

984 E. Sugar Hill Rd.
Ava, IL 62907
'618/ 426-3323

Knight Hawk cc
CREEK PAUM Mine
m-Index 1023

Jackson ct
Sec 10.
T7S
R3W
NW $\frac{1}{4}$ SE $\frac{1}{4}$
Curt Rice
5/1999

Creek Paum Mine

Knight Hawk Coal, LLC

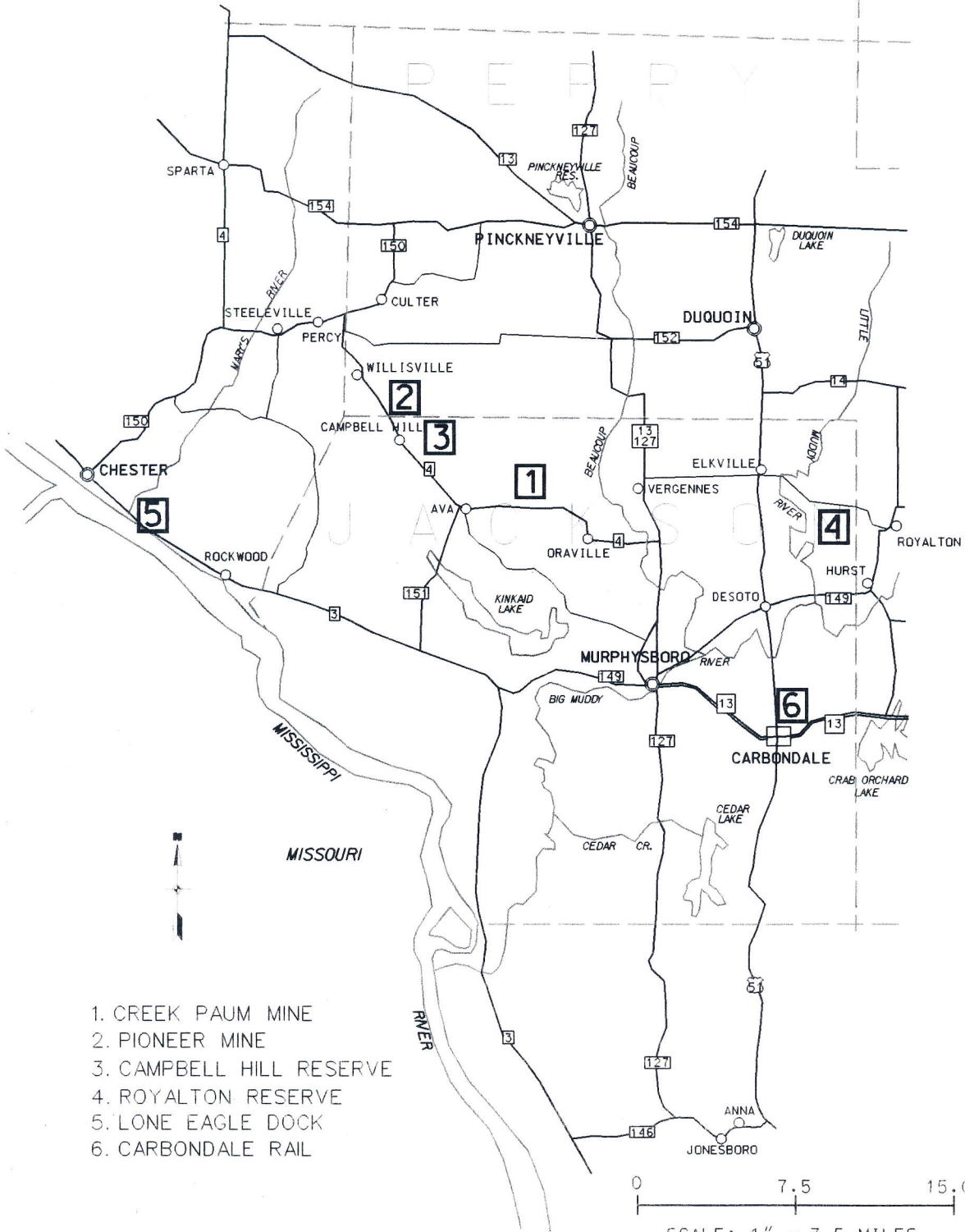
- **Corporation**
 - Virginia LLC formed in April, 1997
 - Steve Carter – 50%
 - F.D. Robertson – 25%
 - James Bunn – 15%
 - James Bunn, Jr. – 10%
 - 984 E. Sugar Hill Road, Ava, IL 62907
Phone: 618-426-3323
Fax: 618-426-3975
- **Operation**
 - Opened Creek Paum Mine in May, 1998
 - Opened Pioneer Mine in April, 2001
 - Purchased Assets of Red Hawk Mine in November, 2003
 - Production & Sales
 - 1998 – 260,000
 - 1999 – 650,000
 - 2000 – 800,000
 - 2001 – 1,200,000
 - 2002 – 1,300,000
 - 2003 – 1,500,000
 - 2004 – 2,100,000 (est.)
- **Mines/Reserves**
 - Creek Paum Mine – Ava, IL
 - Surface Mine
 - Production – 900,000 TPY
 - Reserves – 6,000,000 tons
 - Quality – 1.3% Sulfur
11800 Btu
5.5% Ash
 - Stoker Coal Available
 - Truck Mine
 - 300 TPH Heavy Media Wash Plant
 - Pioneer Mine – Willisville, IL
 - Surface Mine
 - Production – 550,000 TPY
 - Reserves – 2,000,000 tons

- Quality – 3.2% Sulfur
11200 Btu
10% Ash
 - Truck Mine
 - Coal Washed at Creek Paum
- Red Hawk Mine – DuQuoin, IL
 - Surface Mine
 - Production – 550,000 TPY
 - Reserves – 6,500,000 tons
 - Quality – 3.2% sulfur
11,200 Btu
10% Ash
 - Stoker Coal Available
 - Truck Mine
 - 200 TPH Jig Wash Plant
- Royalton Reserve – Royalton, IL
 - Underground Mine Development – Scheduled for 2006
 - Production – 2,000,000 TPY
 - Reserves – 35,000,000 tons
 - Quality – .99% to 1.8% Sulfur
11500 Btu
8% Ash
 - Unit train rail – Union Pacific
 - Heavy Medium Wash Plant to be built
- Campbell Hill Reserve – Campbell Hill, IL
 - Surface Mine – Development estimated for 2005
 - Production – 200,000 TPY
 - Reserves – 2,000,000 tons
 - Quality – 5% Sulfur
11300 Btu
14% Ash
- Transport Facilities
 - Lone Eagle Dock – Chester, IL
 - Mile Post #105 – Mississippi River
 - Capacity – 2,000,000 TPY – Single Shift
 - 1,200hp Tug Boat & 500 HP Tug
 - 35 barges available for direct shipment
 - Crane for off loading, cleanout and cover placement

- Rail Loadout – Carbondale, IL
 - Canadian National/Illinois Central Rail – Main Line
 - 20 car siding – Hopper direct load
 - Capacity – 500,000 TPY

- Rail Load – Cutler, IL
 - CN/IC & Union Pacific
 - Unit Train Capacity – 120 car
 - Capacity – 1 million TPY

KNIGHT HAWK COAL FACILITY LOCATIONS



Mine

Field Notes - by Wayne T. Frankie 4/7/99

Jackson Co.

visit to Plum Creek Mine, Knight Hawk Coal, LLC

984 East Sugar Hill Rd. Ava, IL 62907. PH (618) 426-3323

Steve A. Carter, President

Current production: Feb. 99 = 58,973 tons

Mar. 99 = 56,991 tons

Type of mine = Strip, Murphysboro Coal

Currently they have 920 acres in lease, with $\frac{1}{2}$ of the property containing approximately 3 million tons of recoverable coal. With lease options on 3,000 total acres.

Life of mine estimated at 12-15 years.

Currently operating two small pits (a north and a south pit), with plans to establish one 5,000 feet long pit by this summer.

Coal currently being shipped to:

CIPS - Grand Tower, IL.

SI Power Coop at Lake of Egypt, IL.

Barging some coal to CIPS - Meredosia, IL.

Coal is also being shipped to Contractor Cement in Hanibal,

MO., and to Independence MO, *N 461 500
E 718 130*

Note: Steve Carter provided the following location info: S. 11

Collected channel sample in the northern pit.

Location: ~~NE~~^{NW} 1/4, Sec. ~~10~~¹¹, T7S, R3W, Ava 7.5-Minute Quadrangle.

Murphysboro Coal: Sulphur content ranges from 1.4 to 3.5%, with an average of 2.2-2.5%.

*~400 ft WL
~2100 ft NL*

Thickness ranges from 3.5 to 5 feet, with an average of 4 feet.

Currently stripping ratio of 12 to 1, with future estimated at 15 or 16 to 1.

surface elevation (from topo map) ~ 495 ft

Mine is located on "Conservation Land" owned by the IL Department of Natural Resources, and is known as the Sato property. Mr. Bob Cat is the local Conservation Director.

History of Coal Ownership - Morgan Coal Co., Peabody Coal Co., Arch Coal Co., then Night Hawk Coal Co.

The mine is operating an Eagle portable crusher.

Note: No coal prep plant is on site and the coal is sold as is.

The coal is being trucked using 25 ton haulage trucks, and they are currently loading approximately 120 trucks per day. The mine is using 30 ton pit trucks to haul the coal to the crusher..

General Stratigraphy

Top soil	6-8 in.
'Clay' glacial material	20 ft.
sandstone	25-30 ft.
siltstone	20 ft.

The top soil is being removed and stock-pilled for use in reclamation by three Case 9370 and/or 9380 tractors, each pulling two Reynolds scoop pans. The glacial material is being stripped by three 880 horse power Cat model D11R bulldozers equipped with 56 yard blades. The sandstone and siltstone are then shot and the remaining overburden is removed by 100 ton Cat model 777D dump trucks. The dump trucks are being loaded by a Cat model 992G front end loader. The coal is loaded into the 30 ton pit trucks by a Cat model 375L loading shovel.

Estimated cost of moving materials

Cat - D11R = 35 to 40 ¢ per ton.

Case - 9370 = 60-70 ¢ per ton.

Cat - 777D = 75-80 ¢ per ton.

Trucking of coal 3-8\$ per ton depending upon distance.

Channel sample collected in north pit.

Total thickness of coal 53 inches

*Called # 3
Lab # C 36490*

4" bright banded with thin dull bands,
bright banding up to 3/8 in.

fusain layer

4.5" dull banded with thin bright bands.

fusain layer

4.5" dull banded with thin bright bands.

fusain layer

1.25" bright banded coal

fusain layer

19.75" blocky, bright banded with dull banding

fusain layer

11" bright banded

fusain layer

9" bright banded, less blocky than above

A scissor fault trending N45W with a 74 degree dip to the north is located at the southern end of the strip pit. The pit is orientated perpendicular to the fault and trends approximately N45E. Mr. Carter said that there was a matching "second" fault on the north end of the pit, but this was not exposed during my visit. Mr. Carter also said the mine contained a number of hogbacks.

The fault had a maximum displacement of approximately 6-7 feet on the southwest end of the fault exposure, and



FORM 180 W

Knight Hawk Coal, LLC, Creek Paum Mine

Visited by Heinz Damberger and Dan North on 6/15/99

Purpose: to take channel samples of mined coal and to observe local geology. The samples will be analyzed by ISGS for prox, ult, heating value, FSI, S forms, Cl, R, macerals; a sample will be submitted to USGS for TE analysis (as part of National Coal Quality Inventory program).

We arrived at about 10 a.m. We were met by Steve Carter, President of the company; we also met his son Andrew Carter and Fred Walton, Mine Manager. Both Steve and Fred used to work for Arch. After a brief safety training Steve took us into the mine. We selected two sites for sampling.

Note: Unfortunately photos taken by HHD of sampling sites, pits, people etc. were all lost later while attempting to change films because of his unfamiliarity with the fancy camera we had gotten from the Survey's photographer Joel Dexter. Pictures taken by DLN are included below.

Channel sample #1, Lab # C36488Location:

Ava 7.5 min quad; approx. State Plane West Zone coordinates: N 461,500 E 718,500;

Twp 7S Rng 3W, Sec. 11, ~750 ft from W line, ~ 2100 ft from N line; approx. surface elevation (from quad map): 505 ft, approx. depth to top of coal: 80-100 ft

Sample approx. 80 pd., in heavy plastic bag, kept within cloth bag; taken to applied lab until Ilham Demir and Jill Pine processed the sample a few weeks later.

Description of coal seam, by HHD recorded by DLN:

<u>From</u>	<u>To</u>	<u>Thickness</u>	<u>Description</u>
			TOP OF COAL
0.00	1.42	1.42	Coal, bright banded, finely laminated, hard; thin pyrite coatings on cleat surfaces; thin coating of white kaolinite (?) on 140° cleat set



FORM 180 W

1.42	1.44	0.02	Fusain, soft, slightly shaley, somewhat lenticular
1.44	1.67	0.23	Coal, bright banded, several thick vitrain lenses
1.67	2.47	0.80	Coal, clarain-rich, finely laminated
2.47	2.72	0.25	Coal, fairly dull, mostly clarain with some durain, finely laminated
2.72	3.13	0.41	Coal, bright banded, finely laminated, relatively soft
3.13	3.30	0.17	Coal, bright banded, fairly hard, finely laminated
3.30	3.97	0.67	Coal, medium bright banded, finely laminated, with thin fusain lenses, fairly hard
3.97	4.40	0.43	Coal, fairly dull, hard, occasional thin fusain lenses; probably relatively high in ash

BOTTOM OF COAL

Floor	Claystone, dark gray with numerous rootlets, relatively soft, with many slickensides (typical underclay)
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Cleat headings:

Main cleat sets are about 140° and 50°

140° set: 137/86S variable, 141/86S, 144/90, 142/83, 146/88S, 140/88N, 143/85S, 142/86S, 145/90, 141/87S, 139/86S; spacing between 0.15' and 0.40'

50° set: 52/88N, 49/90, 45/76W, 54/90, 30/65W, 48//85E, 54/86E, 59/87W, 46/82E, 53/87W

FIELD NOTES

Illinois State Geological Survey

Prod.

Year

July 1998

Ton

259,226

Source

omm

MI 1023

Murphysboro coal

Sec 10

										h
										g
										f
										e
							*			d
										c
										b
										a

75

By omm Date 5/1999

Quadrangle _____

County Jackson Sec. 10

8 7 6 5 4 3 2 1

3W

T 75 R 3W



FORM 180 W

Joints in roof shale: most prominent set is 42° - 65° , dip near vertical, but variable to 70° W along dip, spacing about 2-4 ft apart.

Channel sample #2, Lab # C36489

Location: about 60 ft S of N end of highwall which trends about $N45^{\circ}$ - 50° E; Ava 7.5 min quad; approx. State Plane West Zone coordinates: N 463 000 E 719 100;

Twp 7S Rng 3W, Sec. 11, ~1300 ft from W line, ~ 650 ft from N line; approx. surface elevation (from quad map): 525 ft; approx. depth to top of coal: 100-120 ft;

Sample approx. 80 pd., in heavy plastic bag, kept within cloth bag; taken to applied lab and kept in storage until Ilham Demir and Jill Pine processed the sample a few weeks later.

Description of coal seam by HHD, recorded by DLN:

<u>From</u>	<u>To</u>	<u>Thickness</u>	<u>Description</u>
			TOP OF COAL
0.00	1.37	1.37	Coal, bright banded, vitrain and clarain about in equal amounts
1.37	1.40	0.03	Fusain, lenticular, mineralized (mostly pyrite)
1.40	2.42	1.02	Coal, bright banded, several thick vitrain lenses
2.42	2.44	0.02	Fusain, lenticular, with 0.01' thick pyrite lense
2.44	3.12	0.68	Coal, bright banded, mostly thin laminae of vitrain and clarain, hard
3.12	3.99	0.87	Coal, bright banded, vitrain rich, softer than above
3.99	4.30	0.31	Bone coal, fusain rich, occurs mostly as thin lenses, i.pt. pyritized
			BOTTOM OF COAL



FORM 180 W

Floor Claystone, gray, soft, with rootlets (typical underclay)

Cleat headings:

Main cleat sets are about 140° and 50°

140° set: commonly coated with thin pyrite and kaolinite (?); spacing variable, 0.1 to 2.0 ft, mostly in 0.2-0.4 ft range: 143/86S, 140/90, 134/72N, 144/87S, 143/90, 120/82N, 140/90, 122/80N, 134/90, 149/61S, 142/86S, 142/90, 141/85N, 142/72N variable, 139/90, 142/90 variable, 139/87S
50° set: failed to make measurement!

Roof sequence above coal, from base up (estimated):

0	to	~30 ft	Shale, silty, gray, coarsening up to sandy shale and
~30	to	~60 ft	Sandstone, brown, with mica, especially on bedding surfaces

Joints: in gray shale roof ~N60° E, 1.5 to 2 ft spacing, most prominent set also some joints trending ~N10° E to N15° W

Joints tend to cut through shale sequence, are somewhat variable in their trend.

Thrust fault: near N end of highwall we observed a thrust fault, with 142/56N strike/dip; displacement is about 15 ft

Channel sample #3 , Lab # C36490

This sample was taken by Wayne Frankie during a mine visit on 4/7/99; sample approx. 100 pd., in heavy plastic bag; kept in HHD's office till it was taken to the Applied Lab for processing by Ilham Demir, Dan North and Jill Pine in July, 1999, with other samples.

Location:



FORM 180 W

Ava 7.5 min quad; approx. State Plane West Zone coordinates: N 461 500
E 718 130 ;
Twp 7S Rng 3W, Sec. 11, 400 ft from W line, 2100 ft from N line;
approx. surface elevation (from quad map): 495 ft approx. depth to top of
coal: 70-90 ft.



Creek Pann Mine, 6/15/99 near southern end of pit; coal loading in progress. In background removal of overburden v. shovel



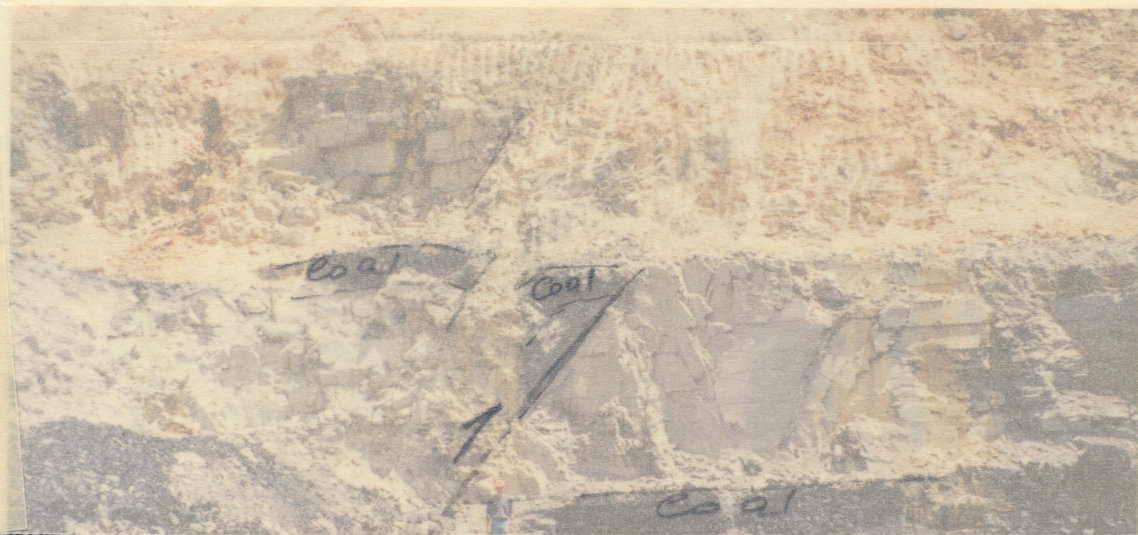
Creek Paurm Mine, 6/15/99 looking south; removal of overburden in progress. Coal in pit mostly removed. Near site of channel spl. #1



Greek Pannu Mine, 6/15/99. Site of channel spl. # 2



Creek Pouch Mine, 6/15/99. HHD cleaning face to take
channel spl. #2



Creek Puum Mine, 6/15/99. N end of pit (left) with reverse fault of about 15 ft displacement. Dan North in picture



Creek Puum Mine, 6/15/99. N end of pit (left) with reverse fault of about 15 ft displacement. Dan North in picture



Creek Pann Mine, 6/15/99. N end of pit with reverse fault
running across pit. Note coal about 15 ft above floor in center of picture
(see photo on reverse side)



Creek Pann Mine, 6/15/99. View of pit near southern edge; coal has been removed.

Knight Hawk Coal, LLC, Creekpaum Mine, Jackson County, IL
Notes by John Nelson on visit with Joe Devera, October 18, 2003.

Primary reason for visit was to collect fossil plants for Bill DiMichele of the Smithsonian Institution. We visited on a Saturday, when there is less activity in the mine, and collected from the spoils. Large blocks of shale loaded with fossil plants are numerous; we collected five boxes of fine specimens. After several hours of collecting, we went into the active pits for a look at highwall strata. The highwalls being unstable, there was no place to measure a section; but we could reasonably well correlate loose rocks from the spoils with in-place strata on the highwalls. The following section is thereby pieced together:

TOP

15-20' Loess and glacial drift, not examined.

10' Sandstone, yellowish brown (weathered), very fine to fine-grained, micaceous lithic arenite, thin to medium planar bedding, some has planar lamination. No fossils seen. Lower contact not clearly seen, appears gradational.

2-4' Shale, black, hard, well laminated, pyritic, very carbonaceous. Abundant pyritized whole shells of *Lingula* and *Dunbarella*.

1' Coal, dull, shaly, pyritic, reported to contain as much as 9% sulfur. This may be the Mt. Rorah Coal or a younger seam. Near west end of the pit, the coal fills a shallow channel scoured into underlying strata. No indication of underclay or paleosol beneath coal.

40-50' Shale and siltstone, interlaminated in part. The basal 10 to 15 feet overlying the Murphysboro Coal coarsen upward. Immediately overlying coal is medium-dark gray, slightly silty shale that is weakly bedded and contains scattered small siderite nodules. This shale contains the most abundant and diverse fossil plants, including fern foliage, calamite stems and leaves, lycopod stems, and cordaite leaves. Among ferns, *Neuropteris* is most abundant and in some areas we collected, is more than 90% of the flora. Miners report upright tree stumps above coal; we did not observe

any. The basal plant-bearing shale grades upward to interlaminated medium gray shale and light gray siltstone to very fine sandstone. Laminae are planar to slightly wavy, highly continuous and rhythmic, and arranged into very obvious neap/spring tidal cycles throughout. Carbonaceous debris is concentrated along bedding-planes along with occasional large, coalified stems and *Cordaite*s leaves. No invertebrates were found and only one trace fossil, which Joe identified as *Cochlichnus*. Beyond 10 to 15 feet above the coal, the succession appears to consist of alternating intervals 1 to 3 feet thick of weakly bedded shale and rhythmically interlaminated shale and siltstone, as before. Near west end of pit there appears to be a large scour or slump feature 20 to 30 feet above the Murphysboro. Joe made a sketch of this feature.

3-7' Murphysboro Coal, bright banded, low sulfur. Not examined in detail. At the one place where I saw the coal well exposed it is about 4.2 feet thick. Base concealed.

The bedrock overburden was thickest and most complete at the southwest end of the pit. Eastward, the total depth of overburden decreases and the thickness of glacial materials increases.

I infer that Murphysboro peat at this site was buried rapidly by sediment in a brackish lagoon, bay, or estuary. The site was clearly in the realm of tides and close to shore where abundant land plants were growing. Given excellent preservation, plant remains were transported only a short distance and deposited in a protected setting. The upward increase in grain size and loss of well preserved plants (only the most robust elements being fossilized) indicates a progressive increase in energy, although we saw no indication of storms or strong currents. (The slump or scour feature seen near west end of mine was inaccessible and enigmatic. It is well above the interval of good plant preservation). Peat may still have been accumulating along the margins of the embayment. Roughly estimating from thickness of tidal bundles and the fact that upright tree trunks reportedly are preserved, the initial upward-coarsening, plant-bearing deposit might have been laid down in 10 to 20 years.

Knight Hawk Coal, LLC - Creek Paum Mine - Jackson County

Notes by John Nelson on visit with Russ Jacobson, Tom Moore, Scott Elrick, and Andrew Louchios, February 6, 2004.

This is the surface mine in the Murphysboro Coal, where I collected fossil plants last fall. Fresh snow and abundant mud hindered geologic study.

A little information about Knight Hawk from printed sheets and conversation with Steve Carter, senior partner in the company. Knight Hawk was incorporated in the state of Virginia in April 1997. The partners are Steve Carter (50%), F.D. Robertson (25%), James Bunn, Sr. (15%), and James Bunn, Jr. (10%). The name Knight Hawk is derived from the University of Kansas Jayhawks and the Knights of Carleton College in Minnesota - where Mr. Carter's two sons attended college. The Creek Paum Mine opened in May of 1998. The Pioneer Mine, a strip mine in Springfield and Herrin Coals located near Campbell Hill, opened in April, 2001. Knight Hawk purchased the Razorback Mine from Phoenix Energy Resources in November, 2003 and renamed it the Red Hawk Mine. As we saw on our visit yesterday, Red Hawk is a surface mine in the Herrin Coal, north of Vergennes. Knight Hawk is currently planing to open an underground mine in the Herrin Coal in 2006 near Royalton. They also plan a new surface mine near Campbell Hill in the "Seahorne" Coal. Product from the various mines is trucked to the Lone Eagle Dock on the Mississippi River at Chester and to railroad terminals at Carbondale and Cutler.

A company map locates the **tipple in the NW SE SE of Sec. 10, T7S, R3W, Jackson County, on the Ava 7.5' quadrangle**. The highwall runs northeast-southwest and is advancing toward the southeast.

At the east end of the active pit, **approximately 800' SL, 600' WL, Sec. 12, T7S, R3W**, overburden is being removed from the Murphysboro Coal. Overburden comprises about 15 feet of glacial sediment over 20 feet of medium to dark gray, silty shale and

siltstone. Bulldozers remove Quaternary surficial deposits, while a large shovel loads rock into haul trucks.

The top of the coal shows well developed face cleat that trends about N 30 W and butt cleat that averages N 45 E. Face cleat is fairly consistent in trend, but butt cleat varies 15-20 degrees either side of the average and commonly is curved. Individual face-cleat fractures are 1 to 3 feet long and spaced 0.2 to 0.8 feet apart. Butt cleat is shorter and spaced more closely, 0.1 to 0.2 feet.

The upper (Mt. Rorah?) Coal is being loaded in a small pit about 1/4 mile southwest of the first (**NE NE NE, Sec. 14**). The coal is practically at the crop line. We can't study it in place, but large loose blocks show thick pyrite cleat facings. Knight Hawk apparently mined into a pod of coal balls, composed of dark gray to brown limestone and replacing much of the seam. The floor is not underclay, but well-bedded medium-dark gray shale that is loaded with plant fossils, especially *Cordaites*, *Calamites*, and large *Neuropteris* fronds.

We briefly visited another area near the southwest end of the pit, where the Murphysboro has been mined. **Location is approximately 2600' NL, 2000' WL, Sec. 14.** The coal is about 4 feet thick, although there was no place to take detailed measurement. Overburden again is 20 to 25 feet of dark gray, weakly laminated shale, topped by 15 feet of till and loess. The floor is shaly siltstone that is bedded, although it contains carbonized roots along with stems and foliage.

Knight Hawk Coal Co. - Creek Paum Mine - Jackson County, Illinois

Notes by John Nelson on visit with Bill DiMichele of the Smithsonian Institution and Howard Falcon-Lang of Bristol University, U.K. , June 15, 2005.

We met Ron Balch of Midwest Reclamation, which handles all the permit applications for Knight Hawk.

We visited a couple areas in the main pit where Murphysboro Coal is being mined. No geologic details could be observed because of vertical, unstable highwalls. No inclines were available where we could directly examine strata above the coal.

On an upper bench of an inactive pit near the southwest corner of the mine we had a good opportunity to examine strata closely and collect fossil plants from two horizons. The section is as follows:

TOP - glacial sediments (removed).

4' Sandstone, light gray, very fine to fine-grained, very micaceous lithic arenite that coarsens upward. The lower part is shaly and has planar and wavy lamination; this changes upward to thin-medium bedded sandstone. Lower contact gradational.

4-5' Shale, olive-gray, weakly fissile. Only the lower part is accessible; it is slightly silty and contains small lenses of sandstone along the sharp, undulating lower contact.

0-0.3' Carbonaceous shale, dark olive-gray, weakly fissile, clayey; contains irregular streaks of black coaly material. Lower contact sharp and slightly uneven.

10' Mudstone, dark olive-gray at the top, the remainder medium olive-gray with abundant rusty iron stains. The lower half has purplish-red manganese stains. Structure is massive to blocky with many small slickensides, peds, and criss-crossing fractures throughout. No rooting observed. The lower 2 feet is siltstone, the rest is claystone. The lower contact is sharp and slightly uneven.

1.5' Claystone, olive-gray, darker than above; blocky and thoroughly slickensided, rooted. Sharp contact:

1.8-3.4' Coal, bright banded, well developed cleat (face cleat N 25°E), no clastic layers. Banding becomes thicker downward. The seam thickens eastward along the 300-foot-long exposure without changing elevation. Lower contact sharp.

0.6-0.8' Claystone, dark olive-gray, highly slickensided, rooted (to west). Eastward this unit changes to thinly laminated, highly carbonaceous shale that contains abundant and well preserved pteridosperm foliage. **Smithsonian Collection # IL-2005-03**. Lower contact sharp.

4 ½' Claystone, olive-gray, massive, lower part becomes weakly bedded. Upper part contains many large, listric slickensided fractures and well preserved stigmarian roots. Lower contact is sharp and irregular.

0.2-0.8' Limestone, olive to brownish gray, highly argillaceous, nodular. Large root casts are filled with mud containing echinoderm fragments. Lower contact sharp.

- 0.5' Shale, black, brittle, thinly fissile, bedding planes slickensided, lower part contains coal laminae. Sharp contact:
- 2.0' Coal, bright banded, face cleat N 25°E, butt cleat N 40°W, cleat lined with pyrite and calcite. This coal is well exposed only in one place. Shale partings appear near base; lower contact gradational.
- 3'± Shale, nearly black, highly carbonaceous, laminae paper-thin near the top, grading downward through olive-gray to medium-gray silty shale becoming less fissile downward. Abundant plant foliage is largely *Neuropteris schuchzeri*, along with 10-20° other fern foliage. The fossil content decreases downward.
- Smithsonian Collection # IL-2005-04.** Lower contact inaccessible at top of main highwall.
- 50' est. Shale, gray, rhythmic lamination (at least in part); nearly all inaccessible.
- 4-4 ½' Murphysboro Coal, bright banded, no clastic layers, no visible pyrite.
- Floor of pit.*

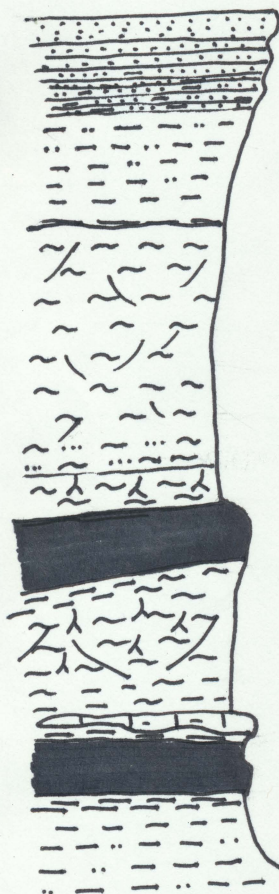
The lower (2.0-foot) coal drops in elevation toward the west without changing thickness. This interval between the two coals increases from about 5 feet on the east to 10 feet on the west. The limestone at the base of this interval is generally thicker toward the west, but is still lenticular. On the west the limestone is overlain by fissile shale, which grades upward to slickensided mudstone. On the east where the interval is thinner, the entire interval is rooted and slickensided. The upper coal seam thickens eastward.

Evidently, in this little area the lower peat (coal) accumulated on a level surface, and was drowned by marine transgression. Mud deposition was followed by sea-level drop and soil formation. During this time the eastern area either subsided more rapidly or was slightly eroded, creating a depression. When the water table rose again, thicker peat of the upper seam accumulated on the east.

Which coal seams are these? The Mt. Rorah Coal commonly has a claystone parting and lacks an overlying limestone. The Wise Ridge Coal (younger) lacks a parting and is overlain by the Stonefort Limestone. Here, neither coal has a parting, and limestone overlies the lower bed, whereas the upper coal is topped by thick, multiple paleosols.

The plant-bearing shale beneath the 2-foot seam appears identical to the shale from which Joe Devera and I previously made a large collection from spoil banks. *Neuropteris* dominated that collection also. At the time, we assumed these fossils came from just above the Murphysboro Coal, but that assumption may have been incorrect. On my three visits to this mine, I have been unable to take a close look at the strata overlying the Murphysboro Coal.

Creek Paum 6/15/05



IL-2005-03

IL-2005-04

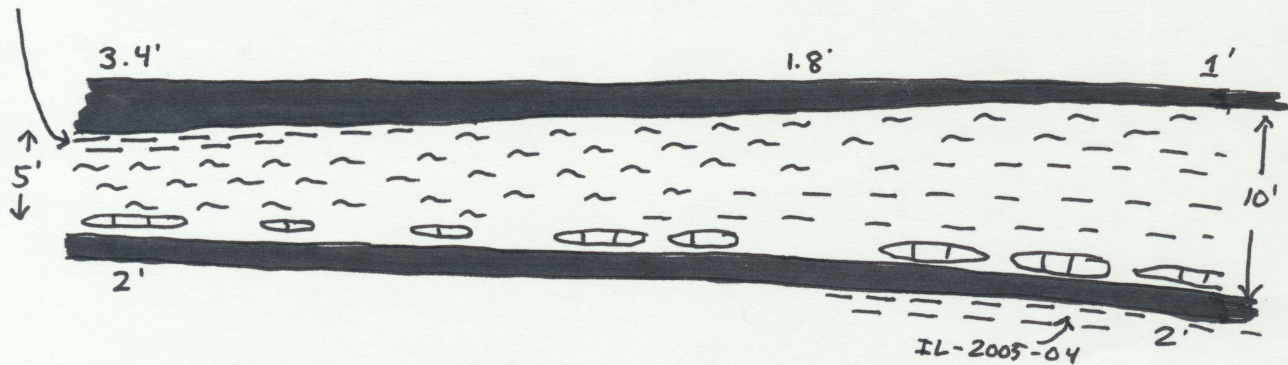
0
10 Ft
(3 m)

50 ft to
Murphysboro Coal



E 500 ft 150 m W

- 2005-03



Creek Paum 6/15/05

Knight Hawk Coal - Creek Paum Mine
Jackson County, Illinois

Notes by John Nelson on visit with Scott Elrick (ISGS) and Bill DiMichele (Smithsonian Institution), with Barry Sergeant from Knight Hawk, Tuesday, August 29, 2006.

Chicken Lake Pit - a new pit near the northwestern corner of the property, close to the Cottage Grove master fault. The pit is roughly 1,000 feet long and the highwall is oriented N 30° E, advancing southeast. Bedrock overburden thins to zero toward the northeast, so we spent our time in the southwestern part of the pit. **Approximate location: SW 1/4 NW 1/4 NW 1/4, Sec. 11, T 7S, R 3W.**

The coal (presumably Murphysboro) is 4.2 feet thick, bright banded, with no clastic layers. Cleat trends N 27° W and N 55° E. I did not distinguish face from butt cleat. Both sets are faced with pyrite. The floor is olive-gray, rooted claystone. Coal and floor were exposed only in one place.

Above the coal are large, elongate lenses of shale and sandstone (see sketch). Initially I believed the lenses were all bounded by imbricate, nearly horizontal thrust faults. Closer inspection eventually convinced me that most, if not all of the contacts actually are erosional and/or depositional rather than faults. The upper part of the highwall was an inaccessible vertical face, but - unusual in this age of safety fanaticism - we were allowed to closely inspect the rocks on the lower part of the wall.

Description of strata from top down - refer to sketch.

1. Sandstone, approximately 30 feet thick, yellowish brown to orange, a few fallen blocks are medium grained, friable lithic arenite that is cross-laminated.
2. Black shale, inaccessible, estimated 2 to 8 feet thick, appears to be sheared but this could not be confirmed.
3. Siltstone to silty shale, medium-light gray with an olive cast, moderately competent and fissile, diffuse sideritic layers. Bedding planes are coated with fragmentary plant fossils. This unit forms a lense 150 feet long and about 12 feet thick in the middle, tapering to zero at both ends.
4. Shale, grayish black, very silty to finely sandy, micaceous, fissile, carbonaceous. Fossil plants are abundant and well preserved, although there is little color contrast between dark gray fossils and rock. *Alethopteris* leaves and *Calamites* stems are most numerous. Lenses of sandstone, as of unit 6 (below) occur at the base. The upper contact was thought to be a fault, but this could not be confirmed because it was entirely out of reach. The lower contact proved to be erosional, although locally sheared. Where best exposed, basal sandstone lenses contain rip-up clasts of siderite derived from underlying shale. Unit is 5 to 8 feet thick along most of highwall but tapers to zero at southeast end.
5. Shale, medium gray, weakly fissile, incompetent clay-shale with abundant small siderite nodules. This unit thickens toward the southeast from 5 to 15 feet. Fossil plants are abundant. In the lower 5 feet they are almost entirely *Neuropteris schuechzeri*, but Bill found a more diverse flora in the upper part of the unit (toward southeast, where more of the unit is preserved).

6. Sandstone, dark gray, very argillaceous, rhythmically laminated, bedding planes coated with mica and carbon. Bedding is highly lenticular, separated by thin dark gray to black shale layers. Sandstone occurs only toward the northeast and is as thick as 10 feet.

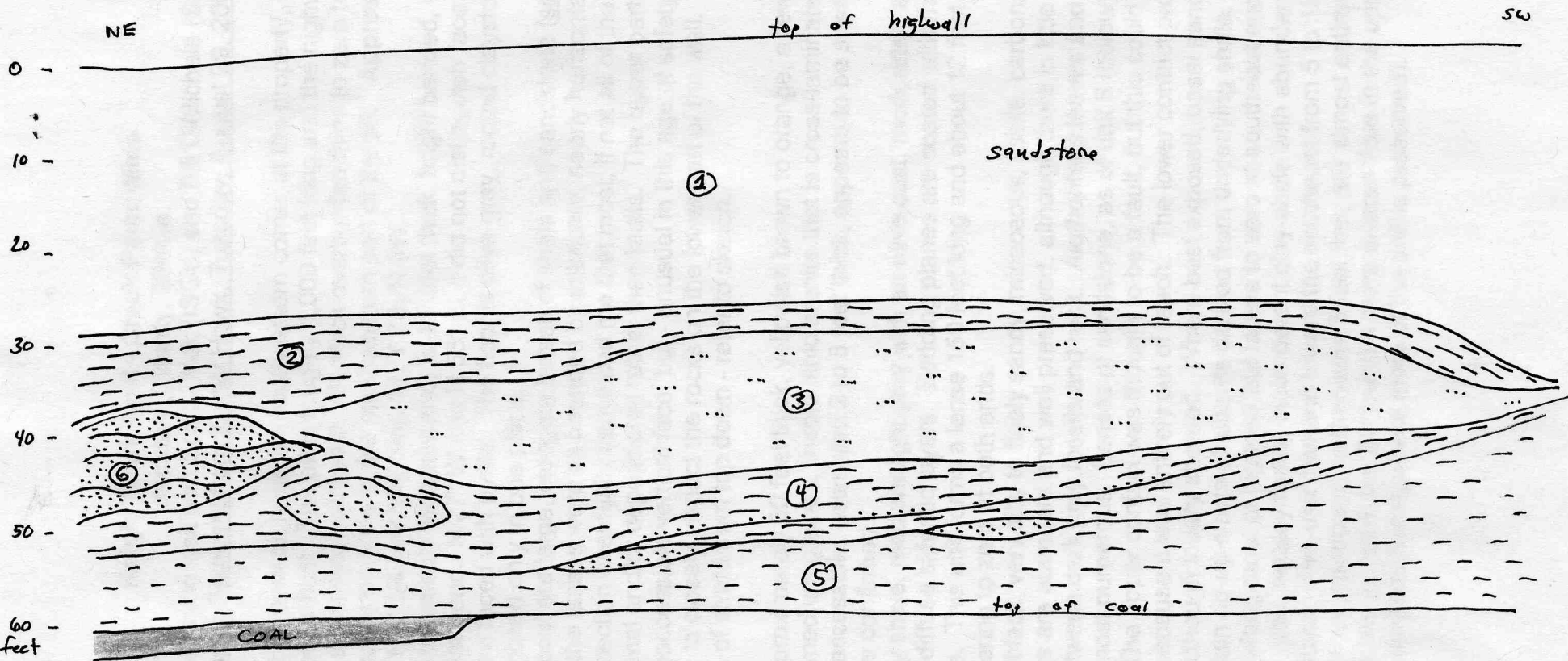
Pit 4. This pit runs north-south and is advancing east, approaching Mud Line Road. According to Barry Sergeant, the Murphysboro Coal pinches out a short distance east of the road. The pinch-out is linear and trends north-south. It is not clear whether this is a depositional pinch-out or merely the subcrop beneath surficial materials.

The coal has been auger-mined here and is poorly exposed, mostly covered by fallen debris. The highwall has not advanced for several months. Coal thickness is between 4 and 5 feet.

Overlying the coal is 20 to 25 feet of shale and siltstone. Clay-shale at the base grades upward to siltstone. Fossil plants are abundant and well preserved in the lower 4 to 5 feet of shale. The basal 1 to 2 feet is thinly fissile and contains abundant large stems along with foliage of *Alethopteris* and other ferns. Upward the stems disappear, and *Neuropteris schuechzeri* becomes the dominant fossil. About 5 feet above the coal, the rock changes to siltstone having pin-stripe sandstone laminae and beautiful neap/spring tidal rhythmites. Only fragmentary plant remains are present (mainly "coffee grounds" coating bedding planes. Large-scale lateral accretion sets have apparent dip toward the north. We saw little change along the length of the highwall, roughly 1/4 mile.

The floor is highly carbonaceous, laminated dark gray shale containing abundant fossil plants, but mostly poorly preserved stems. There may be some roots, but this is not a typical underclay or paleosol.

Knight Hawk - Creek Paumotu
 Chicken Lake Pit - Jackson County



length of wall ~ 500 feet, there is
 much vertical exaggeration.

Knight Hawk Coal - Creek Paum Mine - Chicken Lake Pit
Jackson County

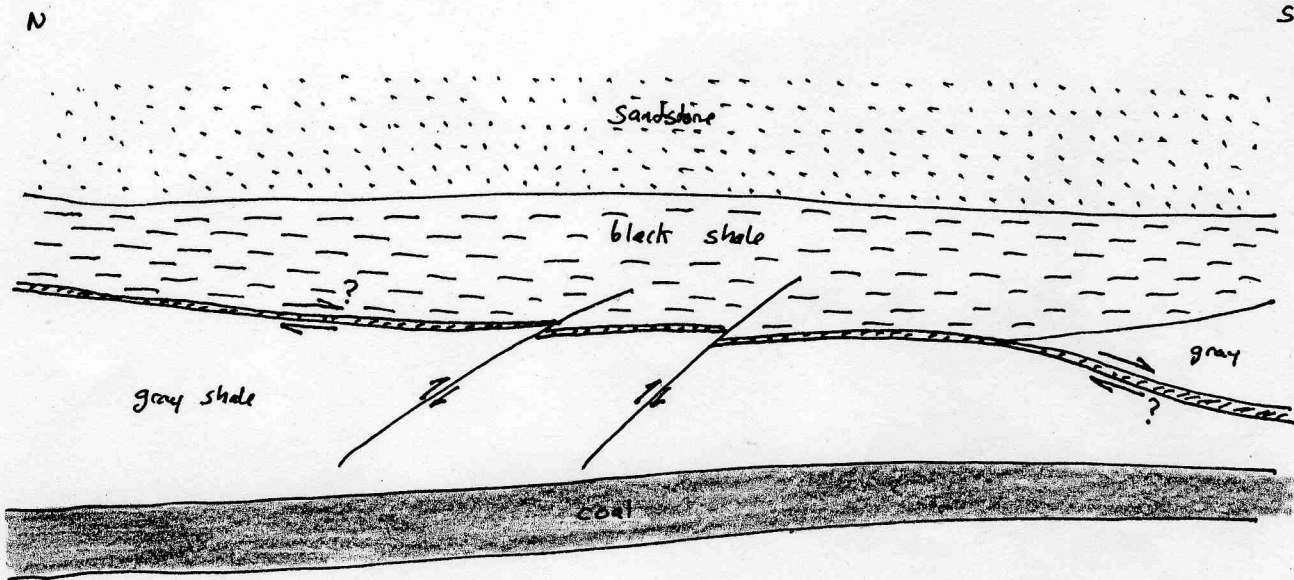
Notes by John Nelson with Scott Elrick, September 11, 2006.

The highwall has advanced about 180 feet eastward since our visit of two weeks previous. Unfortunately the wall is nearly vertical, and all strata except at base are inaccessible. Strata are as follows:

TOP	
30-40'	Sandstone, yellowish brown
5-10'	Shale, grayish black
10-18'	Shale, medium gray, abundant fossil plants
4'	Murphysboro Coal
1'+	Claystone, medium-dark gray, blocky, slickensided, rooted.

The contact between gray and black shales appears to be a shear zone along most of the highwall. Toward the south, the shear zone drops downward into the gray shale, but no offset is evident. Two small thrust faults that dip north displace the black/gray contact less than one foot (see sketch). Lenses of sandstone observed on previous visit are not present.

I could not determine direction or amount of slip along the nearly horizontal shear zone. The two little thrusts carried hanging wall toward the south, suggesting slip on the larger fault is the same. If so, where the shear zone crosscuts gray shale toward the south, it is geometrically a normal fault.



Knight Hawk Coal – Creek Paum Mine – Jackson County, Illinois

Notes by John Nelson on visit with Scott Elrick (ISGS), Bill DiMichele and Arden Bashforth (Smithsonian), Isabel Montanez, Galen Griggs and Amanda Porter from University of California-Davis, and Barry Sargent from Knight Hawk, February 13, 2015.

The mine is near the limit of its reserves, and coal is mined only intermittently when needed for blending with product from other Knight Hawk mines to meet customer specifications. At the time of our visit, there was no activity and no equipment on site. The pit trends north-south and is ½ mile long, with the highwall facing west (advancing east). The highwall runs from approximately 1400' NL, 300' WL to 1400' SL, 0' WL, Sec. 12, T7S, R3W, Jackson County, on the Ava 7.5' quadrangle. Barry provided a recent large-scale air photo showing the entire mine area.

Only the lower (Murphysboro) seam has been mined here; the upper (Mt. Rorah) being eroded. Coal exposures are small and incomplete. It appears that the seam is 3 to 4 feet thick.

A fault crosses the pit a little north of the midpoint. The fault strikes northwest, with the southwest side downthrown 20 to 25 feet. Exposures are poor, and the fault plane was not observed. Coal and overlying strata bend upward gently on the northeast side and sharply (to at least 30 degrees) on the southwest side of the fault. This is not simple drag, but implies an element of compression and/or strike slip. Like other structures we observed on previous visits to Creek Paum, this fault is part of the Cottage Grove fault system. The master fault terminates the coal at the north edge of the property.

Near the fault, the floor of the Murphysboro Coal is shale that is grayish black, thinly laminated, and silt-free. No roots were seen. Overlying the coal is interbedded sandstone, siltstone, and silty shale. Sandstone is medium-light gray and very fine-grained; siltstone and shale are medium to dark gray and laminated. Well-preserved plant fossils (foliage) are locally present. Bedding is mostly thin, planar, and tabular, but a few sandstone layers exceed 3 feet thick and show erosive lower contacts. Near the middle of the pit, a large sandstone body is about 15 feet thick and roughly 100 feet across, grading laterally to shaly strata in both directions. Just south of the fault (near N-S midpoint of pit) there is a marked erosion surface that locally truncates underlying layers that underwent mild soft-sediment deformation. Also seen in this area are large ragged stringers of coal up to ½ foot thick and at least several tens of feet long. These evidently represent large rafted mats of peat.

In the southern part of the pit, the strata downlap toward the south, dipping south at angles up to 10-15 degrees, although contact to the coal is concealed. That is to say, a wedge of sediment prograded from north to south (apparent direction).

Near the northern end of the pit, the section is as follows:

Top

10' Surficial sediments, not studied

10' Siltstone to very fine sandstone, medium gray, sandstone weathers buff. Lamination is planar and rhythmic, with probable neap-spring tidal cycles. Siderite bands and lenses occur near the base. The lower part of the interval coarsens upward, but the upper part shows alternating siltstone and sandstone beds that range from a few inches to about one foot thick. Lower contact is sharp and appears erosive, cutting more deeply toward the south. Possibly, this is marked erosion surface noted near the middle of the pit.

5-8' Shale, dark gray, very thinly laminated, soft, carbonaceous, contains a few siderite nodules. Lower contact appears sharp.

- 3-4' Coal, mostly covered, visible upper part of coal is bright-banded.
1' Shale, in floor of pit: dark gray to grayish black, platy to thinly fissile, carbonaceous. No roots were seen, but small lenses of very fine sandstone contain well-preserved fossil leaves, including *Macroneuropteris*.

Reviewing notes from prior visits, today's observations confirm my interpretation that the strata overlying the Murphysboro were deposited in an estuary, where strong tidal currents operated and sediment was rapidly deposited. The coarsest, highest-energy deposits are in the northeast part of the mine. Abundance of well-preserved plant remains indicates vegetation was dense along the margins of the estuary.

I left the mine after completing my geologic observations, but the rest of the party remained to collect plant fossils.