)	LITHOLOGY	CORE	DEPTH (FT)	ELEVATION (FT)	TOTAL GAS (UNITS)	LITHOLOGIC DESCRIPTION
	GAMMA RAY (API UNITS)					BULK DENSITY (g/cc)	
	0.1 — 10					0 — 100	
	0 — 150					2 — 3	
						Caliper (in) 16 — 8	





coarse texture, calcareous, clay fillings, trace pyrite

1849 limestone: light gray to light gray brown, hard, blocky, fine crystalline, sucrosic, clean, tight, fine pyrite

1852 black shale: black, soft to firm, sub-blocky, earthy to gritty, medium texture, weakly laminated, trace calcite, pyrite

1855 limestone: light creamy tan to light honey yellow, hard, blocky to subplaty, fine crystalline, fragmental, clean, tight, fine pyrite

1858 coal: black, hard, blocky, subvitreous, soft velvety luster, weakly cleated, abundant pyrite

1860 shale: light gray to greenish gray, soft to firm, sub-blocky, weakly laminated, fine texture, clay fillings, trace fine pyrite

1871 limestone: white, hard, blocky, fine crystalline, sucrosic, fragmental in places, sparry, clean, tight, trace fine pyrite

1876 shale: pale green to greenish gray, firm, platy, well laminated, medium texture, gritty, calcareous

1893 black shale: black, firm, blocky, fine texture, weakly laminated, trace pyrite

1897 limestone: white to light creamy tan, hard, blocky to subplaty, fine to medium crystalline, fragmental, sparry, clean, tight, fine pyrite

1900 shale: light gray to greenish gray, firm, sub-blocky, gritty, coarse texture, weakly laminated, abundant black carbonaceous fragments, trace pyrite

1910 black shale: black, hard to firm, sub-blocky, weakly laminated, fine texture, earthy, very abundant coarse calcite interclasts, coarse pyrite

1916 shale: light gray to grayish green, firm, subplaty, gritty, weakly laminated, trace black carbonaceous fragments

1927 shale with ribbon sands: light gray, soft to firm, subplaty, weakly laminated, medium texture, gritty, interbedded white to light gray fine to medium grained sand, well rounded, well sorted, abundant mica, lithic fragments

1956 sandstone: white to light gray, medium grained, subrounded to subangular, well sorted, thin bedded, weakly friable, micaceous, abundant lithic fragments, trace poor porosity, no show, fine pyrite

1969 shale: light gray to pale green, firm, platy, earthy to gritty, fine texture, calcareous

1991 black shale: black, hard, platy to sub-blocky, well laminated, fine texture, abundant pyrite, calcite

1994 shale: varicolored, pale green to dark greenish gray to dark red, hard to firm, sub-blocky, gritty, coarse texture, calcareous

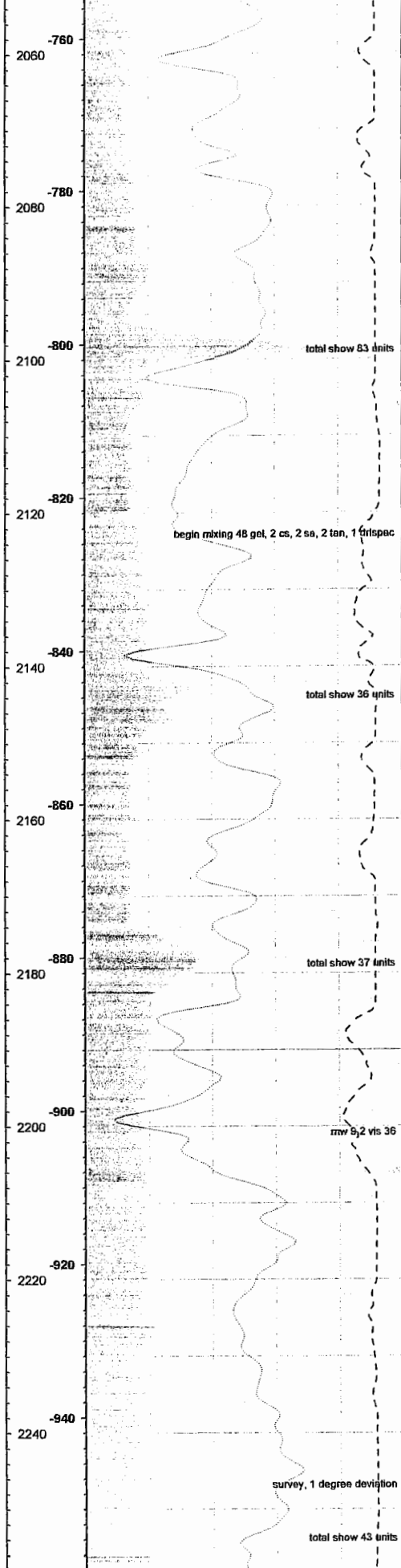
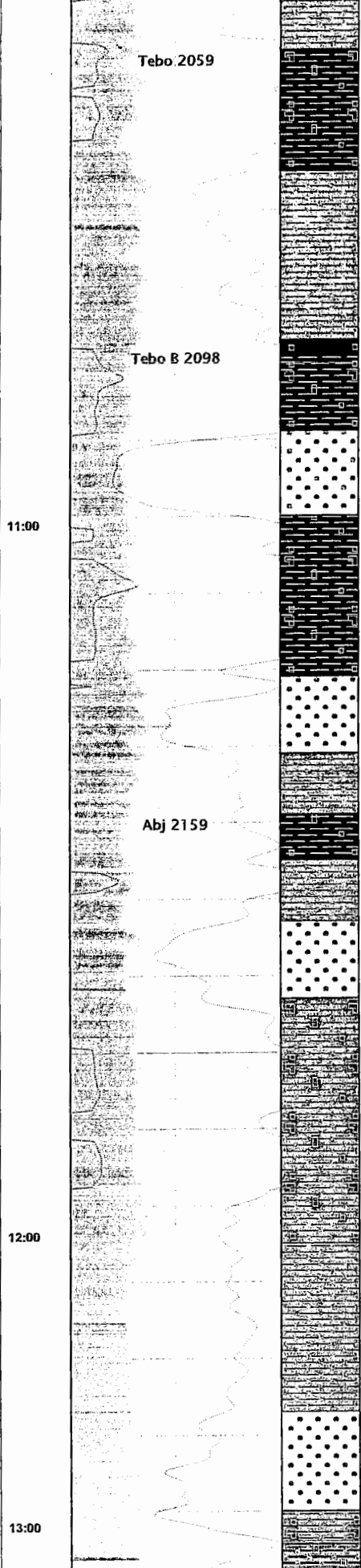
2007 black shale: black, hard, blocky, fine laminated, fine texture, earthy, abundant pyrite

2013 shale: gray to gray brown, firm, platy, splintery, fine texture, earthy to waxy

2022 black shale: black, hard, blocky, weakly laminated, coarse texture, fine calcite, occasional pyrite

2035 sandstone: white to clear, coarse grained, subangular to subrounded, well sorted, poorly consolidated, abundant loose quartz grains, occasional coarse pyrite

2042 shale: pale green to light gray, soft, sub-blocky, gritty, coarse texture, sandy, weakly laminated, calcareous in places



2059 black shale: very dark gray to black, hard to firm, platy, splintery, fine laminated, gritty, coarse texture, abundant fine calcite, trace pyrite

2075 shale: dark gray to grayish green, firm, subplaty, earthy, medium texture

2097 coal: black, hard, blocky, subvitreous, velvety luster, weakly laminated, bony, abundant calcite interclasts, pyrite, moderately cleated

2099 black shale: black, hard to firm, sub-blocky, weakly laminated to massive, coarse texture, gritty, fine calcite, fine pyrite

2108 sandstone: light creamy tan to light gray, medium grained, subrounded, moderately sorted, thin bedded, micaceous, weakly friable, trace pinpoint porosity, pyritic

2120 black shale: black, hard to firm, sub-blocky, weakly laminated to massive, coarse texture, gritty, fine calcite, fine pyrite

2141 sandstone: clear, coarse to very coarse grained, angular to subangular, poorly consolidated, abundant loose angular quartz grains, clean, trace pyrite

2151 shale: light gray, hard to firm, platy, gritty, coarse texture, sandy

2159 black shale: black, hard, blocky, weakly laminated, coaly in places, fine texture, occasional calcite, pyrite

2165 shale: light gray to pale blue green, firm, sub-blocky, coarse texture, gritty, calcareous

2173 sandstone: light gray brown to light gray, fine to medium grained, subangular, moderately sorted, silty, shale fillings, weakly friable, trace pinpoint porosity, fine pyrite

2183 shale: light gray to light greenish gray, firm, subplaty, medium texture, earthy to gritty, fine pyrite

2215 shale: dark gray to dark greenish gray, firm, sub-blocky, weakly laminated, medium texture, trace black carbonaceous fragments

2237 sandstone: light gray to gray brown, fine to medium grained, subangular, poorly sorted, shaly, micaceous, lithic fragments, pyrite, trace poor porosity

2250 shale: light gray to greenish gray, firm, subplaty, gritty, medium texture, weakly calcareous, trace pyrite

total show 83 units

begin mixing 48 gal, 2 cs, 2 sa, 2 tan, 1 frispac

total show 36 units

total show 37 units

rmw 9, 2 vis 36

survey, 1 degree deviation

total show 43 units

14:00

15:00

Drywood Coal 2332

Rowe Coal 2351

Neutral Coal 2370

Aw Coal 2392

Bw Coal 2403

Cw Coal 2421

Dw Coal 2457

2280
-980
2300
-1000
2320
-1020
2340
-1040
2360
-1060
2380
-1080
2400
-1100
2420
-1120
2440
-1140
2460
-1160

RPM 80/90 WOB 2/4 PP 65/950

total show 55 units
total show 36 units
total show 37 units
total show 55 units
total show 43 units
total show 90 units
total show 56 units
total show 62 units
total show 55 units
total show 68 units

2268 shale: light gray brown to greenish gray, soft to firm, blocky, gritty, coarse texture, clay fillings, calcareous, trace pyrite

2300 shale: light gray brown to greenish gray, soft to firm, blocky, gritty, coarse texture, clay fillings, calcareous, trace pyrite

2334 coal: black, hard, blocky, subvitreous, velvety luster, weakly to moderately cleated, bony, fine pyrite

2336 shale: light gray to grayish green, firm, sub-blocky, gritty, coarse texture, black carbonaceous fragments, clay fillings

2351 coal: black, hard to firm, blocky, subvitreous, velvety luster, weakly laminated, fine striations, poorly cleated, clean, trace pyrite

2353 black shale: black, hard, subplaty, weakly laminated, fine texture, earthy, occasional fine calcite, pyrite

2353 shale: light gray brown to greenish gray, firm, sub-blocky, gritty, coarse texture, black carbonaceous fragments, clay fillings

2370 coal: black, hard to firm, blocky, subvitreous, velvety luster, weakly laminated, poorly cleated, clean, trace pyrite

2372 shale: light greenish gray to gray, hard to firm, platy, earthy to waxy, fine texture, clay rich in places, trace pyrite

2392 coal: black, hard, blocky, subvitreous to vitreous, well laminated, moderately cleated, fine pyrite laminations, trace calcite

2394 shale: gray to greenish gray, firm, subplaty, splintery, medium texture, gritty, clay rich in places, calcareous, trace pyrite

2403 coal: black, hard, blocky, subvitreous, weakly laminated, velvety luster, poorly cleated, occasional pyrite, calcite

2405 shale: dark grayish green to dark gray, firm, blocky, gritty, coarse texture, fine calcite, pyrite

2421 coal: black, hard, blocky, subvitreous, weakly laminated, dull velvety luster, poorly cleated, shaly, occasional pyrite, calcite

2423 shale: graybrown to dark greenish gray, firm, blocky, weakly laminated, gritty, coarse texture, calcareous, trace pyrite

2452 sandstone: light tan to light brown, very fine to fine grained, subrounded, moderately sorted, thin bedded, abundant lithic fragments, silty fillings, well cemented, tight

2457 coal: black, hard, blocky, subvitreous, velvety luster, thin laminated, clean, poorly cleated, trace calcite, pyrite

2459 shale: very dark gray to grayish green, hard to firm, subplaty, earthy to waxy, calcareous, trace pyrite

16:00

Upper-Riverton Coal 2480

17:00

Upper McClouth Sand 2653

18:00

Lower McClouth Sand 2640



total show 68 units.

2480 coal: black, hard, blocky, subvitreous, velvety luster, weakly laminated, clean, poorly cleated, trace fine pyrite, calcite

2482 black shale: black, hard, subplaty, splintery, fine texture, earthy, weakly laminated, trace fine pyrite

2498 sandstone: light gray brown, fine grained, subrounded, moderately sorted, thin bedded, micaceous, shale fillings, fine pyrite, no visible porosity

2508 shale: dark gray to dark greenish gray, hard to firm, platy, fine texture, earthy to waxy, trace pyrite

2529 shale: dark greenish gray to dark gray, firm, splintery, fine texture, fine laminated, calcareous, trace pyrite

2563 sandstone: light gray to gray brown, fine to medium grained, subrounded, moderately sorted, micaceous, thin bedded, fine lithic fragments, fine pyrite

2583 shale: dark greenish gray to dark gray, firm, splintery, fine texture, fine laminated, calcareous, trace pyrite

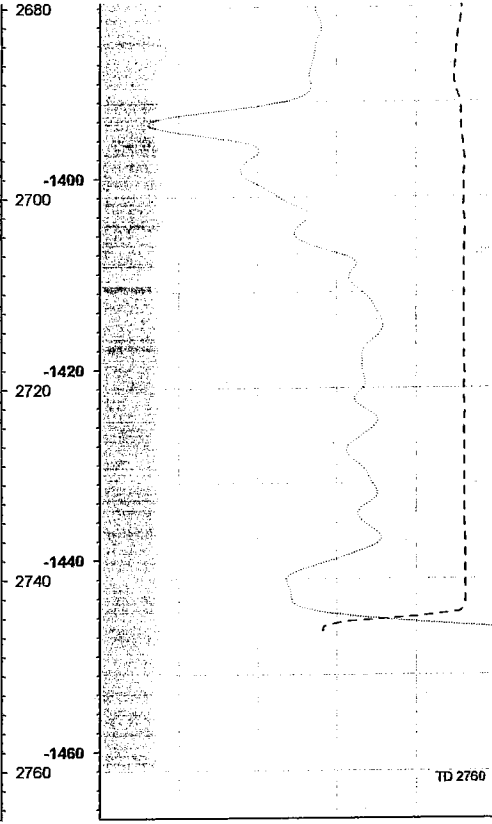
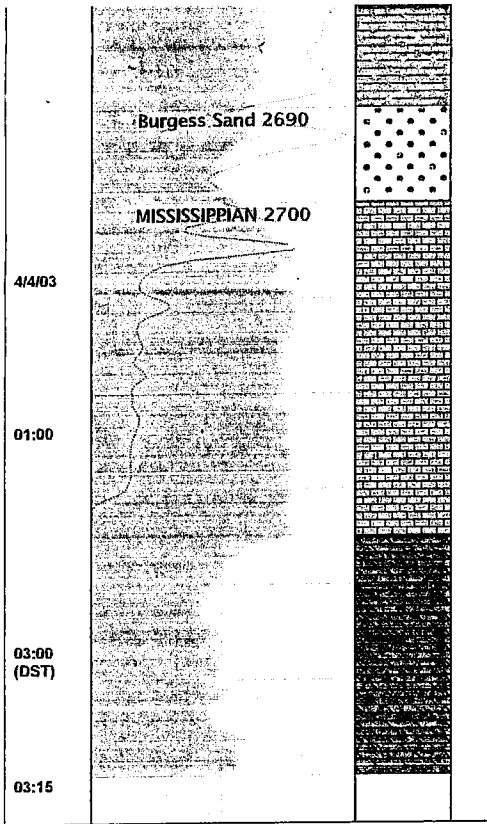
2600 shale: dark greenish gray to dark gray, firm, splintery, fine texture, fine laminated, calcareous, trace pyrite

2640 sandstone: light honey yellow to light gray, fine to medium grained, well rounded, well sorted, clean, abundant pyrite, weakly friable, trace intergranular porosity

2656 shale: dark greenish gray to dark gray, firm, splintery, fine texture, fine laminated, calcareous, trace pyrite

TOOH switch to bit #2: Hughes J33 RT-1889 RR7 7/8

2670 shale: very dark gray to dark greenish gray, hard, platy, waxy, weakly laminated, calcareous



2690 sandstone: light honey yellow to light brown, medium grained to coarse grained, subrounded, well sorted, clean, poorly cemented, friable, trace to poor intergranular porosity, trace vuggy porosity, abundant pyrite

2700 limestone: white to light creamy tan, hard, platy, cryptocrystalline, tight, clean, abundant fine pyrite, white to blue gray chert

2735 dolomite: light creamy tan to dark brown, hard, blocky, fine to medium crystalline, sucrosic, trace to poor intergranular porosity, poor vuggy porosity, clean, abundant pyrite