

ATOKA

COAL LABS

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

FORMATION EVALUATION LOG

SCALE: 1:120 (1"=10', 2.5" = 100')

COMPANY: Heartland Oil and Gas, Inc
WELL: Amon 15-15
FIELD: Wildcat
COUNTY: Jackson **STATE:** KS

API #: 15-085-20074-00-00
LOCATION: ne sw se
810 fsl 1830 fel
Sec 15 Twp 5S Rge 15E

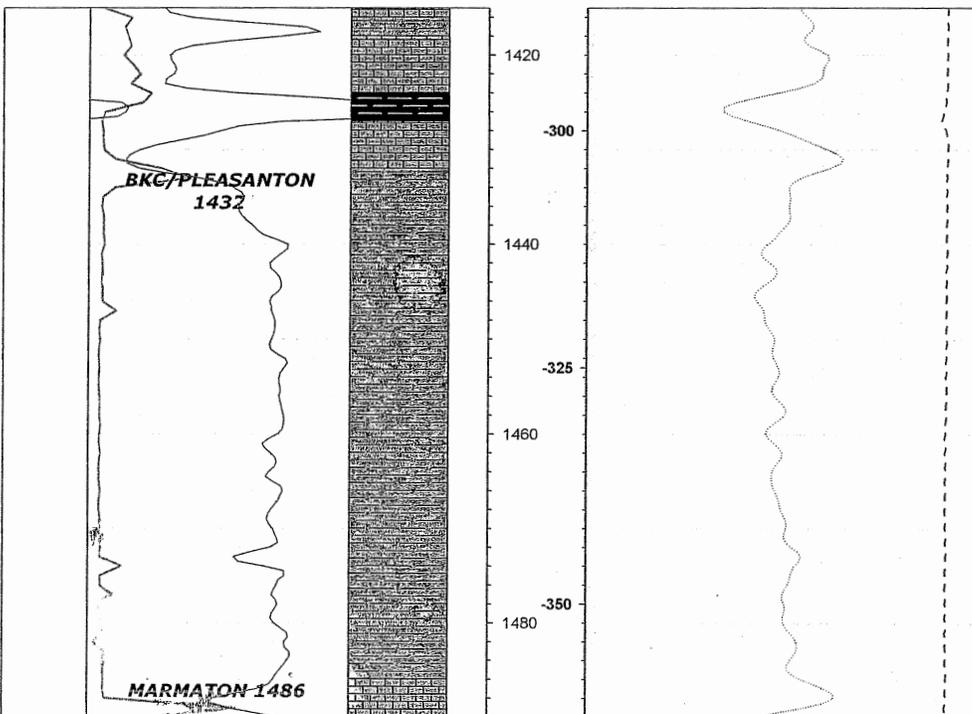
ELEV GL: 1120 ft
ELEV KB: 1128 ft
Log Measured from: KB

Spud Date	June 4, 2004
Surface Casing	8 5/8" 0 - 260 ft
Hole Size	7 7/8
Total Depth	2412 ft
Logging Dates	June 5 - 6, 2004
Interval Logged	1415 - 2412 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		GLAUCONITE
	SAND		BLACK SHALE		COAL
	DOLOMITE		OOBITIC LIMESTONE		CHERT
	LIMEY SHALE		SILTSTONE		PYRITE
	SANDY SILT		CLAY		BENTONITE

DATE/TIME	PEN. RATE (MIN/FT) 0 ————— 5	LITHOLOGY	CORE	DEPTH (FT) ELEVATION (FT)	TOTAL GAS (UNITS)	LITHOLOGIC DESCRIPTION
					0 ————— 100	
	GAMMA RAY (API UNITS) 0 ————— 150				BULK DENSITY (g/cc) 2 ————— 3	
					Caliper (in) 16 ————— 8	



1415 limestone: white, hard, blocky, cryptocrystalline to microcrystalline, clean

1424 black shale: black, soft to firm, subplaty, flaky, weakly laminated, fine texture, weakly calcareous

1427 limestone: white to light creamy gray, hard, blocky, cryptocrystalline to microcrystalline, clean, trace fine pyrite

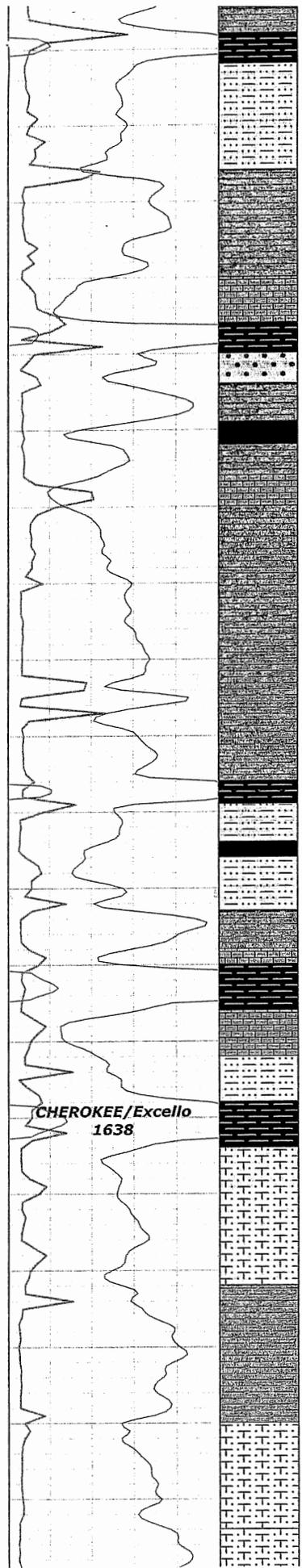
1432 shale: light gray to pale greenish gray, soft to firm, well laminated, fine to medium texture, earthy to waxy, trace fine pyrite

RECEIVED
KANSAS CORPORATION COMMISSION

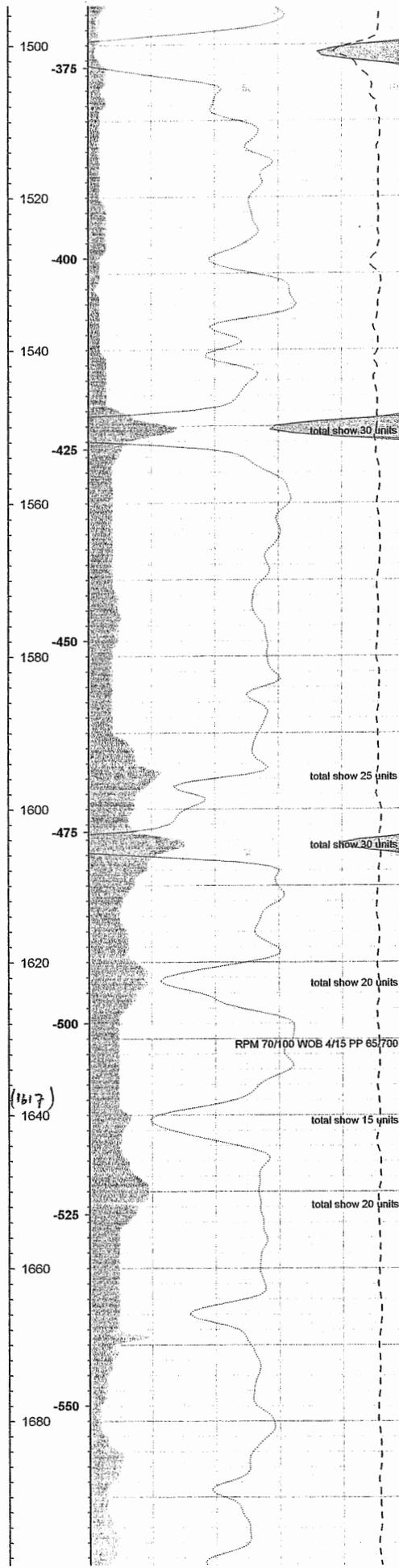
SEP 29 2004

CONSERVATION DIVISION
WICHITA, KS

1486 limestone: white, hard, blocky, cryptocrystalline to microcrystalline, clean



**CHEROKEE/Excello
1638**



1498 black shale: black, firm, subplaty, weakly laminated, medium texture, gritty, fine calcite interclasts

1502 siltstone: light tan to light creamy gray, hard, blocky, fine to medium texture, gritty, well indurated, fine black carbonaceous fragments

1516 shale: light gray to pale creamy green, soft, gritty, coarse texture, sandy, clay rich in places, weakly calcareous

1530 limestone: white to light creamy tan, hard, blocky, cryptocrystalline, light, clean, trace fine pyrite

1536 black shale: black, hard to firm, blocky, weakly laminated, coarse texture, earthy to gritty, calcareous, abundant coarse calcite interclasts, trace fine pyrite

1540 sandstone: light gray to light creamy green, fine grained, well rounded, well sorted, hard to firm, weakly friable, light, shaly fillings in places, trace fine pyrite

1544 shale: pale creamy green to light greenish gray, soft to firm, sub-blocky, weakly laminated, earthy to waxy, calcareous, trace fine pyrite

1549 coal: black, hard to firm, blocky, dull luster, thin laminated, clean, trace fine pyrite, trace calcite

1552 shale: pale creamy green, firm, sub-blocky, weakly laminated, coarse texture, gritty, sandy, calcareous, trace fine pyrite

1556 limestone: white to light creamy gray, hard, blocky, cryptocrystalline to microcrystalline, microsugrosic, abundant coarse pyrite

1560 shale: pale creamy green to light greenish gray, soft to firm, sub-blocky, weakly laminated, earthy to waxy, calcareous, trace fine pyrite

1596 black shale: black, firm, sub-platy, well laminated, flaky, medium to coarse texture, bony, abundant coarse calcite interclasts, scattered pyrite

1599 siltstone: light creamy gray to light creamy tan, soft to firm, sub-blocky, fine texture, powdery to gritty, weakly indurated, sandy in places

1604 coal: black, hard to firm, blocky, dull luster, thin laminated, clean, trace fine pyrite, trace calcite

1606 siltstone: light creamy gray to light creamy tan, soft to firm, sub-blocky, fine texture, powdery to gritty, weakly indurated, sandy in places

1613 shale: pale creamy green to light gray, soft to firm, sub-blocky, weakly laminated, fine to medium texture, gritty, calcareous, scattered pyrite

1618 limestone: white to light creamy tan, mottled, hard, blocky, fine crystalline, fragmental, stylolitic, light, trace fine pyrite

1620 black shale: black, firm, blocky, weakly laminated, fine to medium texture, earthy to gritty, clean, trace fine pyrite

1626 limestone: light honey yellow, hard, blocky, cryptocrystalline, light, clean, trace fine pyrite

1632 siltstone: light tan to light brown, hard to firm, sub-blocky, fine to medium texture, gritty to powdery, well indurated, trace fine pyrite

1638 black shale: black, hard to firm, platy, fine texture, earthy, well laminated, trace fine pyrite

1644 silty sand: white to light gray, very fine grained to fine grained, well rounded, well sorted, weakly friable, hard, clean, trace fine pyrite, fine black carbonaceous fragments

1662 shale: light gray, firm, subplaty, weakly laminated, medium to coarse texture, gritty, weakly calcareous, trace fine pyrite

1680 silty sand: white to clear, medium to coarse grained, subangular, well sorted, weakly friable, hard, tight, shale fillings, scattered coarse pyrite

1694 silty sand: light honey yellow to clear, medium to coarse grained, subangular to angular, well sorted, poorly consolidated, friable, loose annular quartz grains, trace to poor intergranular porosity, shaly fillings

total show 30 units

total show 25 units

total show 30 units

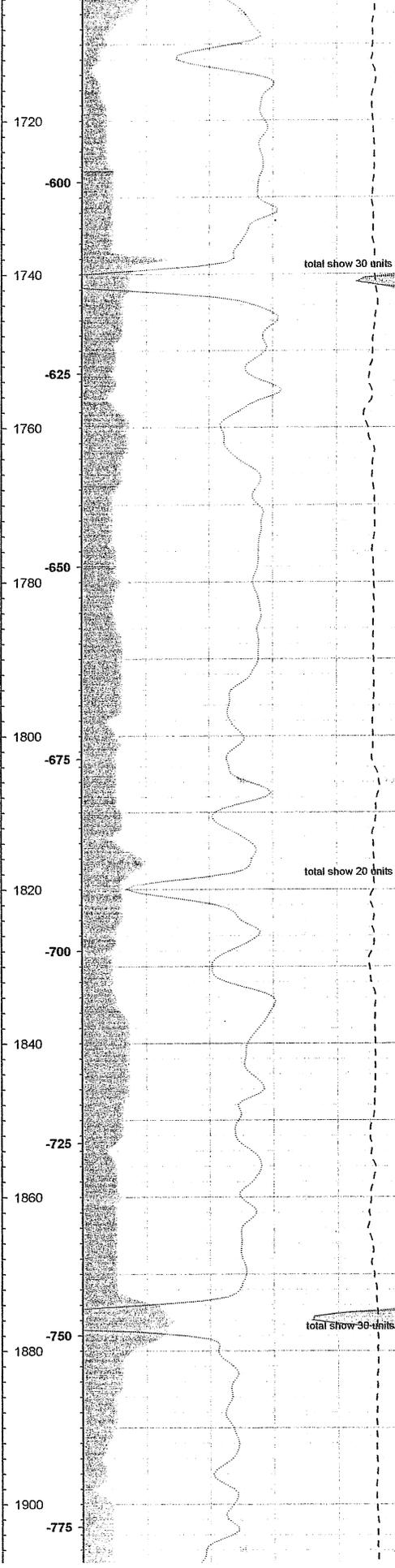
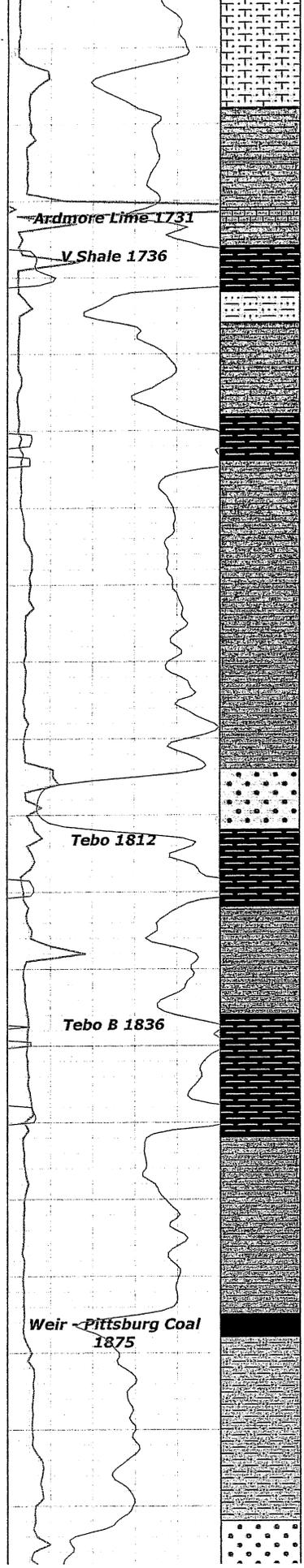
total show 20 units

RPM 70/100 WOB 4/15 PP 65/700

total show 15 units

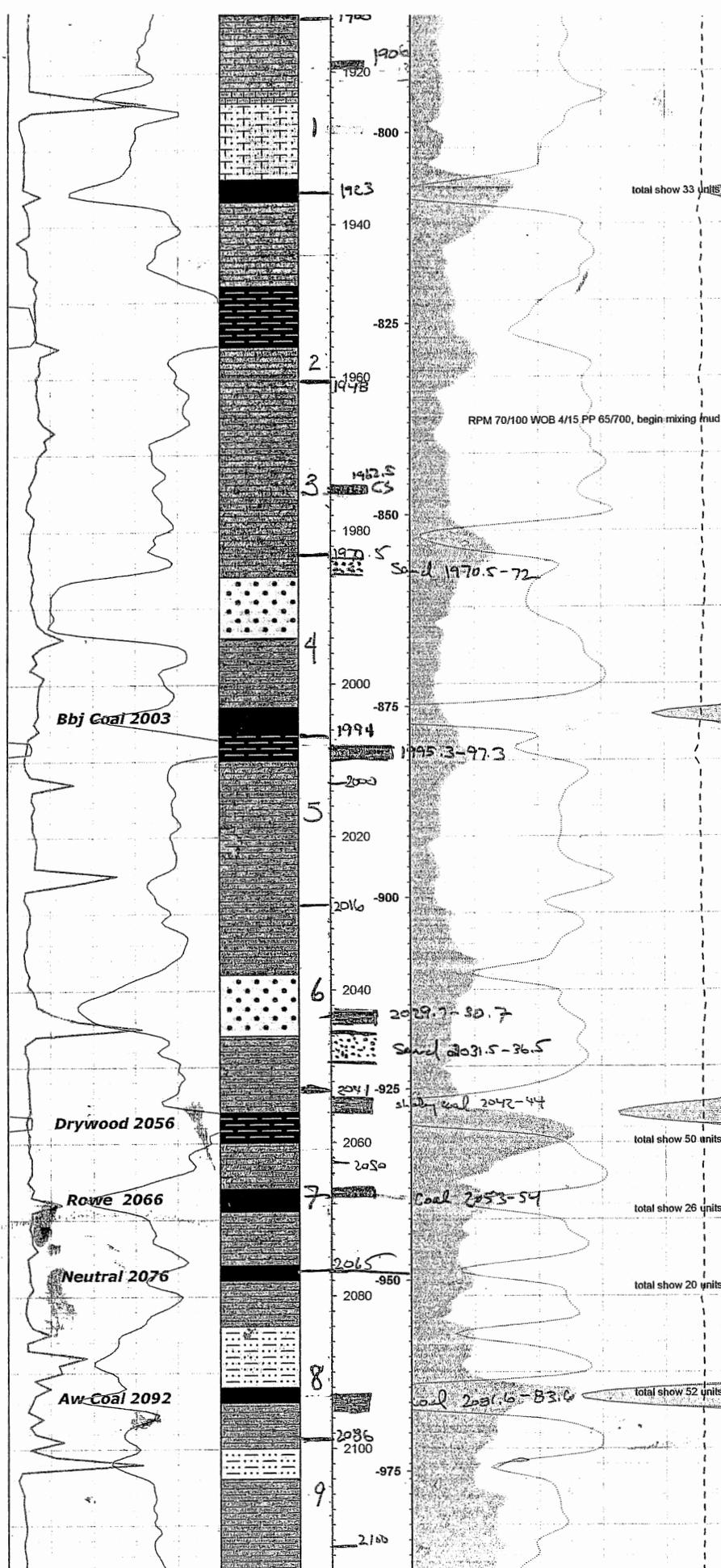
total show 20 units

(1617)

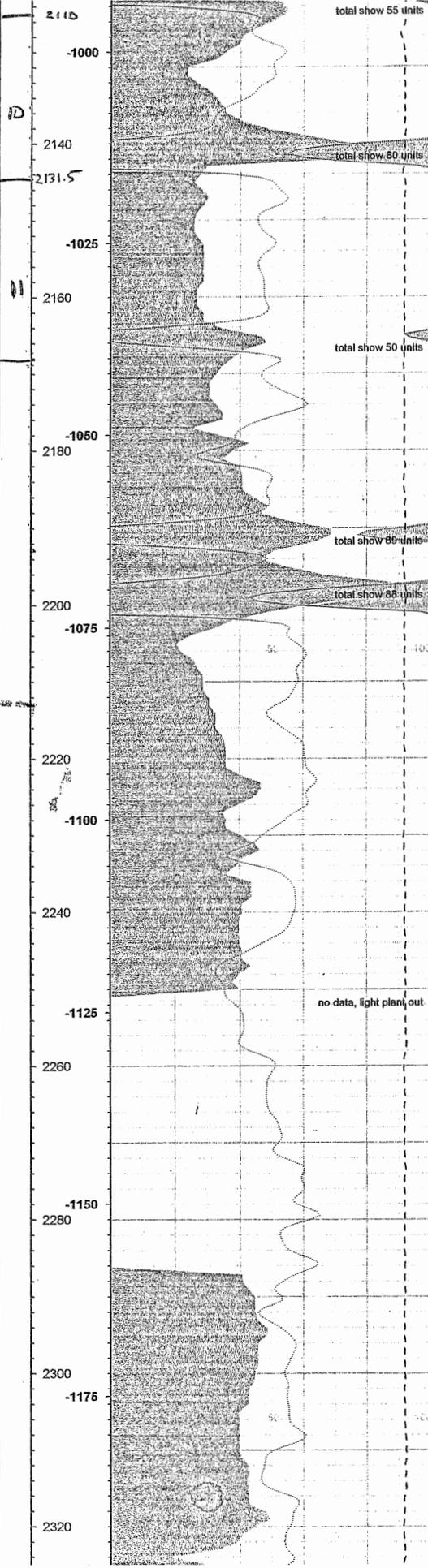
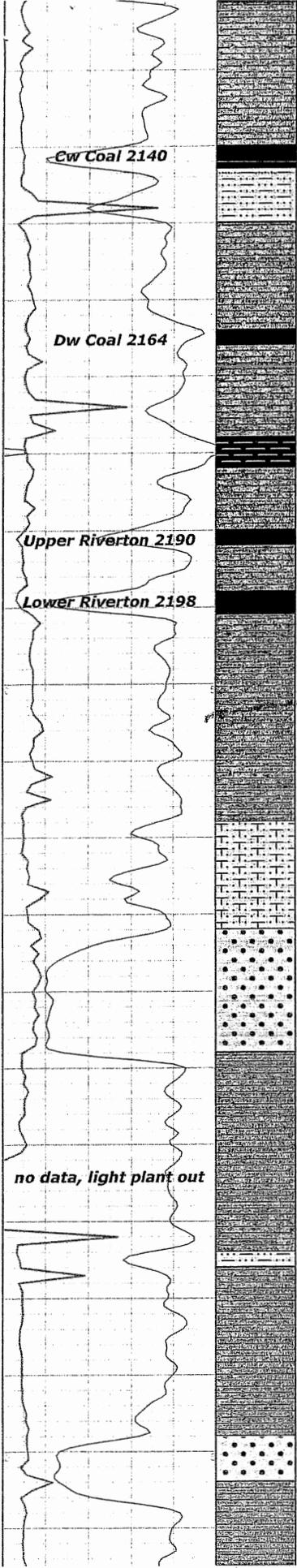


- 1718 shale: light gray, firm, subplaty, weakly laminated, medium to coarse texture, gritty, weakly calcareous, trace fine pyrite
- 1731 limestone: white to light honey yellow, hard, blocky, cryptocrystalline to microcrystalline, fragmental in places, coarse skeletal fragments, scattered fine pyrite
- 1733 shale: light gray brown to light brown, soft to firm, weakly laminated, fine to medium texture, silty to gritty, weakly calcareous
- 1736 black shale: black, hard to firm, platy, fine texture, earthy, well laminated, trace fine pyrite
- 1742 siltstone: light tan to light creamy gray, hard, blocky, fine to medium texture, gritty, well indurated, fine black carbonaceous fragments
- 1746 shale: light gray, firm, subplaty, weakly laminated, medium to coarse texture, gritty, weakly calcareous, trace fine pyrite
- 1758 black shale: black, hard to firm, platy, fine texture, earthy, well laminated, trace fine pyrite
- 1764 shale: light gray, firm, subplaty, weakly laminated, medium to coarse texture, gritty, weakly calcareous, trace fine pyrite
- 1804 sandstone: white to clear, medium to coarse grained, subangular, well sorted, weakly friable, hard, clean, light, scattered coarse pyrite
- 1812 black shale: black, hard to firm, platy, fine texture, earthy, well laminated, trace fine pyrite
- 1822 shale: light gray to pale creamy green to light brown, soft to firm, subplaty, weakly laminated, gritty, coarse texture, calcareous, abundant coarse pyrite
- 1836 black shale: black, hard to firm, blocky to platy, splintery, thin laminated, fine to medium texture, earthy to gritty, calcareous, coarse calcite interclasts, scattered coarse pyrite
- 1852 shale: light gray to pale creamy green, soft to firm, sub-blocky, fine texture, weakly laminated, earthy to gritty, calcareous, trace pyrite
- 1875 coal: black, hard to firm, blocky to flaky, well laminated, dull velvety luster, shaly, fine pyrite laminations, weakly calcareous
- 1878 silty shale: light gray to light brown, firm, sub-blocky, fine to medium texture, earthy to gritty, sandy in places, trace black carbonaceous fragments
- 1902 sandstone: white to clear, medium grained, trace black dead oil staining

1913



- 1922 limestone: light honey yellow, hard, blocky, cryptocrystalline, tight, clean, trace fine pyrite
- 1924 silty sand: light gray to light brown, fine to medium grained, well rounded, well sorted, weakly friable, trace to poor intergranular porosity, clean, trace fine pyrite, trace dark green glauconite, silty in places
- 1934 coal: black, hard to firm, blocky to flaky, well laminated, dull velvety luster, shaly, fine pyrite laminations, weakly calcareous
- 1937 shale: light gray to gray brown, soft to firm, platy, weakly laminated, fine to medium texture, earthy to gritty, calcareous, scattered fine pyrite
- 1948 black shale: black, hard to firm, subplaty, weakly laminated, fine to medium texture, earthy to gritty, abundant calcite interclasts, scattered fine pyrite
- 1956 shale: light gray to pale creamy green, soft to firm, thin laminated to weakly laminated, fine to medium texture, earthy to gritty, calcareous, scattered fine pyrite
- 1960 sandstone: light gray brown, fine to medium grained, well rounded, well sorted, soft, friable, shaly fillings in places, scattered fine to coarse pyrite, fine black carbonaceous fragments
- 1994 shale: light gray to pale greenish gray, soft to firm, subplaty, weakly laminated, earthy to gritty, coarse texture, calcareous, clay rich in places, scattered pyrite
- 2003 coal: black, firm, subplaty to sub-blocky, soft velvety luster, well laminated, shaly, bony, abundant fine calcite interclasts, scattered fine pyrite
- 2006 black shale: very dark gray to black, hard to firm, subplaty, splintery, well laminated, fine to medium texture, earthy to gritty, weakly calcareous, scattered fine pyrite
- 2010 shale: light gray to light greenish gray to gray brown, soft to firm, coarse texture, gritty, sandy, trace pyrite
- 2038 sandstone: white to clear, fine to medium grained, subrounded to subangular, moderately sorted, friable, trace to poor intergranular porosity, clean, scattered black carbonaceous fragments, scattered black pyrite
- 2046 shale: light gray to light gray brown to dark red brown, firm, subplaty, weakly laminated, fine to medium texture, earthy to waxy, calcareous, scattered fine pyrite
- 2056 black shale: very dark gray to black, hard to firm, subplaty, weakly laminated, medium to coarse texture, earthy to gritty, bony, abundant coarse calcite interclasts, limy streaks, coarse pyrite clusters
- 2060 shale: dark gray to dark greenish gray, firm, subplaty, weakly laminated, fine to medium texture, earthy, weakly calcareous, scattered fine pyrite
- 2066 coaly shale: black, hard, blocky, dull luster, very thin laminated, clean, occasional coarse pyrite, fine disseminated, calcite, poorly cleated
- 2069 shale: dark gray to dark greenish gray, firm, subplaty, weakly laminated, fine to medium texture, earthy, weakly calcareous, scattered fine pyrite
- 2084 siltstone: light creamy gray to light creamy tan, soft to firm, sub-blocky, fine texture, powdery to gritty, weakly indurated, sandy in places
- 2092 coal: black, hard to firm, blocky, dull to soft velvety luster, thin laminated, clean, trace fine calcite interclasts, scattered fine pyrite
- 2094 shale: light gray to light grayish green, soft to firm, subplaty, weakly laminated, medium texture, gritty, clay rich, calcareous, scattered fine pyrite
- 2100 siltstone: light creamy gray to light tan, hard to firm, blocky, fine to medium texture, gritty, well indurated, scattered fine pyrite
- 2104 shale: dark gray to dark greenish gray, firm, subplaty, weakly laminated, fine to medium texture, earthy, weakly calcareous, scattered fine pyrite



total show 55 units

2121 shale: dark gray to dark greenish gray, firm, subplaty, weakly laminated, fine to medium texture, earthy, weakly calcareous, scattered fine pyrite

total show 80 units

2140 coal: black, hard to firm, blocky, dull to soft velvety luster, thin laminated, clean, trace fine calcite interclasts, scattered fine pyrite

2143 siltstone: light creamy gray to light tan, hard to firm, blocky, fine to medium texture, gritty, well indurated, scattered fine pyrite

2150 shale: light gray to light grayish green, soft to firm, subplaty, weakly laminated, medium texture, gritty, clay rich, calcareous, scattered fine pyrite

2160

2164 coaly shale: black, hard, blocky, dull luster, very thin laminated, clean, occasional coarse pyrite, fine disseminated, calcite, poorly cleated

total show 50 units

2166 shale: light gray brown to light gray to light greenish gray, firm, platy, splintery, well laminated, medium texture, earthy to gritty, calcareous, trace pyrite

2178 black shale: black, hard to firm, blocky, weakly laminated, fine to medium texture, earthy, clean, weakly calcareous, trace fine pyrite

2182 shale: dark gray to light grayish green, firm, sub-blocky, weakly laminated, coarse texture, earthy to gritty, calcareous, abundant black carbonaceous fragments, scattered fine pyrite

total show 89 units

2190 coal: black, hard, sub-blocky, dull to soft velvety luster, very thin laminated, clean, trace fine pyrite, trace calcite, poorly cleated

2192 shale: dark gray to light gray brown, soft to firm, sub-blocky, well laminated, fine texture, earthy to waxy, calcareous, trace fine pyrite

total show 88 units

2198 coal: black, hard, sub-blocky, dull to soft velvety luster, very thin laminated, clean, trace fine pyrite, trace calcite, poorly cleated

2200

2201 shale: dark gray to dark greenish gray, firm, platy, medium texture, earthy to gritty, weakly calcareous, occasional coarse pyrite clusters

-1075

2220

2228 silty sand: light honey yellow to light tan, fine to medium grained, subangular, moderately sorted, hard, weakly friable, shaly fillings, thin bedded with dark gray earthy shale, trace fine pyrite

-1100

2240

2242 sandstone: white to clear, fine to medium grained, subrounded, moderately sorted, abundant lithic fragments, fine black carbonaceous fragments, scattered fine pyrite

-1125

no data, light plant out

2260

2258 shale: dark gray to dark greenish gray, hard to firm, subplaty to sub-blocky, medium texture, weakly laminated, earthy to gritty, calcareous, trace pyrite

-1150

2280

2300

2308 sandstone: white to clear to light yellow, coarse grained, subrounded, well sorted, hard friable, poorly consolidated, loose coarse quartz grains, shaly fillings in places, scattered fine pyrite, trace to poor intergranular porosity

-1175

2314 shale: dark gray, firm, sub-platy, weakly laminated, gritty, coarse texture, weakly calcareous, trace fine pyrite

2320

MISSISSIPPIAN 2358

TD 2420

2340

-1225

2360

-1250

2380

2400

-1275

2420

TOOH, Bit #2: Hughes J33 7 7/8, mix 15 gel 1 cs 1 sa 1 tann

RPM 60/70 WOB: 25/28 PP 65/900, added 91 gel 2 cs 2 sa 2
tann 1 drispac, MW 9.5 VIS 37

TD 2412 MW 9.5 VIS 50

2358 limestone: light creamy tan to light yellow, hard, blocky, cryptocrystalline, light, scattered milky white to pale blue gray chert, scattered fine pyrite

2400 limestone: light yellow to light brown, hard, blocky, microcrystalline, sucrosic, clean, trace visible porosity, trace fine pyrite