

ATOKA

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: Scooby 6 - 12
FIELD: Wildcat
COUNTY: Nemaha **STATE:** KS

API #: 15-131-20179-00-00
LOCATION: nw se se nw
3150 fsl 3150 fel
Sec 12 Twp 3S Rge 14E

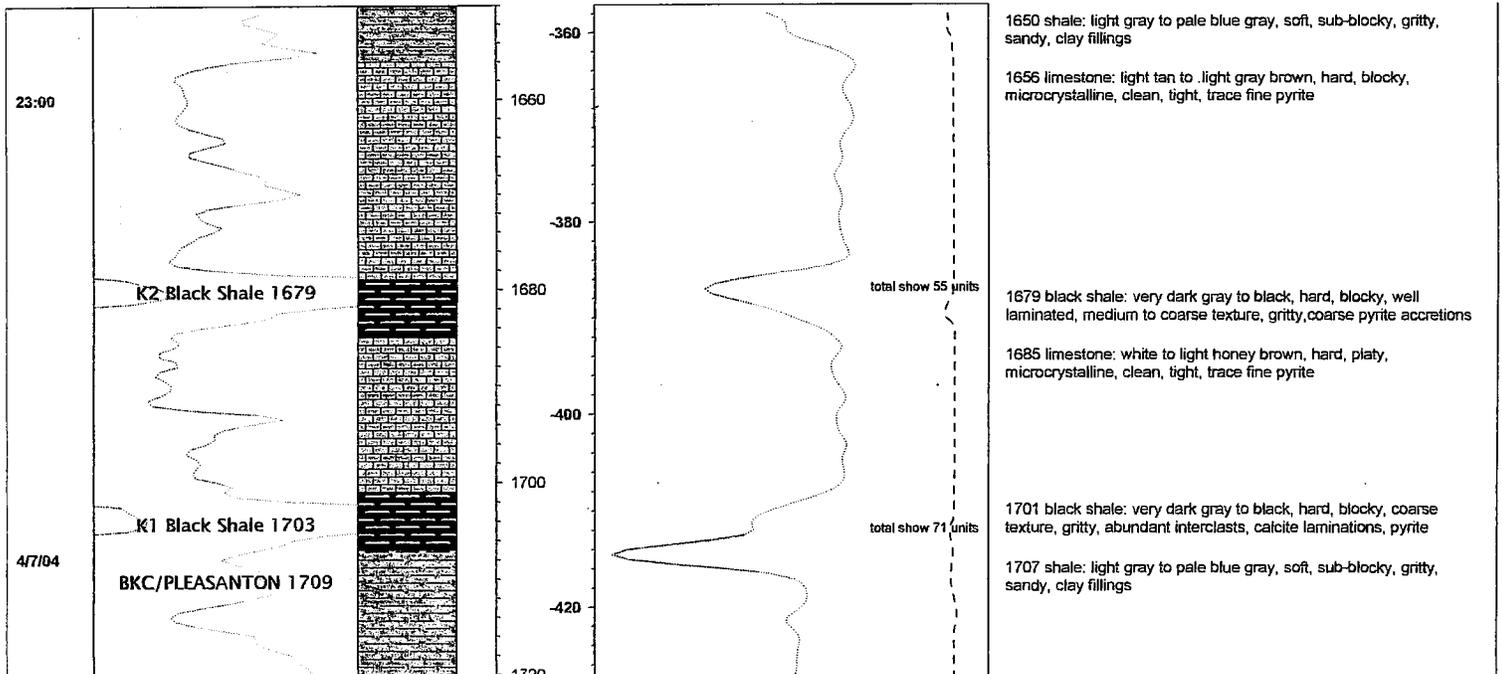
ELEV GL: 1285 ft
ELEV KB: 1293 ft
Log Measured from: KB

Spud Date	April 5, 2004
Surface Casing	12 1/2" to 265
Hole Size	7 7/8
Total Depth	2730 ft
Logging Dates	April 6 - 8, 2004
Interval Logged	1650 - 2730 ft
Drilling Fluid	native mud, bentonite gel
Mud Pumps	Skytop-Brewster 6x14
Drilling Contractor	Gulick Drilling, Inc.
Rig Pusher	Ron Gulick
Company Geologist	Bill Hayworth
Company Engineer	Layle Robb
Logging Geologist	Chris Ryan

LEGEND

	LIMESTONE		BRECCIA		FOSSILS
	SHALE		SILTY SHALE		
	SAND		BLACK SHALE		GLAUCONITE
	DOLOMITE		COAL		
	OOLITIC 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	

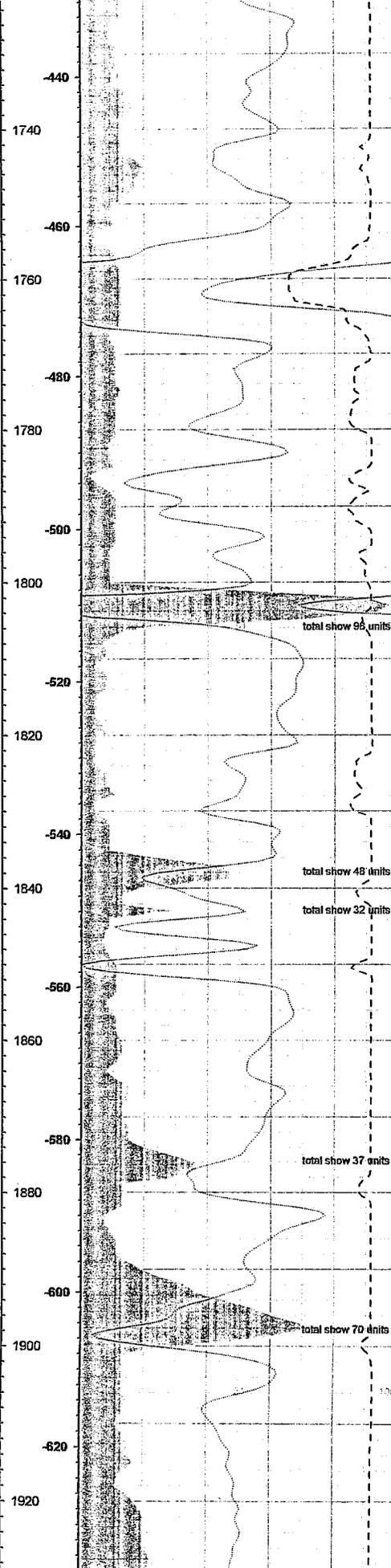
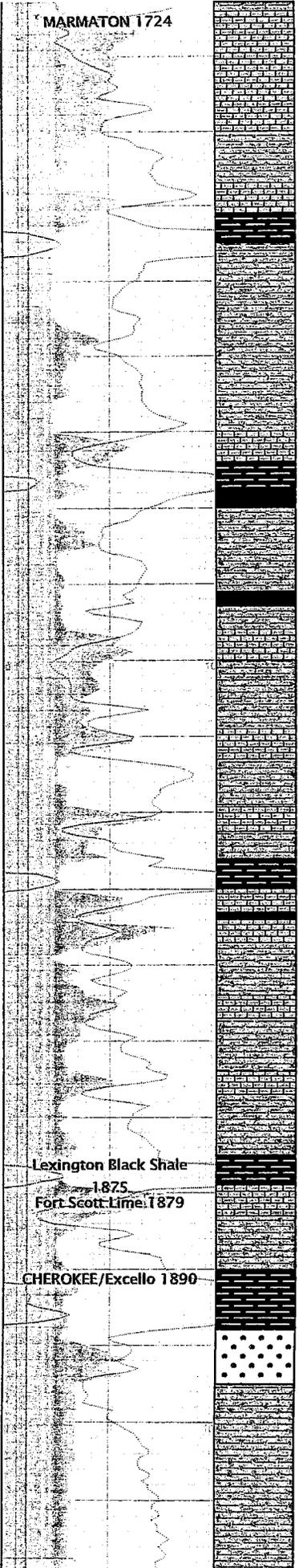


MARMATON 1724

01:00

02:00

03:00



1724 limestone: light tan, hard, blocky, microcrystalline, microsucrosic, fragmental in places, occasional fine pyrite

1740 shale: light gray, firm, sub-blocky, gritty, coarse texture

1747 limestone: gray brown to dark brown, hard, blocky, fine crystalline, sucrosic, fragmental in places, fine pyrite

1751 black shale: black, firm, subplaty to splintery, gritty, medium texture, fine calcite, pyrite

1755 shale: pale green to light grayish green, soft, gummy, gritty, clay fillings, calcareous

1780 limestone: light creamy tan, hard, blocky, cryptocrystalline, clean, tight, fine pyrite

1784 black shale: black, firm, platy, splintery, gritty, coarse texture, abundant calcite

1788 coal: black, hard, blocky, weakly laminated, bony, subvitreous, velvety, abundant pyrite, poorly cleated

1790 shale: pale green, soft, subplaty, gritty, coarse texture, clay fillings, calcareous

1801 coal: black, hard, blocky, subvitreous, velvety luster, well laminated, abundant pyrite, weakly cleated

1803 shale: pale green, soft, gummy, gritty, clay rich, abundant black coal fragments

1806 limestone: white, hard, blocky, cryptocrystalline to microcrystalline, clean tight, trace pyrite

1810 shale: light gray, hard to firm, gritty, coarse texture, weakly laminated

1819 limestone: light creamy tan, hard, blocky, cryptocrystalline, tight, clean, trace pyrite

1823 shale: pale green to light gray, firm, platy, gritty, coarse texture, calcareous

1829 limestone: white, hard, blocky, fine crystalline, clean, tight, fine pyrite

1833 shale: light greenish gray to gray brown, firm, platy, earthy to gritty, medium texture

1836 black shale: black, hard to firm, splintery, gritty, coarse texture, abundant calcite, pyrite

1840 limestone: light gray to gray brown to dark brown, mottled, hard, blocky, fine crystalline, fragmental, sparry, stylolitic

1847 shale: gray to greenish gray, firm, splintery, weakly laminated, gritty, coarse texture, interbedded, light creamy tan limestone

1875 black shale: black, hard to firm, sub-blocky, weakly laminated, gritty, coarse texture, abundant calcite, fine pyrite

1879 limestone: light creamy tan to white, hard, blocky, microcrystalline, fragmental, abundant creamy white translucent chert, fine pyrite

1883 shale: pale greenish gray to gray, firm, sub-blocky, gritty, coarse texture, abundant black carbonaceous fragments

1890 black shale: black, hard to firm, splintery, weakly laminated, gritty, coarse texture, very abundant calcite interclasts, skeletal fragments, pyrite

1898 sandstone: light gray to gray brown, fine grained, subrounded, poorly sorted, abundant lithic fragments, shale fillings, black carbonaceous fragments, weakly friable

1905 shale: light greenish gray to dark red, firm, subplaty, splintery, medium texture, earthy to gritty

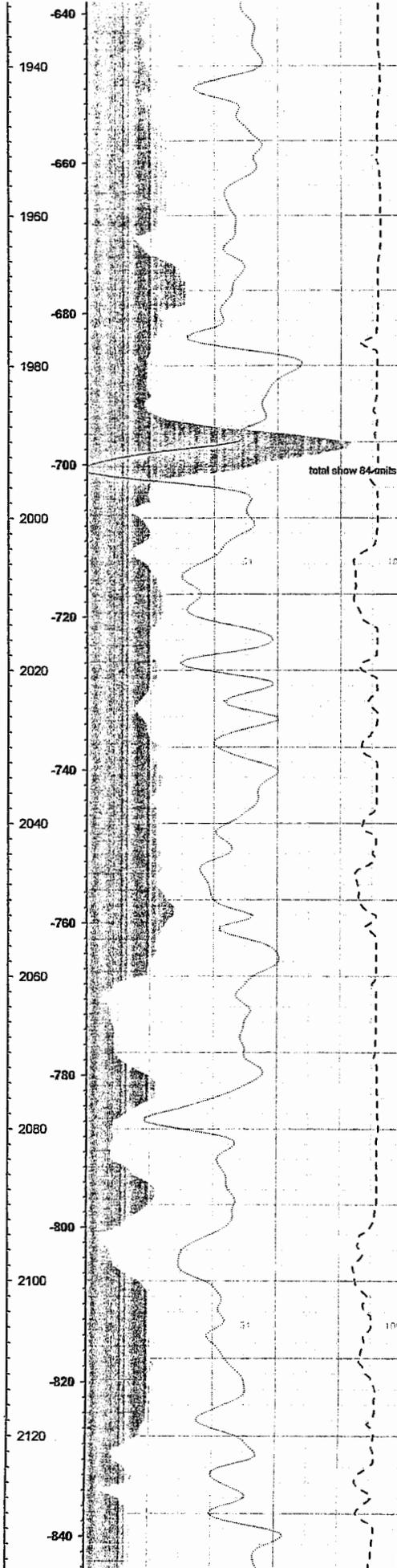
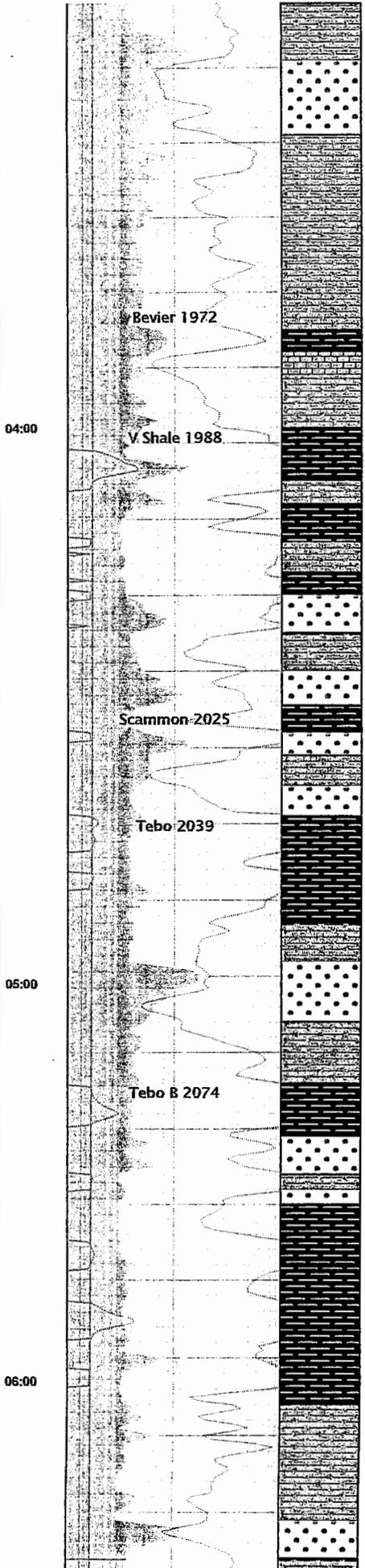
total show 95 units

total show 48 units

total show 32 units

total show 37 units

total show 70 units



- 1939 sandstone: white to clear, medium grained, subrounded, well sorted, weakly friable, clean, tight, trace pyrite
- 1949 shale: varicolored, pale green to light greenish gray to dark red, hard to firm, platy, gritty, coarse texture, calcareous, sandy in places
- 1975 black shale: black, hard to firm, splintery, well laminated, fine texture, fine pyrite, very narrow glassy coal stringers
- 1978 limestone: light creamy tan to light gray, hard, blocky, microcrystalline, sucrosic, trace vuggy porosity, skeletal fragments
- 1978 shale: light gray to greenish gray, firm, platy, earthy to gritty, medium texture
- 1988 black shale: very dark gray to black, hard, platy, thin laminated, earthy, fine texture, fine calcite
- 1995 shale: light grayish green, firm, platy, splintery, earthy to gritty, medium texture
- 1998 black shale: black, hard, platy, fine texture, fissile, trace pyrite
- 2010 sandstone: light gray brown, speckled, fine to medium grained, subrounded, moderately sorted, abundant black carbonaceous fragments, shale fillings, weakly friable
- 2015 shale: light gray to grayish green, firm, platy, earthy, fine texture, sandy
- 2020 sandstone: white to clear, coarse grained subrounded, well sorted, weakly consolidated, loose quartz grains, clean, fine pyrite
- 2025 black shale: black, hard, splintery, well laminated, very fine texture, narrow glassy coal stringers, trace fine pyrite
- 2028 sandstone: white to clear, coarse grained subrounded, well sorted, weakly consolidated, loose quartz grains, clean, fine pyrite
- 2039 black shale: very dark gray to black, firm, platy to sub-blocky, coarse texture, gritty, abundant coarse pyrite accretions
- 2053 shale: light grayish green, firm, subplaty, gritty, coarse texture, calcareous trace pyrite
- 2058 sandstone: white to clear, medium grained to coarse grained, poorly sorted, abundant lithic fragments, abundant coarse pyrite accretions, poorly consolidated, large loose quartz grains
- 2066 shale: light gray to pale blue gray, soft, gritty, sandy, medium texture, clay fillings
- 2074 black shale: black, hard to firm, subplaty, earthy to woodt, well laminated, abundant fine pyrite laminations
- 2081 sandstone: light gray to light brown, fine to medium grained, subrounded, well sorted, fine black carbonaceous fragments, tight, well cemented
- 2090 black shale: black, hard to firm, subplaty, earthy to woodt, well laminated, abundant fine pyrite laminations
- 2116 shale: light gray brown, firm, platy, gritty, sandy, medium texture, weakly laminated
- 2131 sandstone: clear to light creamy tan, coarse grained, subrounded to well rounded, weakly cemented, friable, poor to fair intergranular porosity, loose coarse quartz grains, clean, trace black carbonaceous fragments

Abj 2141

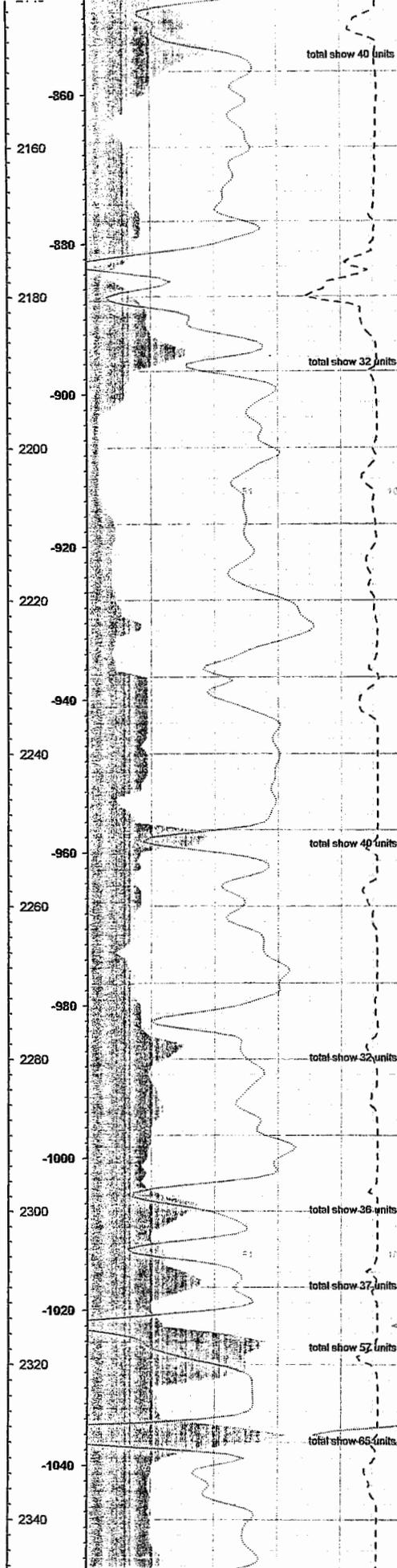
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08:00

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Drywood Coal-2315

Rowe Coal-2329



- 2141 black shale: black, hard, subplaty, earthy to woody, well laminated, medium texture, fine calcite, pyrite laminations
- 2150 sandstone: white to very light gray, medium grained, subangular, well sorted, weakly friable, shale fillings in places, trace fine pyrite
- 2155 shale: light gray to pale greenish gray, soft, gummy, clay rich, gritty, sandy
- 2173 black shale: black, hard to firm, platy, well laminated, earthy, fine texture, fine pyrite laminations
- 2190 shale: light gray, firm, platy, weakly laminated, coarse texture, gritty, calcareous
- 2222 sandstone: white to light gray, fine to medium grained, well rounded, well sorted, clean, trace lithic fragments, trace intergranular porosity, weakly cemented, friable
- 2232 shale: varicolored, light greenish gray to light gray brown to dark red, soft to firm, sub-blocky, earthy to gummy, clay fillings
- 2240 black shale: black, hard, platy, well laminated, fine texture, earthy, abundant pyrite laminations
- 2243 shale: light grayish green to gray, firm, subplaty, weakly laminated, gritty, sandy in places
- 2250 coal: black, hard, blocky, subvitreous to bituminous, dull velvety luster, shaly, boney
- 2252 shale: dark gray to dark grayish green, firm, platy, well laminated, earthy, fine texture, calcareous
- 2278 black shale: black, firm, blocky, gritty, coarse texture, abundant calcite interclasts
- 2280 shale: dark green to gray, firm, platy, fine texture, waxy, weakly calcareous
- 2289 sandstone: white to light tan, medium grained, subrounded, well sorted, weakly friable, shale fillings in places, trace fine pyrite
- 2296 black shale: black, soft to firm, sub-blocky, thin laminated, medium texture, gritty, fine calcite, pyrite
- 2300 sandstone: white to light gray brown, fine to medium grained, subrounded, well sorted, well cemented, weakly friable, abundant fine black carbonaceous fragments, fine pyrite
- 2306 black shale: black, soft to firm, sub-blocky, thin laminated, medium texture, gritty, fine calcite, pyrite
- 2310 shale: light gray to pale greenish gray, soft to firm, sub-blocky, gritty, calcareous, black carbonaceous fragments
- 2315 coal: black, hard, blocky, soft velvety luster, vitreous in places, thin laminated, fine pyrite laminations
- 2317 black shale: black, hard, platy, thin laminated, fine texture, earthy, abundant pyrite
- 2320 shale: dark grayish green, sub-blocky, soft to firm, clay rich, earthy to gummy, weakly laminated
- 2329 coal: black, blocky, subvitreous, bright velvety luster, thin laminated, poorly developed cleats, fine pyrite in laminations and fractures
- 2331 shale: gray to dark gray, subplaty, hard to firm, earthy to gritty,

