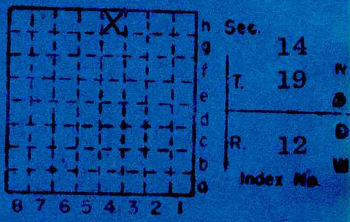


LEE COAL COMPANY
CALEFY MINE

Lee Coal Co. (Underground)
MINE INDEX NO. 994



VERMILION COUNTY

ILLINOIS STATE GEOLOGICAL SURVEY

Location and Elevation Data

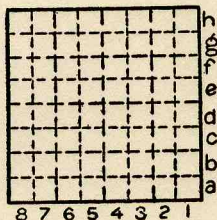
Location _____ Exact Approx. _____
 Location by mile map _____
 Date _____ Notebook No. _____ Page _____ No. _____
 Looseleaf ref. _____ Map files No. _____

Position in sec.

1100' ft. from EL line (mile map) _____

110' ft. from NL line _____

Other description No. 6 coal _____



Sec. 14
 T. 19 N.
 R. 12 W.

Bed	Depth	Elev.	Thickness
<u>No. 6 coal</u>	<u>25'-30'</u>	<u>520'</u>	<u>6.0'</u>

Farm _____
 No. _____

Company _____
 No. _____

Card by _____ Date _____

Used in _____

County No. _____

Elevation 550' ft.

Method: Level, transit, alidade, hand level, top. map.

Elev. of _____ Height of point above ground _____

Date _____ Notebook No. _____ Page _____ No. _____

Looseleaf ref. _____ Map files No. _____

Year drilled _____ Total depth _____ I. P. _____

Sample set No. _____ Electric log _____ S _____ H _____ L _____

Description (drill hole, mine, etc.) _____

Time log _____

County Vermilion Quad. Danville SW Index No. _____

LEE COAL COMPANY CALIFY MINE (UNDERGROUND)
Vermilion County March 13, 1980 Notes by J. Nelson

NW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 14, T. 19N- R. 12W, Vermilion Co.

Met Floyd W. Lee, owner of mine, and Bob Smith, consulting geologist who has been working on the project. Bob Smith accompanied me underground.

Lee began in 1975 strip-mining the Danville (No. 7) Coal on this property. He is still engaged in surface mining although he said no coal is exposed in the pit at present. An excavation was dug below the No. 7 Coal to open a drift into the No. 6 Coal, where underground mining began Dec. 7, 1978. There are four openings; intake (fan), travelway, belt, and return air.

The mine is operated by 6 men, of whom three are part-owners in the company and the others are hired. There is no union. If a union were present at least nine men plus a supervisor would be needed to do the same work. Mining is done with a new Joy continuous miner, two Joy shuttle cars, one roof bolter (another being reconditioned for use) and conveyor-belt haulage to the portal. Trucks take the coal from mine mouth to consumer. The coal is not cleaned.

Lee apparently has no desire to expand his operation or hire more workers. I was told as high as 1600 tons had been mined on a single shift. In unionized mines anything above 1000 tons is considered outstanding except in longwall or pillaring sections. Lee does not pull pillars now but may in the future.

A large part of the mining property is overlain by old works of the Western Brick Co. which worked the No. 7 Coal years ago. The old works are full of water, presenting a worry since only about 20 feet of strata separate the No. 6 and No. 7 Coals.

A major problem at present is the great variability in thickness and quality of the coal. The coal runs 7-8 feet thick in much of the mine and up to 10 feet in nearby drill holes, but pinches down to as little as 2 feet in places. Sulfur is said to vary from 2.2% to 4.1% and B.T.U.'s from 11,200 to 11,800 within the small area already mined. A main purpose of my visit is to try to learn the cause of the variability. A secondary purpose is to collect three channel samples of coal.

The following is a generalized section of the overburden at the Calify Mine, as recorded on the log of one of Lee's drill holes:

20'	Glacial drift
100'	Farmington Shale; gray, soft.
5½-6'	Danville (No. 7) Coal
5'	Gray shale and clay
7'	Limestone
1'	Gray shale
6'	Black shale
2-10'	Herrin (No. 6) Coal

The strata immediately above the coal vary considerably in color, thickness, and texture.

Lee has observed that some of the worst roof conditions occur under stream valleys- possibly relief of overburden stress ?

1.) Massive roof fall at intersection- about 10 feet of shale have fallen above coal. Difficult to see succession of strata, but most of the fallen rock is shale; dark gray, with faint greenish mottling, poorly bedded, hard, silty, finely micaceous, and contains thin irregular streaks and laminae of green-gray shale with finely disseminated pyrite. Note widely-spaced light-colored fractures in upper part of shale. They seem to have no preferred orientation and may be due to synaeresis. Locally the shale has

very irregular bands of light buff or greenish. The top of the fall is light-colored rock, possibly limestone.

Just south of the fall the following section of coal was measured:

- 1.2' Coal, N.B.B.
- 0.04' Shale
- 0.51' Coal, N.B.B.
- 0.05' Shale, lenticular
- 2.3' Coal, N.B.B.
- 0.07' Shale (Blue Band ?)
- 3.33' Coal, N.B.B.
- Underclay. Total coal 7.5 feet.

2.) Roof fall about 10 feet high; view somewhat obscured by dust. Immediate roof is medium-dark gray shale similar to that at Stop 1. A small V-shaped depression similar to a roll is seen in the top of the coal on both sides of the entry. It is about 3 feet wide and less than a foot deep, and is bounded by slips, with no coal "rider". The filling is shale from the roof. This shale is thinly laminated and not jointed, containing numerous slickensided surfaces.

3.) Larger "roll" under which the seam is reduced to as little as 3.4 feet. Not only is the roof protruding downward into the coal, but also the floor has pushed upward along curving slips. The sides of the roll, and its directional trend, are not easy to locate.

The floor consists of medium-dark gray to green mottled, nodular claystone. It is quite firm and Bob says it has given no problems in mining.

4.) Roof fall at 3-way intersection provides good exposure of layers above the coal. The top of the fall is the base of the limestone; buff to greenish-

gray and mottled. On the base of the limestone are many distinct linear ridges (downward-facing) as much as half a foot wide and half a foot deep. They form an intersecting network and show no preferred orientation.

Below the limestone is 8 to 10 feet of shale, all similar to that at Stop 1.

The shale-coal contact is irregular and the coal varies in thickness from 4 to 7 feet around the sides of the intersection. In places the topmost layers of coal are fractured and mixed with shale or clay in what could be called a "white top" disturbance. Elsewhere the contact of coal to shale gives the appearance of being an erosional surface.

5. Measured section of coal:

2.9' Coal, N.B.B.
 0.08' Shale, brownish (Blue Band)
 2.8' Coal.

6.) Measured section:

Limestone, with linear ridges as at Stop 4.
 3.8' Shale, grayish-black, faintly mottled,
 hard, very finely micaceous.
 1.1' Coal, hard
 0.15' Shale (Blue Band)
 1.45' Coal
 0.03' Shale, with nodules of pyrite
 0.80' Coal
 Underclay.

7.) Measured section:

1' Shale, black, with gray mottling.
 1.8' Coal
 0.15' Shale (Blue Band)
 2.35' Coal

Across the rib from location 7 the top of the coal is very irregular and definitely is a surface of erosion. In the top of the coal are several lenses of very hard brownish-black material partially inter-layered with coal. Just above the Blue Band is a big lens of mineralized fusain.

8.) At the face less than two feet of coal is present, and the Blue Band itself has been removed. Near the limit of the Blue Band, the band is deformed and varies in thickness. The floor is bulging up in the region where the coal is thin.

The main roof is limestone with linear ridges, as before. Below the limestone is three feet of shale gray-black, non-fissile, smooth. In the shale at the place of very thin coal are a number of irregular dikes consisting of light greenish shale or clay with abundant angular clasts of black shale. The green shale has intruded laterally between layers of black shale. The dikes do not seem to penetrate either the coal or the limestone. The shale also contains large concretions of dense black limestone.

Measured section of coal:

0.50' Coal
 0.07' Shale, brownish (Blue Band)
 1.50' Coal
 0.03' Shale, dark gray, with lenses of pyrite
 0.80' Coal
 Underclay.

9.) Measured section of coal:

Limestone
 3.3' Shale, grayish-black, hard, non-fissile.
 1.5' Coal
 0.10' Shale, dark gray, hard (Blue Band)
 1.6' Coal

0.03' Shale, hard, pyritic
0.9' Coal
Underclay

10.) Measured section:

2.0' Shale, black, poorly bedded, very
finely micaceous, contains concretions
0.5' Coal, dull, appears mixed with black
shale. Hard and not banded.
1.1' Coal, N.B.B.
0.20' Shale, dark gray (Blue Band)
1.3' Coal
0.13' Fusain, mineralized
0.9' Coal
Claystone

11.) Measured section:

Shale, dark gray, mottled, micaceous.
1.23' Coal, N.B.B.
0.02' Shale, discontinuous
0.4' Coal
-- Shale parting, with pyrite lens 0.2'
thick
2.1' Coal
0.1' Shale, dark gray, pyritic, varies in
thickness (Blue Band)
3.4' Coal
Underclay.

At the southwest faces of the mine the coal is thinning and shows the same type of erosion as on the west faces:

12.) Measured section:

Limestone, with thin greenish mottled shale
at base.

- 3.0' Shale, black, smooth, hard, not fissile, locally mottled with gray. Scattered concretions of limestone at various levels.
- 0.75' Coal, dull, appears mixed with shale, not banded.
- 0.05' Shale (Blue Band), gray-brown, carbonaceous, with bands of hard fusain.
- 2.05' Coal, N.B.B. with plenty of calcite on cleats. One lens of mineralized fusain. Underclay.

13.) Fresh face with about 8 feet of coal -- see details at Channel Sample 1.

14.) See details at Channel Sample 3.

15.) Major roof fall involving three intersections. All shale fallen to base of limestone. The limestone has the linear ridges everywhere, as before, and also is full of small nodules of crystalline material (unidentified). One of the linear ridges is a foot or so deep and slips surround it in the shale below. A nearly vertical fracture with very thin filling of clay extends downward through the shale almost to the top of the coal, below the ridge. None of the other ridges show this type of fracture (which could be a type of clay dike).

The shale below the limestone is about 7 to 8 feet thick. The uppermost foot or less consists of soft, weak, strongly mottled greenish to dark gray shale with very small phosphatic lenses. Below this is one to two feet of grayish-black shale with distinct fine parallel laminations, and an occasional concretion. This grades downward into non-laminated shale, 5 to 6 feet thick, above the coal.

Channel Sample 1 (Location 13)

- Roof- 0.7' shale, medium-dark gray to dark gray, finely micaceous, smooth, finely carbonaceous. This shale is thinly laminated parallel to slightly irregular, and splits easily along bedding planes, forming large slabs. Quite different from shale seen elsewhere in mine.
- 0.45' Coal, N.B.B., hard, blocky, trace of fusain, calcite on cleats.
- 0.14' Fusain, soft, a lens.
- 0.96' Coal, as above.
- 0.01' Fusain
- 0.58' Coal, as above
- 0.07' Coal, dull, hard
- 0.07' Coal, as above
- 0.01' Fusain, soft
- 1.42' Coal, as above.
- 0.01' Pyrite
- 0.63' Coal, as above.
- 0.05' Shale, gray-black, hard. EXCLUDED
- 0.01' Coal streak
- 0.14' Pyrite EXCLUDED
- 0.36' Coal, as above
- 0.01' Pyrite layer
- 1.35' Coal as above, with much calcite on cleat.
- 0.01' Pyrite layer
- 1.30' Coal, as above.

Underclay.

Total seam 7.58'

This description was rushed because they wanted to bring the continuous miner in and cut where I was standing.

Channel Sample 2 (Location 16)

Roof- 0.1' shale, dark gray, hard, poorly bedded, no laminations visible, finely micaceous.

Contains abundant pyritized shell fragments some of which look like mussel shells. Bob says gastropods have been seen elsewhere in the mine.

- 0.70' Coal, N.B.B., hard, blocky, has abundant calcite on cleats, a trace of pyritic fusain.
 - 0.01' Fusain, hard.
 - 0.14' Coal, as above.
 - 0.02' Fusain, soft.
 - 0.58' Coal, as above.
 - 0.01' Fusain, with a small lens of pyrite.
 - 0.51' Coal, as above.
 - 0.03' Durain (dull hard coal)
 - 0.29' Coal, as above.
 - 0.02' Shale, dark gray, hard, carbonaceous.
 - 0.04' Coal, as above.
 - 0.01' Durain
 - 1.30' Coal, as above.
 - 0.01' Coal, dull, with pyrite stringers.
 - 0.29' Coal, as above.
 - 0.01' Pyrite, a layer.
 - 0.60' Coal, as above, with small lenses of pyrite near the top.
 - 0.08' Shale (Blue Band), dark gray, hard, carbonaceous, interlayered with coal near the base. Locally pyritic. EXCLUDED
 - 0.56 Coal, as above, with layers of pyrite and dull coal (durain ?) near top.
 - 0.01' Pyrite, locally thickens to 0.05' lens which was EXCLUDED.
 - 0.30' Coal, as above.
 - 0.01' Shale, gray, pyritic.
 - 1.15' Coal, as above, with calcite on cleats.
 - 0.02' Pyrite, as streaks interlayered with coal.
 - 0.5' Coal, as above. Grades into:
 - 0.5' Coal, thinly laminated with many partings of fusain.
- Underclay. Total seam 7.70'

Channel Sample 3- Location 14

- Roof- 2.0' shale, black, smooth, hard, not fissile, not laminated, contains many thin irregular yellowish streaks, possibly carbonaceous material.
- 0.7' Rock, possibly siliceous coal balls; dark brown to black, extremely hard with splintery fracture, a concretionary layer. Pyrite and calcite in fractures. Overlain by a thin layer of shaly coal, and locally interlayered with coal (this coal not included in sample).
- 0.26' Coal, N.B.B., very hard, not blocky, appears to have deformed banding and slip-fractures. Calcite on cleats, pyrite in small nodules.
- 0.08' Durain, hard, with trace of pyrite.
- 0.44' Coal, N.B.B., hard, blocky, calcite on cleat.
- 0.01' Fusain, hard, with pyrite.
- 1.03' Coal, as above.
- 0.01' Fusain, hard, mineralized. Locally thickens into a lens containing pyrite.
- 0.16' Coal, as above.
- 0.13' Shale (Blue Band), medium-dark gray to nearly black, hard, the central portion blackest with abundant disseminated coaly material. Stringers of vitrain near base. EXCLUDED.
- 1.67' Coal, N.B.B., hard, blocky, with calcite and a trace of pyrite, small lenses of hard fusain.
- 0.50' Fusain, extremely hard, presumably mineralized though no pyrite visible. Contains irregular streaks and layers of bright coal.
- Underclay.
- Total seam 4.29'

Summary of Samples
 (Includes two drill
 cores obtained from
 test holes near mine)

Sample No.	Type	C-Number	Location	Coal Thickness
1	Channel	C-20891	1270'NL, 600'EL Sect. 14	7.58'
2	Channel	C-20892	1350'NL, 780'EL "	7.70'
3	Channel	C-20893	870' NL, 660'EL "	4.49'
Composite		C-20894	- - - - -	- - - - -
13	Core	C-20895	625' NL, 340'EL, "	4.63'
16	Core	C-20896	1140'NL, 110'EL, "	5.07'

Interpretation of Thin Coal

The thinning of the coal is due largely, but not entirely, to erosion of the upper layers of the seam. The irregular contact of shale with the top of the coal shows truncation of layers in the coal in some places. As the coal becomes thinner the interval above the Blue Band decreases, in some cases (Stop 8) to zero. The upper part of the eroded coal in places is dull, and may be reworked or altered. This could be seen in the cores as well as in the mine. Also the presence of siliceous coal balls (?) at Stop 14, Channel Sample 3, probably relates to exposure of the coal after erosion and before deposition of the shale.

It was also noted that where the coal is thin the interval below the Blue Band decreases from the usual 3 feet or more seen in areas of thick coal to 2.3-2.5 feet. Furthermore, the floor is commonly observed to be bulged upwards in areas of thin coal. This may signify that the areas of erosion also were

areas of less accumulation of peat, perhaps relating to topographic highs within the coal swamp. Less peat would accumulate in high areas, and more of it would be later eroded.

Mapping will be required to determine the shapes and orientation (if any) of the areas of thin coal. Presently available evidence suggests a linear body of low coal parallel with the west side of the mine, and possibly another such linear belt on the east side of the mine. But the thin areas might also be isolated patches of irregular outline. Thereby "channelways" of thick coal may exist which will permit Lee to continue mining without having to drive through barren areas. The width of the low areas is also uncertain. Near Stop 8 the coal decreases from 7 feet to 2 feet within 100 feet laterally. No areas barren of coal have turned up in drilling or in mining. This provides hope that the thin areas may be only a few hundred feet across and can be bypassed in mining without severe disruption to the mining plan.

Interpretation of Roof Sequence

The sequence of strata above the coal is quite similar to that observed in the V-Day Mine (now abandoned) and presents the same stratigraphic puzzle Bob Smith has been calling the limestone Brereton and the black shale Anna. I am more inclined to call the limestone Bankston Fork since it has the typical lithology (light-colored, argillaceous, silty and nodular limestone, interlayered with mottled shale) of that member. If the limestone is Bankston Fork then most or all of the shale between coal and limestone would belong to the Lawson Shale Member. The mottled and silty dark gray shale clearly fits a common lithology of the Lawson. We also know in

other parts of the state as far away as St. Clair County that the lower part of the Lawson Shale may be black, contain concretions and otherwise resemble the Anna Shale. This black Lawson Shale ordinarily is not fissile and lacks the phosphatic laminae of the Lawson Shale. Yet the possibility exists that the black shale at Lee Coal Co. is Anna, and is directly overlain by Lawson Shale (no Brereton Limestone). More study will be needed to check out this theory.

The dark gray, thinly laminated shale from Stop 13, Channel Sample 1, closely resembles certain lithologies of the Energy Shale Member. The roof bolter reported the interval to base of limestone there was 13 to 15 feet. Gray shale above the Herrin Coal elsewhere in Vermilion County is locally tens of feet thick and may be Energy Shale. Some Energy Shale may be present at Lee Coal Co. also.

LEE COAL COMPANY CALEFY MINE (Underground)
Notes by John Nelson mapping with Steve Danner
April 11, 1980

Begin mapping thickness of coal, and roof lithologies at a scale of 1"-50'.

1.) Measured section in roof fall:

- Limestone, with "boxwork" protrusions.
- 8' Shale, dark gray, poorly bedded, faint irregular laminations, micaceous, contains finely disseminated pyrite along irregular cracks.
- 1.45' Coal, irregularly laminated, very dirty, much oxidized pyrite, thin irregular streaks of shale and fusain.
- 0.05' Shale, black, hard, with streaks of vitrain; varies in thickness.
- 1.95' Coal, N.B.B., with many lenticular bands of fusain.
- 0.10' Blue Band, brownish-black shale with streaks of coal.
- 1.70' Coal, sim. to above.
- 0.05' Shale, brownish, very hard, pyritic, lenticular masses of pyrite.
- 1.35' Coal, sim. to above.
- Underclay.
- Total coal 6.65'

2.) Coal is thinning to west; thinning both above and below Blue Band. Contact to shale above coal is undulatory. Upper half-foot to one foot of seam is dirty coal. The shale (from top of coal to base of limestone) thins westward from 8 feet to 4 feet coincident with the thinning of the coal. As the shale thins it changes in color from dark gray to black. The change in color definitely is transitional and not sharp. The black shale is poorly bedded, finely micaceous, and contains concretions. Locally the black shale contains thin irregular lenses of

phosphatic material near the top, just below the limestone.

In the intermediate zone the immediate roof is dark gray shale, and it grades upward to black shale.

3.) In this area where the total thickness of the coal is 5 to 6 feet the upper one foot or so of the seam is very "dirty" in appearance and seems to be altered from normal coal. This upper coal consists of alternating irregular discontinuous bands of vitrain and hard, dull coal- Looks mostly like mineralized fusain but may also include shaly coal or coaly shale. The dirty coal has irregular cleats lined with brownish calcite. The contact of the coal to the roof, as elsewhere, is undulatory. Lenses of mineralized fusain are common in the dirty coal.

A discontinuous band of carbonaceous shale is commonly found 1.0 to 1.5 feet above the base of the coal. The Blue Band hereabouts is 3.0 feet above the floor.

The roof is black to grayish-black shale which commonly weathers to a bluish cast, as does the Anna Shale in many parts of Illinois. However this shale, unlike normal Anna Shale, is not fissile but rather it is poorly bedded to massive and breaks into irregular pieces. The shale is finely micaceous and contains small phosphatic lenses locally. Fractures or joints are seen locally but have no persistent orientation or spacing.

This would be a good area to take bench samples of the coal to determine which layers have the high content of ash.

4.) A clastic dike in the shale of the roof, locally extending a few inches into the top of the coal. The dike is a linear feature that crosses both intake-air entries. It is vertical to steeply inclined and filled with gray, olive or greenish clay containing

many angular fragments of the surrounding black shale. The dike varies in width from a hairline to several inches and its course is marked by numerous slips. The downward termination of the dike is not well marked; it is not like clay dikes common in west-central Illinois which die out downward among well-developed slips and "goat beards".

In the eastern of two intake-air entries several thin clay dikes are seen with a variety of orientations. One of the dikes in the black shale is filled with a mixture of coal and clay, similar to "white top". In this case at least some of the filling was injected upwards, in contrast to the usual finding that the clay in dikes was injected downwards.

April 15, 1980

5.) A "roll" or localized, linear area of low coal. The feature trends slightly east of south from the belt entry across the travelway and into the intake-air entries. In the belt entry it is as much as 12 feet wide but becomes narrower to the south. Although slight interfingering of coal with the shale in the roll is seen there is no layer of "dirty" coal at the top of the seam as is found in the broader areas of low coal to the west. The coal in contact with the roll is normally bright banded and has well-developed cleat.

As much as three feet of the coal above the Blue Band has been removed. The interval of coal below the Blue Band maintains its normal thickness of 3.3 to 3.5 feet. The northern boundary of the roll is a large slip or normal fault with "false drag". I am not sure whether the coal in the roll is thinner as a result of erosion within the roll, or whether the upper layers of coal have simply been faulted out. There is not a good cross-sectional exposure. Most of the view is along a rib parallel with the roll.

The filling of the roll is shale; medium-dark gray, poorly bedded (mudstone), weathering to a light yellow or brownish color. It is smooth to finely micaceous and contains streaks of coal and carbonaceous debris; also crystals of pyrite and a few pyritized shell fragments (Pecten ?). It is lighter in color and finer-grained than most of the shale in this part of the mine. The shale in the roll is indistinguishable in lithology from dark gray Energy Shale which occurs in small lenses and in rolls above the No. 6 Coal all over Illinois.

6.) Roof shale in this area appears intermediate between black shale and gray - the basal zone is totally unlaminated and is highly carbonaceous, full of streaks of coal, fragments of carbonaceous debris, pyritized plant fossils and poorly preserved casts of stems. The shale is finely micaceous and contains abundant pyritized shell fragments as well as finely disseminated pyrite. It also contains numerous concretions or nodules of limestone and is calcareous. The basal layer of the shale breaks into irregular slabs but above this the roof appears quite stable. This shale is very similar lithologically to "bastard limestone" occurring at the base of the Anna Shale in many parts of the state.

7.) Clay dike in black shale penetrates about $1\frac{1}{2}$ feet into the coal, and is inclined about 60 degrees to the northwest. The clay interfingers laterally with the coal; the coal is offset vertically about half a foot (normal fault). The top coal adjacent to the dike is thoroughly fractured and yellowish clay fills the fractures. These clay-filled fractures form a fine network but have no consistent spacing or orientation. I would call this development "white top".

About 6 feet of the underclay is exposed in a sump adjacent to the clay dike. The clay is fairly

uniform except that in the lower half it becomes a bit firmer and contains small hard nodules. A very drab uninteresting material.

8.) Top few inches of coal are full of clay veinlets, as above. In base of black shale are occasional fractures lined with clay. This is definitely "white-top". The upper coal is otherwise N.B.B. and not "dirty" like the upper coal where the seam is thin.

The basal half-foot of the seam here is dirty coal with irregular bands of vitrain in a matrix of hard, dull, very finely laminated shaly-appearing coal, with abundant claicte on cleats and fractures. The contact to floor is gradational - this is seen widely.

Note that in this area the Blue Band is very near the midpoint of the seam and is even above the center in a few spots.

9.) A better view of the same type of shale as at Stop 6. This shale is definitely distinct from either the black Anna-like shale or the gray Energy-like shale.

The main roof is shale or mudstone, grayish-black, moderately hard, not bedded or laminated, finely micaceous, and contains finely disseminated pyrite. Occasional pyritized shell fragments and grayish sinuous mottlings or burrows are seen. Rounded septarian concretions up to a foot in diameter are common; as are small slicksided slips. Most of the concretions are near the base of the shale. The lower foot or so of the shale breaks off in irregular slabs, but the main roof has held.

The lower few inches (not over 0.5') of the shale resembles "bastard limestone". It is calcareous and full of broken shell fragments, and very carbonaceous with stringers of coal. The contact to the top of the coal is irregular and shale interfingers

with the coal.

Neither the basal calcareous zone nor the upper main shale contains any regular or persistent joints or fractures.

The coal seam is normally bright-banded throughout although it is perhaps a bit duller than is usual for the No. 6 Coal statewide. It is not blocky; it lacks regular cleats.

April 16, 1980

10.) The upper one foot or so of the seam along the south rib (especially) is very "dirty" and contains numerous siliceous coal balls. The coal balls are brownish-black, very fine-grained, extremely hard, locally show broken laminations; contain fragments of coal and numerous fractures filled with calcite or pyrite. The top of the seam is very "röilly" because of the coal balls. Immediately above the top stringers of the seam concretions similar in appearance to the coal balls are common in the roof shale.

The coal balls are under grayish-black shale as at Stop 9. See the following notes - transition in roof.

11.) A roll trending NE-SW across the entry is bounded by slips on both sides and might more accurately be called a small graben. On the east rib this structure is 5 feet wide and 2 feet deep into the coal. To the west it becomes narrower and shallower. The filling of the roll, and the shale above the coal near the roll, is quite different from the shale at Stops 9 and 10. It is a medium-dark gray shale with faint parallel laminations, resembling dark gray Energy Shale and/or the shale at Stop 5.

12.) Small roof fall exposes contact between grayish black shale(above) and laminated medium-dark gray

shale (below). The exposed thickness of both shales is about $1\frac{1}{2}$ feet. The contact is very sharp but is uneven, and offset by numerous slips. There is quite a bit of pyrite along the upper surface of the gray shale.

On re-examination the same relationship is found just north of Stop 10. About 100 feet to the north the other side of the lens of gray shale is seen, overlapped by grayish-black shale.

13.) Major roof fall cleanly exposing base of limestone. Excellent exposure of the sequence of shales.

The limestone has a bumpy lower surface with occasional "boxwork" protrusions or ridges; often along slip-fractures. In the west-central part of the fall is a "boss" composed of nodules of limestone in a shaly matrix. Numerous fractures in the "boss" are lined with crystalline calcite and other minerals. The "boss" extends at least 2 feet downward into the black shale and is about 6 feet in diameter. At the northwest corner of the fall the edge of another "boss" can be seen partially within the rib.

All around the fall the limestone is underlain by a foot or slightly more of black shale with abundant lenses and laminae of phosphate. The upper part of the shale has disturbed bedding and locally appears to be burrowed. Downward the shale becomes hard and fissile and it weathers to a bluish cast. This shale is identical in appearance to Anna Shale.

Below the phosphatic shale is black, hard, micaceous well-bedded shale averaging $2\frac{1}{2}$ feet in thickness. This shale contains no phosphate but has an occasional concretion up to a foot in diameter. This shale also could be Anna Shale.

Next downward in sequence is about 2 feet of the grayish-black shale of Stops 6 and 9, with the typical thin concretionary, calcareous zone at the base. To the north this shale directly overlies the

coal. To the south the grayish-black shale overlaps the dark gray "Energy" shale, which is well-laminated in the lower part, at least in places. The contact of black shale to grayish-black shale is quite distinct, but the contact of grayish-black shale to gray shale is not as well marked here as in Stop 12. It appears that the gray shale may thicken somewhat at the expense of the grayish-black shale. The maximum thickness of gray shale is about 3 feet, at the southeastern corner of the exposure.

Near the northern end of the fall a slip crosses the base of the limestone from east to west and has a few inches of throw (at the most). The slip steepens downward through the black shale, becoming nearly vertical just above the coal, where a thin clay dike is present along the slip. There is no clay higher up along the slip; only clay is just above the coal.

14.) Coal balls in mid-upper part of seam, 1.5 to 2.5 feet below the top. These appear to be the more common type of calcereous coal balls rather than the siliceous type we have been seeing at the top of the seam. They are brownish in color, and up to a foot in diameter; lens-shaped to rounded, and some are in the form of laminated elongate bands in the coal. The rib is totally solid so they cannot be sampled with a hand pick.

15.) Slip marking continuation of the "roll" from Stop 5. On the west rib the coal is downthrown 2.5 feet and shows prominent false drag. Eastward the slip diminished in throw and it dies out just before reaching the east rib. The shale above the slip, like that away from the slip, is grayish-black. No indication of erosion or intrusion of extraneous material into the coal - simply a fault with false drag.

April 21
Mapping with Heinz Damberger

15.) Roof fall to base of limestone; limestone has prominent "boxwork" ridges on base. Below this is about 6 feet of shale, of which the upper 1 foot is black, fissile, with a bluish cast and generally lacking phosphatic nodules. This grades downward into about 2 feet of poorly bedded black shale, which in turn grades almost imperceptibly into the dark gray-black shale. The latter has the usual zone of fossil hash at the base.

This fall might have been prevented if the roof bolts has been anchored in the limestone. None of the original bolts were long enough to reach the limestone.

16.) Another major roof fall - again the roof bolts were not anchored in the limestone. Here the entire sequence (5 to 6 feet) of shale is black with faint parallel laminations and numerous concretions. One limestone "boss" is present, and in several places masses of concretions or limestone nodules are concentrated along vertical or steeply-dipping fractures in the shale. In one of the fractures the concretionary mass extends almost the full distance from base of limestone to top of coal.

17.) Another fall, this one covering three intersections (see Note 15, March 13). Once again the bolts were not anchored into the limestone. The shale is 6 to more than 7 feet thick and is all black, except for a local calcareous zone as the base (Bs-D)

18.) In this area the immediate roof is black shale; very hard and smooth, and carbonaceous with many fragments of coal (symbol Bsp on map). Large flattened lenses of almost solid pyrite are common along the coal/shale contact. The contact of coal to shale is sharp, with no interfingering. The uppermost coal

is normally bright banded. Westward the black shale grades into the dark gray-black shale (Bs-D).

April 22

Mapping with Steve Danner.

19.) A subtle change in roof lithology yields a drastic change in stability. To the west is the black shale with lenses of pyrite (Bsp). It forms excellent roof-hard to find even a slab that has scaled away. To the east is a black smooth shale, locally having a bluish-white cast. This shale varies from brittle to rather soft, and generally it is not fissile or laminated- it is a massive mudstone. It commonly contains flecks of gray or brown and irregular veinlets or mottles of the same color. Very irregular zones or partings of crumbly carbonaceous material are present. Concretions are not very common, and pyrite is absent. This shale is ridden with slips and forms very unstable top; there are numerous roof falls.

The change from Bsp to Bs is fairly abrupt but the relationship between the two shales is not completely clear due to covering of rock dust. It appears that the weak black shale underlies the hard black shale, but there are no exposures showing one clearly overriding the other. Perhaps the two units are lateral facies-equivalents.

The weak black shale resembles the upper part of Unit Bs-D, lacking only the basal calacereous zone with shell debris.

Possibly the pyritic black shale is closely overlain by limestone, accounting for the stability of the roof; however, there is no way to determine the thickness of the shale since no falls are present. Roof bolts in pyritic black shale are mostly 60" long and a few 84" bolts at intersections.

20.) Area of gray shale roof; possibly Energy Shale as at Stop 11. Here the shale is medium-dark gray, finely micaceous and carbonaceous, and has fine parallel laminations in most places. At the base is commonly a zone of pyritic lenses, and a few lenses of pyrite occur within the top layers of the coal as well. The shale contains many large slips and the roof is not very stable. Cannot determine how thick the gray shale is, although it definitely is overlain by black or dark gray-black shale.

Beneath the gray shale the coal is noticeably thicker than elsewhere. The interval above the Blue Band exceeds 4.0 feet everywhere, locally reaches 4.8 feet and averages about 4.3 feet. The Blue Band itself is 0.15 to 0.25 feet thick and commonly consists of an upper layer of gray shale and a lower layer of black carbonaceous shale with abundant lenses of pyrite. The coal below the Blue Band is about the same thickness here (3.3 feet) as in the adjacent areas of black shale roof.

21.) Note a slight but distinct drop in elevation of the coal in passing from black shale to gray shale roof. This is observed not only at the stop location but for several intersections in both directions along the contact. The drop probably amounts to 2 or 3 feet. It strongly suggests that the areas of thick coal and gray shale roof actually were low places in the coal swamp, while adjacent higher areas in the swamp received less plant material and no gray shale.

This is not the first place I have observed such a relationship. Gray (Energy) Shale occupies depressions in the coal in Franklin, Jefferson, Williamson and St. Clair Counties. At Old Ben Mine No. 24, Franklin County, the coal is several inches thicker under gray shale than under black (Anna) shale

April 23
Mapping with Steve Danner.

Mr. Lee had Don Dowlin, a geologist from Paul Weir Co., in the mine to look over causes of the high ash and sulfur content of the coal. Some of the more obvious sources are the Blue Band, pyrite lenses and nodules, coal balls, and roof or floor rock. The continuous miner breaks coal and impurities finely enough that they pass through the grizzly. The grizzly is the only device which Lee has to remove impurities from the coal. It catches rocks, and also large chunks of coal, greater than about 3 inches in diameter. But the only rocks or pieces of Blue Band that are big enough to be caught on the grizzly are those that fall from the roof or from the fender left between adjacent cuts by the continuous miner.

Mr. Lee is renting a rotary breaker and screener to try to improve the quality of the product he ships to market.

22.) Here the roof is black smooth shale (mudstone without laminations), weathering to a bluish cast and lacking a basal fossiliferous zone. The shale contains numerous clay dikes filled with grayish or greenish clay. These are vertical or steeply dipping and planar, but they show no consistent orientation and none of them can be traced very far. They do not penetrate the coal at all, although slips associated with a few of them do reach the top of the coal. Possibly some of the dikes are fairly continuous in the upper part of the shale or limestone, but this cannot be proven.

The upper part of the coal appears quite dirty or shaly. We are near the western area of thin coal.

23.) Apparent gradational change in roof shale. At

the north side of the fall the roof is black mudstone (Bs) as at Stop 22. At the southeast side of the fall the immediate roof is dark gray-brown, faintly mottled mudstone, (Dm), similar to that seen in the intake-air entries around Crosscut 10. This exposure is quite heavily dusted but there seems to be a lateral gradatioanal change, with the black shale in part overlying the mottled.

The upper coal again is dirty and contains siliceous coal balls. The coal thickens to the south-east, toward the area of mottled shale.

24.) Large roof fall showing about 5 feet of black mudstone overlain by limestone with the usual "boxwork" ridges. The original bolts mostly did not penetrate the limestone. In unfallen places nearby note 36", 60" and 84" roof bolts.

25.) Large roof fall exposes base of limestone above 6 to 7 feet of shale. The upper most shale is black with a bluish cast and is not fissile or laminated, and no phosphatic lenses are visible. Below this is very dark gray to black mudstone with no bluish cast. This grades almost imperceptibly downward into the dark mottled shale of Stop 23.

South of this fall a gradual transition in the immediate roof is seen from dark mottled shale (Dm) on the west to dark gray-black fossiliferous shale (Bs-D) on the east.

26.) The coal thins to about 3 feet at the southwest corner of the entry. As usual, the contact of the coal to the roof undulates and appears erosional. The upper few inches of coal are very dirty and contain lenses of hard fusain or shaly coal. The interval above the Blue Band thins to as little as 1.1 feet, as the coal below the Blue Band thins to as little as 2.2 feet.

As the coal thins so does the black shale above.

The upper part of this shale contains phosphatic lenses and is finely micaceous to smooth; faintly laminated to massive. Faint brownish mottles or olive-black mottles are seen even in the uppermost part of the black shale. Small greenish clay veins or dikes that cannot be traced for any distance are common.

27.) Large roof fall: upper two feet of shale is black, non-laminated and smooth, full of greenish clay dikes and veins. The limestone is not exposed. Below the black shale is the dark gray-brown mottled shale. The contact appears to be gradational.

East of this roof fall the dark mottled shale (Dm) is seen to overlie a foot or less of grayish-black shale (Bs-D). In places the contact is gradational, but elsewhere it is sharp although very irregular, probably deformed.

From this exposure it is apparent that Bs overlies Dm which is a facies equivalent of Bs-D (considering the full thickness of Bs-D, not just the basal fossiliferous zone.)

28.) Revisit to roof fall of Stop 1 from visit of May 13:

Top of fall is limestone with the usual ridges. The uppermost one foot or so of shale is grayish-brown and faintly mottled, finely laminated, and contains thin phosphatic lenses and calcareous concretions. Except for the color it would be called typical Anna Shale.

The lower two feet or so of shale, above the coal, is darker than the rest of the 10 feet or so of shale exposed in the fall. The dark basal shale interfingers with the lighter mottled main shale. This is a definite mottling interfingering. North of the fall the immediate roof is typical Bs-D with pyritic fossil debris quite abundant.

In conclusion I would say that the dark mottled

(15)

shale evidently is nothing more than a color variant of the black shale (Bs) and the dark gray-black shale (Bs-D).



FORM 180 W

Lee Coal Co. Calefy Mine Vermilion County
 April 11, 1980

Notes by Steve Danner; accompanied by John Nelson.
 Purpose of visit was to map roof lithologies
 and geologic structures, as well as record
 coal thicknesses for an isopach map.

Note: The "L" numbers preceding the following
 descriptions refer to locations on the
 mine map (attached). These descriptions are
 brief and random, and generally point out
 only the salient features in the coal at a
 particular location. The coal is the Herrin
 (No.6) Coal.

- L1: Large roof fall; dark gray shale has fallen
 from base of overlying limestone (Brereton Ls.).
 The gray shale is approx 10' thick, dark gray,
 mod hard, poorly bedded, almost massive, and
 breaks in large irregular blocks. This shale
 is micaceous with numerous light colored lam-
 inae (phosphatic or calcareous). Some slick-
 ensides are in evidence.
 The limestone is a med gray with a light
 colored boxworks on basal surface.
- L2: Coal: very granulated and dirty; much fusain
 in thin bands and large lenses; irregular
 gradation from coal to roof shale; small
 vitrain stringers run up into roof.
- L3: Coal: DBC; very dirty; much fusain and many
 shale partings; many small, vertical, calcite-
 filled fractures 1 to 6" long; some calcite on
 cleats; coal grades unevenly into roof.
 Shale: dark gray, very fractured; poor roof.



FORM 180 W

- L4: Coal: D.B.C., similar to above; rather shaly; much calcite;
Blue Band: streaked with many small coal stringers; much pyrite and mineralization locally.
Roof: Shale: dark gray, mod hard, micaceous, with some coaly impressions; breaks in irregular slabs or blocks; rolling irregular contact with coal.
- L5: Coal: D.B.C., very dirty, much shale and fusain in bands and partings; much calcite in vertical fractures and on cleats; thin gradational zone between coal and roof; slightly silty.
Blue Band: variable thickness as is elsewhere; little or no mineralization.
Roof: Shale: dark gray, mod hard, micaceous, poorly bedded, with small coaly impressions; poor top.
- L6: Coal: D.B.C., similar to above.
Blue Band: contains distorted pyrite lenses; thin coaly streaks.
Roof: Shale: dark gray, rather mottled, platy; uneven and broken with numerous slips; gradational contact with coal.
- L7. Coal: D.B.C., similar to above; top 0.5' is very bony; much calcite throughout; continuous bands and lenses of fusain and pyrite are common; gradational contact with underclay.
Blue Band: contains much disseminated pyrite.
Roof: Shale: very dark gray to black, somewhat mottled, mod hard to hard, carbonaceous, slabby with numerous slips; rolling uneven contact with coal.



FORM 180 W

- L8: Coal: D.B.C., similar to above; top 0.7' is extremely shaly; bottom 0.5' is similar to top, with shaly coal grading into underclay; two major partings similar to Blue Band at 0.9' above and 1.7' below Blue Band; partings are hard and pyritic with numerous pyrite lenses; still much calcite.
Blue Band: pyritic with coal stringers.
Roof: Shale: black, hard, fissile, flaggy to slabby parting; phosphatic bands and occasional blue hue weathering. (Looks to be Anna Shale.)
- L9: Coal: D.B.C., similar to above; top and bottom are very hony; much calcite; several thin, mineralized fusain bands.
Blue Band: variable thickness with many coal stringers.
Roof: Shale: black, mod hard, somewhat fissile; more of a uniform, slabby or flaggy parting; slightly silty; some slickensides.
Floor: Claystone: dark gray, mod soft, friable, smooth, slickensided, carbonaceous debris; has a yellow mottling.
- L10: Coal: similar to above.
Blue Band: similar to above.
Roof: Shale: similar to above; more of the blue weathering; more fissile, but more competent; contains some burrows and pseudo-jointing; uneven rolling contact with coal.
- L11: Coal: D.B.C., similar to above; top 0.5' is slightly bonier than rest of seam; contact with roof better defined because of thin transition zone.
Blue Band: contains large mineralized lenses.
Roof: Shale: black, hard, mod fissile, carbonaceous, contains burrows and trails; many phosphatic nodules and streaks; numerous small clay dikes (1.0' long) that do not penetrate coal.



FORM 180 W

- L12: Coal: D.B.C., similar to above; much calcite as fracture filling and on cleats; fusain prevalent in bands and lenses; mod sharp contact with roof.
Blue Band and Roof shale: similar to above.
- L13: Coal: D.B.C., similar to above; top 0.5' is very bony again.
Blue Band: mod soft, fairly pure shale; no coal stringers.
Roof: Shale: similar to above; numerous slips and slickensides.
- L15: Coal: D.B.C., very bony; much fusain and disseminated pyrite; much calcite on cleats and in numerous small, vertical fractures; numerous thin, continuous and discontinuous, partings; top 0.5' is extremely shaly; rolling irregular contact with roof.
Blue Band: contains heavily pyritized areas and pyrite lenses; some thin vitrain stringers.
Roof: Shale: med dark gray with yellowish mottling; mod soft to mod hard, poorly bedded; blocky uneven fracture; numerous slickensides; contains a few small sideritic nodules.
- L16: Coal: D.B.C., similar to above; numerous thin shaly partings; top 0.5' is much bonier than rest of seam;
Blue Band: contains some coal stringers and pyrite.
Roof: Shale: med gray, mottled, mod hard, mod sharp contact with coal; coal stringers in lower 0.4' of unit; many large and small slips.
- L17: Coal: D.B.C., similar to above; thin gradational contact with roof.
Blue Band: hard and mineralized.
Roof: Shale: med gray, mod hard, poorly bedded, many slips; jagged blocky fracture.



FORM 180 W

April 15, 1980

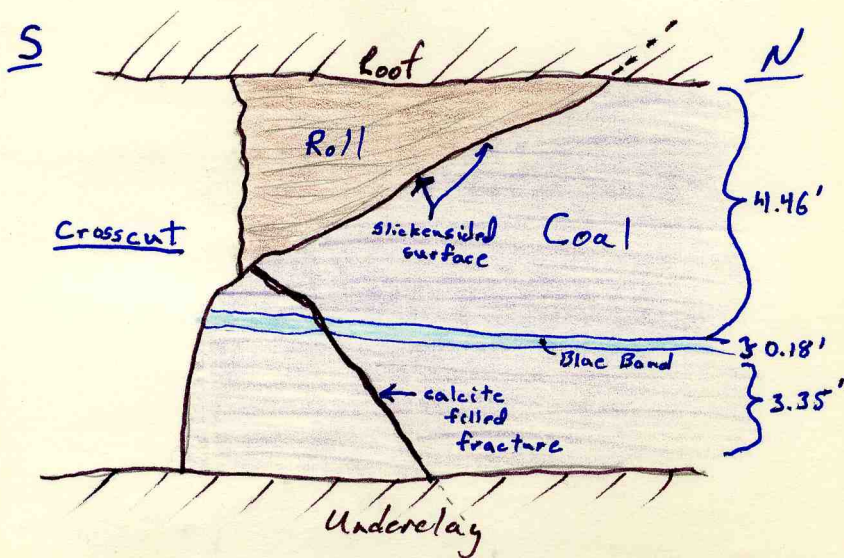
Calefy Mine

- L20: Coal: D.B.C., bony, much fusain and shale in bands; many small, vertical fractures with calcite filling; calcite on cleats too; contains pyrite mixed with shale and fusain; mod sharp contact with roof.
 Blue Band: med to dark gray, hard, poorly bedded, pyritic and mineralized; 0.01 to 0.02' thick.
 Roof: Shale: black, hard, fissile, carbonaceous, silty, slickensided; mica on bedding planes.
- L21: Coal: D.B.C., similar to above; much calcite; increase in fusain near top of unit; very bony; mod sharp contact with roof.
 Blue Band: med gray, hard, pyritic, deformed bedding; contains coal stringers; mod sharp undulating contact with coal.
 Roof: Shale: black, similar to above; numerous coffin covers and compactional slips.
- L22: Coal: D.B.C., similar to above; top 0.4' is ultra-bony.
 Roof: Shale: (Anna) black, mod hard; many small slips and many concretions; no jointing.
- L24: Coal: D.B.C., similar to above; top of unit is not as bony as above; undulating contact.
 Roof: Shale: (Anna) black, many concretions and slips, very unstable.
- L25: Coal: D.B.C., similar to above; very bony at top again; undulating contact with roof.
 Blue Band: variable thickness; almost pinches out in spots; hard and pyritic; occasional coal stringers.
 Floor: Claystone: dark gray, soft, friable; rises up 0.5' higher than floor on either side, a mini-anticline.



FORM 180 W

L26: Roll and Falls: Crosscut 10 off the Main South haulageway has a large roll (15+ft wide) extending from 8-10' west of the stopping, across the entry, to a point several feet short of the belt entry. The shale in the roll is gray with a yellowish mottling, very similar to weathered "Energy Shale". It displaces as much as 2 to 3' of coal and is accompanied by numerous compactional slips that parallel the strike of the roll. These slips have caused several small falls at the intersection. Coffin covers, or saddles, are abundant. It should be noted that the Blue Band is very undulating on the east side of the stopping where it rises to within 1.0' of the roll. The contact between the roll and the coal is marked by heavily slickensided surfaces. A calcite-filled fracture extends from the base of the roll, through the coal, to the underclay, trending parallel to the roll. The material in the roll is somewhat lighter in color than the adjacent roof rock.





FORM 180 W

- L27: (Several feet north of previously described roll)
Coal: D.B.C., similar to above; much fusain; calcite in small vertical fractures and on cleat surfaces; much pyrite; fairly bony throughout; contains a fusain lense about 5' long and 0.4' thick; mod sharp contact with roof rock.
Blue Band: light to med gray, hard, mineralized; variable thickness; much pyrite and fusain; thin vitrain laminae.
Roof: Shale: dark gray, mod hard, smooth, flaggy or slabby fracture; vitrain stringers near base.
- L32: Clay dike: runs N-S across #6 crosscut; up to 0.12' thick; stops 0.4' short of coal in south rib; stops 2 to 3' short of north rib.
- L34: Clay dike: cuts through black shale (Anna); less than 0.04' thick at north end; intersects a nest of small clay dikes. Roof is very unstable here; slabs of shale have fallen exposing dike and numerous slips.
- L35: Coal: S.B.B. and D.B.C.; increase in vitrain in upper half; still very bony with much calcite on cleats and in fractures; mod sharp contact with roof; still contains many fusain, shale, and pyrite partings in lower half.
Blue Band: light to med gray, hard, pyritic, with coal stringers.
Roof: Shale: (Anna) black, hard, mod fissile, poorly bedded, carbonaceous; very pyritic with numerous pyritic fossils; exhibits blue hue on weathering; blocky fracture.
- L36: Clay dike: extends from the stopping in the #4 crosscut, across the haulageway, to the belt entry; up to 0.14' thick; very unstable roof here.



FORM 180 W

L42: (Return entry of Main South)

Coal: N.B.B., black, hard, thinly banded, much fusain and shale; top 1.0' has numerous shale laminae and partings; much calcite on cleats and in small vertical fractures; mod sharp contact with roof.

Blue Band: shale; med gray, hard, poorly bedded, pyritic, coal stringers and streaks; irregular and uneven contact with coal.

Roof: shale: black, hard, poorly bedded, poor fissility, phosphatic streaks; slickensided, contains many small and several large clay dikes; rather unstable roof here!

(Vicinity of L42)

Clay dikes: The roof is black shale, probably Anna Shale, and contains many small clay dikes and several large ones. One such large one cuts diagonally across the intersection of Main South return and cross-cut #2. It is up to 0.5' wide in spots and often contains slices of roof rock in its center. The clay penetrates the coal at both ends of the fracture; it cuts down as much as 1.5' at the south end, forming an irregular lense of clay in the coal. Several stringers of coal can be seen extending out into the clay mass.

Another dike, striking N90W, enters the coal approx 10' south of the first one. The clay-filled fracture is partially covered in the roof by several inches of "white top", coal that exhibits a cross-hatch pattern of small, intersecting, clay-filled cracks. The white top shows up at several other locations in this mine. The disturbance that produced the cracked top coal may be the same one responsible for the clay-filled fractures. White top and clay dikes are often found in the same vicinity.



FORM 180 W

Lee Coal Co. Calefy Mine Vermilion County
 June 19, 1980

Notes by Steve Danner; accompanied on visit by Jennifer Thompson, a grad student from Penn State Univ.

Purpose of visit was to collect a channel sample and vitrain samples from the Herrin (No.6) coal.

 Sample Site #1: South rib in the 9th crosscut south of the belt transfer, between the 1st and 2nd entries east of the belt entry, or NE $\frac{1}{2}$ NW $\frac{1}{2}$ SE $\frac{1}{2}$ NE $\frac{1}{2}$ Sec 14, T.19N, R.12W.
 (Sample # C21116)

- Roof Shale: (Energy) med gray, hard, smooth, dense, finely laminated; occasional laminae of siderite or phosphate; breaks in angular, sharp-edged slabs; bedding surfaces are often smooth and soapy; sharp undulating contact with coal.
- 0.75' Coal: N.B.B., approx 20% vitrain, generally very thin banding with thickest vitrain approx 0.02' thick; attrital coal is dull to mod dull and fine grained; poor cleat development; many fusain laminae; some white calcite in vertical fractures.
- 0.06' Fusain and vitrain: lenticular and discontinuous; dark gray to black; mod hard; fusain with thin vitrain laminae grades laterally into pure fusain. (excluded)
- 1.40' Coal: N.B.B., very similar to top unit; several thin pyrite bands less than 0.01' thick; some finely crystalline pyrite on cleat surfaces; many fusain laminae.
- 0.03' Coal: mod hard, very boney and possibly fusainitic; fairly continuous.



FORM 180 W

- 0.05' Coal: N.B.B., similar to 1st and 3rd units above.
- 0.02' Coal: mod hard and boney.
- 2.21' Coal: N.B.B., similar to above; approx 20% vitrain, thickest vitrain is 0.04' thick, the mode is less than 0.01'; the attrital coal is fine grained and dull to mod dull; poor cleat development; some calcite in vertical fractures; very little pyrite and less fusain than above.
- 0.13' Shale: (Blue Band) med-gray, mod hard, slightly silty; some vitain stringers and pyrite nodules; continuous, but quite variable in thickness. (excluded from sample)
- 1.54' Coal: N.B.B., similar to above; thin or laminar banding; attrital dull to mid-lusterous; contains several shaly bands; no visible pyrite; some calcite.
- 0.01' Pyrite: hard and fairly continuous.
- 1.75' Coal: N.B.B., similar to above; attrital generally less bright than above; occasional fusain bands near base.
- 0.20' Coal: very shaly and very finely laminated; reddish-brown hue; grades downward into a mod hard carbonaceous shale and then the underclay.
- Floor Claystone: med dark gray, mottled, mod soft, smooth, carbonaceous, slickensided.
- Total thickness: 8.15'
-

Random notes:

Large roof fall: Two entries east and two breaks north of the sample site, a large roof fall occurred just after being bolted. Approx 8 to 10 feet of what appears to be Anna Shale fell from the base of the Brereton Limestone. The fall extends from one intersection to the next, completely



FORM 180 W

(continued)

blocking the entry. Few, if any, of the roof bolts penetrated the limestone. Several large blocks of gray shale (Energy) can be seen protruding from beneath the black shale (Anna) that didn't fall. Apparently this entry lies along the contact zone between the Energy and the Anna. Typically these zones are rather unstable, often characterized by numerous slips and other such deformational structures. Floyd Lee says that they plan to abandon that entry until the other faces have been advanced far enough to find out what the roof is like in the adjacent entry.

High sulfur problem: Floyd Lee says that he is having trouble selling his coal because of the high sulfur content. The electric-power plant that usually buys his coal has cut back on its orders for Floyd's coal until he gets the sulfur content of the prepared coal down. With only a one stage crusher and screening it is doubtful that Floyd will be able to improve the quality of the coal without a sizable expenditure for preparation equipment.



FORM 180 W

Lee Coal Co. Calefy Mine 12/12/80
 Vermilion County NW SE NE Sec 14, 19N, 12W

 Notes by Steve Danner. Purpose of visit was to collect 2 sets of benched channel samples of coal. from the Herrin (No.6) seam. Assisted by Paul Pushcar, a visiting professor from Wright Univ.

Sample site A: Approx 75' east of the SE corner of the intersection of the haulageway and crosscut #29; or south rib of cc #29, between #1 and #2 return entries, 15' inby return #2.

Roof: Shale: dark gray; moderately hard, brittle, finely laminated bedding; scratches black with a brown powder; numerous slknsds and slips; slabby or platy fracture; pyrite laminae and nodules near base; plant impressions on basal contact. Top holds up fairly well in this crosscut.

Note: due to the lack of partings, benches were arbitrarily assigned.

Bench #1 (C21320)

1.06' Coal: N.B.B., black, hard, poorly developed cleat; approx 20% vitrain, medium banding, maximum thickness 0.01' thick; attrital coal dominant, thin to medium banding; fusain disseminated or in thin laminae; several long, thin, vertical fractures filled w/ calcite, calcite also on cleats; discontinuous pyrite laminae in lower ½ of unit; coal shows a sharp contact w/ roof, silky to resinous lustre.

Bench #2 (C21321)

1.10' Coal: N.B.B., similar to above; less fusain;

attrital bands are thicker than above, up to 0.03'; calcite-filled fractures still present, also thin pyrite laminae and lenses.

Bence #3 (C21322)

1.05' Coal: N.B.B., similar to above; poor cleat; very little visible pyrite; upper $\frac{1}{2}$ of unit more silky and less resinous than unit above; appears to be more fusain.

Bench #4 (C21323)

1.02' Coal: N.B.B., similar to above; 0.1' below upper contact is a 0.1' band of fusain and bone coal, rather dull w/ occas. streaks or thin bands of bright coal; intermittent pyrite band, 0.015' thick, at base of dull coal; sharp contact w/ Blue Band at base of unit.

0.15' Shale and pyrite: (Blue Band?) upper 0.08' of unit is a med-gray shale, moderately hard, slightly silty, finely laminated, w/ occas. streaks of bright coal. 0.02' band of bone coal between upper and lower $\frac{1}{2}$ of unit, intermittent and irregular. Lower 0.05' to 0.1' of unit consists of pyrite and pyritized shale; intermittently lenticular; very hard; golden pyritized shale is bounded above and below by bands of pure pyrite.

Bench #5 (C21324)

1.05' Coal: N.B.B., similar to coal above Blue Band; contains a few thin gray shale streaks and bands; several fusain lenses and bands up to 0.03' thick near top of unit; no visible pyrite; one vitrain band 0.02' thick.

Bench #6 (C21325)

1.00' Coal: N.B.B., similar to above; a few small fusain lenses; one long and thin pyrite lense near base of unit (0.02' thick); overall banding is thin to medium thickness.

Bench #7 (C21326)

1.30' Coal: N.B.B., similar to above; is duller

overall than above units; several thin pyrite lenses and discontinuous laminae; lower $\frac{1}{2}$ is somewhat bony w/ rather poor cleat, hard to fracture; moderately sharp contact w/ underclay.

Floor Claystone: medium to dark gray; soft to mod. hard; very smooth; friable; slickensided; very little carbonaceous debris; not prone to heaving.

 Note: this sample was rather laborous to obtain because of the poorly developed cleat in the coal. It seems that the run-of-mine coal would contain a large quantity of fines as a result of the coal's hardness and the inherent amount of fusain.

We were able to obtain only one sample on this day because Paul Pushcar became ill from the coal dust in the air.

 Note: Samples of the roof shale, Blue Band, and underclay were taken for petrographic analysis. Their assigned petrography numbers are P2191, P2192, and P2193, respectively.



FORM 180 W

Lee Coal Co. Calefy Mine 12/16/80
 NE SW NE Sec. 14, T19N, R12W, Vermilion County

Notes by Steve Danner; assisted by Laurie Leahey, a secretary in the ISGS Coal Section. Purpose of visit was to collect the remaining set of benched channel samples for the MMC 81 project. The mine is a box-cut drift in the Herrin (No.6) Coal seam.

Sample site B: North rib, 15' west of NW corner of intersection of Crosscut #29 and the #4 intake entry.

Roof: Shale: dark-gray to grayish-black, moderately hard; brittle, but less so than the shale at sample site A; numerous slickensides and slips; numerous fossils and plant impressions near base, found several small corals, Lophophyllidium, as well as pyritized shell fragments; slightly silty; laminar bedding; slabby parting; occasional pyrite nodules and large limestone concretions; coal stringers near base; mod sharp contact w/ base. (P2194)

Bench #1 (C21314)

1.58' Coal: N.B.B.; black, hard; upper 0.2' of bench has poorly developed cleat, much pyrite, even on bedding planes, slightly bony, moderate amount of fusain, thin banded. Remainder of bench shows good cleat; approx 25-35% vitrain, generally thin banded, max thickness 0.02'; may be as much as 15-20% fusain, thin to moderate bands and lenses; attrital coal approx 50%, luster dull to silky, banding of variable thickness; calcite and pyrite on cleats, much calcite and little pyrite; several long calcite-filled fractures, some full thickness of bench; sharp basal contact w/ shale parting.

0.04' Shale: medium gray, moderately soft, slightly friable; contains thin laminae and stringers of bright coal; slightly irregular but continuous, variable thickness. (excluded from sample)

Bench #2 (C21315)

1.08' Coal: N.B.B., similar to bench above; less vitrain than above, approx 15-20%, w/ a max band thickness of 0.01'; approx 60-70% attrital, dull to silky luster; fusain finely disseminated or in thin laminae and lenses; still much calcite; cleat not as well developed as above; pyrite nodules up to 0.15' in diameter, majority of pyrite is in upper 1/3 of bench; coal is fairly uniform throughout bench.

0.03' Shale: med to dark gray; variable thickness, intermittently continuous; carbonaceous w/ some laminae of coal; irregular contact w/ coal. (Excluded from sample)

Bench #3 (C21316)

0.87' Coal: N.B.B., similar to above bench; much calcite, little pyrite; more vitrain than above, 25-35%, max band thickness of 0.02'; approx 50% attrital, moderate to thick banded; fusain has medium banding, but sparse; sharp but uneven basal contact.

0.18' Shale: (Blue Band) medium gray; moderately soft to hard; rather smooth; variable thickness; numerous stringers of thin coal; local spots of disseminated pyrite, as well as pyrite nodules; sharp but uneven contact w/ coal. (Excluded from sample; sampled separately for petrographic analysis, P2195)

Bench #4 (C21317)

- 1.73' Coal: N.B.B. similar to above bench; much calcite in long, thin vertical fractures; moderate cleat development; very little pyrite; vitrain generally thin banded in sparse to moderate concentrations; at least 50% attrital, dull to silky luster; numerous small fusain lenses and thin, discontinuous fusain bands.
- 0.03' Shale: light to dark gray; heavily pyritized in part, numerous pyrite stringers; occasional bright coal stringers; variable thickness, very uneven and irregular. (Excluded from sample)

Bench #5 (C21318)

- 1.19' Coal: N.B.B., similar to above bench; much fusain in bands and lenses, lenses up to 0.08' thick and 0.8' in length; vitrain is thin banded and sparse; attrital coal has a dull to silky luster, banding of variable thickness; little pyrite; calcite-filled fractures are prevalent; occasional thin and discontinuous partings near base; lower 0.3' of bench is rather bony; sharp contact w/ underclay.
- Floor Claystone: medium-dark gray with lighter gray mottling; mod soft to soft; smooth texture; friable; massive; slickensided; plant impressions near upper contact, but relatively little carbonaceous debris overall.
(Sampled separately for petrographic analysis, P2196)

Total thickness of coal: 6.70'

Lee Coal Company Calefy Mine 12/23/80
NE SW NE Sec 14, T19N, R12W, Vermilion County

Notes by Steve Danner; assisted by Miriam Hartshorn, a secretary in the ISGS Coal Section. Purpose of visit was to collect 3 channel samples for washability studies. The mine is a box-cut drift in the Herrin (No.6) Coal seam.

The first two channel samples were taken at the same locations as the benched channel samples that were collected on the 12th and 16th of this month. Hence, the coal descriptions for the bench samples should suffice for the channel samples.

Sample site C: East rib of the #1 return entry, approx. 30' south of crosscut #30.

Roof: Shale: (Energy) medium gray w/ a brownish cast; moderately hard and brittle; very little silt; finely laminated; slabby parting; slickensided w/ numerous slips, some up to 30 or 40 feet in length; makes a fairly good top when bolted properly; irregular, but moderately sharp contact with coal.

2.40' Coal: N.B.B.; black, hard; cleat is small when present; vitrain is sparse in thin to medium bands, max band thickness 0.02', average less than 0.01'; attrital coal approx 50-60%; much fusain in thin, discontinuous bands and small lenses; numerous long, thin vertical fractures filled w/ calcite, averaging about 1.0' in length; much calcite, but very little visible pyrite; unit is fairly uniform from top to bottom.

0.06' Shale, fusain, pyrite: shale is a lt gray, moderately hard to hard, heavily pyritized,

w/ numerous stringers of pyrite and fusain throughout; fusain varies from soft to hard; unit is discontinuous and irregular, w/ the thickness varying between 0.02' and 0.10'. (Excluded from sample)

- 1.79' Coal: N.B.B., similar to above; vitrain thin-banded and sparse; approx 70% attrital coal, dull to silky luster; much fusain in thin bands and lenses; several discontinuous pyrite laminae and bands; 0.40' up from base is a 0.10' thick shale parting, is discontinuous and contains much silty material and laminae of bright coal.
- 0.17' Shale: (Blue Band) medium gray, mod soft, smooth, friable, continuous; contains numerous bright coal stringers and some disseminated pyrite; moderately sharp contact with coal, rather even and regular. (Excluded from sample)
- 3.60' Coal: N.B.B., similar to above; vitrain thin-banded and sparse, max band thickness 0.02', average less than 0.01'; 65-70% attrital coal, thick banded w/ a dull to silky luster; less fusain than above, mostly in thin bands and lenses; small cleat; much calcite on cleat and in thin vertical fractures; lowest foot of unit is bony, becoming bonier downward; base of unit is very bony just above underclay; rapidly grades into underclay; only visible pyrite is a single lense near middle of unit.
- Floor- Claystone: med to dark gray, soft to moderately hard, very smooth, except for

an occasional streak of silt; slickensided; very little carbonaceous debris; not prone to heaving.

Total thickness of coal: 8.02'

Addendum: Sample site C was approx. 20' north of a working face. About 10' from the face the coal thinned down to 6', which was the average thickness across the face. On the left side of the face the gray shale displaced approx 1.0' of coal, forming a small V-shaped roll trending north-south. This anomaly was not a typical roll, however. The coal was displaced in a distinct V-shape, not the usual bowl shape. Also, there were no signs of deformation in the shale or the coal, and none of the usual faults or fractures that often accompany rolls. This area should be checked again in the near future to see what happens beyond the present face.

Calefy Mine

6/17/80

Channel Sample Location #1

Roof - Shale: (Energy) med gray, hard, smooth, dense, finely lamin; occasional laminae of phos or siderite; breaks in sharp edged slabs; bedding surfaces often smooth & soapy; sharp undulating contact w/ coal.

0.75' - Coal: N.B.D.; ~20% vitrain, general thin bed; thickest vitr ~ 0.025'; attrital mod dull to dull; poor cleat devel; many fusain laminations; attrital fine grained; some white calc in vert tract fills

0.06' - Fusain & vitr: lenticular & discont; mod hard; fus w/ thin vitr lamin; grades laterally into pure fusain

1.40' - Coal: N.B.D.; very similar to above; several thin pyr bands < 0.01'; much fusain lamin; some finely xtaline pyr on cleats

0.03 Coal: honey & possibly fusainitic, fairly cont.; mod hard

- 0.05' - Coal: NBB STA, ~~mod~~
- 0.07' - Coal: bone; STA, mod hor
- 2.21' - Coal: N.B.B.; STA; thickest vitr 0.04;
generally < 0.01 ; ~ 20% vitr
attrital fine grained & dull or mod dull;
poor cleat; calc in vert fract;
less fusain & pyr than above;
very little pyr.
- 0.13' - shale (Blue Band): med gray, ^{mod} hard,
slightly silty; vitr stringers; some
pyr nod; cont but very variable
thickness (excluded)
- 1.54' - Coal: N.B.B., STA; thin or laminar
banding; attrital dull to midlust;
contains a couple shaley lamina;
little or no visible pyr; calc
in vert fractures;
- 1.01' - pyr: hard & fairly cont.
- 1.75' - Coal: N.B.A.; STA; attrital generally
less bright than above; occas.
fusain bands near base;
- 0.20' - Coal: very shaley; very finely lamin
red-brown hue; grades into

mod hard carb shale i under clay

Underclay - claystone: med-lyb gray mottled,
carb, silksedl; mod soft & smooth

Bench #1 1.30'

#2 1.15'

#3 1.20'

#4 1.40'

#5 1.15'

Lec Mine

6/17/80

Bench sample location:
middle of highwall, south side of
pit

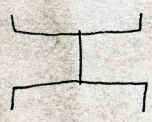
Roof - Shale ^{med} gray, mod soft, smooth, finely
laminated; mod shaly contact w/
coal; often marked by pyrite layer
or lenses

3.42' - Coal; N.B.B.; weathered, well devel.
oped cleat; much pyr & calcite
on cleat; vitr quite variable,
from finely lamin & sparse, to
thick & abndt; attrital fine good
& mod dull to bright; bandg
indistinct where lamin; some
vitr up to 0.05 - 0.07 thick.

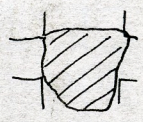
2.80 Coal; N.B.B.; similar to above.
Cleat not as well developed
contains large pyrite balls &
lenses, also pyrite goat beards.
middle of unit is soft &
somewhat brecciated. Coal is
harder near base w/ no
cleat devel, but less impurities

Lee Coal Company

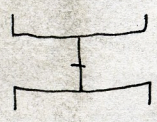
Proposed Symbols for Mapping



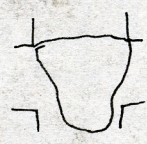
Stopping



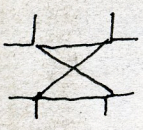
Roof fall blocking place



Stopping w. man door

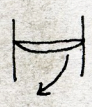


Roof fall not blocking



← Overcast walk through without climbing

Give height of fall in feet.



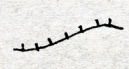
Door

- $\frac{4.5}{0.15}$ — Thickness of coal above Blue Band
- $\frac{0.15}{2.0}$ — Thickness of Blue Band
- Thickness of coal below Blue Band

Give total thickness if no Blue Band

- Bf - Black fissile shale
- Bs - Black soft shale
- D - Dark gray shale
- M - mottled shale

- L - Limestone (solid)
- Ln - Limestone nodules



Slip or fault



Roll

WT = white top Give thicknesses of roof units.

Calety Mine
Lee Coal Co.

4-11-80

- L₁: Large roof fall; dark gray shale
has fallen from ls. base; shale broke in
large irreg. blocks
G shale - $\approx 10'$ thick; dark gray, mod hard, almost
massive; poorly bdd, breaks blocky; micaceous w/
num. light colored (calcs) laminae; some slickens;
Ls: It \rightarrow med gray w/ light boxworks
- L₂: Coal very granulated & dirty; much tus in
thin bnds & lrg lenses; irreg. gradation from
coal to roof; small vitr. ridges run into roof.
- L₃: Coal: DBC, very dirty; much tus; many shale
partings; many small calc fract 1-6" long, all
vertical; calc on cleats too; uneven transition
from coal to roof
Roof: shale - d. gray; very broken; poor top!
- L₄: Coal: S.A.P.; DBC w/ much calc & shale;
blue band is streaked w/ small coal stringers;
also quite mineralized in places w/ much
pyrite.
Roof: drk gray, micaceous, breaks in uneven sheets
& blocks; some coaly impressions; rolling;
uneven contact w/ coal

L5: Coal - DBC; very dirty, much shale & fus in bands & partings; much frac. & cleat calc.; narrower trans. zone to roof; slightly silty;

Roof - shale - dk gray; med hard; micac; small coaly impress; poorly bdd; poor top;

Blue band - uneven in thickness as is elsewhere; little or no mineralization.

L6 - Coal: S.A. B.

Roof: dk gray; more mottled; still plagy, uneven, & broken; numerous small slips as elsewhere; gradational trans. w/ coal.

Blue band: cutns distorted lenses of pyrite & thin coaly streaks.

L7 - Coal: S, A, B.; top 0.5' very dirty; much calc thlot; cont. bands of fus & pyr, also in large lenses; base is an uneven grad into clay - similar to top.

Blue band contains much disseminated pyr.

Roof: Shale - vry dk gray to black; med hard to hard; somewhat mottled; broken, plagy, carbonaceous; num small slips; rolling uneven contact w/ coal

L8: - Coal - S, A, B; top 0.70' extrem. dirty; major partings similar to Blu Bd 0.9' above & 1.70' below B.B.; Partings are hard & pyr, w/ num. lenses;

Bottom - 6" similar to top; dirty; coal grading into clay; still much calc.

Blue band - contains pyr & coal stringers;

Roof - shale: black, plagy, hard, more fissile; occas. blue hue & some phos. strks; looks like Anna.

L9 - Coal: S.A.B.; DBC, top & base very dirty;
much calc; several thin mineralized fus. bands.

Blue band: varying thickness w/ num coal stringers.

Roof: shale - blk, mod hard, somewhat fissile,
more uniform fracture, more plaquey;
slightly silty; some silksds;

Floor: Clay - dark gry; mod soft; friable; carbonac.
debris; smooth, slickensided; yellow mottling;
possibly pyritic(?)

L10 - Coal: S.A.B

Blue Band: S.A.B

Roof - S.A.B; more blue hue; more stable,
more fissile; some burrows; pseudo-joints;
uneven rolling contact w/ coal

L11 - Coal: S.A.B.; top 0.5' only slightly more dirty
than rest of seam; contact w/ roof more
well defined; very little trans. to roof

Blue Band: entas large mineralized lense.

Roof: shale - black, hard, mod fissile; many
phos. nodules & streaks; platy; num
small (1.0' long) clay dikes; do not penetrate
coal; carbonaceous; burrows & trails

L12 - Coal: S.A.B.; much cleat & trace calc; mod sharp
contact w/ roof; fus. lenses & parts.;

Blue Band: about the same

Roof: S.A.B

L13 - Coal: S.A.B; top 0.5' very dirty again

Blue band; mod soft, fairly clean here, no coal
stringers;

Roof: S.A.B.; silksdcl

L15 - Coal: ABC; very dirty; much fusoid dissem. pyr;
much calc on cleats & in num small fractures;
numer cont. & discont. partings; top 0.5' extrem.
dirty; irreg rolling contact w/ root.

Blue Band: contains heavily pyritized areas &
pyr. lenses; some thin vitr. coal stringers.

Root - Shale: mod soft to mod hard, mod
drk gray w/ yellowish mottling; poorly
bed; breaks uneven & blocky; few
small sid. noduli; slknsdd

L16 - Coal: S.A.B.; num thin mineral-shale partings;
Atop 0.5' not much dirtier than rest of
seam.

Blue Band: w/ coal strings & pyrite

Root - Shale: mod gray mottled, mod
hard; mod. sharp contact w/ coal;
coal stringers in lower 0.4'; numer
large & small slips.

L17 - Coal: SAD; slightly gradational contact w/ root.

Blue Band: hard & mineralized

Root shale: gray, mod hard, broken, slknsdd,
numer slips; poorly bed; breaks in
jagged uneven blocks

Lee Coal Co.

4-15-80

L-20: Coal - DBC, dirty, much fus & shale in bands; numer. small vert. fract. w/ calc; calc on cleats too; pyrite mixed w/ shale & fus.; contact w/ roof mod. sharp.

Blue band: med to dk gray; hard, poorly bdd; mineralized w/ pyrite; coal stringers .01' to .02' thick;

Roof: shale: black, hard, fissile, carbonaceous, silty; s/knsdd; mica (?) on bedding planes

L-21: Coal: S, A, B; much calcite in vert. frac & on cleats; increase in fus. near top; very dirty; mod well defined contact w/ roof.

B, B₁ is gray, hard, pyritic, coal stringers; deformed bedding; mod sharp undulating contact w/ coal.

Roof: shale - black, S, A, B.; numerous coffin covers & comp. slips.

L-22 Coal: S, A, B.; top 0.40' ultra dirty; almost a parting of shale 0.10' below gradational contact.

Roof: shale (Anna): many concretions! many small slips; no jointing

L-24: Coal: S.A.B.; undulating contact w/ coal top not as dirty as before.

Root: Shale - blk; numerous concret. & slips; rather unstable; both sides propped along this entry.

L-25- Coal: S.A.B.; very dirty at top again; however, undulating contact w/ root.

B.B.: irreg thickness; almost pinches out in spots; intermittent coal stringers; shale is hard & pyritic.

Floor: CS - drk gray, ~~is~~ soft, friable; raises up 0.5' higher than floor on either side; a mini anticline in the floor.

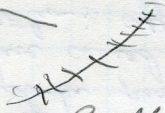
L-26: Roll & Falls: x-cut #10 has a large (154w) roll extending from the stopping to the belt entry; the shale in the roll is a typical, mottled "Energy shale". It displaces as much as 2 to 3' of coal. It is accreted by numerous compressional slips that strike parallel to the roll. These slips have caused several falls at this intersection; coffin covers are ~~about~~ about. The B.B. is very undulating just on the east side of the stopping, where it rises to ~~at~~ within 1' of the roll.

Roll - CS (shale): (Energy) - med → drk gray; w/ yellow mottling (typical of Energy S.); mod hard, poorly bedded; breaks unevenly.

Roof

vit.

vit.



Roll

Coal

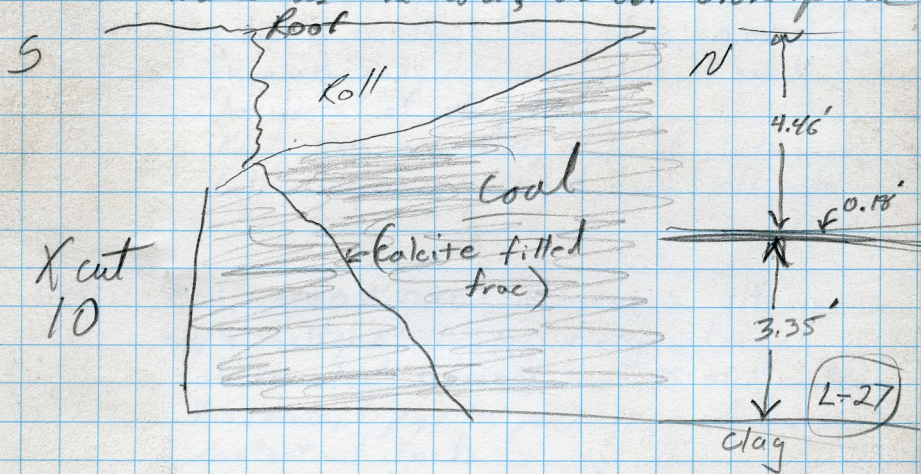
slknsdc

B.P.

Coal



contact between coal & roll marked
by slickenside surface. This slip surface
intersected by a calcite filled fracture
in the coal that strikes almost the
same as the roll; almost 0.02' of calcite



L-27 Coal: SAB- D.B.C., much fusain; calc
on cleats & in frac; much pyr;
fus. lense 5' long & .4' thick;
fairly evenly dirty thro; mod sharp
contact w/ root.

BB: med to lt gray; hard, mineralized;
much pyr & fus.; thin vitr. lamin.;
varying thickness

Root: Shale: dark gray, mod hard, breaks uneven
slabby; smooth; vitr. stringers near
base,

L 32: Clay dike - runs N-S across #6 X-cut;
up to 0.12" thick; stops 0.4' short of coal
in south rib; stops 2-3' short of North ribs.

L 34: Clay dike: in Black (Anna) shale; < 0.01" thick;
on north end, dike intersects w/ small
"boxworks" of clay dikes;
Roof very unstable, slabs of shale have
fallen exposing dike & num. silksds

L-35: Coal: NBB & DBC; increas in vitr in
upper half; still very dirty w/ much
calc in cleats & tract; lower 1/2 still contains
fus, shale, & pyrite partings; mod shaly
contact w/ roof.

BoBo: lt-med gray, hard, pyritic,
w/ coal stringers

Roof: Shale: (Anna) black, hard, mod fissile
blue hue, very pyritic; carbonaceous
tends to break in blocky slabs; poorly
bd'd; num. pyrit fossils

L-36: Clay dike - extends from Xcut 4 stopping to
belt entry; up to 0.014" thick; produced
a very unstable roof in this Xcut

L42: Return Entry Main South

Coal: blk; hard, thinly bedded; BDC; much fusain & shale; much calc on cleats & in thin vertical tracts; top foot has numer. shale laminated partings; mod. sharp contact w/ roof;

BD: shale - med gray; hard, poorly bedded; pyritic; irreg & uneven contact w/ coal; coal stringers & vitr. streaks;

Roof-shale: blk, hard, non-fissile; poorly bedded; phosph. streaks; disturbed, silty bedded; numer small & several large clay dikes; relatively unstable top

Vicinity of L42:

Roof - black shale: contains numer small (1-4' long) clay dikes & several large ones.

One large one cuts diagonally across intersect of x-cut "2. It is up to 0.5' wide in spots, & often contains roof rock in its center; west side of dike is down-dropped; it penetrates coal at both ends; cuts down 1.5' at south end, forming an irreg lense in coal; near the roof, the dike contains stringers of coal & pieces of roof.

Another major dike enters coal \approx 10' south of first dike; north side down-dropped. Dike is partially covered by several inches of white top, dike strikes N90W.

L-50: Coal: NBB, blk, hard, thin fusain lamin,
much calc in trace & on cleats; much cleaner
than before; even top 0.5' is relatively clean;
gradat. contact w/ roof

D.B.: med gray hard, slightly mottled; contains
coal stringers, uneven contact w/ coal;

Roof-shale: blackish gray, hard, poorly bedded;
coaly particles & phosph nodds; slabby
fossiliferous; very fossil at base; streaked

LEE Coal Co.; Calcity mine; 12-12-80

Location; see map

Roof: Sh: med-drk gray w/ brnsh hue
mod hard, laminar bed; numer. silks; pyr
lamina & nodules near base; 3' thick
platy or slabby fracture, mod good
topl thru here; plant impress along
basal contact.

Note: due to lack of partings, benches
were broken out arbitrarily.

Bench #1 (PB)

1.06' - Coal; N.B.D., hard; little or no cleat,
sharp contact w/ roof; vitrain ~ 20%,
med banded, max thick ~ .01; attrital
~ 60-70%, thin to med banding, mostly
thin beds (1-3mm); several thin vert
fracs filled w/ calc; calc on what
cleats there are; seems like much
fusain dissem'd in thin lamellae; several
discont pyr laminations in lower 1/2 of
unit; silky to resinous luster

Bench #2 (PB)

1.10' - Coal; NBB, similar to above; less fusain
attrital bands somewhat thicker than above
up to .03' thick; calc frags & pyr

lamin & thin lens still present

Bench #3 (PB)

1.05' Coal: NBB, similar to above; good cleat
very little visible pyrite; upper 1/2 of
unit now silty & less resinous than
unit above; appears to be more
disseminated fusain

Bench #4 (PB)

1.02' Coal, NBB similar to above; ~ 0.1' below
upper contact is a 0.1' band of
fusain & bone, rather dull with occas.
streaks or thin bands of bright coal,
w/ pyr band (intermittent) ~ 0.015' thick
at base of dull coal. Sharp
contact at base w/ blue band

1.2-17: Sh & pyr (Blue Band?): upper 0.08' is ^{med} gray
shale, mod hrd, lamin bedding, slightly
silty, occas streaks of bright coal.
0.02' bone coal

0.05' to 0.01' pyr & pyr sh; intermitt.
lenticular; very hrd, golden to gray-gold
shaly pyr is bounded above & below by
lamin of pure pyr.

Bench #5 (PB)

1.05' Coal: NBB, similar to above, few thin
gray sh streaks; no visible pyr; one
vitr band 0.02' thick; few fusain
lenses or bands up to 0.03' thick near
top of unit

Bench #6 (PB)

1.00' Coal NBB, similar to above,
few small fusain lenses,
one long thin pyr lens (0.02' thick)
near base of unit; generally
thin to med bedding

Bench #7 (PB)

1.30' Coal: NBB, similar to above;
overall is duller than above units;
several thin pyr lenses & discont
pyr lamina; lower 1/2 is somewhat
lumpy & hard to fracture

12/16/80

Loc B: see map

Roof: sh. dk-med gray (AmnA?): mid-hard;
slight brittle; slicked; Passiflora;
occasional pyrite nod.; slightly
silty; massive; some concn;
mod good top; coal stringers
near base; mod sharp contact
w/ coal

bench #1
(PB) 1.58' - Coal wbd; upper pt. 12' poorly
dev. cleat, much pyrite;
slight, boney, much pyrite
on bedding planes; mod amt
fus; basal thin Bedd;
remain of Bench shows
good cleat; mod well
dev.; approx 85-35%
vitrinite; gen. thin Bedd;
thickest Bedd .02';
15-20% fusine; thin to
mod. Bands & lenses;
calcite & pyrite on cleats;
much cal, little pyrite;
numers. long cal.
filled lanes; some full
thick of Bench; attrited
Coal approx 50%;
luster dull & silky;
numer. fines in samples;
sharp base cont w/ shale part's

.04 shale; med gray, mod soft,
slightly friable; thin
laminae & stringers of
bright coal; slightly irreg.
but continuous; thickness
variable

Bench 2

PB
1.08 Coal - NBB, sim. to above;
less vitrinite ~ 50-20%
max. thick .01 ~ 60-70%
friable; dull to silky
luster; still much coal;
• pyrite nod. .15 in dia;
several pyrite lenses
thin; fusine fine
dissem. & occasional
thin laminae or lenses;
clast not well dev.;
fairly uniform throughout
Bench; major pyrite
in upper 3rd;

.03' - shale - med - dk gray;
variable thick; intermittent
continuous; ~~carb~~ carb;
coaly laminae; irr.
contact w/ coal

Bench 3
PB

.87 - Coal - NBB sim to above;
little pyrite, much
calcite; more vitrine
than above ~ 25-35%
~~mod~~ max band, 2" thick;
~ 50% attrite;
mod-thick band;
fusane, med banding
but sparse; sharp
But uneven contact
w/shale

.18 - shale (Blue band) med gray;
numer fine coal
stringons; pyrite nod
& plexos; local spots
of chert, pyrite;
mod. smooth; ~~mod. soft to hard~~
mod soft to hard;
variable thick; mod
sharp but int. contact
w/ coal

Bench 4
PB

1.73 Coal - NBB sim to above,
much calcite, long
wavy linc; mod
cleat dev; little
pyrite; numer small
fusane lens & disc.
fusane bands;

→

Ultrane Gen. thin bedded,
sparse to mod. concentrations;
trickle dull to silky
luster at least 50%

.03 shale; dk. H. dk grey; heavily
puritized in part; numer
pyrite stringers; occasional
bit coal stringer; UAB,
thick very uneven &
irreg.

Bench 5
PB

1.19 Coal - UAB - sim. to above;
much rustiness in Bds &
lenses; lenses up to
.08 thick & .8 in length;
ultrane thin bedded &
sparse; trickle is Boney
to silky; Bedding quite
variable; lower .3" rather
Boney; Bl. cleats; vertical
cont. frac. much prevalent;
bcc. thin disc. shaly
part near base / Bright
Coal Band; base
contact w/ underlay;
relatively little pyrite!

10% thick
ness
6.69

Floor - shale - med dk grey; H. speckle
mottl; plant impress.; little
or no carbon debris;
slicked; soft; friable; massive
bedding

old
sample

Calctg Miae
12/23/80

Loc C (see map)

Root: 5k:

Shale gray (energy) - med gray w/ brownish
cast, mod. hard, brittle, coal
stringers in lam. at base.
finely lam. (mass.) weathers to
yellow-brown, blocky, num. slips,
many large mod. irreg. but mod.
sharp contact w/ coal. Occ. rolls
1-2" thick. Mod. good top &
bolted properly. Rather smooth,
very little pits,

2.40' coal: NBB, Black, brown powder
mod. hard, cleat small when
present. Num. long vert. fractures
filled w/ calcite. Average about
1" in length. Much calcite
in frac. on cleat. Very
little visible pyrite. Vitrain
thin to mod. banded, sparse
conc. Max. thickness .02'.
Average less than .01'.
15-20% vitrain. attrital
coal approx. 50-60%. Much
fusain. in thin discont.
band & small lenses.

unit is fairly uniform
from top to bottom.

.06 Shale, fusin, + pyrite. Shale
lgt gray, mod. hard to hard,
heavily pyritized; numer.
stringers of fusin +
pyrite throughout. Fusin
varies from soft to hard.
Unit discont, irreg. w/
variable thickness (.02-.10)

1.79 Coal: NBB, sim to above. Sev.
discont. pyrite lam. + bands,
much fus. in lenses +
bands. Vit. thin banded
+ sparse ~70% attrital dull
to silky luster. .10' chaly.
band, .40' from base. Band is
discont. Contains much
silty mat. ^{frag} + lam. of
bright coal.

.17 Shale (Blue Band) med. gray,
smooth, friable, mod. soft,
num. bright coal stringers.
Some dissem. pyrites,
continuous med. sharp
contact w/ coal. Rather
even + reg.

3. 60%^{total} NBB sim, a/a, num. long
calcite-filled fractures
Small cleat, much calcite
on cleat & in frac. Fractures
thin banded & sparse.
max. thick. .02. Average
less than .01. 15-20%
attotal, due to silky
cluster, thick banded
65-70%. Less fusin
than above. Mostly thin
lenses & bands. Lowest
foot of unit becomes
bonier downward. Base
of unit very bonny, just
above underclay. Rapidly
grades into underclay.
One pyrite lens visible
in unit.

Underclay: soft to mod. hrd,
med. to dk grey. Shlicker
sided, very smooth.
very little carbonaceous
debris, fusible.
not prone to heaving
no visible fossils
Occ. streaks of silt.

8.01 total thickness