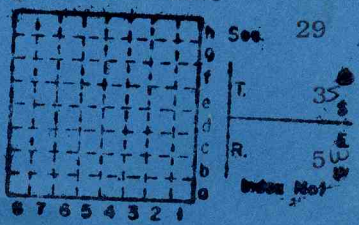


PEABODY COAL COMPANY, MARISSA MINE

Peabody C.C. Marissa Mine (Underground) **HERRIN**

MINE INDEX NO. 990



Mine Index 990

WASHINGTON COUNTY



PEABODY MARISSA



(Sheets)

COAL PRODUCTION

(Sheet)

Period
Mo. Day Year Mo. Day Year

Tons

PEABODY COAL CO.
MARISSA MINE

1979	326	871
1980	424	880
1981	620	100
1982	955	800
1983	1 110	900
1984	1 475	100
1985	1 492	400
1986	1 423	700
1987	1 610	800
1988	1 621	900
1989	1 880	500
1990		
1991		
1992	2 194	080
1993	2 734	239
1994	2 452	255
1995	3 258	994
1996	3 673	750
1997	3 975	220
1998	2 008	790
1999		

SUMMARIES

No. to No.

Railroad, Wagon, Strip, Idle, Abandoned

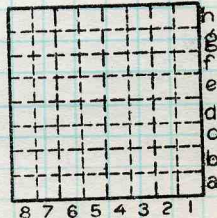
IDENTIFICATION

County No. _____ Coal No. _____

Coal Report No. S-4 8

Quad.

County Washington



Sec. 29

T. 3 S.

R. 5 W.

Index No.

Mine Index 990 COAL MINE—PRODUCTION
ILLINOIS GEOLOGICAL SURVEY, URBANA





Surface works at main slope of the Marissa Mine.

June 6, 1979

Mine visit to Peabody Mine - Marissa

Location: T3S-R5W, Sec. 29 Center, Washington
County

By: J. Cobb, B. Bauer

Traced barite and pyrite vein in ceiling. It went for 2 feet, and its width was around $\frac{1}{4}$ in. Pyrite filled portions of vein, mostly along vein wall. Orientation about 280° .

Many small fractures running perpendicular.

Seam 6.7' thick.

Limestone and black shale roof, Brereton and Anna.

1.5' coal below blue band
0.12' blue band thickness

A second barite vein was taken 100' feet from first orientation 100° , although it curves greatly; runs for about 2 ft., about $\frac{1}{4}$ in wide.

Peabody Coal Company --Marissa Mine

June 6, 1979 Bob Bauer + Jim Cobb

The Marissa Mine started to produce coal in March of this year. It only has a slope shaft that is being used for man and materials, air, and a conveyor belt for coal haulage.

We were called to sample the underclay for clay mineralogy and to sample large blocks of underclay for compressive strength testing.

At site 1 (shown on accompanying map) the roof was Brereton Limestone Member, with the coal seam being 6.7 feet thick. Gathered two underclay samples here for clay mineralogy and natural moisture content.

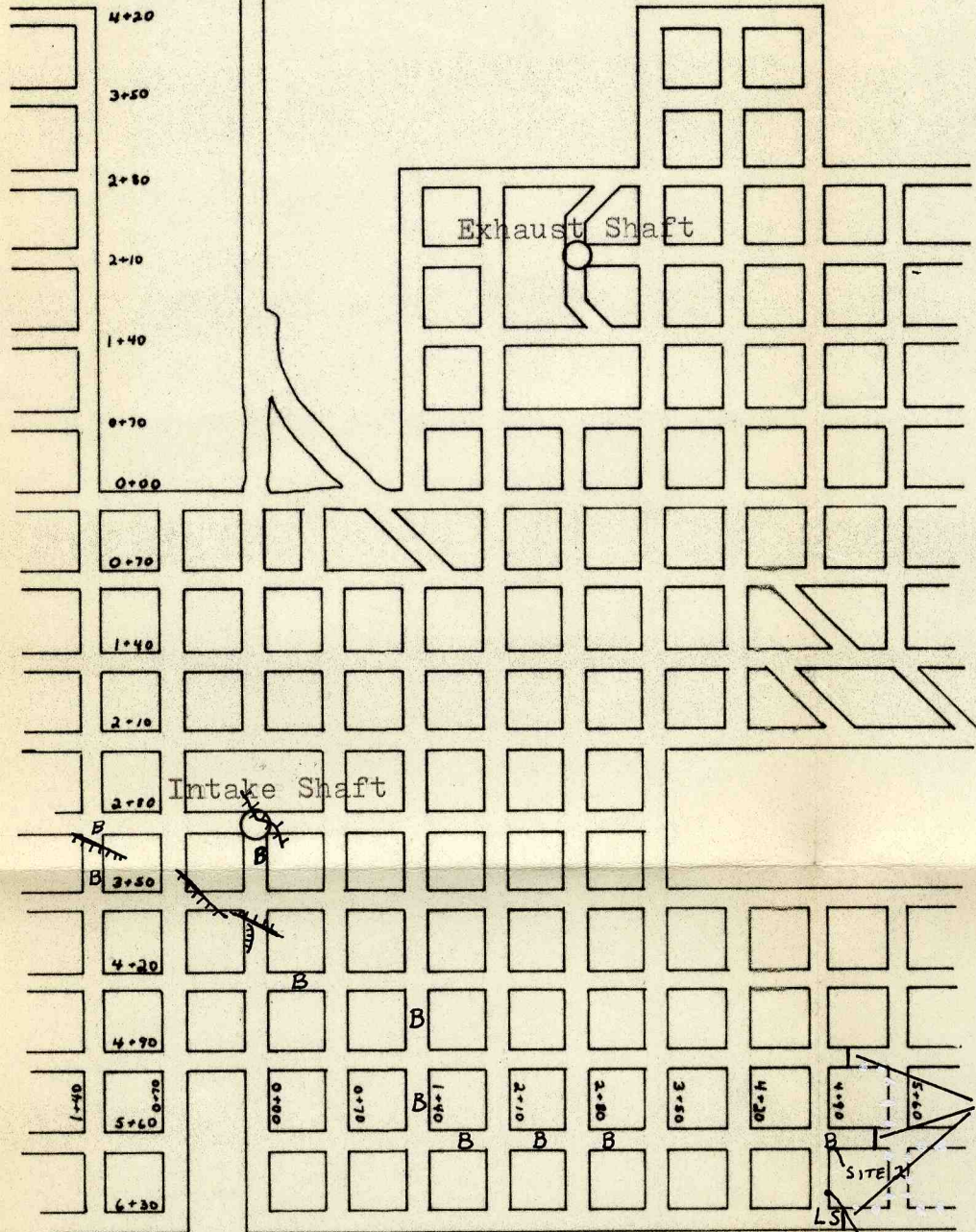
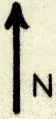
At site 2 the roof was Black Anna Shale with 6.7 feet of No. 6 coal, with 1.45 feet of that thickness being below the blue band shale parting.

The rest of the mapping shown on the accompanying map was performed as we walked through the mine. The set of northwest-southeast slips near the intake shaft mark the rough boundary between good roof and bad roof. The bad roof has many slips and is found southwest of the intake shaft. This area is also where it is believed that the Brereton Limestone is thin or is not found in the roof sequence. The good roof probably has the Brereton Limestone in the sequence.

Mine superintendent --Bob Narone

Jim McSparin accompanied us through the mine. He is from their engineering department.

Marissa Mine



WORKING
FACE
6-6-79

SITE 1

Peabody Coal Company Marissa Mine St. Clair County
May 16, 1980

Notes by John Nelson on visit with Steve Danner.
Accompanied by Bob Bennett from the environmental
dep't. of Peabody. Superintendent of mine is Bob
Nerone.

Currently working two units with Jeffrey ripper-type continuous miners. In full production there will be six or seven units. Now one unit is in the Main East, and the other in the Main North.

The roof in the Main North is Anna Shale with only a few widely-spaced joints and very few small slips. From the Main West junction to the slope bottom the immediate roof is Brereton Limestone. The coal is 6 to 7 feet thick throughout the mine, and is level to gently rolling. The only parting of note is the Blue Band, a little more than one foot above the floor. The floor is claystone. It is dug out for overcasts; wisely Peabody does not shoot the roof to make overcasts.

In the Main East several local areas of Energy Shale are present. Slips are common within this fine-grained gray shale. Again joints in the Anna Shale are widely-spaced. They trend ENE, as they do in most of Illinois. No faults were noted except in the gray shale. Bob Bennett said that no faults worth of note have been encountered in the mine, and no clay dikes or other geologic disturbances have been noted.

Details on the coal seam and roof lithologies are found in Steve Danner's notes.

Peabody Coal Company Marissa Mine Washington Co.

May 16, 1980

Notes by Steve Danner on visit with John Nelson.

Accompanied by Bob Bennett, the dust engineer at Marissa.

Purpose of visit was to collect 3 face channel samples of coal and to observe general geologic conditions of mine.

Channel Sample Location #1: Unit 1, #3 entry of Main North off Main West, or 500' north and 1400' west of center of Sec. 29, T.3S, R.5W. (sample # C21049)

- Roof Shale: (Anna) dark grayish-black, hard, smooth, fissile, phosphorus nodules; contains burrows filled with coarse limey material; no definant joints; thin banded pyrite at base.
- 0.82' Coal: N.B.B., approx. 50% vitrain; attrital coal is midlusterous; hard, cleat poorly developed; abundant white calcite on fractures; occasional streaks of pyrite.
- 0.01' Pyrite: discontinuous.
- 0.43' Coal: similar to above.
- 0.02' Shale: brownish-black, hard, carbonaceous, with numerous pyrite lenses; fairly continuous.
- 0.81' Coal: similar to above; less calcite and more pyrite.
- 0.11' Coal: dull, hard, with irregular vitrain stringers; pyrite filled goatbeards extend down into next unit.
- 1.30' Coal: N.B.B., less vitrain than above, several thick, discontinuous bands of dull coal; more pyrite goatbeards; not much calcite.

- 0.01' Shale: brownish-black, hard, carbonaceous, discontinuous.
- 1.10' Coal: similar to above; abundant pyrite stringers, fracture fillings, and goat-beards.
- 0.02' Shale: grayish-black, hard, carbonaceous, and discontinuous.
- 0.45' Coal: N.B.B., approx 40% vitrain; thin laminations of dull coal; some calcite on cleats; very little pyrite.
- 0.05' Shale: (Blue Band) med dark gray, hard, smooth, finely carbonaceous. (excluded from sample)
- 1.20' Coal: N.B.B., 30-40% vitrain, very thinly banded; little calcite; a few very thin laminations of pyrite.
- Floor Claystone: med light gray, soft, smooth, and carbonaceous.
- Total thickness: 6.33'
-

Channel Sample Location #2: Room 7, East Panel, or
650' north and 700' west of SE corner of Sec. 29,
T.3S, R.5W. (sample # C21050)

- Roof Shale: dark gray, hard, slightly silty and carbonaceous, thinly laminated and contains very finely disseminated pyrite; streaks of coal near base; locally the limestone rests directly on the coal.
- 0.34' Coal: N.B.B., approx 25-30% vitrain; most vitrain bands less than 0.01' thick; hard, cleat poorly developed; calcite in fractures and on occasional cleats; attrital coal moderately bright with a few thin fusain bands; several thin pyrite partings.
- 0.01' Pyrite: hard and fairly continuous.
- 1.04' Coal: N.B.B., similar to above; with more calcite and several fusain lenses; calcite-filled fractures extend from unit above.

- 0.02' Pyrite: with a little shale; variable thickness and fairly continuous.
- 0.57' Coal: N.B.B., similar to above; slightly better cleat development and more calcite than above.
- 0.01' Pyrite: hard and discontinuous.
- 0.35' Coal: similar to above.
- 0.02' Shale: dark gray to black, mod soft, very finely laminated, variable thickness, contains vitrain streaks; discontinuous.
- 0.09' Coal: dull attrital; moderately hard with a few vitrain streaks.
- 0.01' Pyrite: hard and discontinuous.
- 0.42' Coal: similar to above.
- 0.02' Fusain: soft and discontinuous.
- 0.01' Vitrain: discontinuous.
- 0.03' Fusain: soft and discontinuous.
- 0.18' Coal: N.B.B., much vitrain; mod bright attrital coal.
- 0.01' Pyrite: hard and discontinuous.
- 0.69' Coal: N.B.B., fair cleat development, approx 30% vitrain; attrital coal is midlusterous; occasional bands of fusain; calcite similar to above.
- 0.03' Pyrite and shale: soft to hard; shale is med gray, smooth, and finely laminated; fairly continuous.
- 0.02' Vitrain: discontinuous.
- 0.01' Pyrite: hard and discontinuous.
- 0.06' Coal: S.B.B., contains a few thin pyrite partings; attrital coal is moderately dull.
- 0.01' Pyrite: hard and discontinuous.
- 0.16' Coal: N.B.B., very thin banded, approx 15% vitrain; attrital coal midlusterous; thin fusain band at base.
- 0.01' Pyrite: hard and discontinuous.

- 1.27' Coal: N.B.B., 10 to 20% vitrain, with bands less than 0.02' thick; attrital coal is midlusterous; contains a few thin shaley partings; some calcite on poorly developed cleats.
- 0.04' Shale:(Blue Band) med to dark gray, mod soft, finely laminated; smooth; contains a few thin streaks of coal; variable thickness.
- EXCLUDED* 0.27' Coal: N.B.B., vitrain content varies, with bands up to 0.04' thick; attrital bands very thin; calcite on cleats and in fractures
- 0.02' Pyrite: very hard and discontinuous.
- 0.46' Coal: N.B.B., very thin banded; calcite as above.
- 0.01' Fusain: mod hard and discontinuous.
- 0.78' Coal: N.B.B., vitrain bands up to 0.05' thick, but most are thinner; attrital coal mod bright; calcite as above.
- Floor: Claystone: med gray, soft, smooth, crumbly, and slickensided.
- Total thickness: 6.97'
-

Channel Sample Location # 3: 450' north and 700' west of SE corner of Sec. 29, T.3S, R5W.
(sample # C21051)

- Roof Shale:(Anna) black, hard, fissile, widely spaced joints (070-073°); some lined with calcite; occasional large concretions; no phosphates noted; smooth undulating contact.
- Shale:(Bastard limestone) dark gray, mod hard, poorly bedded, calcareous, abundant fossil debris; thickens just west of sample location up to 1.5' of limestone; this ls is very hard, dense and massive, lenticular; contact with coal is sharp, but irregular.
- 0.79' Coal: N.B.B., approx 50% vitrain; attrital midlusterous; cleat well developed with abundant calcite; occasional pyrite goatbeards.

- 0.01' Fusain: discontinuous.
- 0.40' Coal: N.B.B., 30-40% vitrain; attrital mid-lusterous; well developed cleat with abundant calcite; no visible pyrite.
- 0.01' Pyrite: hard with black shaley streaks; discontinuous.
- 0.59' Coal: similar to above; a few fusain laminations; banding less distinct than above; abundant calcite.
- 0.01' Shale: very pyritic; grayish-black and hard; variable thickness.
- 0.26' Coal: similar to above.
- 0.01' Pyrite: hard with black shaley streaks; discontinuous.
- 1.19' Coal: N.B.B., contains 30% vitrain; mod dull attrital coal; cleat less developed than above; some calcite on cleats but less than above; occasional fusain lenses and 1 pyrite goatbeard.
- 0.02' Pyrite: interlaminated with black shale and coal; lenticular.
- 1.30' Coal: similar to above with less pyrite.
- 0.02' Fusain: soft and lenticular.
- 0.26' Coal: similar to above but more thinly bedded; contains some calcite; no visible pyrite.
- 0.01' Pyrite: lenticular.
- 0.38' Coal: similar to above;
- 0.02' Coal: dull and hard; appears shaley.
- 0.42' Coal: N.B.B., approx 40% vitrain; attrital coal is midlusterous; contains irregular laminations of pyrite; much pyrite on cleats
- 0.10' Shale: (Blue Band) med dark gray, hard, smooth, occasional coaly streaks; pyrite lenses near top of unit. (excluded from sample)
- 1.34' Coal: N.B.B., approx 30% vitrain; attrital coal is midlusterous; thin to thick banding; abundant calcite and pyrite on cleats.

Floor Claystone: med gray, mod hard, smooth, carbonaceous, slickensided.

Total thickness: 7.14'

Observation stop #1: approx 50' south of sample site 3.

Shale roof; med dark gray, smooth, poorly bedded; breaks in irregular slabs; contains abundant pyritized fossils, mostly bivalves; a few coaly streaks near base; no laminations; numerous slickensided slips along contact with black shale (Anna). Appears to be overlain by black shale.

Observation stop #2: approx. 90' west of gray shale/black shale contact.

Numerous coal balls can be seen in top of seam overlain by gray shale.

Note; the black shale in this area many concretions.

Peabody Coal Company
Marissa Mine
Herrin (No. 6) Coal

March 14, 1985
Washington County

Notes by S. K. Danner. Accompanied by Keith Hackley and Steve Hawk (ISGS chemists), and Steve Browning and Bobby Bennet (Peabody engineers).

Purpose of visit was to collect two sets of coal samples for a sulfur isotope study.

Sample Site #1:

260' inby Room 3 of 1st Panel South, off 1st Submain West, off 1st Submain South, off Main East;
or
2540' from NL, 2060' from EL, Sec. 32, T.3S., R.5W.

Roof: Anna Shale: dark gray to black; hard; thinly bedded with sheety to slabby parting; contains many small pyrite flakes and nodules. Prominent joint set trending N 65⁰ E, \pm 3⁰, with 3'+ spacing.

Coal: 6.3' thick; normally bright banded, very hard with small, poorly-developed cleat. Coal is relatively clean with only a few discontinuous shale partings and occasional pyrite stringers. There is little cleat pyrite and virtually no calcite.

Blue band is 1.5 inches thick and located 5.04 feet from top of seam.

Mining conditions are good in this area. No unusual geologic features.

Marissa Mine

Page 2

Sample Site #1 (Continued):

1st Submain West just west of 1st Panel South:
Very pronounced jointing on track entry. There are two joint sets; one set trends about N 10° E, the other trends N 85-90° E. The spacing between joints is about 2.5 feet.

About 4.2 feet of underclay is exposed beneath a nearby overcast. The underclay (claystone) is a medium dark gray; moderately firm; upper 0.5 feet is friable with numerous, thin, coal stringers.

Sample Site #2:

#6 crosscut right off #4 entry of 4th Panel South off 1st Submain West, off 1st Submain South, off Main East; or

2590' from SL, 10'- from EL, Sec. 31, T.3S., R.5W.

Roof: Anna Shale: 2 to 12' thick; black; hard; thinly laminated with a sheety parting; pimply surfaces; shows small patches of granular pyrite, some pyritized fossil frags; found one impression of a coiled cephalopod, about 3 inches in diameter. Much of the roof in this area is flat and smooth. Appears to hold very well.

Coal: 6.58' thick; normally bright banded; small, poorly developed cleat; very little cleat pyrite or calcite; few thin partings. Blue band 1.5 inches thick, 5.13 feet from top of seam.



FORM 180 W

Peabody C.C. Marissa Mine - Washington County

Trip: December 3, 1985 by R. D. Harvey and Phil DeMaris (notes) of I.S.G.S., Karl Vorres and George (photographer) of Argonne National Laboratory, three men from Pittsburgh M.T.C., Blaine Cecil and Ron Stanton (U.S.G.S.) and George Morris and Ron Wilson (Peabody Coal Co.)

Coverage: Introduction
Coal descriptions East of column site
Collection of Premium Coal and IBCSP-5 Samples
Coal descriptions West of column site
Samples: PMA-A-1 to-8

Introduction

This trip was set up primarily to collect two large coal samples from a fresh face as standards. A four-ton sample cut by machine will become the IBCSP-5 sample and a one-ton sample will become the Premium Coal Sample; both will be processed at Argonne National Laboratory.

We were briefed both by Vorres and by Peabody personnel on the sample plan, the planned site, and safety and mining procedures. The mine entry is by a slope, which eases the problem of moving full barrels in and out. Blue reflectors mark intake air, which is the prime escapeway leading to the bottom of the slope. A 6-passenger emergency elevator is also available.

The mine uses continuous miners: the coal runs about 5½' thick under limestone roof to about 7½'



FORM 180 W

-2- of 10, plus 1 map

under black shale ("slate") roof. They indicate there are no cutouts encountered and no faults either. I asked about differences in the underclay and the superintendent reported that undercasts (6-7' deep) can be cut on south side of mine, but must be blasted on north side of mine because underclay is only 3' thick. This means that the underclay becomes calcareous and/or nodular by that depth on the north side of the mine.

I reviewed our mine notes for this mine for types of roof and came up with three: Anna Shale, Brereton Limestone and "White-top". Prime candidates for what "white-top" is, are: 1) pods of Energy Shale, 2) a clay dike or clay injected into top coal, and 3) fossiliferous shale or "bastard limestone", which is older than the Anna Shale. Both 1 and 3 were found at the Nashville Mine by Cady, also in this county, but it is much closer to the Walshville channel.

Main entries (where we will be) are driven with pillars on 70' centers; pillars are on 60' centers in the panels. They do a "second mining" on the periphery of panels before they are sealed.

Cecil and Stanton are carrying Bowdil 6-10 picks with replacable carbide tips - Ron says they are great.

Coal descriptions east of column site

The sample area is only a short distance from the slope bottom area, but we took electric vehicles to the collection area. The south face at a cross-cut was selected as the collection site (See Map A) where "Unit 2" was working on the East Main:



FORM 180W

p 3 of 10, plus 1 unno

they are now actually cutting back west to hook up with areas mined earlier.

A. Thirty feet east of the center of the crosscut (the column left was roughly in line with the crosscut center) I did a basic seam description where the full seam and roof was exposed. There is a sharp contact to black shale (Anna) roof which was slightly calcareous, being under the edge of an Anna concretion 2' in diameter. Anna Shale (-A-1) was sampled for XRD and chemical analysis.

Column site had identified Anna roof 10' away, so it would have the typical roof for the mine. Initial cleaning of rock dust at A. showed a similar set of partings to that of Crown II (which is 85 miles north) which was encouraging. After description, blue band (-A-2) and underclay (-A-3) were samples.

Anna Sh. roof (-A-1)

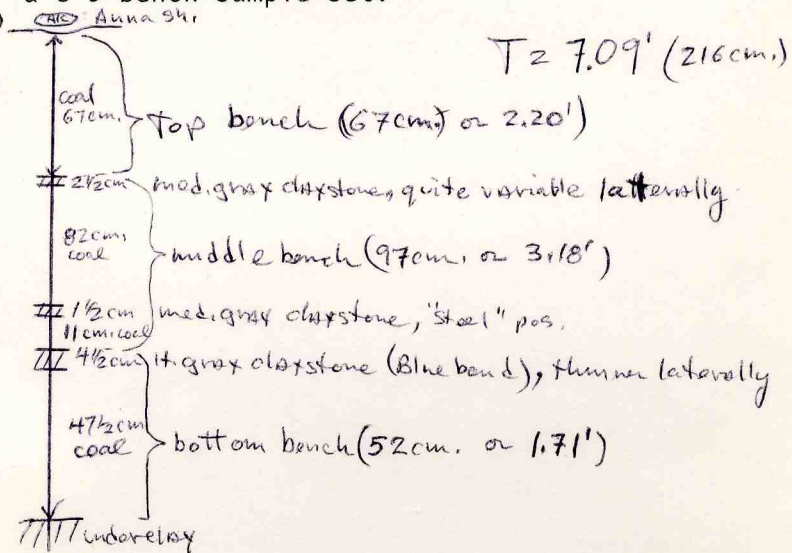
$$T = 6.71 \frac{5.30', 08'}{1.33', 08'}$$

Orig. measured in cm.
 $T = 203\frac{1}{2} \text{ cm. or } 6.68'$

- 1.28' BBC.
- *.05' claystone band w. pyr. nodules
- .80' BBC.
- *.05' fusain band - cross section of pyxteral (?) 109 cm. Across,
- *.07' BBC.
- *.02' claystone ptng. w. pyrite, laterally thicker + widespread
- .70' BBC, finely banded
- *.03' bone parting, by scratch
- .72' BBC, with some fusain
- *.07' claystone band, w. pyrite streaks
- .67' BBC, finely banded
- *.02' claystone ptng. with pyrite.
- .38' BBC, finely banded
- *.08' claystone band, med gray, only slightly pyritic
- .36' BBC, finely banded (Steel position)
- *.08' claystone band, light gray (Blue band) (-A-2)
- .20' BBC.
- *.05' fusain band, ends to one side, traced over 1 meter on the other side.
- 1.08' BBC, finely banded except for a few wide (up to 1/4") vitrain bands; some Fusain,
- /// Underclay, light gray, soft; (-A-3) represents top 10 cm.

B. This pillar corner is where Ron Stanton and Blaine Cecil first examined the seam, and planned to collect a bench set in the PM. Roof bolts used in this area (including column area) are all 5'; 5' bolts generally but not always reach limestone ("rock") according to the face boss. They apparently don't have roof falls when this occurs. After completing the description and checking laterally, I decided the parting at 69 cm. down was the corresponding prominent parting which separates bench 2 from bench 3 at Crown II (B2/3 ptng.)* I marked the B2/3(?) ptng. and blue band at this site and got vertical bench thicknesses, and passed this information on to Blaine. Roof is Anna Shale with a limey concretion pressed right to top coal. I checked laterally and this is the normal pattern; the base of concretions or shale immediately under concretions are typically pressed down 0.1' into top coal. The same effect was photographed elsewhere by RDH in cross-section at the end of the shift. At B., Ron had noted the same partings I saw at A., and was going to take a 8-9 bench sample set.

* This judgment was premature - best method to A. may be with bone ptng. at 2.9' down, after checking Crown II and Monterey I data.





FORM 180 W

-5- of 10, plus 1 map

C. Just 8' west of A. there was a small corner ("fender") where samples are easier to get. Here I sampled 2 more claystone partings noted at A., both the B2/B3 position parting (-A-4) and the parting at the "steel band" position (11 cm. above the blueband here) as well (-A-5). RDH got photo of me chiseling out -A-4. This site corresponds to RDH's site 1; Dick collected three blocks with partings here or nearby.

Collection of large samples

As I took the partings at C., the continuous miner finished the eastern-most cut to isolate the sample column, and began the western-most cut. This coal became the IBCSP-5 sample and was loaded into barrels and buckets when the cut was complete. After the roof was bolted Ron Stanton marked the column to be cut, tarps were spread, and the column was cut down by pick. While it was being cut down as the "Premium Coal" sample, I did coal descriptions at D. Dick did a quick check of the coal thickness at the column, which measured 7.3'. Roof at the column is Anna Shale with 4' diameter concretions present in the intersection. Just 8-10' back from column spot, there is an ovate patch (about 4'x6') of "bastard limestone" between the Herrin and the Anna. RDH sampled a small piece of "bs. ls."; it is medium brown-gray, slightly granular, clay rich, with lots of small shells, including gastropods and bivalves. This material can be distinguished from typical Anna concretions which are medium-dark gray, more homogenous internally, are rarely fossiliferous (and if so, animal fossils are sparse), as well as by their different stratigraphic position. The bs. ls. here appeared to vary laterally in amount of fossil content, but exposure was not ideal.

Location of the two samples is NW $\frac{1}{4}$, SE $\frac{1}{4}$, SE $\frac{1}{4}$ of Sec. 29, T.3S., R.5W., in Washington County. By footages within Sec. 29, the location would be 980' from east line, 1070' from south line.

Coal description west of column site

- D. North one crosscut and slightly west of the column site, I did a quick description on the pillar corner. Large Anna concretions (to 4' diameter) are bolted up just to the east. At description site roof is Anna Shale with a 1 $\frac{1}{2}$ ' diameter concretion near the base.

Anna Shale with cone.

$$T = 6.84$$

$$T = 209\frac{1}{2} \text{ cm. oz.} \\ 6.87' \text{ direct}$$

1.29' coal (NBB)

* .02' claystone parting, heavily pyritized

.90' coal (SBBC)

B₂ B₂ - - * .10' bone coal ptng. w. 1/2 mm vitrain sheets, more clay to top

.79' coal, not distinguished

? - * .02' claystone with pyrite

1.67' coal (SBBC, some Fusain bands)

* .07' claystone ptng. med. gray

.33' coal (SBBC, finely banded)

B₂ B₁ - * .08' claystone, light gray, traces of pyrite (Blue band)

1.57' coal (NBB)

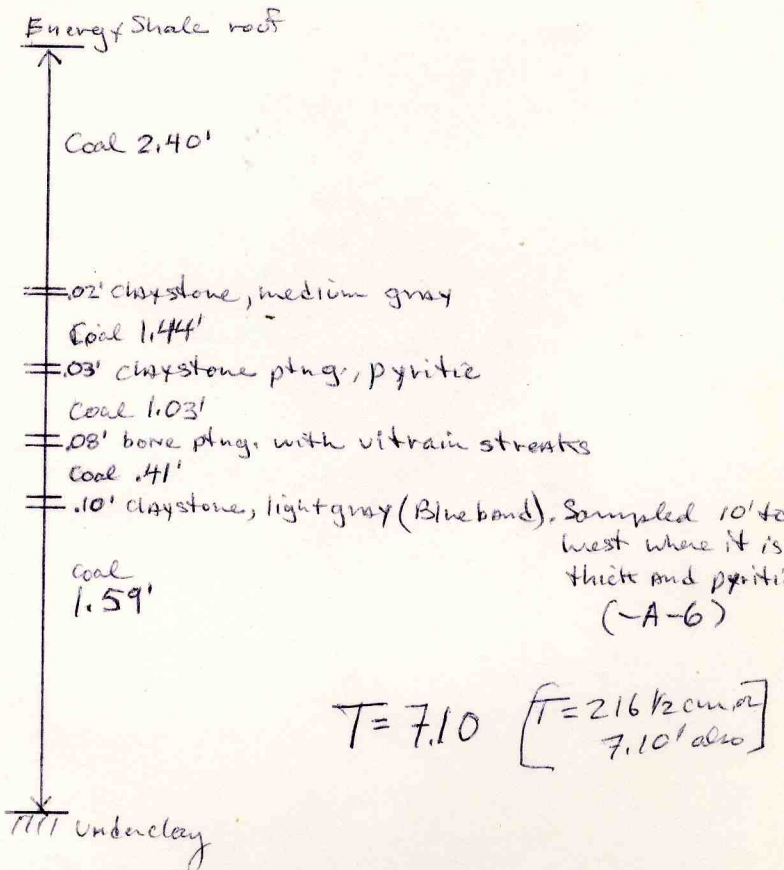
/// underclay



FORM 180 W

-7- of 10, plus 1 map

- E. About 35' west of column which Ron Stanton is describing. Site is well dusted; I cleaned enough to identify major plugs, but couldn't distinguish coal types. Site is near edge of an Energy Shale roof area. This Energy Shale is finely carbonaceous, light to medium gray, pectin-rich, and seems to be the same facies which is present at Crown II.

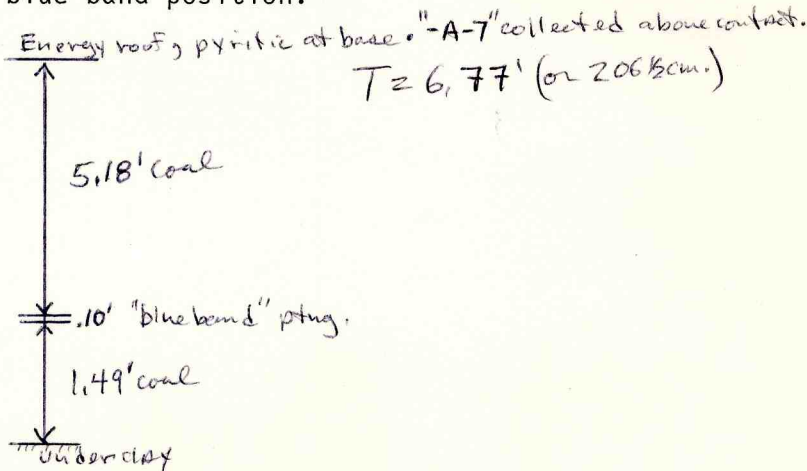




FORM 180 W

-8- of 10, plus 1 map

- F. About 20' further west from E. More roof has fallen out here as Energy Shale thickens to W. Exposure is too fresh and wet to clean up well, so I got only a thickness and the blue band position.



I spoke to roof bolters on section about this roof, and they called it "soap stone" and knew it to be poor top. When I asked them what "white top" was, they considered it to be a hard material; I didn't go any further, but this could be the light colored "bs. ls." pods. The Brereton Limestone is simply called the "rock", usually with black "slate" below it. However, the bolters didn't seem to distinguish the bastard limestone from the black shale concretions because of their similar outward appearance. The superintendent in his briefing considered "white top" a weak material, which fell out between header boards. Thus, his "white top" is probably, and the bolters "soap stone" is certainly, the Energy Shale, which is the least stable of the roof units. This illustrates how the use of popular terms is not consistent even within the same mine.



FORM 180 W

-9- of 10, plus 1 map

G. This site is RDH's site 2. In the afternoon Dick sampled two blocks of coal including the blue band, which he measured at 1.60' above the base of the seam. Sample A-8 is a crushed sample made from one of these blocks.

After the barrels had been loaded out we compared notes and watched Ron and Blaine collect a face channel on the remaining column. They did a description and took a "chip channel" like I have occasionally done, using a plastic gallon bottle cut open at the bottom as a funnel. Fine bands are obvious here (no rock dust!) and the B2/B3 parting is a carbonaceous claystone, although it was a "bone" parting at most other sites. The "steel" position band was "bone" here. Comparison of their description with ours will be useful.

Due to lack of time, they skipped bench sampling at site B. At 3:55 we packed up and headed out. On the way out, RDH photographed an Anna concretion in fully-cut cross-section with Blaine's hand for scale.

Samples: PMA-A-1 to 8

All numbered samples are to be crushed for XRD analysis and chemical analysis, as part of a project on the nature of partings in the Herrin Coal.

	<u>Site</u>	<u>Description</u>
-A-1	A	Anna Shale roof, bottom 0.1'
-A-2	A	Blue band, where 2½ cm. thick
-A-3	A	Underclay of H., top 10 cm., light gray and weak
-A-4	C	Claystone parting, pyritic (B2/B3? position); <i>parting at 67 cm. down.</i>



FORM 180 W

-10- of 10, plus 1 map

	<u>Site</u>	<u>Description</u>
-A-5	C	Claystone parting, "steel band" position
-A-6	E	Blue band where 3 cm. thick, and only slightly carbonaceous, also pyritic
-A-7	F	Energy Shale, facies with pectins; sample from bottom $\frac{1}{2}'$, but excludes base which was very pyritic
-A-8	G	Blue band, medium gray with some pyrite (R.D.H.)

RDH collected blocks of coal at C with the three most prominent partings. RDH also collected 3 band samples of Energy, 2 with pectins, a shell-rich sample of bastard limestone, and two samples of Herrin/Anna contact.

Clay #'s 3095 A to H, respectively
 C #'s are C24257-264, respectively.

Peabody Coal Co. Marissa Mine
John Nelson, September 1, 1988

Visit with Connie Letsky and Steve Wilson of Peabody Coal Co. Purpose of visit is to inspect reported faults.

4th Panel East off Submain North

- 1) Intersection of track entry with crosscut 6. Open vertical fracture in roof trends approximately N. 55° E. Fracture extends from pillar to pillar but is offset en echelon in middle of intersection. Maximum width of fissure is about 1/3 inch. Roof is black shale overlain by limestone. Fracture does not penetrate coal.
- 2) Area of bad top, numerous slips; irregular blocks of rock up to 3 ft. have fallen out. Immediate roof 2 to 3 feet of grayish-black mudstone, poorly laminated, with numerous fossils: Pecten, Lingula.

Orbiculoidea. Occasional coal stringers-main roof appears to be limestone. Shale probably is lenticular Energy Shale.

Discontinuous joints or fractures trending northeast. Some lined with crystals, more open. Ordinary slickensided slip with a few inches of normal offset.

Walked east to crosscut 13 on track entry, then returned to mouth of panel via belt entry and entry north of belt. No faults or open fractures were encountered. Roof is variable, 0 to 3 feet Anna Shale, discontinuous Brereton. The following

section was observed in a large roof fall:

- ~~TOP~~
- $\frac{1}{2}$ ' Claystone, dark gray to black, soft, mottled.
- 12' Shale, medium gray, poorly laminated, silty, calcareous, occasional whole brachiopods. Upper 6 ft. darker gray and slightly better laminated. Gradational contact.
- $1\frac{1}{2}$ -2' Limestone, to calcareous shale, very argillaceous, nodular, biomicritic with whole and broken brachiopods. Dark brown septarian concretions about 4" thick and 1 to 3 feet long, common near top of interval. Sharp and irregular contact:
- 1- $1\frac{1}{2}$ ' Anna Shale, black and fissile (as usual).

Top of Herrin Coal

The limestone probably is the Conant.

No faults reported or observed in this panel.

Main East Entries

Thrust fault reported to cross main East Entries, trending NNW and entering panels north of the Main East.

On track entry between crosscuts 32 and 33, a small thrust fault is visible on north rib. A thin zone of pulverized coal, dipping about $10\frac{1}{2}$ west, is present near the top of the seam. It appears to merge into a bedding plane 1.5 feet below the top of the seam. Where it enters the roof (Anna Shale) the fault plane steepens, and a sharp drag fold is developed. The displacement is only a few inches.

The feature was not found on south rib, due to heavy rock dust.

Definite thrust fault on belt entry just east of crosscut 35. Strike N. 40° E., dip 10° to 30° west (varies within coal); penetrates entire thickness of coal. "blue band" offset on south rib - throw 0.6', heave 1.6'.

Fault observed in 1st entry north of belt, crossing intersection at crosscut 34. Strike N. 30° W., dip 25° , a few inches of reverse displacement. Coal is pulverized, shale sharply folded. This is most likely the larger fault seen on the belt entry, but the strike has changed abruptly. We could not locate this fault farther north.

No faults were observed in the 3rd entry north of the belt, but a narrow fracture zone is present in the roof (Anna Shale) from crosscut 33 to crosscut 35. The zone strikes slightly north of east. It is more intense than ordinary jointing, but there is no visible offset or separation.

We could not locate the fault of crosscut 35 in the track entry or farther south.

Fault in 1st Panel West off Submain
North off Main West

According to Connie Letsky and Steve Wilson, a thrust fault was encountered in the now-sealed 1st panel west, north and slightly west of the thrust faults that I saw in the Main East. A map of the fault in 1st panel west was given to me by Steve Wilson and is included here. The fault was said to dip west at a shallow angle and to have a maximum throw of about 1.5 feet. Water seepage and roof falls occurred along the fault. The structure may continue farther north into a yet unmined area.



FORM 180 W

All indications are that this is another of the class of thrust faults that Bauer and I described in a paper in the March, 1987 issue of G.S.A. Bulletin.

Marissa Mine

1" = 100'

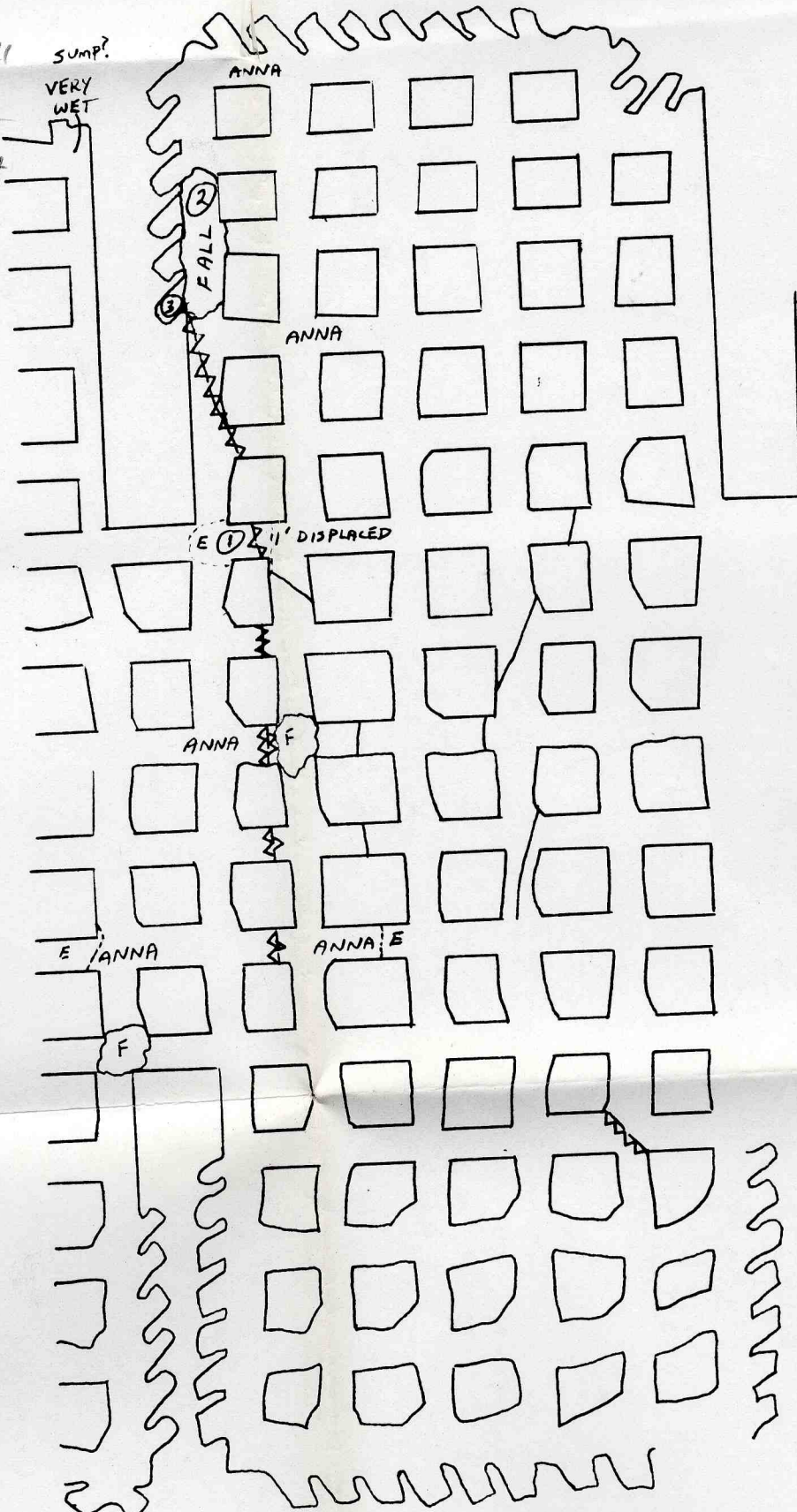
Portal: Sec. 29-38-5W

1ST PANEL WEST/SMN/ME

Fault: Sect. 28-21 area

SUMP?
VERY WET

John: If you want mine map 1:200, call Steve Wilson (314) 342-3473

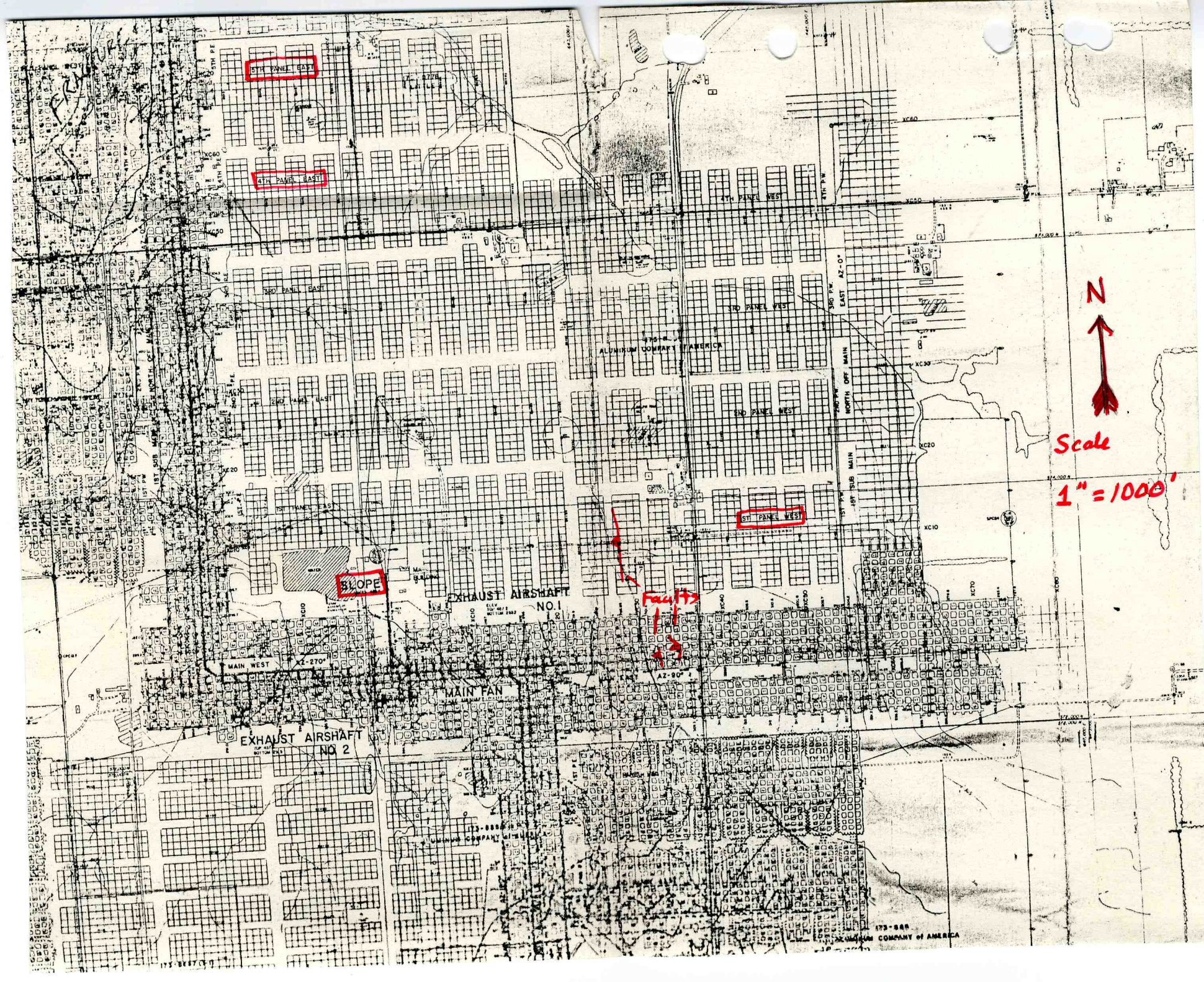


① REVERSE FAULT
1' DISPLACEMENT.
ABUNDANT GOUGE
TRACEABLE THRU
WEST FACE OF
NORTH PILLAR.
ENERGY SHALE
TOP, BENEATH
ANNA. ABUN. SLIPS
IN ROOM EAST OF
①.

② VERY HARD
LIMESTONE IN FALL,
MODULAR.

③ FAULT TRACEABLE
IN COAL FACE

WEST SIDE UPTHROWN
RUBBLY GOUGE +
BRECCIA, NO MINERAL-
IZATION. DIP ~ 40°
WEST.



5TH PANEL EAST

4TH PANEL EAST

3RD PANEL EAST

2ND PANEL EAST

1ST PANEL EAST

5TH PANEL WEST

4TH PANEL WEST

3RD PANEL WEST

2ND PANEL WEST

1ST PANEL WEST

MAIN WEST

MAIN PAN

EXHAUST AIRSHAFT NO. 1

EXHAUST AIRSHAFT NO. 2

SLOPE

Faults



Scale

1" = 1000'

ISGS Mine Notes - Peabody "Marissa" - Washington Co.

Visit: April 17, 1990 by Phil DeMaris, Kumar Chandrashekar and Mark Phillips of SIU-C, escorted by William Abernathy, Larry Justice (Eng.), Connie Letsky (Geol.), Dick Reisinger (Eng.) and Dennis Robinson (Assist. Supt.) all of Peabody Coal or Peabody Development Companies.

Coverage: Introduction
1st Submain N. off W.
Main East falls
3rd Panel West off 1st Submain N.
1st Submain N. off E.
Summary
Samples: Set B begun (to -2)

Introduction

This is the sixth mine visited for the second year of IMSRP-supported ground stability research. Peabody personnel briefed us on immediate roof lithology, based on a significant amount of mapping by Bill Abernathy, Connie Letsky and others. Although data was not available, I estimated the areas as follows: 60% Anna Shale, 1/2' or greater, 30% Brereton Limestone (within 1/2' of Herrin), 5-8% Energy Shale in lenses, and <3% Lawson roof areas. There seems to be no pattern to the Energy Shale lenses: the Lawson roof areas are also small, occurring within areas of Anna Shale and Brereton Limestone roof, but

appearing to be distributed independently with regard to Energy roof areas.

Connie thought that small areas of Jamestown/Conant roof were also present, but she was not sure how it was mapped (part of Lawson area?). Connie indicated that she provided detailed raw data, but did not compile the maps.

We were told that thrust faults were hit in general places. (Reviewing notes after trip indicates the thrust faults seen by Nelson vicinity 35 c/c on E. Mains were small and laterally discontinuous.)

Dick Reisinger ended the briefing by posing the problem: What further data can be gotten from drill hole information (spaced on 1/2 mile centers) that will help predict and/or help solve the typical smaller scale mining problems encountered?

1st Submain N. off W.

A. (See map A) On the way toward a roof fall, I quickly examined a cut exposure. Here, there is 2' of Anna below Brereton with large ovate concretion, up to 1½' in diameter.

B. Old fall extending 14' above Herrin. Conant nodules are visible, and we are told they are hard on the drills. We could not check the units here for safety reasons. Desc. of "Site 1201".

	Base of Bankston (prob.)
?	carbonaceous unit at top of interval
ca. 6'?	Thick Lawson Shale

- ca. 2' Conant limestone (base if distinct and has continuous tough nodules up 1¼' thick)
- ca. 1/2' Jamestown - carb. claystone
- ca. 1/2' prob. calc. zone (Brereton?)
- <1' thin Anna Shale
- ca. 3' Energy Shale

(Later in the day Mark, Connie and I confer about what we saw and what is in d.h. data. Connie confirmed that continuous thin Brereton is typical in this setting. Also the Jamestown interval is prob. calcareous since it was not a weak zone in the fall).

B. No. One c/c north the edge of the Energy occurs and "bs. ls." concretions occur atop Herrin (-B-1). Anna shale above nodules is 1' thick and phosphatic at the top. Above is Brereton "clod". This mode of occurrence of "bs. ls." is similar to that of other mines in the region, including River King and the old Nashville Mine.

East Main falls

We stopped around 30 c/c on Main E, crossed belt at 29 c/c and headed east to find some fault-related falls. (See map B.) (Site 1202)

C. No. Poor view of big fall. Prob. Lawson Shale seen in gob. At edge I see

- ? Brereton Ls., very dark
 (argil.?)
- ca. 2' Anna Shale

C. Between 2nd and 3rd E. at 30 or 31 c/c Connie gets picture of sagging Anna Shale. Brereton in roof is slightly discontinuous--broad nodules seen. Section here is: Brer., very dk, gray

0.5' Clod
2.1' Anna
- Herrin

D. 7-8' fall on 1st E.; as counted at 34 c/c but probably 35 (map shows it at 35 + 36 c/c)

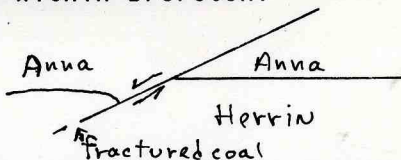
(thick) Lawson Shale (1202/1)
- nodular Conant Ls. 1½' above Brer.
(thin) Jamestown, if present (not distinctive)
ca. 1½' Brereton Ls., flat based
3½' Anna with 3' x 1' thick concretions which depress base 1/4'

Anna has phosphate bands at the top and large "tube" type bioturbation. Piece of Conant examined; is very tough, black and recrystallized with 1/8" veins. Connie says Brer./Conant sandwiched with little Jamestown (if any) is seen in cores.

3rd Panel W. off 1st Submain N. off M.E.

This is unit #6 territory. We parked at 28 c/c, passed power at 32, and examined fault at face of far end of panel. 33 c/c has 2187' tag. (See map C) (Site 1203)

E. At 34 c/c normal fault crosses room with strike of about N. 40° E., showing 1/2' throw on base of Brereton. Fault is low-angle in Anna but can't tell within Brereton.



The northernmost of 2 faults is sketched (above); the southernmost fault is bigger and has similar strike. Both have brittle broken coal and pyrite mineralization in small cracks. There is clay injected into the plane in Herrin Coal on conjugate fault on pillar corner (marked "clay" on map). As a set of faults the movement is down to the SE, i.e., this is normal en echelon faulting. As we tracked the big one north the strike turned to the north and the fault weakened and was lost in top coal about 100' from the pillar corner.

These faults have no compressional features and are not thrust faults, nor probably related to thrust faults. (Map B. sites however were in areas where Nelson reports small thrust faults, but provided no map).

1st Submain N. off E. Main (Site 1204)

F. (See map D) Area of wet conditions. 6' resin bolts are used here after 2' Anna is cutdown i.e. nothing substantial to bolt to. They use 2' minimum limestone rule; if not met they use the 6' resin bolts. Dennis estimates 25% of their bolts are of this type. Here there is over 2.7' of Anna; just to N. is 7790' tag, one vertex of planned 45° c/c.

G. Easternmost entry shows edge of Energy Shale wedge with pectins and pyrite tetrahedra, confirming this as a lens of the shelf facies (sensu DeMaris and Nelson 1990). Energy Shale collected (-B-2) for analysis.

The face of all 8 entries were checked. Dennis indicated 6' resin bolts were used all across the area, and 3' mechanical bolts would have been used if the Brer. was 2' or thicker. He estimated bolt usage at 25% 3' bolts, 50% 5' bolts, and the balance 6' resins. Some of the 5' bolts go into the Conant Ls. which is tough on the bits.

We had no fall or other exposure here, so I asked if we could see "good roof" in the same area. We went south to see an overcast in same submain.

H. Examined overcast at feeder between belt and track.

2.3'+ Brereton, medium gray
0.3' clod/bioturbated zone
1.5' Anna Shale

The top of the fall shows angular breaks in hard limestone (shot down); originally bolted with 5' mech. bolts suggesting more than 3½' Ls before shooting. Now bolted with 3' bolts suggesting minimum of nearly 5' of Brereton.

I. On the way out we looked at 13-14' fall. We went through door at c/c 22 on Submain N. and examined fall in vicinity 15-17 c/c. Desc.:
(Site 1205)

6'+ Lawson (fall comes down to a chimney at top)
1-1½' Conant Ls., thicker at nodules

- 3/4' Shale (Jamestown?)
 ca. 1' Brereton, gray, not nodular,
 breaks irregularly
 3½' Anna Shale

One crosscut away has 892' tag. No notes taken at second good exposure of same fall--see Mark's notes. Left at 2:40.

Summary

The roof in this mine, because it has similarities with the roof at River King Mine, is more complex than the average. This was only the second studied mine with continuous Conant/Jamestown interval present; its effect as roof stability is hard to judge from fall exposures alone. Likewise, the apparent thinning of Brereton Ls. over thick Anna Shale (independent of Energy lenses) though not new, is also impossible to evaluate from limited exposures. The nodules of impure limestone (bs. ls.) on the flanks of Energy lenses are either bolted or cut down if unstable; they also add to the variety of conditions and in our sequences they should be mentioned in association with Energy lenses. The number of roof falls examined was few, so few will be added to the data base. While general stability here can be related to roof sequences, no gains were made in our ability to predict lateral stability changes. Based on the use of 6' resin bolts, the situation of thin Brereton over thick Anna Shale must be a widespread problem.

Samples: PMA -B-1 to -2

-B-1 B. No. Bs. Ls. nodule atop Herrin Coal adjacent to Energy lens.



FORM 180 W

8 of 8
4 mo

-B-2 G

Energy Shale 0.5' to 0.7' up; bulk
for Chemistry and carbon %;
retained small pieces with pectins.
Pectin impressions vary 3 mm-14 mm
wide and are not fully pyritized;
traces of u/i carbonaceous matter
also present.

Peabody's Marissa Mine, Randolph plant resume operations

Marissa resumes production

The company also reported that its Marissa Mine resumed normal production in early March to begin to build a coal stockpile for processing at the Randolph preparation plant, which is expected to be operating again in April. The full complement of 300 employees returned to work at the mine.

Extensive damage to the building and the coal processing equipment was done by the fire at Randolph plant on Dec. 6, 1993.

As a result of the damage, the plant could not operate, and the nearby Marissa and Baldwin underground mines, which produce coal for the plant, could not resume production in mid-December. All three facilities employed more than 700 people.

Peabody Coal hired Packer Engineering, an engineering consulting firm that specializes in investigating industrial fires, to determine the cause and origin of the Randolph fire. After a thorough investigation, including burn patterns, combustible materials, etc., Packer determined that the fire was intentionally set on the first floor of the plant. The fire spread rapidly through the upper floors, causing major damage to equipment in those areas.

Repairs on the Randolph plant began in mid-December 1993. At that time, company officials thought they would take about six months to complete.

Finally, Peabody Coal announced the permanent closure of the Baldwin Mine. The mine, which employed 300 people, had been scheduled to close in mid-1994 when the sulfur dioxide emission limits prescribed by the 1990 Clean Air Act Amendments caused a major customer to stop burning Illinois coal.

The Randolph fire accelerated Baldwin's closure by making it economically impractical to reopen the mine for the short period of time during which the customer will accept Illinois coal.

Two-hundred-seventy Baldwin employees were laid off in the latter part of December. The closing of the mine began shortly thereafter.

About 35 people continue to work on equipment recovery and closure programs, which are expected to take until mid-1994. ♦

MINING ENGINEERING

April, 1994

PEABODY COAL REORGANIZES; LAYOFFS, DECENTRALIZATION SET

Peabody Coal Co. — the Midwestern coal producing unit of Peabody Holding Co. — will decentralize many of its functions, moving many of its salaried headquarters workers to four operating units and will lay off about 100 employees throughout the company.

Ron Greenfield, the spokesperson for Peabody Holding Co. in St. Louis, said the move reflects the general trend at Peabody Holding, but that it applies only to Peabody Coal Co. Eastern Associated Coal Co. and Peabody's western affiliates are not affected. Asked if similar decentralization would be applied to the other subsidiaries, Greenfield would only say that he did not have anything to release on that.

The new organization creates four business units with unit heads responsible for their competitiveness and profitability. They are the Marissa Business Unit comprising the Marissa mine, Randolph preparation plant and supporting facilities in Illinois; the Hawthorn Business Unit comprised of the Hawthorn mine, plant and facilities in Indiana, the Lynnville Business Unit built around the Lynnville mine and plant in Indiana and the Camp Business Unit in western Kentucky, comprised of the Camp No. 1 and No. 11 mines, the Camp No. 9 plant, the Camp Terminal barge loader and other facilities.

cont. (over)

From: Coal Week, April 18, 1994

Each unit will handle its own staff and technical functions. Although Peabody COALSALES Co. will continue to market coal for of Peabody Holding's mines, the business unit heads will work closely with COALSALES and will have veto power over bidding and sales, Greenfield said. The units will be responsible for their own profits and losses, making the connection with sales vital.

The personnel moves are somewhat complex. Greenfield said about 65 salaried workers will be transferred to the business units from Peabody Coal Co.'s headquarters in Henderson KY and another 30 more will be laid off. Elsewhere through the company another 70 salaried workers will be let go. Finally, the remaining 50 members of the PCC headquarters staff will relocate from the current company owned office building.

Peabody Coal's restructuring into four self-contained business units drew a mixed reaction from a number of midwestern coal industry officials interviewed by *Coal Week*, including several Peabody employees affected by the move.

"I don't think we've seen anything like this before," said Joe Spivey, president of the Illinois Coal Association. Spivey observed that Peabody soon will have only one operating mine in Illinois, Marissa, following a series of mine closings in recent years. The company's Pawnee No. 10 mine in central Illinois is scheduled to close this summer.

Bill Yockey, president of the United Mine Workers of America in Indiana, called the restructuring "a smart move" on Peabody's part. "We'll make these mines compete with anybody," he vowed.

At Peabody's soon-to-be-vacated headquarters in Henderson KY reactions ranged from surprise to sadness to relief, at least for those employees who were told they still had a job.

Marissa coal mine set to close

7/17/99 *Speed*
Peabody Group.

About 400 workers could lose their jobs

THE ASSOCIATED PRESS

MARISSA — In another setback for the state's dwindling coal industry, the company that owns Marissa Mine in southern Illinois said Friday that it will close the mine Oct. 15. About 400 people could lose their

jobs, according to Vic Svec, a spokesman for Peabody Group, the St. Louis-based owner of the mine. Svec said the Peabody Group will try to help salaried employees find work elsewhere in the company and in the area.

The Peabody Group said the Randolph County mine's loss of its biggest customer, Illinois Power, forced the closure.

The utility is switching to cleaner-burning Wyoming coal at its plants in Baldwin and Hennepin, Ill. The Wyoming coal would be provided by

another Peabody unit, Peabody said in a statement.

Illinois Power spokeswoman Shirley Swarthout said using low-sulfur Wyoming coal was the cheapest way to comply with the federal Clean Air Act requirements.

For Illinois coal to meet new federal requirements, power plants must install costly scrubbers. The second phase of the Federal Clean Air Amendments, which limits sulfur dioxide emissions from electricity generating plants, takes effect Jan. 1.

Peabody Group president Richard M. Whiting said efforts to find new customers to buy coal from Marissa Mine were unsuccessful.

The company will continue its search, but Whiting said the relatively high-sulfur content of Illinois coal and limited access to generating plants with scrubbers will make the task difficult.

Marissa Mine has shipped more than 40 million tons of coal since it began operating in 1979.

With its closure, the mine becomes the latest to fall victim to the

demands of federal clean-air requirements.

Between 1982 and 1998, Illinois' coal industry dwindled from 47 mines and 12,200 workers to 22 mines and 4,413 workers, according to Brian Reardon of the state Department of Commerce and Community Affairs.

Ironically, the coal industry outside Illinois and other parts of the Midwest, is booming.

Svec is expecting strong domestic sales to make 1999 the industry's best year.

Peabody Coal closes Marissa mine

In one of the Illinois coal industry's biggest setbacks this decade, Peabody Coal Co. will close its Marissa mine on October 15.

Barring the unexpected signing of a new sales contract for Marissa in the next couple of months, the Randolph County mine's 20-year run will cease, taking with it the jobs of approximately 400 union and salaried employees.

Marissa's fate apparently was sealed by Illinois Power Co.'s decision to switch from high-sulfur Illinois coal to low-sulfur Powder River Basin (PRB) coal from Wyoming to comply with Phase II of the 1990 Clean Air Act Amendments.

An Illinois Power spokesperson said the fuel-switch decision was necessary because it is much cheaper for the utility to shift to PRB coal than to install and operate scrubbers at its Baldwin and Hennepin power plants. Illinois Power plans to begin receiving deliveries of about 4 million tons of PRB coal next year. Another Peabody mine in Wyoming will provide that coal.

Peabody Group President Richard M. Whiting said efforts to find new customers for Marissa's coal have been unsuccessful. "We have not given up on efforts to find suitable customers, but realistically, we have nowhere to ship coal from Marissa after October 15," he said. "We deeply regret the significant economic impact and job loss that the mine closing may cause."

over

Whiting said employees affected by the shutdown will be given assistance to ease the transition.

The United Mine Workers of America, which represents hourly workers at Marissa, was disappointed by the planned closing. Union officials have tried for months to persuade Illinois Power to continue burning Marissa's coal.

During the past two decades, the mine has produced more than 40 million tons of coal. In recent years, its production has risen; during 1998, its peak production year, Marissa sold 4.4 million tons of coal.

Peabody Coal Co.
Marissa Mine
Herrin (No. 6) Coal

3-14-85

Washington County

Notes by S.K. Danner. Accompanied by Keith Hackley & Steve Hawk (ISGS chemists), and Steve Browning & Bobby Bennet (Peabody engineers).

Purpose of visit was to collect two sets of coal samples for a sulfur isotope study.

Sample site #1:

260' in by Room 3 of 1st Panel South, off 1st Submain West, off 1st Submain South, off main East; or

2540' from NL, 2060' from EL, sec. 32, T. 3S., R. 5W.

Roof: Anna Shale: dark gray to black; hard; thinly bedded with sheety to slabby parting; contains many small pyrite flakes and nodules. Prominent joint set trending $N 65^{\circ} E, \pm 3^{\circ}$, with 3' spacing.

Coal: 6.3' thick; N.B.B., very hard with small, poorly-developed cleat. Coal is relatively clean with only a few discontinuous shale partings and occasional pyrite stringers. There is little cleat pyrite and virtually no calcite.

Blue band is 1.5 inches thick and located 5.04 feet from top of seam.

Mining conditions are good in this area. No unusual geologic features.

1st Submain West just west of 1st Panel South:
Very pronounced jointing on track entry.

There are two joint sets; one set trends about $N10^{\circ}E$, the other trends $N85-90^{\circ}E$.

The spacing between joints is about 2.5 feet.

About 4.2 feet of underclay is exposed beneath a nearby overcast. The underclay (claystone) is a medium dark gray; moderately firm; upper 0.5 feet is friable w/ numerous, thin, coal stringers.

Sample Site #2

#6 crosscut right off #4 entry of 4th Panel South off 1st Submain West, off 1st Submain South, off Main East; or

2590' from SL, 10' from EL, Sec 31, T.3 S., R.5 W.

Roof: Anna Shale: 2 to 12' thick; black; hard; thinly laminated with a sheety parting; pimply surfaces; shows small patches of granular pyrite, some pyritized fossil frags; found one impression of a coiled cephalopod, about 3 inches in diameter. Much of the roof in this area is flat and smooth. Appears to hold very well.

Coal: 6.58' thick; N.B.B.; small, poorly developed cleat; very little cleat pyrite or calcite. few thin partings. Blue band 1.5 inches thick, 5.13 feet from top of seam.

Pearbody Marissa

5/16/80

Bob Bennett - Dust Engineer & Guide
C-21049

500' N, 1400' W of center Sect. 29, T. 35 - R. 5W.

Washington County

Channel Sngl #1; Loc. Unit One; main
North off main west; #3 entry

Roof: Shale: (Anna), dark gray-black, hard, smooth,
fissile; phos. nodules, very ~~little~~ pyrite;
burrows filled w/ coarse limey material;
no distinct joints; thin bedded pyr at
base

0.82' Coal: WBB; ~50% vitr; attrital midlustrous;
hard, cleat poorly devel; abndt wht cal
on fractures; occas thin pyr streaks;

0.01 Pyr: discont;

0.43' Coal: STA

0.02' Shale: brown-blk; hard, carb, w/ numer
pyr lenses; fairly cont;

0.81' Coal: STA; less cal & more pyr;

0.11' Coal: Dull; hard; w/ irreg vitr stringers;
pyr. filled goat beard extends ↓ into
next unit,

- 1.30 - Coal: NBB, less vitr than above; several thick discont bands of dull coal; not much cal; pyr filled gt brds;
- 0.01 shale: brown-blk; hard, carb, discont;
- 1.10 Coal: S.T.A.; abndt pyr stringers, fract fills, d gt brds;
- 0.02 shale: gray-blk, hard, carb; discont;
- 0.45' Coal: NBB; ~40% vitr; thin lamin of dull coal; cal on cleats; very little pyr;
- 0.05 shale: (Blu Bed) med dk gray; hard, smooth; finely carb; EXCLUDED FROM CORE
- 1.20 Coal: NBB; ~30-40% vitr; very thinly banded; little cal; few very thin lamin of pyr
- 6.33' total
- Floor - elst: med lt gray, soft, smooth, carb;

Channel Sample #2

C-21050

East pond - Room 7.

650' W, 700' W of SE corner Sect 29, T. 35-R. 5W

Roof - Shale, dark gr., sl. silty, hard, sl. carbonaceous,
Locally limestone streaks on coal.
Shale is finely laminated and contains very
finely disseminated pyrite. Streaks of coal
near base.

0.34' Coal, N.B.B., approx. 25-30% vitrain, most
vitrain less than 0.01' thick; hard, cleat
poorly developed, calcite on fractures and occasional
cleats. Occ. thin ~~or~~ fusain bands. Dull
coal here is moderately bright. Several thin
ptgs. of pyrite.

0.01' pyrite, hard, fairly continuous.

1.04' Coal, N.B.B., same as above with more
calcite and several fusain lenses. Calcite
fractures extend from unit above.

0.01 to 0.03' Pyrite, with a little shale. Fairly continuous,
variable thickness.

0.57' Coal, N.B.B., as above. Slightly better
development of cleat and more calcite
than above.

0.01' Pyrite, discontinuous, hard,

0.35' Coal, as above.

0.02' Shale, dk gr. to blk, contains streaks of
vitrain; med. soft, variable thickness,
discontinuous very finely laminated.

0.09' Coal, dull attrital; few thin vitrain
streaks. moderately hard.

0.01' Pyrite, hard, discontinuous.

0.42' Coal, sim. to above.

0.02' Fusain, soft, discontinuous.

- 0.01' Vitrain discontinuous
- 0.03' Fusain, soft, "
- 0.18' Coal, NBB, very Vitreous. A thin coal is moderately bright
- 0.01' Pyrite hard discontinuous
- 0.69' Coal, N.A.B. dev. development fair, occ. bands of fusain - calcite at base. Approx. 30% vitrain. A thin coal is mid-lustrous.
- 0.03' Pyrite and shale, hard to soft; shale is med. gy, finely laminated, smooth, fairly continuous
- 0.02' Vitrain discontinuous
- 0.01' Pyrite hard, discontinuous
- 0.06' Coal, ~~sub~~ sub-bright banded, few thin pyrite partings. A thin coal moderately dull
- 0.01' Pyrite hard, discontinuous
- 0.16' Coal, NBB, very thin banding, approx 15% vitrain, a thin coal. mid-lustrous. Thin fusain at base
- 0.01' Pyrite, hard, discontinuous
- 1.27' Coal, NBB, vitrain bands less than 0.02' thick. 10 to 20% vitrain. A few very thin shale partings. Some calcite on poorly developed cleats. A thin coal mid-lustrous.
- 0.04' Shale, (Blue Band), thickness variable - med to dk gray, med. soft, finely laminated. Contains few thin strks. of coal. smooth
- EXCLUDED FROM SAMPLE

- 0.27' Coal N.B.B., vitrain content varies. Calcite on cleats and fractures. Vitrain bands to 0.04' thick. Attrital bands very thin.
- 0.02' Pyrite, very hard, discontinuous.
- 0.46' Coal, N.B.B. very thin banding, calcite as above.
- 0.01' Fusain, moderately hard, discontinuous.
- 0.78' Coal, N.B.B. vitrain band to 0.05' thick but most thin, attrital coal mod.
- 6.97' total bright, calcite as above.
- Flour, claystone, med. gray, soft, smooth, crumbly, striationsided,

Channel Sample #3: Loc → km 8; C-21051

450' N, 700' W of SE corner Sect. 29, T. 35 - R. 5W.

Roof: Shale = (Anna) blk, hard, smooth, fissile; widely spaced joints ($070-073^\circ$); some lined w/ cal; occas. large concretions; no phos noted; smooth undulating contact;

shale: (Bastard line) dark gray, mod hard, poorly bed, cal, abndt fossil debris; thickens just west of sample up to 1.5' of ls; dk gray w/ abndt coarse fossil debris; very hard; dense & massive, lenticular; contact w/ coal sharp irreg;

0.79' Coal: N.B.B.; ~50% vitr; attrital midlustrous, cleat well developed w/ abndt cal; occas gt brds filled w/ pyr.

- 0.01' - Fus: discont
- 0.40' Coal: NBB; ~ 30-40% vitr; attrital midlast; well devel cleat w/ abndt cal; no observed pyr;
- 0.01' Pyr: hard; w/ blk shale streaks; discont;
- 0.59' Coal: STA; few fus lamina; banding less distinct than above; abndt cal.
- 0.01' shale & Pyr: gray-black & hard; variable thick;
- 0.26' Coal: STA;
- 0.01' Pyr: hard; w/ blk sh streaks; discont.
- 1.19' Coal: NBB; contns 30% vitr; med dull attrital; occas lens of fus; cleat less developed; less cal than above, some cal on cleats & 1 pyr gthrid.
- 0.02' Pyr: interlam w/ blk shale & coal; very local lense.
- 1.30' Coal: STA w/ less pyr;
- 0.02' Fus: soft & lenticular
- 0.26' Coal: STA but more thinly bedded; contains cal; no pyr noted.
- 0.01' Pyr: lenticular

- 0.38' Coal: STA;
- 0.02 Coal: dull, hard, appears shaley
- 0.12 Coal: NBB; ~ 40% vitr; attrital midlast;
irreg pyr lamin; much cal on cleats;
- 0.10 shale: (Blk Bed) med dk gray; hard, smooth,
occas coal streaks; pyr lenses near
top (excluded from sample)
- 1.34' Coal: NBB; ~ 30% vitr; attrital midlusterous;
thin to thick bed; abund cal on cleats
& much pyr on vert fractcs;
- 7.14' total
- Floor clst; med gray; med hard; carb, ssd;
smooth

Loc: ~ 50 south of sample 3

Shale: med dk gray; smooth; poorly bed;
breaks in irreg slabs; pyr shells;
few coal streaks near base; no lamin;
ssd slips along contact

Some coal balls 30 yards west of ~~sample~~
~~site~~ gray sh contact

Note: numer concretions in Anna