

# ATOKA COAL LABS

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## FORMATION EVALUATION LOG

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

**COMPANY:** Heartland Oil and Gas, Inc  
**WELL:** Hochard 7-14  
**FIELD:** Wildcat  
**COUNTY:** Nemaha **STATE:** KS

**API #:** 15-131-20189-00-00

**LOCATION:** sw sw ne  
3150 fsl 2130 fel

**Sec 14 Twp 4S Rge 14E**

**ELEV GL:** 1232 ft

**ELEV KB:** 1240 ft

**Log Measured from:** KB

**Spud Date** May 25, 2004

**Surface Casing** 8 5/8" 0 - 282 ft

**Hole Size** 7 7/8

**Total Depth** 2720

**Logging Dates** May 27 - 2004

**Interval Logged** 1500 - 2720 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



OOITIC  
LIMESTONE



CHERT



PYRITE



LIMEY  
SHALE



SILTSTONE



SANDY  
SILT



CLAY



BENTONITE

DATE/TIME

PEN. RATE (MIN/FT)

0 5

GAMMA RAY (API UNITS)

0 150

LITHOLOGY

CORE

DEPTH (FT)

ELEVATION (FT)

TOTAL GAS (UNITS)

0 100

BULK DENSITY (g/cc)

2 3

Caliper (in) 16 8

LITHOLOGIC

DESCRIPTION

drilling with water, bit #1: Hughes HC805 1905815 7 7/8

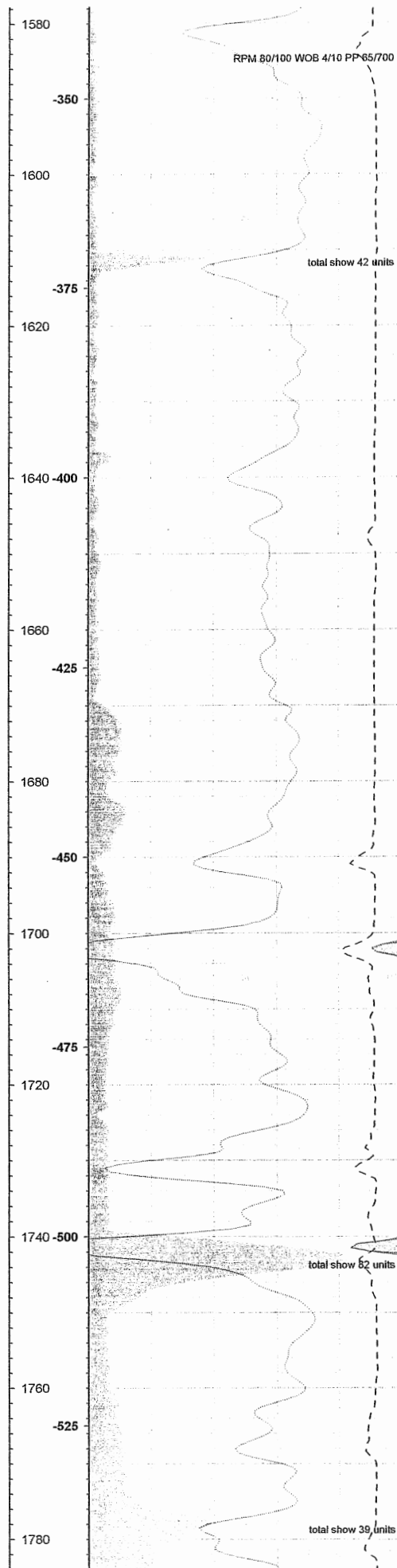
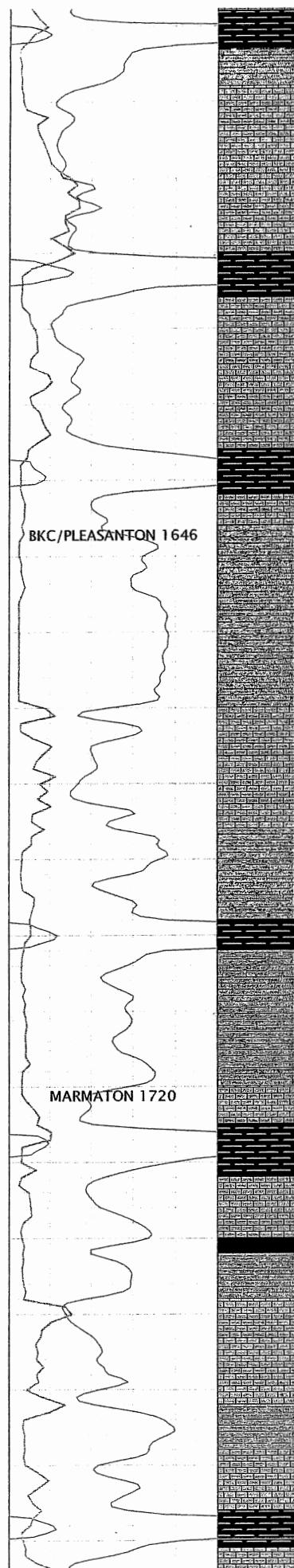
1500 limestone: white to light gray, hard, blocky, cryptocrystalline to microcrystalline, light, trace fine pyrite

1516 shale: light gray, blocky, medium to coarse texture, earthy to gritty, weakly laminated

1522 limestone: white to light gray brown, hard, blocky, fine to medium crystalline, granular, sparry, trace fine pyrite

1528 shale: light gray to light greenish gray to brown, soft to firm, well laminated, earthy to gritty, clay rich in places

1536 limestone: white to light gray brown, hard, blocky, microcrystalline, granular, clean, trace fine pyrite



1578 black shale: black, firm, sub-blocky, medium to coarse texture, weakly laminated, abundant coarse pyrite, calcite

1583 shale: light gray brown, firm, blocky, massive, medium texture, earthy to gritty

1588 limestone: white to light creamy tan, hard, blocky, cryptocrystalline, clean, tight, trace fine pyrite

1610 black shale: black, hard to firm, sub-blocky, weakly laminated, clean, trace fine pyrite

1616 limestone: white to light creamy tan, hard, platy, cryptocrystalline, clean, tight, trace very fine pyrite

1636 black shale: black, hard to firm, sub-blocky, weakly laminated, clean, trace fine pyrite

1642 limestone: white to light honey yellow, hard, platy, microcrystalline to fine crystalline, clean, tight, trace fine pyrite

1646 shale: light gray, firm, subplaty, medium texture, weakly laminated, earthy to gritty

1670 limestone: white to light honey yellow, hard, platy, microcrystalline to fine crystalline, clean, tight, trace fine pyrite

1686 shale: light gray, firm, subplaty, medium texture, weakly laminated, earthy to gritty

1698 black shale: black, hard to firm, blocky, coarse texture, gritty, abundant coarse calcite interclasts, coarse pyrite

1702 shale: varicolored, dark gray to dark brown to dark red, soft, firm, sub-blocky, clay rich, fine to medium texture, gritty, calcareous

1720 limestone: light creamy tan, hard, platy, cryptocrystalline, clean, tight, occasional fine pyrite

1725 black shale: black, hard to firm, blocky, massive, coarse texture, gritty, clean, trace fine pyrite

1732 limestone: light creamy tan, hard, platy, cryptocrystalline, clean, tight, occasional fine pyrite

1740 coal: black, hard, blocky, glassy, conchoidal, weakly laminated, clean, trace fine pyrite

1742 shale: light gray to dark gray, firm, subplaty, medium texture, earthy to gritty

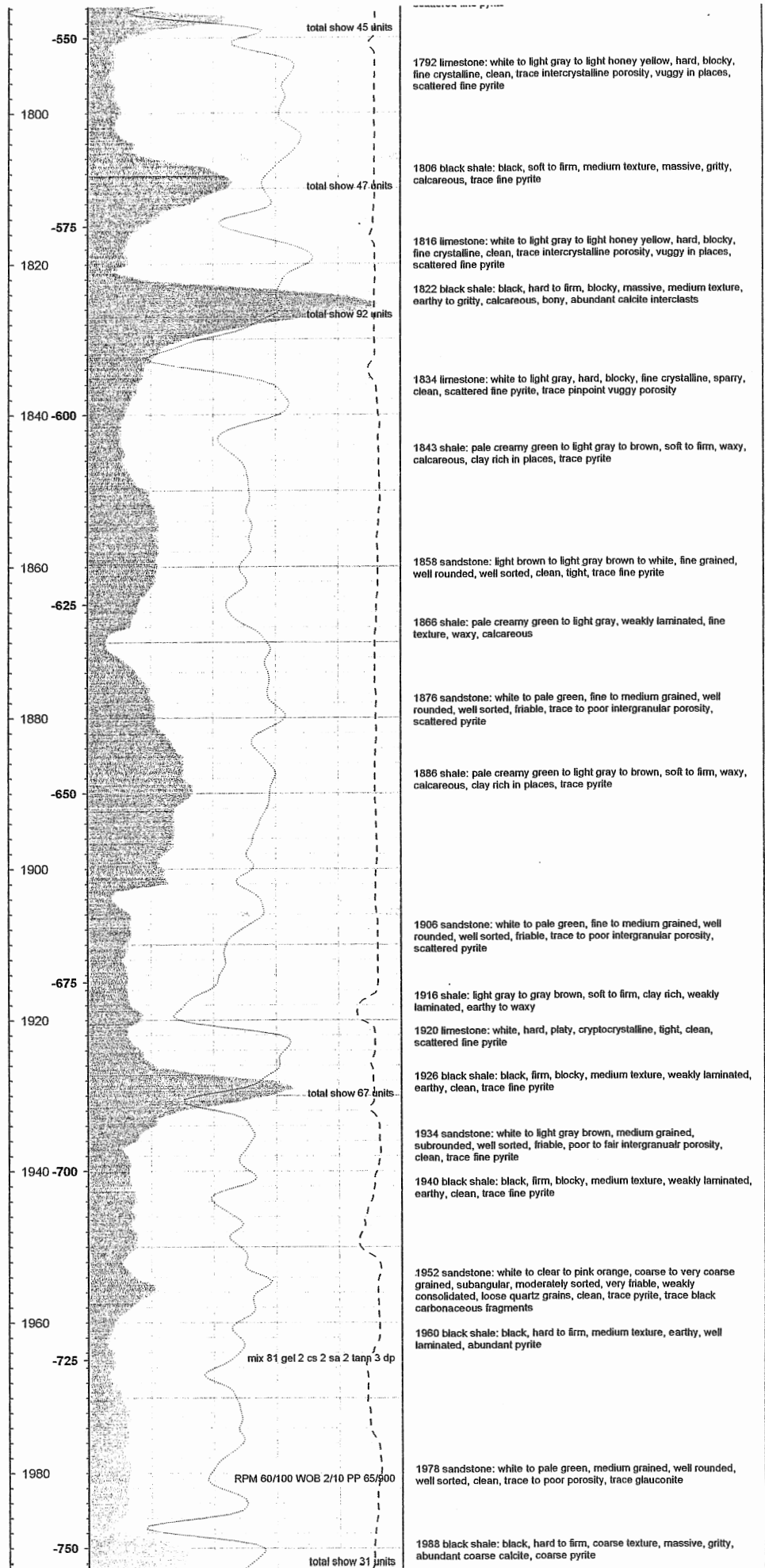
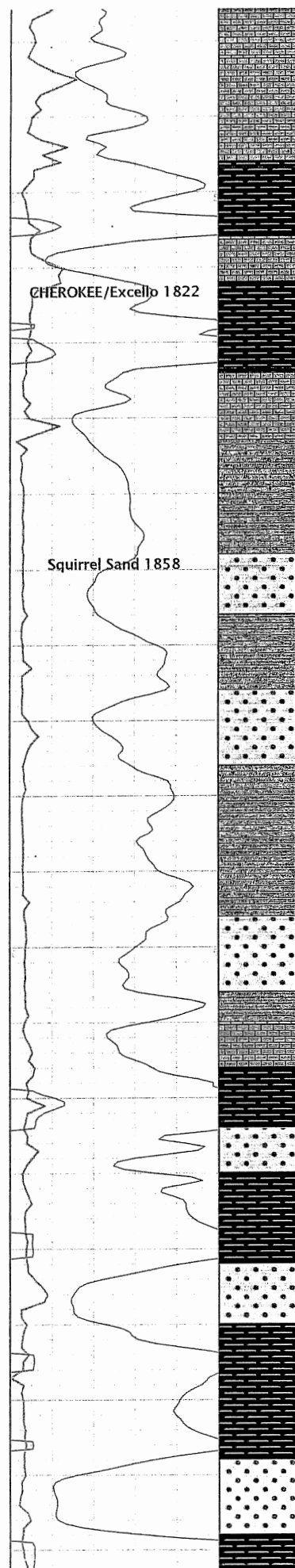
1748 limestone: white to light gray, hard, blocky, fine crystalline, sparry, clean, scattered fine pyrite, trace pinpoint vuggy porosity

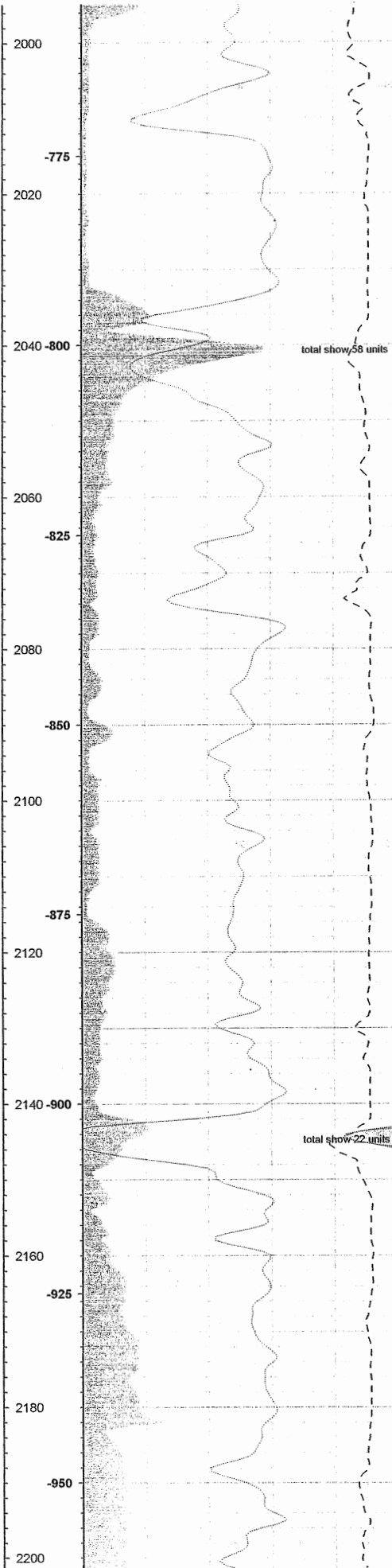
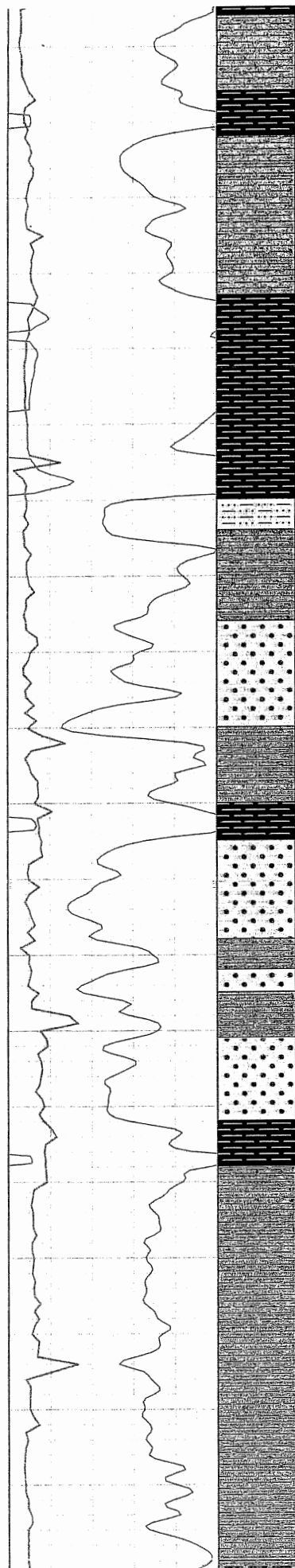
1762 shale: dark gray brown, soft to firm, weakly laminated, earthy, clay rich in places, trace fine pyrite

1768 limestone: white to light gray, hard, blocky, fine crystalline, sparry, clean, scattered fine pyrite, trace pinpoint vuggy porosity

1776 black shale: black, soft to firm, medium texture, massive, gritty, calcareous, trace fine pyrite

1781 limestone: white to light gray to light honey yellow, hard, blocky, fine crystalline, clean, trace fine pyrite





1996 shale: varicolored, pale green to dark red to light gray, soft to firm, waxy, calcareous, clay rich in places

2006 black shale: black, hard to firm, medium texture, earthy, well laminated, abundant pyrite

2012 shale: dark gray, firm, medium texture, weakly laminated, abundant pyrite

2033 black shale: black, hard to firm, medium texture, earthy, well laminated, abundant pyrite

total show 58 units

2060 siltstone: light tan, hard, blocky, fine texture, well indurated, scattered pyrite

2084 shale: light greenish gray to red brown, soft to firm, gritty to waxy, calcareous, clay rich

2076 sandstone: white to clear, medium grained, well rounded to well sorted, silty in places, trace fine pyrite

2090 shale: varicolored, light gray to gray brown to dark red, soft to firm, gritty, clay rich in places

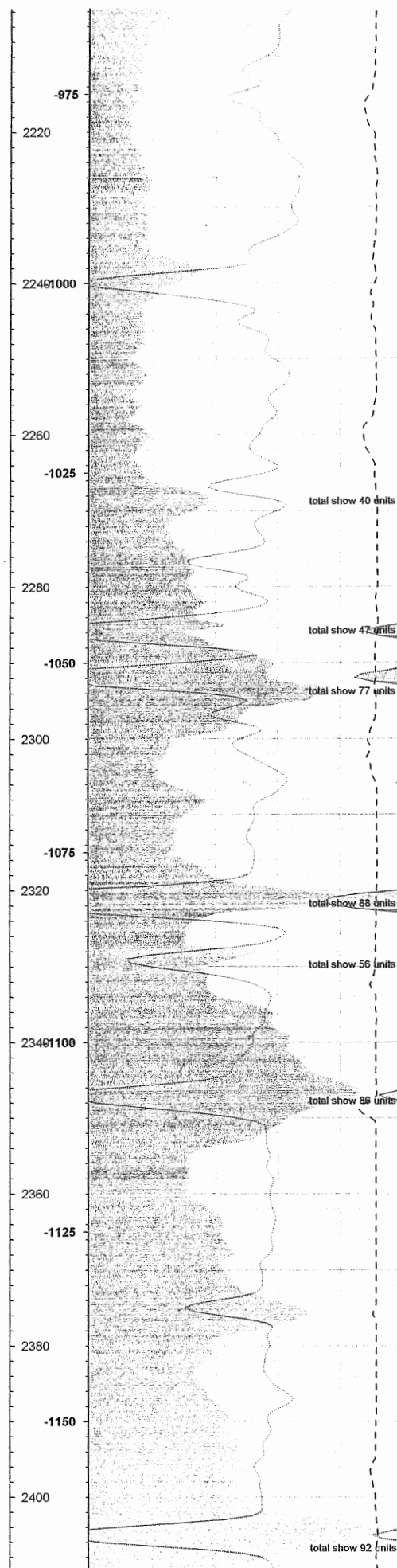
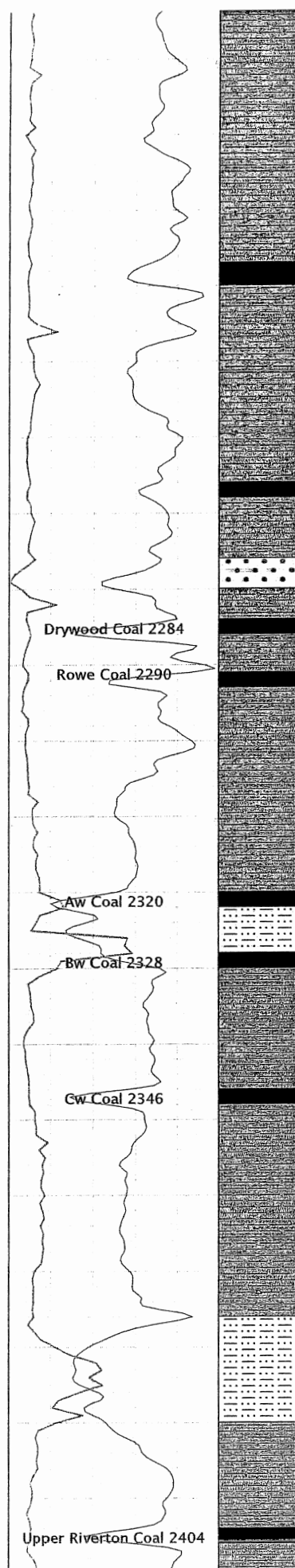
2100 black shale: black, hard to firm, blocky, medium texture, weakly laminated, earthy, trace pyrite

2105 sandstone: white to clear, medium grained, well rounded to well sorted, silty in places, trace fine pyrite

total show 22 units

2142 black shale: very dark gray to black, firm, sub-blocky, coarse texture, gritty, calcareous, trace fine pyrite

2148 shale: light gray to pale creamy green, soft to firm, coarse texture, weakly laminated, gritty, calcareous



2237 coal: black, hard, blocky, glassy luster, conchoidal, well laminated, abundant coarse calcite interclasts, abundant pyrite bands

2240 shale: light gray to pale creamy gray, soft to firm, sub-blocky, gritty, calcareous, scattered pyrite

2266 coaly shale: black, hard, blocky to flaky, weakly laminated, dull luster with bright glassy microbands, clean, trace pyrite, poorly cleated

2268 shale: dark gray, firm, sub-blocky, medium texture, earthy, weakly laminated, gritty, calcareous

2276 sandstone: white to light tan, fine grained, subrounded, moderately sorted, silty in places, fine black carbonaceous fragments

2280 shale: dark gray, sub-blocky, soft to firm, gritty, coarse texture, weakly laminated, calcareous

2284 coal: black, hard to firm, blocky, dull luster, thin laminated, fine bright bands, bony, coarse calcite interclasts, abundant fine pyrite bands

2286 shale: dark gray, sub-blocky, soft to firm, gritty, coarse texture, weakly laminated, calcareous

2291 coal: black, hard to firm, blocky, dull luster, thin laminated, fine bright bands, bony, coarse calcite interclasts, abundant fine pyrite bands

2293 shale: dark gray, hard to firm, sub-blocky, weakly laminated, gritty, coarse texture, calcareous, scattered pyrite

2304 shale: dark gray, soft to firm, weakly laminated, coarse texture, gritty, calcareous

2320 coal: black, hard, dull luster, thin laminated, clean, trace fine calcite

2322 siltstone: light tan to light creamy gray, hard, blocky, well indurated, clean, trace fine pyrite

2328 coaly shale: black, hard, blocky to flaky, weakly laminated, dull luster with bright glassy microbands, clean, trace pyrite, poorly cleated

2330 shale: dark gray, soft to firm, weakly laminated, coarse texture, gritty, calcareous

2346 coal: black, hard, dull luster, thin laminated, clean, trace fine calcite

2348 shale: pale creamy green, soft to firm, sub-blocky, coarse texture, waxy to gritty, calcareous

2376 siltstone: light tan to light creamy gray, hard to firm, fine texture, earthy to powdery, well indurated, clean, trace pyrite

2390 shale: dark gray, firm, platy, splintery, fine texture, well laminated, earthy, calcareous, trace pyrite

2404 coal: black, hard, blocky, velvety luster, bony, abundant coarse calcite interclasts, scattered pyrite

2406 shale: dark gray to pale creamy green, firm, subplaty, medium texture, weakly laminated, earthy to gritty, calcareous

