

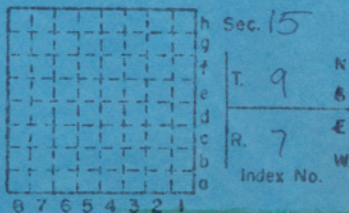
MONTEREY COAL CO. MINE # 1

In 2009 sold to Macoupin Energy and renamed Shay #1 Mine. As of 2018 the Shay #1 Mine is owned by Foresight Energy, and operated by MaRyan Mining LLC.

MONTEREY COAL CO.  
MINE # 1  
Mine Index No. 886  
County No. 1270  
Coal Report No. S-19

MACOUPIN COUNTY

HERRIN



Shay #1



Mine Name or No.,  
 mile from  
 Operator, 19

1-8-93

# COAL WEEK

## MONTEREY COAL PRESSES ON; NO. 1 MINE MOVES INTO LOWER SULFUR

Exxon Coal's Monterey No. 1 mine is on schedule as it moves into new lower-sulfur reserves that will supply Central Illinois Public Service's Coffeen power plant under a 20-year, 1.7 million t/y contract signed two years ago (1-7-91 *Coal Week*).

According to Exxon spokesperson Tom Torget, Monterey 1 began to phase in lower-sulfur deliveries at Coffeen in 1992. Room-and-pillar mining is being used to access lower-sulfur reserves that eventually will be longwalled under a \$50 million program to develop new reserves adjacent to the Hornsby reserve it now mines.

Exxon has received equipment bids and plans to award a contract in a couple of months for the longwall. It should arrive at the central Illinois mine by early 1994 and longwalling is expected to commence by mid-1994. By 1995, lower-sulfur coal will account for all of Monterey 1's production.

The 20-year agreement signed in January 1991 replaced a 10-year-old contract between Monterey and CIPS. No financial information has been disclosed, although Monterey agreed to accept a lower price for its coal under the accord. CIPS says the new Monterey 1 reserves will produce coal that will vary between 1.5 and 2.2 lbs. SO<sub>2</sub>/mmBtu.

### IDENTIFICATION

County No.

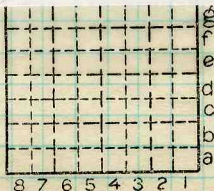
Coal No.



Part

Quad.

County



T.

R.

N.

S.

E.

W.

Index No.



( Sheets ) COAL PRODUCTION ( Sheet )

| Period |     |      |     | Tons |      |
|--------|-----|------|-----|------|------|
| Mo.    | Day | Year | Mo. | Day  | Year |
|        |     | 1970 |     |      |      |
|        |     | 1971 | 1   | 169  | 874  |
|        |     | 1972 | 1   | 974  | 355  |
|        |     | 1973 | 2   | 694  | 505  |
|        |     | 1974 | 2   | 479  | 763  |
|        |     | 1975 | 2   | 866  | 941  |
|        |     | 1976 | 2   | 780  | 421  |
|        |     | 1977 | 2   | 524  | 815  |
|        |     | 1978 | 2   | 064  | 210  |
|        |     | 1979 | 2   | 455  | 791  |
|        |     | 1980 | 2   | 913  | 264  |
|        |     | 1981 | 2   | 320  | 036  |
|        |     | 1982 | 2   | 043  | 138  |
|        |     | 1983 | 1   | 682  | 170  |
|        |     | 1984 | 2   | 404  | 051  |
|        |     | 1985 | 1   | 949  | 837  |
|        |     | 1986 | 1   | 999  | 543  |
|        |     | 1987 | 1   | 824  | 659  |
|        |     | 1988 | 1   | 728  | 014  |
|        |     | 1989 | 1   | 826  | 192  |
|        |     | 1990 |     |      |      |
|        |     | 1991 |     |      |      |
|        |     | 1992 |     |      |      |
|        |     | 1993 | 1   | 703  | 370  |

MONTEREY COAL CO.  
MINE NO. 1

SUMMARIES

No. 1970 to 1971(INC) No. 1 431 437

Railroad, Wagon, Strip, Idle, Abandoned

IDENTIFICATION

County No. 1270

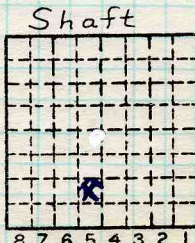
Coal No.

Coal Report No. S-19

6

Quad.

County Macoupin



Sec. 15

T. 9 N.  
R. 7 W.

Index No. 886

COAL MINE—PRODUCTION

ILLINOIS GEOLOGICAL SURVEY, URBANA



For more info on  
Monterey Mine #1

see L Monterey C.C.  
file of Coal Section

HHD 11/23/92



FORM 180 W



View looking southward at preparation plant of  
Monterey Coal Company's Mine No. 1.



Monterey #1, MACoupin Co  
1979

Illinois State Geological Survey

Monterey Coal Company, Mine No. 1

B. F. Eads - Technical Services Manager  
Bob Henry - Guide in mine (Surveyor)  
Engineer - Russ Potts

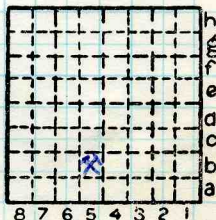
Sample *T9N R7W*  
#1 797'S 574'W from center Sec. 15  
#2 1040'S 1560'E }  
#3 1090'S 2760'E } from center Sec. 22

Each sample 2 cans column sample  
1 can face channel

By KEC and NHB Date May 7, 1971

Quadrangle \_\_\_\_\_

County Macoupin Sec. \_\_\_\_\_ T 9N R 7W



Monterey Coal Company, Mine No. 1  
 Sample #1

Thick Corner near working face.

Location: Main N in take, entry no. 3.  
 797'S, 574'W of center Sec. 15, T. 9N.,  
 R. 7W.

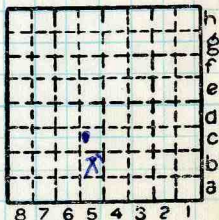
Mainly limestone roof in mine because thin  
 black shale mined away.

- 1.40' Black shale.
  - 2.10' 0.00'-2.10' Coal, normally bright banded,  
 thin, hard calcite on normal  
 cleat surfaces.
  - 0.01' 2.10'-2.11' Pyrite.
  - 0.67' 2.11'-2.78' Coal, normally bright banded.
  - 0.10' 2.78'-2.88' Pyrite (deleted).
  - 1.02' 2.88'-3.90' Coal, normally bright banded.
  - 0.03' 3.90'-3.93' Pyritized fusain (deleted).
  - 0.08' 3.93'-4.01' Coal, normally bright banded.
  - 0.03' 4.01'-4.04' Fusain.
  - 1.14' 4.04'-5.18' Coal, normally bright banded.
  - 0.09' 5.18'-5.27' Blue band, hard pyritic shale  
 (deleted).
  - 0.43' 5.27'-5.70' Coal, normally bright banded.
  - 0.05' 5.70'-5.75' Boney coal
  - 1.85' 5.75'-7.60' Coal, normally bright banded.
- 7.60' Underclay, gray and soft.

By KEC and NHB Date May 7, 1971

Quadrangle \_\_\_\_\_

County Macoupin Sec. 15 T 9N R 7W





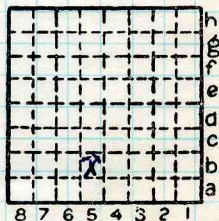
Monterey Coal Company, Mine No. 1  
Sample #2

Location: Main E, entry no. 4 at intersection  
with 2nd N off Main E (75'E of STA 372).  
1040'S, 1560'E of center Sec. 22, T. 9N.,  
R. 7W.

Black shale roof of 4" exposed.

- 0.00'-1.63' Coal, normally bright banded.  
1.63'-1.66' Pyrite and cleat filling nearby  
(deleted).  
1.66'-2.22' Coal, normally bright banded.  
minor fusain.  
2.22'-2.25' Pyrite (deleted).  
2.25'-3.78' Coal, normally bright banded.  
Calcite cleat fill.  
3.78'-3.84' Fusain - partially pyritized.  
3.84'-5.06' Coal, normally bright banded.  
Calcite and pyrite cleat fill.  
5.06'-5.08' Pyrite.  
5.08'-5.59' Coal, normally bright banded.  
Minor pyrite in cleat.  
5.59'-5.66' Gray shale (blue band) hard  
(deleted).  
5.66'-7.40' Coal, normally bright banded  
with minor thin pyrite cleat  
fill.

Hard, dry claystone floor.



By KEC and NHB Date May 7, 1971

Quadrangle \_\_\_\_\_

County Macoupin Sec. \_\_\_\_\_ T. 9N R. 7W

Illinois State Geological Survey

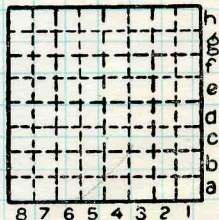
Monterey Coal Company, Mine No. 1  
Sample #3

Location: Main E, entry no. 4, near end  
STA 529. 1090'S, 2760'E of center Sec. 22,  
T. 9N., R. 7W.

Black shale roof.

- 0.00'-0.65' Coal, normally bright banded.
- 0.65'-0.68' Fusain.
- 0.68'-1.68' Coal, normally bright banded.
- 1.68'-1.70' Fusain.
- 1.70'-2.68' Coal, normally bright banded.
- 2.68'-2.74' Pyritic shale (deleted).
- 2.74'-3.74' Coal, normally bright banded.
- 3.74'-3.76' Bony coal, pyritic.
- 3.76'-5.55' Coal, normally bright banded.  
Minor fusain and pyrite lenses.
- 5.55'-5.66' Shale, hard (blue band) (deleted).
- 5.66'-7.33'

Hard floor



By KEC and NHB Date May 7, 1971

Quadrangle \_\_\_\_\_

County Macoupin Sec. \_\_\_\_\_ T. 9N R. 7W

Visit to Monterey Coal Company at Carlinville, Macoupin County on July 11, 1972 by Bruce Bohor, Heinz Damberger, and M. E. Hopkins. Accompanied by Dick Lounsbury, Monterey Coal Company and Dick Playter, Carter Oil Company. Also participating was Dr. Ernest M. Spokes, University of Missouri, Rolla.

Purpose of Visit: To inspect area of intensive squeezing of the floor and of subsequent roof failure.

A. Information supplied by Lounsbury and Playter:

The squeeze area is positioned between the 1st Main North and the 2nd Main East (see sketch). A pillar of coal was left between the Main North and the panels to the east of it which are worked from the 1st Main East ("Bottom Main") towards the north in forward mining and then from there in retreat mining (see sketch). The first floor squeezing was noticed in about April, 1972 when the 1st (forward) panel had about reached the 2nd Main North. During May and June, the area affected increased toward east and south with over time increasingly rapidly. The management finally decided to withdraw from the 1st panel (retriet portion) and to leave a fairly large coal pillar hoping to stop the floor squeezing from spreading further east into the second panel. (Not without losing some machinery over a weekend.)

Factors that may contribute to the floor squeeze:

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| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |

By HHD Date July 11, 1972

Quadrangle \_\_\_\_\_

County Macoupin Sec. \_\_\_\_\_ T. \_\_\_\_\_ R. \_\_\_\_\_

(1) Size of rooms: A 50 percent recovery rate is the basic aim of the room and pillar mining method. In the southern portion of the first panel rooms were kept at a width of 15½'. This was too narrow for some of the heavy machinery used. They had to cut off the corners from coal pillars in order to get the needed freedom of movement for their equipment. After about 2/3 off the 1st Main East up to the 2nd Main East had been mined, the width of the rooms was therefore increased to 20 and 24'. Recovery is still about 50 percent, the coal pillars are accordingly larger.

About 1½ to 2 months after the rooms had been widened the first signs of floor squeezing were noticed. This would seem to indicate that a fairly direct relation between the width of the rooms and the probability of floor squeezing exists under the given geologic conditions. However, Lounsbury and Playter pointed out that other areas were mined with the same larger room width without encountering -as yet- any significant floor squeezing. These rooms are as old and older than the ones with the squeezing. Thus, some factor other than the room width may be responsible for the "big squeeze."

(2) Moisture content and structural contours: A detailed survey of the elevation of the seam reveals a structural low in the area where the squeeze first started. Water puddles were found quite frequently both in the Main North and some also in the workings along the eastern side of the coal pillar that protects the Main North. The question was raised whether water may be moving through the underclay sequence, preferentially toward this structural low. Lounsbury and Playter are therefore quite interested in a survey of the moisture content of underclay samples. If expandable clays were present in the underclays -and they are- then "moist" areas might be especially prone to squeezing.

(3) Presence of expandable clays (esp. Montmorillonite): Lounsbury and Playter speculated that areas with particularly high percentages of expandable clays might exist and that such areas might tend to develop floor squeezing. Possibly, they could be mapped with a small portable drilling machine to take samples or by geophysical methods, e.g. electr. resistivity. Clay mineralogical data from boreholes (report by Arthur White, ISGS) within the mine seem to indicate particularly high montmorillonite and mixed layer percentages for one borehole near the "big squeeze" area. But the number of datum points is not sufficient to draw any far reaching conclusions. Two more drill holes within and outside the "big squeeze" area are planned to get a more closely spaced sampling. Two holes have already been finished and analyses are being run.

(4) Lithologic sequence below mined coal: The exceptional thickness of the shale-claystone sequence below Herrin (No. 6) Coal in this area ("western shelf" of the Illinois Basin) may cause the squeezing or greatly contribute to the disposition of the floor to the squeezing. Lounsbury and Playter said that other mines in the same general area also had floor squeezing problems (see footnote on our Mine Notes).

The presence or absence of a reasonably thick limestone (underclay limestone, St. David Limestone, Hanover Limestone) might also make a big difference in the reaction of the underclay sequence after the mining process has removed 50 percent of the coal: areas with thick limestone might be less prone to floor squeezing than areas with thin limestone or no limestone in the floor rock sequence. Again, the amount of information now available is not conclusive one way or the other. The planned two additional boreholes may give some hints.

The sequence below Herrin (No. 6) Coal in this area contains an unusually high percentage of claystones and shales: the sequence is quite condensed with the coals and sandstones and in part the limestones of the normal succession preferentially suppressed, leaving a sequence



- 4 -

of mostly shales and claystones with some limestones intercalated. Such a sequence is rather typical for the "western shelf" of the Illinois Basin, west of the DuQuoin Monocline.

(5) Unequal load distribution on coal pillars: The corner area between the Main North and the 2nd Main East may have experienced some unusual stresses (as a result of design<sup>of</sup> mining operations, local structure, etc.) and the squeezing may have started in a small area and the pillars to fail. Once this process was started it spread both eastward and southward through the area of wide rooms of panel #1, and was temporarily or hopefully permanently stopped by a relatively large coal pillar left between panels #1 and #2 and by the more stable conditions with the smaller rooms in the southern 2/3 of panel #1.

(6) Surface topography: It is interesting to note that the only topographic hill in the whole area overlies the "big squeeze" area.

B. Observations in Mine *(notes by Heinz H. Damberger)*

(1) Outside "big squeeze" area: Roof seems to be generally good, apart from some local flaking of the bottom few inches in the 1st Main East (calcareous shale - "clod"?). In the 15½' wide rooms of southern portion of panel #1 the floor shows no inclination to squeeze, though the rooms are as old as 1½ years.

(2) Floor heaving: As we walked northward the first signs of floor squeezing were noticed in the zone where they had changed from the smaller 15½' to the wider 20' and 24' rooms. As we went further north the squeezing and associated failure of the coal pillars became more and more apparent until we reached the area where the former 7' <sup>part of</sup> opening was closed to only a few feet (photos 1 and 2). Lounsbury



- 5 -

and Playter told us that there are areas where no opening is left at all.

As the floor heaves particularly near the center of the rooms, irregular cracks start to develop thus dividing the floor into separate plates thereby allowing differential movement of these plates. Thus one plate may be lifted above the adjacent one by several feet and the crack may open one foot and more near the top, narrowing downward; inspection of the rock sequence below the floor level thus is possible locally (photo 3). The area of the "big squeeze" seems to be characterized by the lack of any thick limestone within a few feet under the floor. One bore hole in the area also did not penetrate any thick limestone below Herrin (No. 6) Coal.

Wooden posts which were set when the squeeze first started broke (photo 1) or were pushed into the underclay which heaved and broke around them (photo 4).

(3) Failure of coal pillars: The heaving puts unusual stresses on the coal pillars which leads to their ultimate failure (photos 5 and 6). The failure usually begins with the formation of a crack more or less parallel to the rib and an upward displacement of the slab of coal that is thus produced. These slabs are of variable thickness and size.

(4) Roof failure: In most of the area the roof has remained intact with only the clod or the lenticular "black slate" failing in relatively small roof falls. However, near the barrier pillars (the one on the west side of the heave area which separates the panel from the Main North and the one which was not mined on the retreat side of the panel) there is failure of the Brereton Limestone - this according to Playter and Lounsbury. We saw one place where only the bottom two feet or so of the Brereton failed, this appeared to be

failure along the argillaceous partings which characterize the Brereton in this area. Undoubtedly the heaving contributed to this but the limestone did not break entirely through as it was reported to have done in other places. The above-mentioned fall was on the west side of the panel very near the major barrier pillar.

Footnote:

Mine Notes on floor heaving below Herrin (No. 6) Coal in Macoupin, Montgomery, and Christian Counties.

Mine notes on floor heaving in this area are sparse.

Macoupin County

MI #180, Virden Mng. Co., North Mine in 12N-6W- Sec. 9: "Floor heaves some."

MI #186, Girard Coal and Tile Co., Empire #4 Mine in 12N-6-W-Sec. 32, floor described as follows: "Light gray clay, soft, plastic when wet. Does not heave, used to undercut upon."

*MI # 6, Superior C.C. Mine #3 in 8N-7W-36-H8  
"18-24" clay-floor, heaves.."*

Christian County

MI #222, G. H. Shafer, Pana #2 Mine in 11N-1E-Sec. 15, floor described as follows: "Varies from light gray to dark gray, very soft in west where it heaves, hard limy clay in the east, softens when wet."

MI #220, Peabody Coal Co., #8 Mine in 13N-3E-Sec. 8, floor described as follows: "Medium gray, soft, with many slickensided surfaces, heaves. Have had several bad squeezes...."

This is by far the strongest and most explicit statement in our Mine Notes. It is known that Peabody #10 Mine next to Peabody #8 also had problems with floor squeezing, but no entry was made into our mine notes. However, a study of the mineralogy was made at



that time by Simon, White and others which should be in our files.

Montgomery County

MI #76, Shoal Creek Coal Co., Panama #1 Mine in 7N-4W-Sec. 22, floor described as follows: "Clay heaves badly, slack readily when exposed to air and especially so when water strikes it. Clay is gray, sandy and very hard when fresh. Lime boulders in bottom clay. Bastard limestone below." "Thickness 14'<sup>+</sup>, fairly constant."

MI #197, Indiana and Illinois Coal Corp., Mine #11 in 8N-3W-Sec. 5, floor described as follows: "The floor clay is hard, massive, light to medium gray, it becomes calcareous as it goes toward the limestone beneath, no tendency to heave, used to undercut upon,..."

MI #196, Indiana and Illinois Coal Corp., Mine #12 in 9N-2W-Sec. 6, floor described as follows: "Medium to dark gray clay, many slips, small amount of black fragments of plant remains, some trouble with floor heaving, used to undercut upon,..." "Thickness 3'-7'."

MI #194, Indiana and Illinois Coal Corp., Mine #10 in 10N-2W-Sec. 10, floor described as follows: "Dark gray to light green-gray shale, has some slips, many fragments of plant remains, heaves a little on north side of bottom, used to undercut upon,..." "Thickness 6" to 6', no information as to maximum."

MI #195, Nokomis Coal Co., Mine #1 in 10N-2W-Sec. 27, floor described as follows: "Light gray, crumbles upon exposure to air, heaves as much as 6" after first 6 months, used to undercut upon,..." Thickness 1'-3'. "Little variation in character."

Madison County

MI #71, Lumaghi Coal Co., Mine #2 in 3N-8W-Sec. 25-B8, floor described by F. H. Kay in 1912 as follows: "12' thick, no variation, clay filled with boulders, does not heave."



- 8 -

W. Arthur White, 1956, Underclay Squeezes in Coal Mines: Mining Engineering, V. 8, No. 10, p. 1024-1028, Ill. Geol. Survey Reprint 1956-R: in this paper White reports about squeezing problems in a "Lumaghi Coal Co. mine near Collinsville, Ill." (which may have been Lumaghi #2, but probably was Lumaghi #4, MI #842 in 3N-8W-Sec. 23-A2) which seem to have been similar to those in the Monterey Coal Co. Mine #1. Squeezing is attributed to plastic flow of clay with higher than normal montmorillonite contents which is triggered when coal is removed and load ~~is~~ of coal pillars on underclay about doubles and exceeds plastic flow point of underclay. Discusses different methods of detecting presence and amount of montmorillonite (e.g. staining with benzidine).

Our Mine Notes do not contain any hints of the squeezing problems they had though the mine was visited in 1959, to take coal samples and, according to W. A. White, earlier (in 1956) to study the squeezing by different members of the Coal Section.

It is therefore quite conceivable that other mines also had floor squeezing problems but that members of Coal Section either never learned about these cases or failed to make appropriate entries in our Mine Notes.

MI #72, Livingston-Mt. Olive Coal Co., Mine #1 in 6N-6W-Sec. 16-D2, floor described by Kay in 1912 as follows: "3' to 5' thick, said to be clean, heaves somewhat when wet."

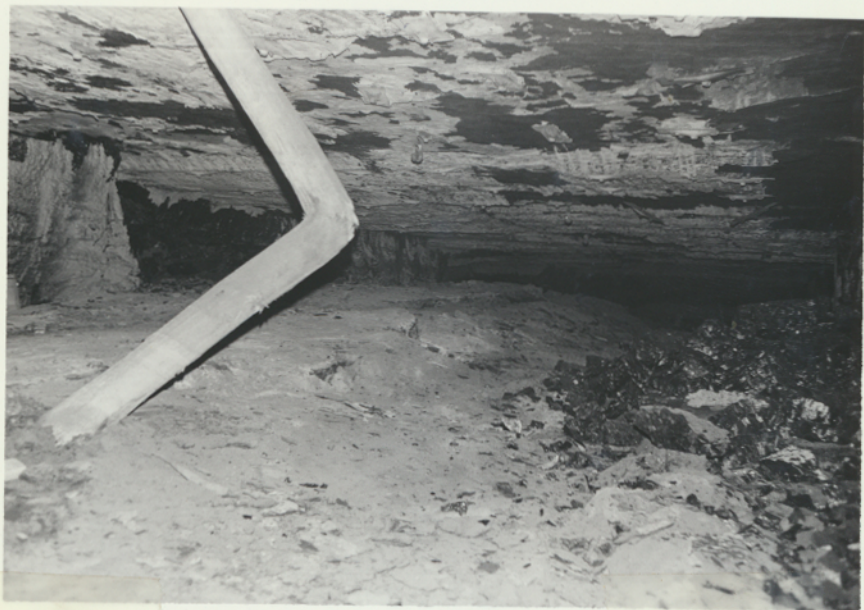
MI #192, Hardscrabble Coal Co., Abbey Mine in 3N-8W-Sec. 33-C6, floor described by Netzeband in 1921 as follows: "More than 6' thick, no variation in character; light gray, soft clay, plastic when wet, heaves badly giving much trouble with grades; used to undercut upon,..."

MI #191, Henrietta Coal Co. in 4N-8W-Sec. 10-B2, floor described by Netzeband in 1921 as follows: "6' to 3' thick, light gray clay, plastic when wet, no trouble from heaving, used to undercut upon,..."

#13 on film

T#

#1



Monterey C.E.

By H. Damberger Date 7/11/72

Quadrangle \_\_\_\_\_

County Macoupin Sec. \_\_\_\_\_ T. \_\_\_\_\_ R. \_\_\_\_\_

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Pit # 11

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#2



#2

Monticoy C.C.

By H. Dambrey Date 7/11/72

Quadrangle \_\_\_\_\_

County Macoupin Sec. \_\_\_\_\_ T. \_\_\_\_\_ R. \_\_\_\_\_

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ILLINOIS GEOLOGICAL SURVEY, URBANA

on film: #8

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#3



#3

Monterey C.C.

By H. Danberg Date 7/11/72

Quadrangle \_\_\_\_\_

County Macoupin Sec. \_\_\_\_\_ T. \_\_\_\_\_ R. \_\_\_\_\_

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ILLINOIS GEOLOGICAL SURVEY, URBANA

on film : 194-20



97

#5  
~~#6~~

By H. Dambert Date 7/11/72

Quadrangle \_\_\_\_\_

County Macoupin Sec. \_\_\_\_\_ T. \_\_\_\_\_ R. \_\_\_\_\_

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ILLINOIS GEOLOGICAL SURVEY, URBANA

on film: #18A



#7

mn-act-macoupin-14.tif

By W. Davenport Date 7/11/72

Quadrangle \_\_\_\_\_

County \_\_\_\_\_ Sec. \_\_\_\_\_ T. \_\_\_\_\_ R. \_\_\_\_\_

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ILLINOIS GEOLOGICAL SURVEY, URBANA



By H. Damborg Date 7/11/72

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Quadrangle \_\_\_\_\_

County \_\_\_\_\_ Sec. \_\_\_\_\_ T. \_\_\_\_\_ R. \_\_\_\_\_

ILLINOIS GEOLOGICAL SURVEY, URBANA

on film: #15



By H. Dambach Date 7/11/72

Quadrangle \_\_\_\_\_

County \_\_\_\_\_ Sec. \_\_\_\_\_ T. \_\_\_\_\_ R. \_\_\_\_\_

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ILLINOIS GEOLOGICAL SURVEY, URBANA

on file: #16A



By H. Danberg Date 7/11/72

Quadrangle \_\_\_\_\_

County \_\_\_\_\_ Sec. \_\_\_\_\_ T. \_\_\_\_\_ R. \_\_\_\_\_

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ILLINOIS GEOLOGICAL SURVEY, URBANA



By W. Bunker Date 7/11/72

Quadrangle \_\_\_\_\_

County \_\_\_\_\_ Sec. \_\_\_\_\_ T \_\_\_\_\_ R \_\_\_\_\_

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Monterey Coal Company, Carlinville, Macoupin Co.  
 Visited on July 11, 1972.

Clay dike in Herrin No. 6 Coal

According to Dick Lounsbury, clay dikes are encountered occasionally. During our search for an example we found only one clay dike which could be traced over two rooms in the Main North about half way between the 1st and 2nd Main East. The usual features of clay dikes could be observed:

(1) Displacement of well over 1 foot at top of seam, as is usual for inclined clay dikes. This one had an average dip of about 45° or a little less.

(2) Bending of bands within coal toward fault plane with tendency to form a right angle.

(3) At dike protrusions into the coal bands converge toward tip of protrusion, from both above and below.

(4) The main fault seemed to run approximately into boundary coal/underclay on the upthrown "bulged?" side. It was not clear whether the bulging of the underclay was related to an actual off-set or -as is usual- just the usual bulging of underclay under a large clay dike.

(5) The coal was disrupted quite irregularly, with several larger irregularly shaped pockets ("horses") of claystone along the general dip-trend of the clay dike. There were quite a few stringers protruding from the clay dike into the coal. The width of the main clay dike varied between

|   |   |   |   |   |   |                                      |   |
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By HHD Date July 11, 1972

Quadrangle \_\_\_\_\_

County Macoupin Sec. \_\_\_\_\_ T \_\_\_\_\_ R \_\_\_\_\_



- 2 -

less than an inch to well over 1 foot.

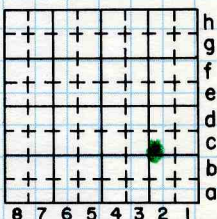
(6) The roof shale was also affected and showed rather intensive small scale faulting and much slickensiding. A tendency to V-shape of the faults was noticed. No clear continuation of the actual dike was found probably indicating that the disturbance happened when only little sediment had accumulated on the seam. The roof was difficult to hold up along the trend of the clay dike, reminding me of the bad conditions I had found in the El-Ben Mine near Lincoln in Logan County (see Mine Notes there). Fortunately, such clay dikes seem to be rather sparse in the Monterey No. 1 Mine.

HHD 7/11/72

ILLINOIS GEOLOGICAL SURVEY, URBANA

Monterey Coal Co., No. 1 Mine. North crosscut - NW cor., 2nd N off Main E. 100 ft. back. Column sample of West Rib rock dust cleaned, no pyrite oxidized. Fissile black shale roof. Normal underclay bottom. Total coal 7'3 1/2".

- 0'-5" Coal - Normally bright banded. Some films of pyrite on bedding and cleat somewhat bony band with pyrite base less than 1/4" thick.
- 5"-12 1/2" Coal - Normally bright banded. Calcareous kaolinite pyrite on cleat, very few thin fusain less than 1/8".
- 12 1/2"-1'8 3/4" Coal - Duller than above, with thin vitrain less than 1/8" fusain at base. Fusain lens 3/8" thick. Maximum at 1'6 1/2". Pyrite with bony coal, disc thin lenses up to 1/4" thick. Thin shale parting along this horizon.
- 1'8 3/4"-2'5" Coal - Normally bright banded. Kaolinite, calcareous, pyrite on cleat. Thin less than 1/16 bony bands at 1'11 1/2", 2'0 1/2", 2'3". Pyrite - Lens up to 3/8" in maximum. Disappears within 1 ft. each direction.
- 2'5"-2'7" Coal - Normally bright banded. Kaolinite, calcareous on cleat. Pyrite and pyrite shale nodule,



By EHB Date 8/21/72

Quadrangle \_\_\_\_\_

County Macoupin Sec. 15 T. 9N R. 7W  
 1119 ft. from E. line  
 1331 ft. from S. line



approximately 6" in section by 1" thick.

Coal - Normally bright banded. Kaolinite and minor calcareous on cleat. Fusain less than 3/8" thick at 3/4", pyrite and bony coal less than 3/8" at 3'6 $\frac{1}{2}$ ". Some pyrite on cleat.

2'7"-5'0"

Fusain - Soft, discontinuous, up to 1/4" maximum at 4'6" and 4'9".

Pyrite lens - 1/4" thick, contains thin vitrain stringers.

5'0"-5'6 3/4"

Coal - Normally bright banded. Calcareous, kaolinite on cleat.

5'6 3/4"-5'7 3/4"

Blue band - Gray shale.

5'7 3/4"-7'3 1/2"

Coal - Normally bright banded. Kaolinite and more pyrite and calcareous on cleat. Thin pyrite parting less than 1/8" at 5'8". Coal dirtier below blue band. Fusain band hard mineralized.

Location by State Plane coordinates -

N 929,585

E 588,505

This sample is located 19 ft. south and 131 ft. east of drill hole 17M-627.

Analyzes C-17924 +  
(71 cat. Dick)









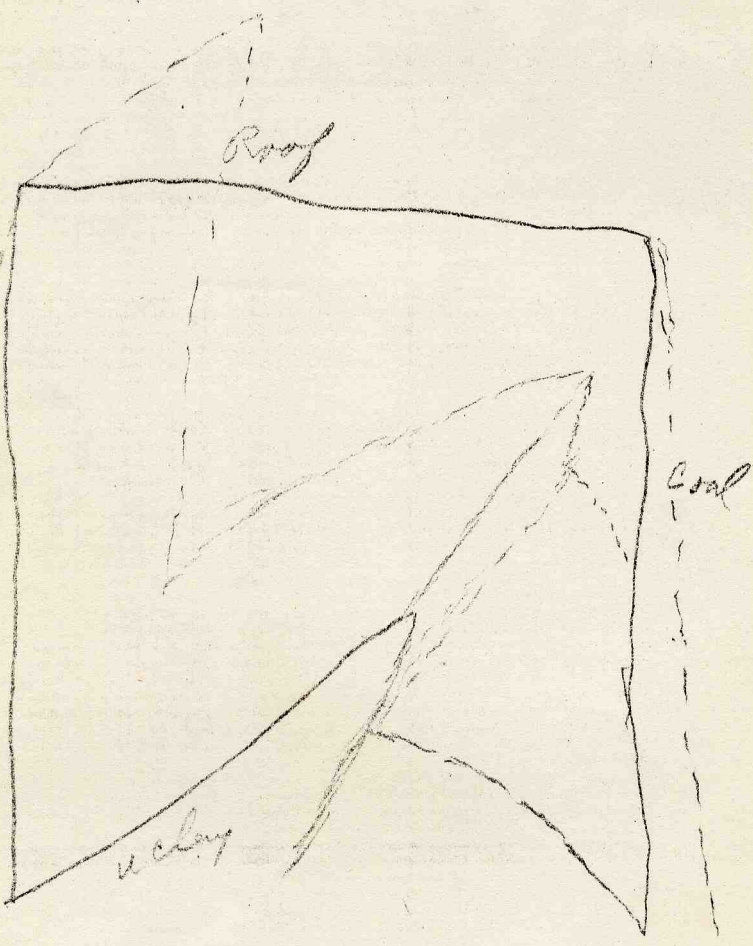








FIELD NOTES  
Illinois State Geological Survey



A W

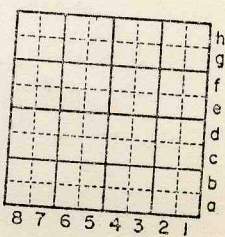
Date 8-21-72

Monterey Coal Co

Macoupin

Sec. 22

T 9 N R 7 W









ILLINOIS GEOLOGICAL SURVEY, URBANA

Monterey Coal Co. in 3rd Panel N off Main East near drill hole 17M609

Roof - "Black Slate" - Few fish scales visible, also plant fragments, few pectens and orbiculoidea.

- 0-1.20 Coal - Finely laminated, few fusain lenses in lower portion.
- 1.20-1.30 Coal - Bright banded.
- 1.30-1.62 Coal - Relatively dull, finely laminated.
- 1.62-2.12 Coal - Normally bright banded, few fusain streaks and few thin pyrite lenses.
- 2.12-2.14 Pyrite lens with fusain above and below.
- 2.14-2.75 Coal - Finely laminated, relatively dull.
- 2.75-2.88 Shale - With local pyrite lenses and vitrain streaks and lenses, rather irregular, lower part with much fusain.
- 2.88-2.98 Coal - Bright banded.
- 2.98-3.08 Bone coal with pyrite lenses at bottom up to 0.02' thick.
- 3.08-3.40 Coal - Normally bright banded, some shy. lenses in middle part.
- 3.40-3.70 Coal - Dull, much fusain and somewhat shaly.
- 3.70-3.83 Coal - Bright banded, thick vitrain lenses.
- 3.83-3.92 Pyrite nodules, quite lenticular, interfingering with shale.

|   |   |   |   |   |   |   |     |
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By MEH and HHD Date 11/20/72

R. Playter, R. Lounsborg

Quadrangle described by HHD

County Macoupin Sec. 15 T 9N R 7W

- 3.92-4.21 Coal - Normally bright banded.  
4.21-4.25 Fusain - Soft, lenticular.  
4.25-4.32 Vitrain  
4.32-4.90 Coal - Normally bright banded.  
4.90-5.19 Coal - Relatively dull, somewhat shaly especially in lower part.  
5.19-5.22 Shale - Carbonaceous with irregular pyrite lenses up to 0.02' thick.  
5.22-5.72 Coal - Normally bright banded, somewhat shaly in upper portion.  
5.72-5.80 Shale - Gray with irregular pyrite lenses up to 0.02' thick.  
5.80-6.40 Coal - Finely laminated.  
6.40-7.38 Coal - Normally bright banded, several thick (0.02') vitrain lenses.  
7.38-7.43 Coal - Dull, somewhat shaly, finely laminated.

Bottom is gray, soft, underclay with rootlets.

Analysis - C-18061 +  
(Float - Sink)

MONTEREY COAL CO. MINE # 1 CARLINVILLE, MACOUPIN  
COUNTY, ILLINOIS

Visit by Heinz Damberger, Art White, M.E. Hopkins,  
and John Nelson 3/18/74.

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The notes of this visit, if any were made, have been lost. The following are impressions made from memory, on what was my first visit to an underground mine.

The main purpose of this visit was to examine an active squeeze area in the 1st Panel North off the 2nd Main East (?). A severe squeeze was in progress with the floor in places buckled almost to the roof, and fissures several inches wide and many feet deep. The floor heaving was accompanied by rib rashing, and many large roof falls in the area. Our company guide showed us one which had fallen a week before our visit while he was standing one crosscut away. He said the rush of air nearly blew his hat off. We looked up into several of the falls, which were 15-20 feet high and through the Brereton Limestone. The area was very noisy with constant popping in roof and ribs, and rain of slabs from the roof. It definitely was scary for my first underground mine.

We visited another squeeze area away from the first, possibly along the Main North (??). This was much less severe, but rows of props along the track were bent and broken, and rib rash was prominent. The area was again "noisy" though less so than the main squeeze area. Measured survey points at several intersections showed considerable movement since last checked.

Four photos, showing severe floor heave, are to be found in the Roof Study Photo Notebook on file.

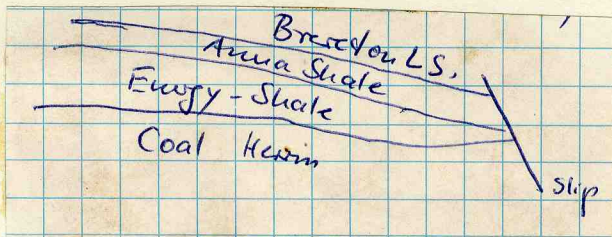
Monterey Coal Co. Mine # 1 Carlinville, Macoupin County, Illinois.

Visit 7/31/74 by H.-F. Krausse, Steve Hunt, and Russ Jacobson.

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Photos taken (new film) Main East, 8th North off Main East.

- 1) 2nd Crosscut, room 25, looking east.  
Anna Shale, slip and bedding.
- 2) 2nd crosscut, room 25, looking NW  
Anna Shale, slip and bedding.
- 3) 3rd crosscut of room 28, looking SE  
Roof fall, where Energy Shale above coal (many plants in shale) above Energy Shale very thin Anna Shale and "pot" of Brereton Limestone
- 4) 3rd Crosscut of room 28, looking N  
"Crossbedding of coal laminae in gray shale, fall along slip"
- 5) 2nd crosscut between room 26 and 27  
Energy Shale pinching out towards the south, rather thin (2 ft.) Anna Shale above and thin Brereton Limestone; fall along slip.





Monterey #1

7/31/74

#1



Monterey #1

7/31/74

#2



Monterey #1

7/31/74

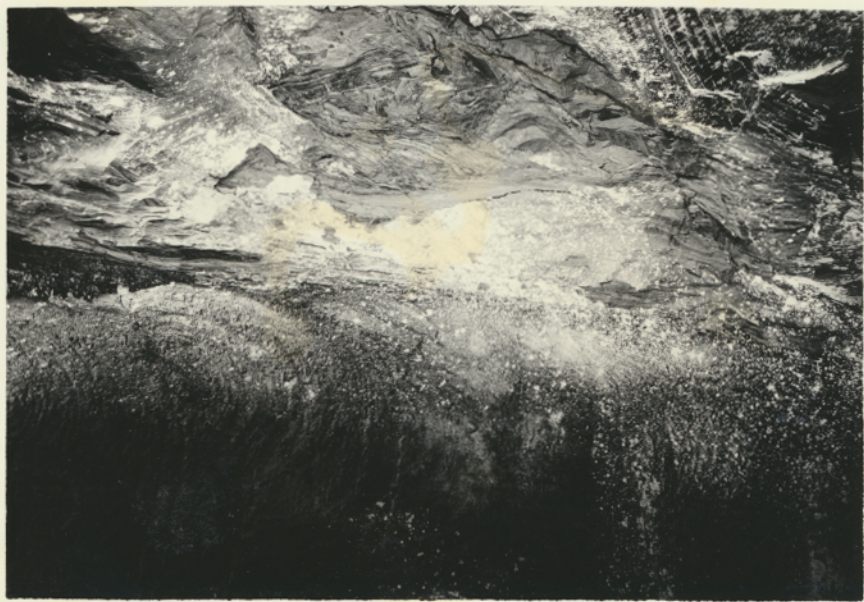
#3



Monterey #1

7/31/74

#4



Monteary #1

7/31/74

#5



31-74

H.F. KRAUSSE, ST. HUNT, R. JACOBSON

Photos taken (new film) Main East, 8<sup>th</sup> North off main East

① 2<sup>nd</sup> crosscut room 25; looking E

Anna Shale, slip and bedding

② 2<sup>nd</sup> crosscut room 25; looking NW

Anna Shale, slip and bedding

③ 3<sup>rd</sup> crosscut of room 28, looking SE

Roof fall, where ~~Anna~~ Eury shale above coal (many plants in shale)

above ~~Anna~~ Eury Shale very thin Anna Shale and "pot" of Breton LS.

④ 3<sup>rd</sup> crosscut of room 28, looking N

"Cross bedding of coal laminae in grey shale, fall along slip

⑤ 2<sup>nd</sup> crosscut between room 26 and 27

Eury shale pinching out towards the South, rather thin (2') Annash.

above and thin Breton LS.; Fall along slip

Monterey Coal Company Mine No. 1 Macoupin County

May 14, 1980

Notes by John Nelson on visit with Steve Danner  
Accompanied by Dennis Murphy, geologist; and Brent  
Burton from Monterey.

---

Purpose of visit was to make general geologic observations and to collect three channel samples. See Danner's notes for description of coal at the three sampling localities.

Dennis Murphy noted that squeezes at this mine were found to occur where the ratio of unconsolidated material to bedrock is greater than 1:1, as under Pleistocene valleys. Monterey now is countering the tendency to squeeze by leaving bigger pillars in such areas; pillars are on 84-foot centers instead of the usual 75-foot centers. No squeezes have been reported since the new policy was adopted.

The roof in most of the mine is Anna Shale or Brereton Limestone. On the east side of the mine is the edge of a major body of gray Energy Shale. They have not mined into this area because the roof conditions are poor. According to Dennis no exposures of the gray shale are currently accessible. Evidently the change from black shale-limestone to gray shale roof is quite abrupt. We saw none of the small lenses of gray shale that are common in so many mines. According to Dennis again, no such lenses are present.

The first sample was taken in the northern part of the mine, in the 2nd North Panel off the 4th East. Around the working face at the north end of the panel, the immediate roof is shaly limestone with an irregular lower surface. The limestone is nodular, with shaly partings and occasional "bosses" or irregular downward protrusions.

We observed one roof fall where the limestone had broken. This was adjacent to a "boss" where several large slips penetrate the limestone and the coal. The limestone is not solid, but consists of large nodules in a matrix of silty shale. The limestone is

(2)

about three feet thick overall and is overlain by silty shale with irregular laminations of light gray siltstone. The contact is very poorly exposed. Just to the south of the fall Anna Shale comes in below the Brereton Limestone. The Anna Shale is black but not fissile and it contains numerous phosphatic lenses and nodules. The upper part of the shale has greenish mottling and is very weak; appears to be burrowed. Three crosscuts to the south the Anna Shale is at least six feet thick as exposed in a fall. Many large slickensided slips are present and severely hinder roof stability. The Anna Shale pinches out a short distance farther south and so forms a lens a couple of hundred feet across.

Along the southern margin of the lens of Anna Shale, the bottom of the limestone becomes very irregular and "bossy". Several clay-dike faults are present and there is a small amount of "white top" at the top of the coal. The clay-dike faults penetrate most of the coal seam. From these limited observations it seems as though "bosses" and faults commonly mark the edge of lenses of Anna Shale.

The immediate roof is limestone throughout the southern part of the mine, south of the shaft bottom. The lower surface is generally smooth and the "clod" is thin if present. According to Dennis the limestone persists as immediate roof about a mile east of the shaft as well; almost to the border of the gray shale. Around the bottom no roof bolts or other artificial supports were installed except at intersections; no roof falls have occurred. Now the Federal law wastefully requires bolting everywhere regardless of the type of rock in the roof.



Monterey Coal Co. Mine No. 1 Macoupin County

May 14, 1980

Notes by Steve Danner on visit with John Nelson,  
Accompanied by Dennis Murphy, geologist, and  
Brent Burton, engineer, both employed by Monterey.

-----  
Purpose of visit was to collect 3 channel samples  
and to observe general geologic conditions in the  
mine.

-----  
Channel Sample Location #1: 4th room east outby  
face of 2nd North panel off 4th East off Main North  
or 4700' north and 2100' west of SE corner of Sec 34,  
T.10N, R.7W. C 21041

|       |  |
|-------|--|
| Roof  | Limestone: (Breraton) med gray, very hard, argillaceous; irregular surface; approx. 0.2' of clod at base; clod contains irreg stringers of coal.                                       |
| 1.64' | Coal: N.B.B., blocky, well developed cleats, face cleat trend 060; thick white calcite on face cleat, thinner on butt cleat; much pyrite on face cleat in lower $\frac{1}{2}$ of unit. |
| 0.03' | Coal: similar to above with thin irregular lamina of pyrite.   |
| 0.29' | Coal: similar to above with closely spaced vertical fractures lined with pyrite and a little calcite.  |
| 0.02' | Pyrite: very hard, nodular appearance; discontinuous.  |
| 0.63' | Coal: N.B.B., thin laminations of soft fusain in lower part; thick calcite on cleats, some finely disseminated pyrite.   |
| 0.09' | Fusain: soft, trace of pyrite, lenticular.   |
| 0.08' | Coal: N.B.B., mostly vitrain with a little calcite.  |
| 0.01  | Shale: grayish-black, traces of pyrite, discontinuous.   |

- 0.18' Coal: similar to above.  
0.02' Fusain: soft and lenticular.  
0.08' Coal: similar to above.  
0.05' Coal: D.B.C., lenticular, trace of pyrite.  
0.39' Coal: N.B.B., similar to above.  
0.12' Coal: alternating vitrain and D.B.C. with thin laminations of pyrite.  
0.50' Coal: N.B.B., several short lenses of soft fusain; very little calcite; trace of pyrite.  
0.76' Coal: N.B.B., very thinly banded; a few thin fusain streaks; trace of calcite and pyrite on cleats.  
0.03' Pyrite: very fine grained; hard; local streaks of black shale. (excluded from sample)  
0.54' Coal: similar to above; pyrite and calcite more abundant. 0.05'  
0.05' Shale: (Blue Band) med dark gray, moderately hard, thin coal stringers. (excluded from sample)  
0.32' Coal: N.B.B., with irregular stringers and bands of dull pyritic coal and pyritic grayish-black shale; pyrite on cleats; very little calcite.  
1.22' Coal: N.B.B., fairly thick banding; blocky; abundant calcite on cleats.  
0.14' Coal: D.B.C., few thick vitrain stringers.  
Floor Claystone: light to med gray, faintly mottled, very soft, contains thick stringers of vitrain.

Total Thickness: 7.19

Channel Sample Location #2: 3 crosscuts outby spud 7492 between neutral and intake-air entries, 2nd North panel off 3rd East off Main North or 2100' south and 900' west of NE corner or Sec. 3, T.9N, R.7W. (C21042)

|       |   |
|-------|---|
| Roof  | Shale:(Anna) black, hard, smooth, fissile, contains unusual abundance of pyritized fossils, mainly pelecypods, similar to mussels with shells 1 to 1½ inches long; also note one coiled cephalopod about 5" in diameter. Numerous pyritic concretions at base of unit; occasional phosphatic lenses higher up; slickensided slips common; joints sparsely distributed, trending ENE; small slip (0.1' displacement) at rather sharp contact between shale and coal. |
| 0.64' | Coal: S.B.B., thinly laminated except for thick vitrain bands; moderate cleat development; much calcite in thin vertical fractures and on cleats; several pyrite goatbeards; fine layer of clay (kaolinite) on banding planes.  |
| 0.01' | Pyrite; hard, fairly continuous, with fusain streaks.   |
| 0.92' | Coal: similar to above with discontinuous streaks of pyrite; much calcite on cleats and in vert fractures; vitrain bands up to 0.1' thick; numerous laminations of fusain.  |
| 0.02' | Shale: med gray, moderately hard, contains coal stringers; discontinuous.   |
| 0.36' | Coal: N.B.B., well developed cleats; much calcite on cleats; several large pyrite goatbeards.   |
| 0.02' | Pyrite: hard, with thin coaly streaks, discontinuous; grades laterally into a soft fusain band.   |
| 0.82' | Coal: N.B.B., much calcite; less pyrite than above; several fusain lenses.  |
| 0.02' | Shale: med to dark gray; moderately soft, smooth; continuous.   |

- 0.30' Coal: N.B.B., numerous pyritic streaks and much calcite on cleats.
- 0.01' Pyrite: hard, fairly continuous, locally thickens into lenses.
- 0.63' Coal: N.B.B., similar to above.
- 0.05' Pyrite: hard, carbonaceous, fairly continuous. (excluded from sample)
- 1.92' Coal: N.B.B., less calcite than above; vitrain very thin banded; thin laminations of shale and occasional pyrite lenses.
- 0.11' Shale: (Blue Band) med gray, mod hard, smooth, thinly laminated with finely disseminated pyrite; pyrite stringers near middle of unit. (excluded from sample)
- 0.26' Coal: similar to above.
- 0.01' Pyrite: hard and discontinuous.
- 0.28' Coal: similar to above; some pyrite in small vertical fractures; calcite in fractures and on cleats.
- 0.01' Pyrite: hard and discontinuous.
- 0.39' Coal: similar to above.
- 0.02' Shale: light to med gray, mod hard, discontinuous; stringers of coal through center.
- 0.81' Coal: similar to above; calcite and pyrite in fractures; vitrain thinly banded; several thin shale laminations and one fusain lense.
- Floor Claystone: light to med gray, soft, slickensided, carbonaceous, smooth.
- Total thickness: 7.61 feet.

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Channel Sample Location #3: 3600' south and 2100' east of NW corner of Sec. 27, T.9N, R.7W (C 21043)

- Roof Limestone: med gray, fine grained, argillaceous; basal 0.2' is clod with abundant coal stringers; fine grained pyrite interlaminated with top of coal.
- 1.4.' Coal: N.B.B., blocky, abundant calcite on cleats; fine grained pyrite in lower 1/3.
- 0.04' Fusain: soft, lenticular, with streaks of vitrain.
- 0.47' Coal: similar to above with streaks of pyrite near middle.
- 0.01' Pyrite: hard, with very thin coal streaks.
- 0.45' Coal: N.B.B., with abundant pyrite in vertical fractures; very little calcite; thick bands of vitrain at base.
- 0.36' Coal: S.B.B., thinly laminated, includes some pyrite laminations; much calcite, but little pyrite on cleats.
- 0.01 Shale: grayish-black, hard, carbonaceous, with abundant pyrite.
- 0.73' Coal: N.B.B., much calcite on cleats; small lense of pyrite near top.
- 0.04' Coal: dull, hard; numerous pyrite stringers.
- 1.25' Coal: N.B.B., abundant calcite and finely disseminated pyrite.
- 0.03' Coal: dull, hard, with streaks and lenses of hard pyrite, locally up to 0.03' thick. (pyrite excluded from sample)
- 0.53' Coal: N.B.B., much vitrain in thick bands; much calcite and fine-grained pyrite on cleats.
- 0.07' Shale: (Blue Band) olive gray, hard, smooth, finely carbonaceous, with thin coal stringers. *EXCLUDED*
- 1.67' Coal: N.B.B., similar to above; vitrain-rich.
- Floor Claystone: med light gray, mottled, soft, smooth, carbonaceous debris.
- Total thickness: 7.07'

Composite face channel: C21044  
Request #: 16518



## FORM 180 W

Monterey No. 1      July 30, 1981      Notes by John Nelson

Dennis Murphy showed us on the map in the office approximately where the Energy Shale was encountered in the mine. It was met at the face of the Main East Entries (SE $\frac{1}{4}$  SE $\frac{1}{4}$  Section 23, T. 9N- R. 7W) and at the face of the 1st Submains East off the Main North (NE $\frac{1}{4}$  SE $\frac{1}{4}$  Section 11, T. 9N- R. 7W) and in the easternmost panels of the same. The edge of the gray shale ran nearly due north and south. All of these areas now are sealed.

We also noted a large area in panels north off the 1st Submain West (now sealed) noted as having "bad top" or "squeeze". Several fairly large blocks of coal were left unmined as a result of these unfavorable conditions.

We visited a large roof fall on the belt entrance approximately 1500 feet north of the main bottom areas. The fall occurred about a week prior to our visit and kept the belt out of commission for a full shift- luckily it was not a production shift. The original roof was the base of the Brereton Limestone, from which the "clod" and black shale had been scaled. The fall took place along a series of shaly partings between nodular beds of the limestone. Up to three feet of rock fell in places. Examination of the area indicated only spotty installation of roof bolts. At the time this place was mined, the law required roof bolts only at intersections in areas of limestone roof.



FORM 180 W

Monterey Coal Co.                      Mine No. 1                      July 30, 1981

Notes by Steve Danner, accompanied on visit by Suzanne Russell, John Nelson, and John Hamilton. Dennis Murphy, Monterey's geologist, was our guide.

The purpose of this visit was to collect two full-seam column samples and two channel samples. We chose two sample sites, one on the north side of the mine, and one on the south side. The sites had been mined through less than two weeks before.

-----

Sample Site #1: Location- 55' inby crosscut 27, Entry 4, 5th North Submains, off 4th Main East, off Main North; or 1830' from North line and 250' from West line of Sec. 35, T.10N, R.7W, Macoupin County.

Channel Sample M-1:                      (C21547)

- Roof Shale: (Anna Shale) black; hard; smooth; well-bedded; contains a little pyrite; joints trending N65°E.
- 2.31' Coal: N.B.B.; black; hard; vitrain most abundant near top of unit; contains a few thin laminations of fusain; abundant pyrite in upper 0.1'; pyrite and calcite in vertical fractures.
- 0.03' Pyrite: small lens; contains inter-laminated shale. (Excluded from sample.)
- 0.60' Coal: N.B.B.; mainly vitrain and clarain, no visible fusain; calcite on cleat; no visible pyrite.
- 0.03' Shale: dark olive-gray; very hard; smooth; contains abundant lenses of pyrite. (Excluded from sample.)
- 0.95' Coal: similar to above; more thinly banded; contains fusain bands and thin pyrite lenses.
- 0.03' Pyrite: lenticular; variable thickness. (Excluded from sample.)
- 1.19' Coal: similar to above, but very little calcite.



FORM 180 W

Monterey No.1 Mine                      Sample M-1 cont'd

-----

- 0.01' Pyrite: fairly continuous band.
- 0.53' Coal: similar to above, but contains little fusain; both pyrite and calcite on cleat.
- 0.06' Shale: (Blue Band) dark olive-gray; smooth; hard; contains abundant lenses of pyrite. (Excluded from sample.)
- 1.75' Coal: similar to above.

Floor Claystone: medium greenish-gray; moderately hard; smooth; slickensided.

Total thickness of coal: 7.49'

-----

Sample Site #2: Location- 2480' from South line and 250' from West line of Sec. 35, T.9N, R.7W, Macoupin County.

Channel Sample M-2: (C21548)

Roof Limestone: (Brereton Ls.) olive-gray; fine-grained; appears massive; base of unit consists of several inches of limey shale (clod) which readily breaks away from roof.

- 2.05' Coal: N.B.B.; vitrain and clarain fairly evenly banded; less than 5% durain; contains a few fusain laminations; much pyrite on cleat near top of unit; some calcite and pyrite on cleat in rest of unit; also a few pyrite laminations.
- 0.01' Pyrite: fairly continuous band.
- 0.09' Coal: similar to above.
- 0.01' Fusain: hard; slightly pyritic; fairly continuous band.
- 0.51' Coal: similar to above.
- 0.08' Shale: dark gray at top, with numerous streaks and fragments of coal; lower part is medium dark gray w/ less coal; hard and smooth; lenticular. )Excluded from sample.)





FORM 180 W

Monterey No.1 Mine

Sample M-2 cont'd

-----  
0.36' Coal: similar to above.

0.03' Pyrite: Irregularly laminated in small nodules  
variable thickness. (Excluded from sample.)

2.50' Coal: more thinly banded than above, with  
more fusain partings; a little calcite and  
pyrite on cleat; several discontinuous bands  
of pyrite in lowest 0.5'.

0.12' Shale: (Blue Band) medium dark gray; hard;  
smooth; contains lenses of pyrite. (Excluded  
from sample.)

1.53' Coal: similar to above; calcite on cleat.

Floor Claystone: dark gray; hard and coaly

Total thickness of coal: 7.29'  
-----

## Mine Notes - Monterey No. 1, Macoupin County

Trip: Sept. 22, 1982 by Phil DeMaris and Joe Thomas. Underground visit by D. with Dennis Murphy (Geol.) & Mark Robinson (Eng.) from the company; T. took bulk coal sample.

Coverage: Introduction  
Coal description  
General observations  
Samples; MO1-A-1 & -2

### Introduction

This visit is part of a sampling program for the EPRI contract on self-heating of coal. The coal from this mine has previously been blended with western coal at utilities; we wanted to sample this coal "as shipped" for experimental use. The Sioux power plant (St. Louis area) has used this coal in the past, and the Coffeen power plant is planned to use this coal pending litigation between the utility and the former supplier, Consolidation Coal Co. Joe sampled 4 X 40lbs. sacks of fresh (6 hrs.) coal of about 2 X 0 size while I was underground. Mine uses continuous miners and belt haulage; presently working 3 days a week only.

### Coal Description

We went two miles south of main shaft to near the end of the South Mains. "Unit 1" was starting to develop a sub-main to the east; here they are about a mile west of the Energy shale roof area. Dennis Murphy reports that there is no "transitional" roof at the edge of Energy sh. roof area; no "pods" of Energy roof have been seen in the mine. The area the description is from is where the 2nd E./South submain branches east, 9 cross-cuts east of the main belt which had been mined

a couple months previously. I cleared a sharp spur near the pillar corner for the description

(Site A)

Anna shale roof; blk., fairly fissile, only a few inches seen

1.02' NBB, finely banded

≠.03' fusain

.67' NBB, widely banded

≠.06' fusain lens (3.4' wide phyl. lateral) max. .09' thick

≠.02' NBB

≠.02' fusain, loc pyritic

≠.01' NBB

≠.01' shale, brown, continuous

≠.51' NBB, widely banded (.01' pyr. ptng at top)

≠.02' shale, pyritic

≠.11' NBB, widely banded

Total tk. = 7.53'

B3  
B2

B3 = 2.83'

B2 = 2.88'

B1 = 1.82'

≠.09' shale/durain band - .04' sh. over .05' durain

≠.24' NBB, SBB at top

≠.01' fusain

.72' NBB w. fusain of

{ .01' at .08 down (pyr.)  
.02' at .13 "  
.01' at .32 "  
.01' at .41 "

[Could not check lateral extent of banding, esp. fus. due to narrow exposure]

1.23' NBB w. a few wide bands

≠.06' durain (bone PSD) (.04' w. .02' pyr lens here)

.51' NBB, fine banded, except for a few wide vit. bands at middle.

(B.B.) ≡.06' med. gray claystone, w. sharp contacts (not very carb.)

.36' SBB c

.16' NBB

≠.01' pyr. ptng.

1.01' NBB

≡.07' DBC, gray (pyr. fus?)

.15' NBB; mostly vitrain

≡.07' v/c med. to dk-gray, rooted (sample - 1)

### General Observations

Concerning the coal, pyrite was most commonly seen as thin ptngs. on bedding, or thick lenses to 3mm. which are discontinuous within the shale or durain bands. Little cleat pyrite was seen, but cleaned exposure was only  $\frac{1}{2}$  foot wide. The fusain was generally not pyritized, especially the thicker lenses.

Concerning the roof, the south side of the mine is predominantly Brereton Ls. with thin "clod". On the 2 mile trip south I saw no Anna shale at all. I counted only 5 Ls. "bosses" (plus 2 possibles, prob. cut down) on the trip, none over  $1\frac{1}{4}$ ' deep.

Dennis M. has mapped extensively in the mine; one time per month he maps roof lith. and falls at every new crosscut, and the lith and location of any fall over 4'. The north side of the mine has more Anna sh., and it reaches greater thicknesses there also. The coal is a little thicker to the north, occas. 10' in small areas; thicker coal is more common under Anna roof, but the relationship is not 1:1. He noted a small area of "thin coal" ( $5\frac{1}{2}$ -6'?) near the shaft as we left.

### Samples

MO1-A-1 Underclay, med. to dk. gray, top 0.1'  
(to R. Hughes 9/24)

MO1-A-2 Clastic-rich parting at 2.83' down  
(prob. B2/B3 parting at Crown II),  
upper 2/3rds only. For block mount?

Bulk sample for self-heating work coded "MO1"



FORM 180 W

MONTEREY COAL CO. MINE # 1 CARLINVILLE, MACOUPIN  
COUNTY, ILLINOIS

Visit by John Nelson and Steve Danner; with Jeff  
Padgett, Rick Dunkin, Matt Cross, and Steve Hunt  
from Monterey. 7/29/84

Mining Herrin (No. 6) coal, room and pillar, about 300 feet deep. In all active works the roof is limestone, or black shale with limestone above, making generally excellent top. On the east side of the mine the roof abruptly changes to gray shale (Energy Shale) 20 feet or thicker. The area of gray shale roof was briefly probed in 1973, and the probe abandoned because of great difficulty in roof control. Now Monterey is trying again.

Test panel is offset slightly south off Main East Entries from main portal.

Jeff Padgett and other geologists have mapped roof conditions very thoroughly. Steve Hunt is installing instruments to measure convergence and strain on roof supports, and plans overcoring to determine in situ stress in the roof.

Geologic map shows several "Kink Zones" trending slightly W. of N. in the probe panel.

From the bottom of the main shaft about halfway out the Main East, limestone lies directly on the coal. Eastward to the edge of the gray shale, the black Anna Shale comes in below the limestone. Several "bosses" of limestone protrude down through the black shale.

At the edge of the gray shale the coal drops very gradually in elevation. This was seen on all four entries of the probe panel.

Within about 100 feet of the edge of the gray shale, the black shale becomes softer and loses its fissility, and is cut by irregular veinlets of greenish clay. The shale also is streaked and mottled with medium to dark gray. No fossils noted.



## FORM 180 W

-2-

At the edge of gray shale proper, a normal fault cuts the full thickness of the coal. It strikes N-S, dips east about  $35^{\circ}$ , and has about 2 feet of throw down to the east. Several such faults are shown on Monterey's map.

Monterey has taken no chances in roof support through the gray shale. The pillars are 150 feet long and staggered. They use 9-foot point-anchor bolts on 4-foot centers, plus trusses every 4 feet on the entries, and each intersection has been cribbed. This support has worked well, so only the basal layers of the shale can be seen. It is loaded with coalified logs, flat-lying and pointing in all directions, plus many fragments of fusain and stringers of coal. No plant foliage was noted. The shale itself has alternating laminae of medium gray and dark gray.

Kettlebottoms or upright fossil tree stumps 2 feet in diameter or larger are fairly common, and all are plotted on company map. These have typical appearance; a central "plug" of gray mudstone, lined with slickensides and fanning out at the base like a cypress bole; a thin coalified rind of bark surrounding the core.

Many of the fallen fossil trunks are quite large; 3 feet across and at least 20 feet long. One reportedly was measured at 80 feet long where it ran parallel with an entry. The impression of bark or cortex is visible on some, but not on most.

In places the shale shows extremely fine, faint, regular and parallel dark and light laminations, resembling varves. Could it be a lake deposit?

Because of all the precautions, the largest roof falls are only  $2\frac{1}{2}$  or 3 feet high, generally along slips and kettlebottoms. Thus we can see only the



## FORM 180 W

-3-

basal layers of the dark gray shale. Monterey's cores show that the basal dark, laminated, carbonaceous shale varies from about  $1\frac{1}{2}$  to 3 feet thick, and is overlain by lighter gray shale or mudstone that becomes siltier and more competent upward. This shale is not exposed in the mine - only the basal dark zone with its tree trunks and kettlebottoms.

Drilling also shows that the total gray shale thickens to 10 feet within less than 100 feet of the edge. Eastward it continues to thicken but much more gradually. The shale reaches 20 feet thick about 1000 feet east of the edge.

Small nodules of pyrite, and larger calcareous concretions, are fairly common at the coal/shale contact or in the lower few inches of the shale. There are no coal balls as such.

Monterey's measurements indicate that the coal thickens by as much as a foot in passing from black shale to gray shale roof. Eastward it varies only slightly in thickness, very gradually thinning as the Walshville Channel is approached. None of Monterey's drill holes have encountered split coal. The thinnest coal, at the east edge of the property, is still over 6 feet thick. It is about 8 feet thick at the edge of the gray shale.

The "kink zones" that are mapped are very mild, and some barely noticeable. One is seen in the room running north from crosscut 25, but it is poorly developed, and most of the fallen rock has simply sagged away. Minor "cutters" along ribs are more common than "kink zones", but are not a serious problem. "Cutters" appear both in N-S and E-W headings.

The shale does not show any systematic jointing. Planar fractures are rare and very local.

Several types of mechanical tests are being performed:



FORM 180 W

-4-

- (A) Extensometers to measure strain on roof trusses.
- (B) Vibrating-wire strain gauges set in boreholes in roof, to measure changes in stress as pressure arch develops. Up to three gauges set at various heights in same hole.
- (C) Pull tests on roof bolts.
- (D) Overcoring to measure in situ stress. One test performed to date in hole 4 feet above coal; results are dubious.

Another test is scheduled.

(about 1000 feet into the gray shale area)

In the rooms, the shale is less carbonaceous and has fewer kettlebottoms and fallen trees than were seen near edge of gray shale. Shale in rooms is generally not laminated; it is a nearly massive medium gray mudstone, lacking fossils, and containing many pyritic nodules and septarian calcite concretions. Many of the latter are large enough to be hazardous; they are taken down. Monterey is not installing trusses in the rooms. In many places the mines are leaving a few inches of top coal, with good results.

We were shown maps and photos of the area where gray shale was probed in 1973. This area was reopened and partially cleaned last fall. Photo of edge of gray shale clearly shows unconformable contact between horizontally bedded gray shale and inclined Anna Shale. The Anna Shale is thin, weak, mottled, and poorly laminated. The gray shale has a thin dark basal zone. Gray shale is generally thinly laminated.

Roof falls up to 12 feet high capped out at base of limestone; thin weak Anna Shale below.

All roof falls were in intersections and in N-S headings, none in E-W headings. In many E-W entries top coal was still intact after 10 years. One fall extended N-S through 5 intersections.



John C. Moore Corporation, Rochester, N.Y. 14604



FORM 180 W

-5-

After viewing these conditions Monterey decided to seal the area and start a new probe.



FORM 180 W

MONTEREY C.C. MINE NO. 1  
Macoupin County

7/29/84

Addendum to Nelson's notes on new test panel  
("Hornsby Probe") at Monterey No. 1.

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According to Jeff Padgett, Monterey's geologist the Herrin Coal overlain by gray shale is supposed to be lower in sulfur and BTU's and have a higher moisture content than the coal overlain by black shale. While the higher moisture content and lower BTU's are negative factors, Monterey's management apparently feels that the lower sulfur content and thicker seam outweigh the negative features. Since most of the coal mined at Mine No. 1 probably averages more than 3.5% sulfur on the raw basis, it would be to their benefit to have some low-sulfur stock for the purposes of blending.

An additional note of interest concerns the "Clyde Mine" at Hornsby. This mine is located about 4 miles southeast of Monterey No.1, and reportedly has a gray shale roof. Since the mine was abandoned in 1906, there is very little information available on mining conditions at that mine. Recently one of the Monterey engineers was able to locate a detailed map of the Clyde Mine. The map reveals a couple of interesting features of that mine. We were rather surprised to discover that the rooms were almost 30 feet wide. This means that the gray shale is stronger than we thought, or that the miners in the Clyde Mine had no respect for life and limb! In contrast, the Monterey engineers opted for 15' wide entries in the new test panel. They usually run 20' wide entries. If the gray shale continues to hold up as well as it has so far, they may go back to the 20' wide entries.



FORM 180 W

Monterey No.1; Hornsby Probe addendum

page 2

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The other intriguing feature of the Clyde Mine is that it is laid out on NE-SW and NW-SE headings. Most of the other mines in the county are laid out on N-S and E-W headings. This brings up the question of whether the 45° off of North orientation of the mine aided in stabilizing the mine roof. If it did, the implications are that the in situ stress field may be a major factor in roof stability. If that is the case, then the Monterey engineers should consider reorienting their headings when mining in the gray shale area. Without further evidence it is almost impossible to determine the amount of influence the mine orientation had on mining conditions. After all, it could be that the layout of the Clyde Mine had no influence on mining conditions and that the miners got away with 30' wide rooms because of a more competent gray shale in that area and/or an increase in the amount of timbers used.

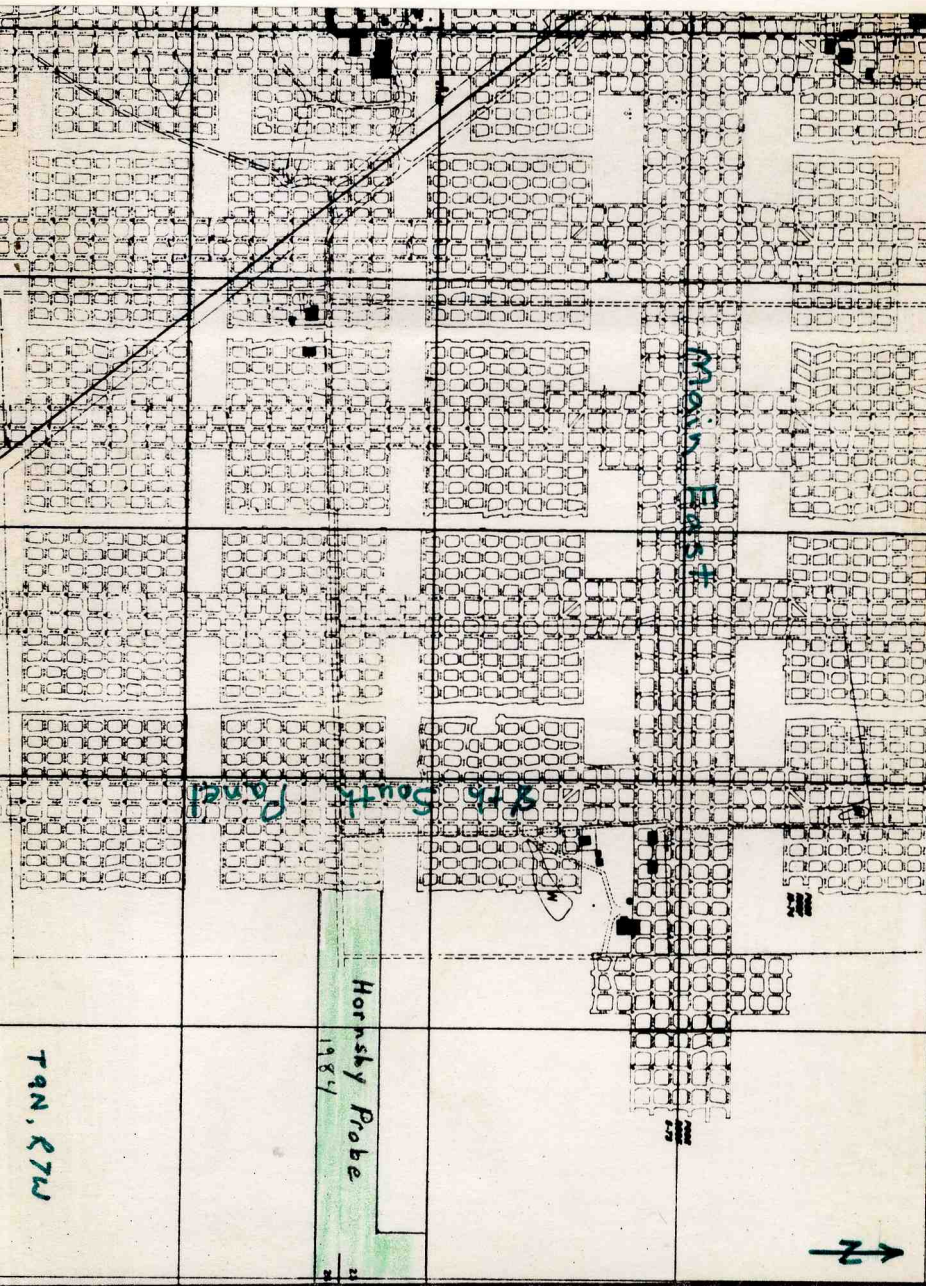
At any rate, it appears that the Monterey engineers are taking a cautious, analytical approach to mining under the gray shale. The new test panel will allow them to experiment with a variety of roof control techniques and to come up with a custom-made roof control plan for the gray shale area.

Steve Danner

7/29/84



FORM 180 W



TAN, RTW

Hornsky Probe  
1984

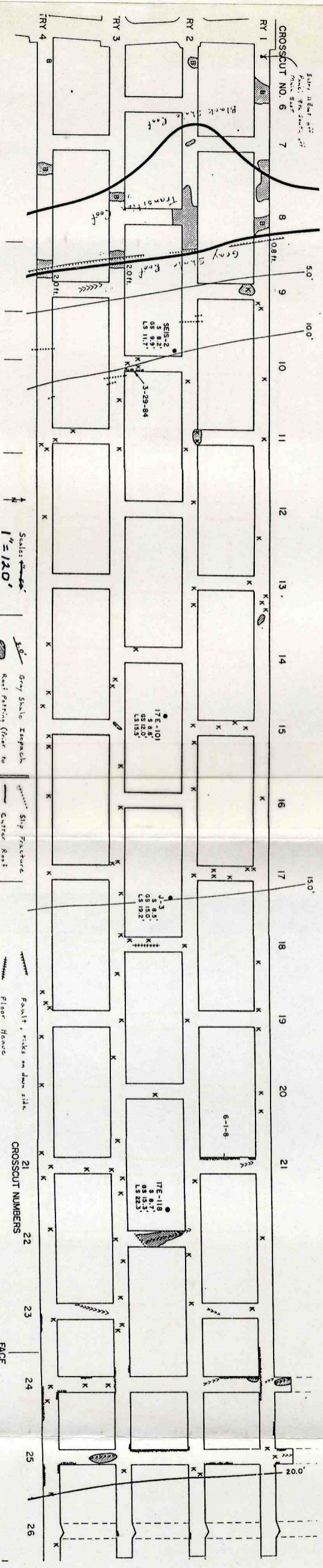
Main East #

8th South Parcel



MONTEREY NO

Hornsby Probe; Monterey No. 1 Mine



Scale: 1" = 120'

FACE 3-30-84

LEGEND

FACE 6-1-84

CROSSCUT NUMBERS

LEGEND

FACE 6-1-84

23 | 24  
26 | 25



Monterey No. 1 Mine, Hornsby East probe. In rooms near eastern end of probe, septarian concretions in gray silty mudstone above the Herrin Coal.



FORM 180 W



Pyritic concretion at coal-shale boundary.



FORM 180 W

*mn-act-macoupin-15.td*



One of the many flat-lying fossil logs in the immediate roof.





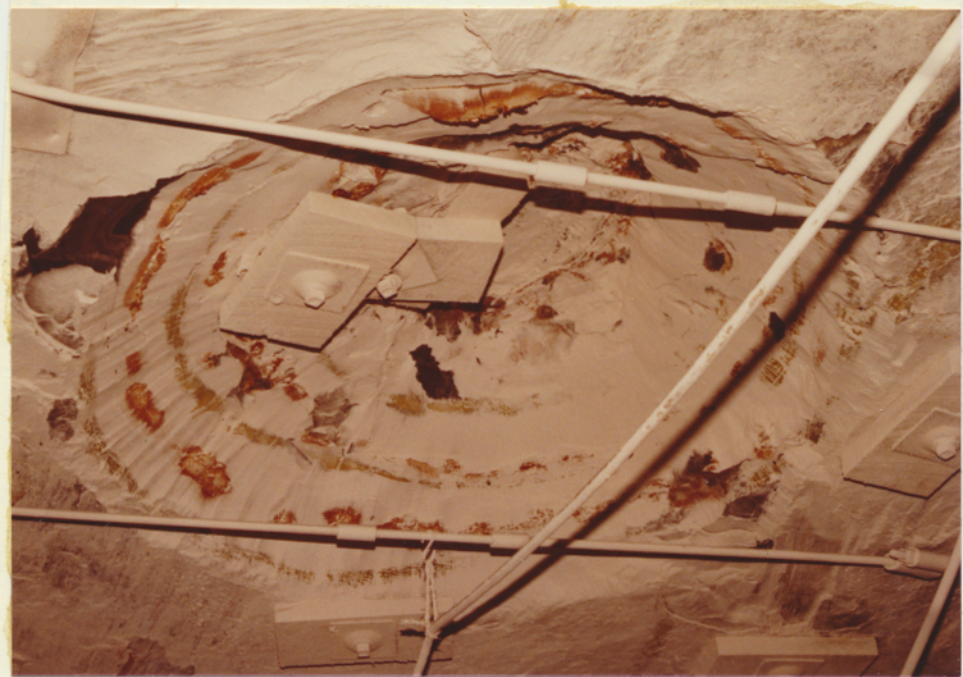
FORM 180 W

mn-act-macoupin-16.tel



Fossil tree stump, or "kettlebottom" in immediate roof.

17



"Kettlebottom", Monterey No. 1 Mine,  
in Energy Shale (Hornsby East probe)  
1984.

# Beneath the farmland, a sprawling engineering enterprise

by Jeff Brody

SJWR JR  
1-27-88

CARLINVILLE — It doesn't take as long as you'd think to drop 300 feet underground.

But when you get there, you gain an immediate understanding of the isolation that must be felt by the men and women who toil day after day in underground coal mines.

It is eerie near the base of the main elevator shaft at Exxon's Monterey No. 1 mine, several miles southeast of Carlinville. Headlamps reflect off a white lime coating that covers the open faces of the coal seam and would help inhibit a fire.

Three hundred feet of limestone,



**COAL**  
THE ONCE AND  
FUTURE KING?

Fourth in a series of articles.

clay and slate hides this sprawling engineering enterprise from eyes viewing the farmland above.

In one breath, Taylor Pensoneau of the Illinois Coal Association, touts Monterey No. 1 as a typical mine. In

the next, Pensoneau is highlighting the mine's special qualities.

The mine is a showplace as well as a producing industrial facility. Officials are used to showing their mine to visiting delegations of company officials and foreign visitors. So the tour arranged in October for a number of Illinois lawmakers fell right into the routine.

The parts of the mine that are on the surface belie the magnitude of the operation that goes on underground.

Above ground at the main portal is a plain industrial-looking building that houses offices, classrooms, changing rooms and shower facilities

and the elevator mechanism.

Coal carried up from the mine by conveyor is initially processed, then stored in a large silo. Coal is conveyed from the storage silo to a cleaning plant, where it is crushed into 2-inch pieces, separated from impurities and dried. The cleaned coal is then stored in two 12,000-ton silos pending shipping.

The office, processing area, and the sludge lagoons take up about 300 acres. But the underground operation stretches more than 5 miles north from the main portal, and, at spots, up to 3 miles east.

The mine uses the room-and-pillar method of extracting coal from a sec-

tion of the Herrin No. 6 seam that is 7 to 8 feet thick.

The mine is divided into 75-by-75-foot squares. In each square, coal is taken first from a 25-by-75-foot section along one side, then from a 25-by-50-foot section perpendicular to the first.

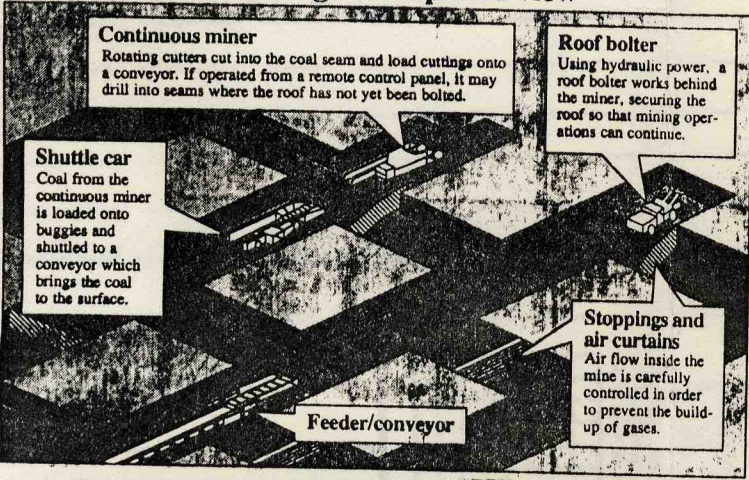
What remains after each section is mined is a 50-by-50-foot pillar of coal, bordered on two sides by a 25-foot-wide corridor.

Monterey No. 1 is a series of thousands of these sections. They form an

Continued on page 6

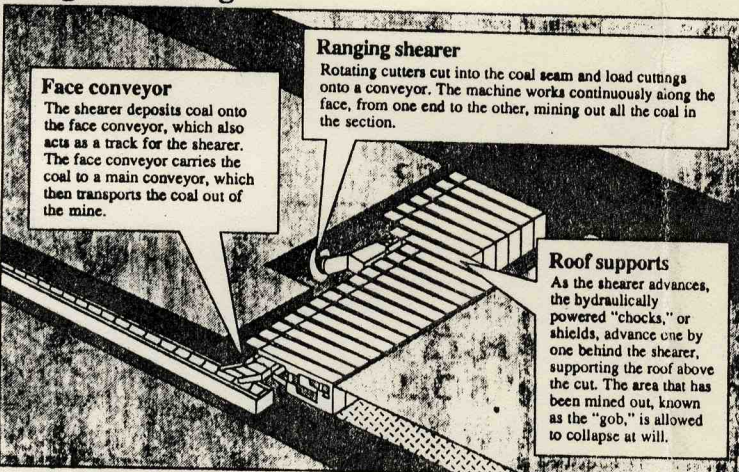
## COAL

### Room and pillar mining: A simplified view



*The once and future king*

### Longwall mining



## Beneath the farmland

from page 1

underground gridwork of 25-foot-wide passageways, each as tall as the thickness of the coal seam from which it was cut. The method leaves half the coal in the mine behind, but helps minimize subsidence of land on the surface.

The mine engineering is impressive. Passageways are isolated from each other to create huge ducts that bring fresh air from the surface to the face where coal is being cut. Air from the face of the seam is then pulled through other isolated passageways by large exhaust fans at the surface, bringing with it any methane gas released during the operation.

The work at Monterey, and every other operating Illinois mine, is automated. Alligator-like continuous miners sport an upper jaw that contains a spinning, toothed drum. As the jaw is raised and lowered, the coal is stripped from the face and conveyed

to a waiting shuttle car.

Periodically, when the miner has worked its way about 30 feet into the seam, it must be backed out to allow the roof to be bolted.

The seam at Monterey No. 1 is covered by a layer of slate 12-24 inches thick. To stabilize this ceiling, or top, metal plates are secured to bolts anchored in the limestone three feet above. A roof bolter operated by two miners supports the top and drills holes for the bolts, which are then tightened by hand.

The air in the mine is cool and moist; the coal seam is 14 percent water. Low spots in the clay floor of the mine become goeey with standing water. Miners must always be on the lookout for loose top, and must periodically dislodge pieces of slate that appear ready to fall.

Thursday: Coal has been part of Illinois' history from the start.



FORM 180 W

p1 of 6

## Mine Notes--Monterey No. 1 Macoupin Co.

Trip: March 29, 1989 by Heinz Damberger, Phil DeMaris, and Joe Miller, escorted by Jeff Padgett, Roof Control Specialist.

Coverage: Introduction  
Geologic Briefing from March 9  
Visit to N. Mains and 4th E. syncline  
Visit to S. Mains and 2nd E. near Energy wedge  
Samples: Set B-1 to -5

Introduction

This is the fourth mine visited under a mine stability contract from IMSRP. We began with a visit to the Monterey office in Carlinville to be briefed by Jeff Padgett. Anil Atri and I were briefed on March 9, but we could not go underground due to logistical problems. We met the second geologist (Ms. Liz Brown) attached to the Production division; she handles coal quality problems and also has new duties for the evaluation of longwall mining in the SW quadrant of the mine which is currently being considered.

Geologic Briefing on March 9

The Monterey No. 1 property in the Herrin, located a few miles south of Carlinville runs roughly 8 miles N-S and 3 to 4 miles E-W, of which perhaps 40% has been mined. Herrin has gradual ENE dip over block. There are few faults in the mine; most have 1' to 2' throw. Clay dikes have been seen only in the extreme NE part of mine. There is a bedrock valley running E-W across the middle of the mine, with glacial drift up to 200' thick. The floor stability problems are spatially correlated with this bedrock valley.



FORM 180 W

p. 2 of 6

Anna Shale roof is patchy in distribution present across most of the mine, but is consistently present within 4-6000' of Energy Shale wedge which borders the eastern side of the mine block. The Brereton Ls. overlies the Anna in all but unusual cases and is immediate roof over large areas of the mine. Near the Energy Shale wedge there are areas paralleling the edge of the wedge where the Brereton reaches 12' thick; other such areas have normal (4-6') thickness of Brereton. Roof in SW quadrant of mine is expected to be very good, i.e. thick, consistent Brereton with thin Lawson interval above it.

In the SE quadrant of the mine the Energy Shale wedge has been encountered at several points. The wedge thickens up to 25' within 1/4 to 3/4 mile of the edge of the wedge. The East Hornsby Exploration Area ("Hornsby probe") was an attempt to evaluate the mineability of Herrin under this wedge. This effort, documented in a proprietary 1986 report by M. J. Cross, J. M. Mulhern and J. T. Padgett, was considered a success. We plan to visit a panel where thin patches of Energy Shale are found as roof near the wedge proper.

Most of known subsidence sites were examined in mine and were all found to be squeeze-related. All such sites were located west of N. Mains and N. of 1st West. Submain; most are over 1st to 4th N. Panels. As noted before, floor problems are more common under E-W bedrock valley. Floor data is less detailed, but 1 1/2' to 3' underclay is probably typical with underclay limestone of variable thickness and often nodular; sometimes it is fairly pure.

Bolting plan is to put in 30" to 6' bolts on 5' x 5' centers, starting 2 1/2-3' off rib. Grade 55 steel (5/8" diam.) is used; extenders are used to reach 9' or 12' when needed. Jointing in Anna Shale runs N.55°-65°E. and is common; Brereton is sparsely jointed.



FORM 180 W

p. 3 of 6

Calculated max. lateral stress direction of N.68°E. (from Hornsby probe work) is probably a good value; intensity of the stress is unclear.

### Visit to N. Mains and 4th E. Mains syncline

Jeff Padgett briefed us further as we traveled. Herrin average 7-8'; is rarely below 6' or above 8'. Blue band averages 18-20" above floor; there is another prominent parting ca. 5' above floor; top 2' of Herrin is typically brighter coal. As we traveled through N. Mains we noted some rib rashing and corner problems due to long-term floor movement. Near 1st W. submain junction pillars showed wedging of lower parts of seam-gob buildup eventually helps support these pillars.

The blue band thickens and becomes siltier toward the Walshville Channel in the "Probe" area and in d.h. data.

Anna Shale comments: unit is well-jointed at base--is weakened and bioturbated for 1 1/2' down from Brereton Ls. contact. Anna gradually weathers and "punches" plates off with as little as 18" Anna. Anna thickness variation doesn't affect Brereton thickness in this mine: no facies changes in Brereton noted, but shoals upward (becomes coarser) where very thick (10'+).

We paused in syncline on 4th E. about 3 panels short of turn to north. In this area coal below blue band increases to 3 1/2' and bench is dirty. Syncline trends NE-SW and Herrin locally reaches 14' thick. Anna Shale is present consistently in syncline (compare P. 10' 'trough' feature) from 2' to 4' and is more competent roof. Anna is jointed 1 1/2-2' centers at N.50°E. in syncline. Jeff thinks coal may be harder in syncline (liptinites up?)--but this may actually be a function of ash content. Syncline is 800' wide and is a deep seated structural feature.



FORM 180 W

p. 4 of 6

On the way to Unit 6 (at N. and of 15th N. panel) we went N. across edge of syncline which locally has steeper grade than acceptable. On section they leave floor coal. I sampled 2 oriented blocks of coal from above blue band and 6 1/2' down from Anna contact (-B-1A); Joe Miller sampled bone coal (parting?) in Herrin (-B-1B) from same site. Coal is thick-banded (3-4 mm vit. bands); fusain bounds top and bottom of bigger block. Occasional pyritic coal balls (of periderm?) occur, but are not a mining problem; chips (-B-2) sampled.

We headed back south past unit 5 which Atri visited but couldn't visit due to dusting. Floor considered "soft".

#### Visit to S. Mains and 2nd East nr. Energy wedge

We stopped quickly in junction of 2nd E. submain (8 yrs. old) and could see buildup of gob at base of pillars.

We went to 10th N. Panel, east rooms (Unit 1) to see Energy lens near main wedge. We had continuous Anna roof on 2nd E. for 22 crosscuts before we turned north into the last panel. Anna contains poorly formed discoidal concretions, or perhaps they weather rapidly. Anna has lots of slip planes and is very coaly in bottom 0.2'. Measured 2.2' total thickness and unit is not fissile. Ls. "bosses" show up within 1000' of edge of wedge. Some in-seam compactional faulting seen. Anna appears to be composed of two subunits. Sequence is:

- Brereton - gently rolling base
- 0.3' "clod" of Brer., better indurated than typical
- 0.7' Anna; non-fissile, lots of thin brown bands



FORM 180 W

p. 5 of 6

- 0.6' Anna; typical blue cast, finely banded, slightly fissile
- Herrin Coal, with slip planes on some bedding surfaces

One c/c further north sampled dark gray shale thought to be Energy from lens under definite Anna. Shale is "Energy" by scratch but is very dark gray and has odd popcorn-like mineralizations in it; oriented piece from near base sampled (-B-3).

Next we inspected Unit 4, near N. end of 9th N. panel. Examined non-fissile Anna with upright stump ("rind" only) in fair condition. Unit picked as Anna by scratch before "kettle bottom" was seen--pick still likely though confusion w. very dark Energy is possible. Gray shale parting 2.1' from top of Herrin is thickest ptng. seen here; blue band is continuous but thin (-B-4). Joe Miller sampled oriented block of blue band (-B-5).

Samples: Set B (-1A to -5)

- B-1A Thick banded coal from above blueband in syncline, 6 1/2' from top of seam (15th N. panel off 4th E. Submain); 2 oriented blocks.
- B-1B Bone coal (parting?) from Herrin in syncline, as above. (JDM)
- B-2 Chips of "woody" coal ball from syncline, as above.
- B-3 Dark gray shale (Energy?) from lens in 10th N. panel off 2nd E submain. Scratches "gray" but could pass for non-fissile Anna.
- B-4 Blue band from 9th N. Panel off 2nd E. thin (0.05') but persistent (carbon).





FORM 180 W

p. 6 of 6

-B-5 Blue band from 9th N., as above. For oriented block (JDM).

de:Fieldnotes



FORM 180 W

Phone conversation between Jeff Padgett of Monterey Coal Company and John Nelson of ISGS, June 15, 1989.

In the northern part of the Monterey No. 1 Mine south of Carlinville is a dip or valley, where the Herrin Coal thickens from its normal 8 feet to as much as 14 feet. The lower part of the seam, below the "blue band", thickens to as much as 4 1/2 feet, and is abnormally high in sulphur. This lower bench of coal ordinarily is not mined. The dip is approximately 1,000 feet wide and is synclinal or monoclinal in form. The east margin is a west-facing monocline that trends N.10°E. Grades steeper than 15% have been encountered, severe enough to interfere with haulage. Padgett reports that the coal in the dip appears duller than usual, and more water than usual seeps from the coal. Within the dip the coal is uniformly overlain by black shale (Anna Shale). Outside of the dip the roof is "patchy" Anna Shale, or Brereton Limestone.

Padgett stated that oil-well data and a high-resolution seismic profile indicate that the dip overlies a sub-Pennsylvanian paleovalley, 50 to 100 feet deep. The Herrin Coal is 300 to 350 feet above the base of the Pennsylvanian. Not much information is available on the nature of sediments within the paleovalley vs. those outside the feature. I inquired about the possibility that paleovalley and dip are fault-controlled. Padgett stated he has seen no evidence for faults.



Operator,  
Mine,  
Location in mine,

Date  
Sec. T. R.

GRAPHIC SECTION

DESCRIPTION OF SECTION (AT POINT SAMPLED)

# June, 1990, Carlinville Newspaper Landowners meet to discuss longwall mining

by Gary Pakula

Monterey Coal officials, and representatives from the Illinois Department of Mines and Minerals, the Illinois State Geological Survey, and the University of Illinois Department of Agriculture Tuesday, May 15, met with landowners whose property falls within the boundaries of Monterey's proposed longwall mining project. The representatives informed landowners about the effects of longwall mining and the resulting mine subsidence.

Monterey is proposing the use of longwall mining in an effort to produce coal with a lower sulfur content, which would enable Monterey to continue production and meet proposed acid rain legislation regulations. Longwall mining would also be a more economically efficient method of mining the coal.

Longwall mining involves sectioning off large panels of coal, which may be as wide as 800 feet, and up to several thousand feet long. The coal is then "sheared" off the face of the panel. Large shields are implemented to hold the mine wall up in areas of mining and as the mine work advances along the panel, the wall is allowed to collapse behind the mining.

It is the collapse of the mine wall that causes mine subsidence. According to Monterey officials, the subsidence would be three to six feet at its greatest point.

However, representatives from the state agriculture and geological departments informed the landowners that the subsidence would have only a minor effect on their land, and crop yield.

According to Paul Ehret of the Illinois Department of Mines and Minerals, corporations that under-

mine through the use of longwall mining are required to "restore the land to its pre-mining capability."

Ehret noted that Monterey would be responsible for any crop damage, as well, until the land is mitigated, or restored to its capabilities by Monterey. The Illinois Department of Mines and Minerals also requires the mining corporation to compensate landowners for structures that may have been damaged due to the subsidence. "Illinois is one of the few states in the nation that demand structures be compensated for," Ehret said.

The mining company would be required to compensate the landowners on a cash basis, or by restoring the property, rebuilding the structure, or by relocating the structure based upon a contractual agreement between the mine and the landowner, until the subsidence is complete.

However, the coal company must restore the property to its pre-subsidence market value, Ehret said.

Monterey would also be required to mitigate the land to its pre-subsidence capabilities, which means correcting any depressed areas caused by the subsidence. If the mining is done during a crop season, the landowner must be compensated for any crops lost due to the subsidence as well, Ehret said.

Bill Simmons, of the University of Illinois Department of Agriculture informed the landowners about the quality of the mitigated land, using the results of a study conducted on crop yields grown in mitigated fields in southern Illinois in 1988 and 1989.

Simmons noted that the fertility of the mitigated soil was actually as

good, or better than the original soil and added that the yields were not effected, or were effected very little. "The material (used for mitigation) is often nicer from a physical standpoint than what was there," Simmons said.

Simmons told landowners that the soil generally used by the mines for mitigation comes from drainage ditches and is, therefore, a fertile soil, and is also a "fluffy" soil which would hold more moisture.

Simmons said that the results may have been altered due to the abnormal moisture conditions in the state in 1988 and 1989, but added that there was an increase in the soybean yield in 1989 even in a worst case test. The soybean results from 1988 and 1989 tests ranged from a decrease of eight bushels, to an increase of nine bushels.

Corn yields on the mitigated and unmitigated land showed little difference. "Basically, the two years we looked at, the corn yields look the same," Simmons said.

Monterey officials said that the proposed longwall mining area would affect approximately 62 tracts of land, and that their ultimate goal is to obtain all of the land being considered for the project. The proposed longwall mining area is located just east of the Monterey No. 1 Mine.

The Macoupin County Farm Bureau organized the informational meeting and Farm Bureau Manager Brett Roe stressed that the meeting was for informational purposes only. "The Macoupin County Farm Bureau, at this time, has not taken a position plus, or minus, toward longwall mining," Roe said.



(576-2M-7-23)

SHEET  
COMPAN

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED

### CIPS, MONTEREY SIGN 20-YEAR PACT; NEW RESERVES TO YIELD LOWER-SULFUR COAL

The speculation is over on how Central Illinois Public Service will meet Clean Air Act Phase I emissions goals at its Coffeen IL power plant; it will shift to lower-sulfur coal from its current supplier, Monterey Coal, which will convert its Monterey 1 mine to new reserves and a longwall mining system.

While neither CIPS nor Monterey would give exact details, they signed a 20-year, 1.7 million t/y contract Jan. 2 to supply Coffeen, replacing a contract signed in 1981. The delivered price in September for 102,300 tons of 10,570 Btu/lb., 6.75 lbs. SO<sub>2</sub>/mmBtu was \$34.44/t. Under the new contract, Monterey will accept a lower price for its coal.

Monterey will also spend about \$50 million to transform Monterey 1 to mine lower-sulfur reserves adjacent to the Hornsby reserve it now mines. Monterey president Jerry Goodrich said in a statement that the mine will longwall the new reserves.

The plan is to phase in lower-sulfur deliveries from Monterey 1 at Coffeen starting in 1992 and to make all deliveries from the new reserves by 1995. Since the Clean Air Act Amendments of 1990 limit emissions to 2.5 lbs. SO<sub>2</sub>/mmBtu by 1995, Monterey's new coal probably must be lower. A CIPS official said the new East Hornsby reserves will produce coal that will vary between 1.5 and 2.2 lbs. SO<sub>2</sub>/mmBtu. In addition, the coal has less chlorine in Illinois No. 5 coals mines by Consolidation Coal and Kerr-McGee.

In its announcement Lowell A. Dodd, CIPS' senior vice president for operations said the contract will allow the utility to continue burning Illinois coal at Coffeen and avoid installing scrubbers.

The CIPS official said the utility plans to "overscrub" its Newton I power plant to comply with Phase II of the Clean Air Act of 1990 after 2000. The utility has studied the concept of scrubbing Newton I to as low as 0.6 lbs./mmBtu under a "bubble" emissions plan for the plant that would allow the Newton II unit to emit more than 1.2 lbs. SO<sub>2</sub>/mmBtu. The official said CIPS may yet apply the bubble concept for the Newton plan between 1995 and 2000.

By 2000, CIPS will have to meet fixed emissions limits at its five plants which produce 2,817-mw of coal-fired power. The new Monterey contract is "going to be the cornerstone of our acid rain compliance program," the official said. "Coffeen is our largest plant affected by acid rain in Phase One." He said CIPS and Monterey have been negotiating the contract for about two years.

COAL WEEK  
JAN 7, 1991

County  
T. - D



FORM 180 W

mo 1

1/91

Jan. 7, 91  
Coal Week 1/7/91

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An Intelligence Service for Executives Covering

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FORM 180 W

Macoupin Co

COAL Feb. '91 p. 21

COAL IN THE NEWS continued

### Exxon to install longwall at Monterey No. 1 mine in southern Illinois

Exxon Coal and Minerals Co. plans to spend \$50 million at its Monterey Coal subsidiary in Illinois, mainly to install a longwall to mine a low-sulfur reserve that will supply a new 20-year contract with Central Illinois Public Service Co. (CIPS).

Under terms of the contract, Monterey's No. 1 mine near Carlinville, Ill., will supply at least 1.7 million tons of coal a year, or a minimum of 34 million tons during the life of the agreement, to CIPS' 1,005-Megawatt (Mw) Coffeen power plant. The accord, signed in December, replaces a pact that was to have expired in about 10 years.

The longwall will be the first for Monterey, which also operates the No. 2 underground mine at Albers, Ill. Both Monterey mines currently are room-and-pillar operations.

Exxon spokesman Thomas L. Torget said that other Exxon affiliates, including one in Australia, have some experience with longwalls. He also noted that development of the Monterey No. 1 longwall is expected to begin in 1994, but said that it is premature to discuss other details of the project.

The low-sulfur reserve, adjacent to Monterey No. 1, has been owned by the company for about 20 years. The reserve is believed to contain some 200 million tons of coal with a sulfur content in the 1% range. In contrast, Monterey has been supplying CIPS with coal averaging 3.5% sulfur, which is among the highest in Illinois. The low-sulfur reserve had not been developed previously, Torget said, because "it wasn't necessary."

He elaborated: "It's a little expensive to produce because roof conditions aren't as good. That's a big reason we'll use a longwall."

With acid-rain legislation a reality and many midwestern utilities scrambling to put together compliance strategies, the company decided that it was time to develop the reserve.

Until the longwall is installed, Monterey plans to use room-and-pillar mining to begin supplying CIPS with coal from the low-sulfur reserve in 1992, Torget said. "We'll be supplying coal from the new reserve exclusively in 1995," he added.

Because the new longwall won't begin operation for another four years or so, Torget said employment levels are expected to remain around 350 people at Monterey No. 1 for several years. At present, Exxon has no plans to install a longwall at Monterey No. 2.

Torget said Exxon is pleased it has the low-sulfur reserve available to serve CIPS. "This enables our customer to meet Clean Air Act provisions without having to install scrubbers," he noted. "It enables Monterey to continue mining and selling Illinois coal." □

370 people.

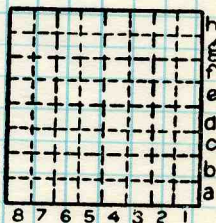
**MONTEREY COAL PRESSES ON;  
NO. 1 MINE MOVES INTO LOWER SULFUR**

Exxon Coal's Monterey No. 1 mine is on schedule as it moves into new lower-sulfur reserves that will supply Central Illinois Public Service's Coffeen power plant under a 20-year, 1.7 million t/y contract signed two years ago (1-7-91 *Coal Week*).

According to Exxon spokesperson Tom Torget, Monterey 1 began to phase in lower-sulfur deliveries at Coffeen in 1992. Room-and-pillar mining is being used to access lower-sulfur reserves that eventually will be longwalled under a \$50 million program to develop new reserves adjacent to the Hornsby reserve it now mines.

Exxon has received equipment bids and plans to award a contract in a couple of months for the longwall. It should arrive at the central Illinois mine by early 1994 and longwalling is expected to commence by mid-1994. By 1995, lower-sulfur coal will account for all of Monterey 1's production.

*1-18-93  
Coal Week.*



By \_\_\_\_\_ Date \_\_\_\_\_

Quadrangle \_\_\_\_\_

County \_\_\_\_\_ Sec. \_\_\_\_\_ T \_\_\_\_\_ R \_\_\_\_\_



FORM 180 W

## SAMPLE HISTORY

Plant sampled: **Monterey No 1 (Hornsby Block)** Date: **10/22/92**

Company: **Monterey Coal Co.** Sample ID: **Hornsby C32778**  
**POB 496, Carlinville, IL 62626**  
**Jerome D. Goodrich, Jr., pres.**

Company representative: **Mike Kaufman, Quality Coordinator**  
**217-854-4240**


Mine (source of sample): **No. 1 Hornsby** Collected by: **RDH & RRR\***

Seam identification: **Herrin** Time of closure: **\***

Mining period represented (dates): **10/26-29/92**

Panel(s) & location(s) in mine:  
 Mine locations (descriptive):  
**4½ miles SE of main office on the east side of Carlinville**

|              |           |                |                      |
|--------------|-----------|----------------|----------------------|
| ¼ or footage | section   | tpw            | rge                  |
| <b>W½</b>    | <b>18</b> | <b>9N - 6W</b> | <b>Macoupin Cnty</b> |

Type of Preparation Plant: 

**See description and flow sheet in booklet filed under Monterey in Coal Section office. McNally jigs and crib cyclones, centrifical driers**

Sampling point: # increments: **\***  
 Belt (describe position in plant)  
**Off main belt carrying product coal to train loading dock**

Train Truck

Company's sampling device (yes / no ) **YES**  
 Type: **Primary and secondary sample cutters with crushers**

Other (describe)

Procedures (describe other aspects):

\* **Sampling done by Monterey staff as part of their regular quality control sampling procedure.**





## FORM 180 W

## SAMPLE HISTORY

Plant sampled: **Monterey No 1 (Main Block)** Date: **10/22/92**Company: **Monterey Coal Co.** Sample ID: **MONTMAIN**  
**POB 496, Carlinville, IL 62626** **C32797**Company representative: **Jerome. D. Goodrich, Jr., President**  
**Dale A. Farmer, Engineering Mgr**  
**Mike Kaufman, Quality Coordinator, 217-854-4240**  
**Mike Mulhern, Prep. plant mgr, 854-3291 ext 265**  
**Bob Gardner, Chemist**Mine (source of sample): **No. 1 - Main block** Collect by: **RDH & RRR\***Seam identification: **Herrin** Time of closure:Mining period represented (dates): **10/26-29/92**Panel(s) & location(s) in mine:  
Mine locations (descriptive):**Approximately 7 miles south of Carlinville** $\frac{1}{2}$  or footage section twp rge  
estimate 9N - 7W Macoupin Cnty

Type of Preparation Plant:

**See description and flow sheet in booklet filed under Monterey in Coal Section office. McNally jigs and crib cyclones, centrifical driers**Sampling point: # increments: \*  
Belt (describe position in plant)**Off main belt carrying product coal to train loading dock**

Train Truck

Company's sampling device (yes / no ) **YES**  
Type: **Primary and secondary sample cutters with crushers**

Other (describe)

Procedures (describe other aspects):

\* **Sampling done by Monterey staff as part of their regular quality control sampling procedure.**



FORM 180 W

12/11/96 During phone call on ITTI  
business John Lanzarote Production  
Superintendent reported that they  
have recently had major incursion  
of water from bedrock valley and  
Trivoli ss into their thine. Have  
been pumping 200 gpm; hydrologist  
suggests they need to prepare for  
up to 500 gpm; have installed  
additional pipes & pumps to handle  
these quantities. Water has caused  
floor to fuse into mud, causing  
major problems of clean up etc  
production has suffered, made  
their customers unhappy. They  
have spent plenty of money & over-  
time (weekends etc. 80+ hrs/wk)  
to overcome problem.

Are trying to move as fast as  
possible to go from fusion to compression

in area where they connect  
through bedrock to Pleistocene  
valley to hopefully close cracks,  
by advancing longwall face as  
quickly as possible.

1/22/98

Phone call to John Lanzetta: they  
have since moved to S with their  
longwall operations and they no longer  
have a water problem which was  
related to a bedrock valley in  
northern portion of their reserves.

They now have the largest low  
sulfur coal reserve in IL. The  
Galatia mine will exhaust its re-  
serves in not too distant future,  
esp. at the increased production  
rate.

| Mine Company (parent)                       | Seam           | Seam height (Inches) | Cutting height (Inches) | Panel width (ft) | Panel length (ft) | Overburden (ft) | No. gate entries | Depth of cut (Inches) | Shearer <sup>1</sup> | Haulage system |
|---|----------------|----------------------|-------------------------|------------------|-------------------|-----------------|------------------|-----------------------|----------------------|----------------|
| Monterey No. 1<br>Monterey Coal Co. (Exxon) | Herrin (No. 6) | 70-90                | 72-90                   | 750              | 9,600             | 330             | 3                | 30                    | Joy 4LS<br>DDR 1,030 | Ultratrac      |

| Roof supports (legs/yield) | Face conveyor Type <sup>2</sup> (strand, motors) | Face conveyor width (mm)/ speed (fpm) | Stageloader type width, speed | Crusher | Electrical controls | Voltage to face | Capacity (raw tons per shift) <sup>3</sup> | Daily no. prod. shifts |
|----------------------------|--|---------------------------------------|-------------------------------|---------|---------------------|-----------------|--|------------------------|
| Joy 2/620                  | Joy 38 TIB 2x600                                 | 950/264                               | Joy 1,024 mm, 340 fpm         | Joy     | Service Machine     | 2,300           | 10,000                                     | 2.5                    |

US Longwall mines in COAL AGE,  
Feb. '98

Dennis Murphy

Results of  
analysis

Monterey #1 - 5/14/80

C-21041

2100' W, 4700' N of SE corner sect 34 T.10N. R.7W

Dennis Murphy - Geologist & guide

Brent Burton - Engineer

2nd N. Panel off 4th East off main North - stub for  
4th room east outby face of the panel.

Loc #1

Roof - Ls - (Brecciated) - med gray; argil, irreg lower  
surface;  $\approx 0.2'$  clod at base, clod intrs irreg,  
stringers coal;

1.64' - Coal: NBB, blocky, well devel. cleat; trace  
cleat trend 060, thick mineralization of  
wht cal on face cleat, thinner on butt cleat  
much pyr on face cleat in lower 0.25' of  
unit;

0.03' Coal - w/ very thin irreg lamin of pyr;

0.29' Coal - S.T.A; w/ closely spaced vert frac  
lined w/ pyr & a little cal

0.02' Pyrite - discon. bands, very hard, nodular  
appearance.

0.63' Coal - NBB, thin lamin of soft fusain  
in lower part; thick cal on cleats;  
finely dissem. pyr;

0.09' - Fusain: soft, trace of pyr, very lenticular.

0.08' - Coal: mostly vitrain w/ little white cal;

✓ 0.01' - shale: gray-blk; trace pyr, discont;

0.18' - Coal: S.T.A.

0.02' - Fusain: soft & lenticular

0.08' - Coal: S.T.A.;

0.05' - Coal: DBC; trace pyr, lenticular

0.39' - Coal: NBB, S.T.A.;

0.12' - Coal: altern. vit & DBC w/ thin lamin pyr.

0.50' - Coal: NBB, w/ sev short lens soft fus;  
very little cal, trace of pyr.

0.76' - Coal; NBB, thinly lamin (more than above);  
few thin fus. strks; trace of cal &  
pyr on cleats;

0.03 - pyr: very fine grnd & hard; local  
strks blk sh (excluded from sample)

0.54 - Coal: S.T.A.; pyr & cal more abndt;

0.05 - shale: (Blue Band) med drk gray, mod hard,  
thin coal stringers (excluded from sample)

0.32' - Coal: NBB; w/ numer irreg stringers & bands  
of dull pyritic coal & pyr gray-blk sh.

(cont) pyr on cleats, very little cal;

1.22' Coal: WBB; fairly thick lamin; blocky;  
abundant cal on cleats; rtaln cal on cleats

0.14' Coal: DBC; few thick vitr stringers;

Floor - claysta: med ~~gray~~ gray; faintly mottled,  
very soft; contns thick stringers of vitr.

Total: ~ 7.0'      7.19' total

---

C-21042

Channel Sample No. 2

3 crosscuts mly, spal 7492

between Neutral and Intake - air entres -

2nd N. Pond off 3rd East off Main North.  
2100' S, 900' W of NE corner Sect. 3 T.9N-R.7W

Roof: Shale (Anna) black, hard, smooth, fissile,  
contains unusual abundance of pyritized fossils;  
mainly pelecypods similar to mussels with shells  
1 - 1½" long; note also one coiled cephalopod  
about 5" in diameter. Numerous pyritite  
concretion at base of shale, occasional  
phosphate lenses higher up. Stretensched slips  
common. Joints sparsely distributed, trend ENE.  
Sharp contact: one small slip 0.1" displ.

0.64 Coal, sub-bright banded, thin lam. except for  
thick vitrain bands, contains pyrite "goat  
beards" and much calc. on cleat  
surfaces and in fractures. Argil. matrix  
on upper bdy. planes. Moderate cleat  
development.

- 0.01' Pyrite, fairly cont. band with mineralized fusain.
- 0.92' coal, sh. to above, w. discontinuous strk of pyrite; much calcite on cleats and fractures. Vitram bands up to 0.10' thick. Numerous thin laminae of fusain.
- 0.02' Sh, mod. gy, moderately hard, contains stringers of coal. Discontinuous.
- 0.36' Coal, N.B.B., much calcite on cleats; large pyrite "goat beads" - well developed cleats.
- 0.02' Pyrite, hard, contains thin strks. of coal - discontinuous. Grades laterally into soft fusain band.
- 0.82' Coal, N.B.B., much calcite, less pyr. than above, contains fusain lenses.
- 0.02' Shale, mod to  $\downarrow$ lt gy, smooth, mod. soft; continuous.
- 0.30' Coal, N.B.B., numerous py. strks + bands, much calc. on cleats.
- 0.01' Pyrite, hard, fairly continuous, locally fractures to lenses.
- 0.63' coal, N.B.B., as above.
- 0.05' Pyrite, hard, carbonaceous, fairly continuous, EXCLUDED FROM SAMPLE.
- 1.92' Coal, N.B.B., less calcite than above, thin laminae of shale and occ. pyr. lenses - vitram in thin bands.
- 0.11 Sh, Blue Band, mod. gray, mod. hard, 5 mod. thin lam. with pyrite stringer near middle of unit. Contains finely disseminated pyrite. EXCLUDED FROM SAMPLE.
- 0.26' Coal, as above.
- 0.01' Pyrite, hard, discontinuous.



- 0.28' Coal, ~~as above~~; with some pyrite in small fractures and calcite in fractures and on cleats
- 0.01' Pyrite, hard, discontinuous
- 0.39' Coal, as above.
- 0.02' Shale, with string of coal through center. -  
sh. lt. med gy, med. hard, discontinuous.
- 0.81' Coal, as above, calcite and pyrite on fractures, several very thin sh. laminae and one fusain lens. Vitrain very finely banded.
- Floor - Clayst., lt to med gy, soft, slickensided, carb., smooth,
- 7.61' total

Channel Sample #3

C-21043

3600' S, 2100' E of  
Main South

NW cor. Sect. 27  
T.9N - R.7W

Roof - LS: med gray, fn grnd; argil; basal 0.2' clod; w/ abndt coal stringers; fine grnd pyrite; interlamina w/ top of coal

1.41 - Coal: NBB, blocky, abndt cal on cleats; fine grnd pyr in lower 1/3;

0.04' - Fusain: soft, lenticular w/ streaks of vitrain;

0.17' - Coal: S.T.A., thin stick pyr near middle;

0.01 Pyr: very thin coal streaks;

0.45 Coal: NBB w/ abndt pyr in frac; little cal; thick sticks vit at base

- 0.36' Coal: SBB, thinly lamin; thin pyr lamina;  
considerable cal on cleats, but no pyr;
- 0.01' shale: gray-black, carb, hard, w/ abndt pyr;
- 0.73' Coal: NBB, much cal on cleats; small  
lens of pyr near top
- 0.04' Coal: dull, hard, w/ numer pyr stringers;
- 1.25' Coal: NBB, w/ abndt cal & finely dissem  
pyr;
- 0.03 Coal: dull, hard, w/ strks & lens of hard  
pyr, locally 0.03 thick; thick pyr  
excluded from sample
- 0.53' Coal: NBB, vitr rich in thick bands,  
abndt cal & fine grnd pyr on cleats,
- 0.07 Shale: (Blk Bnd) olive gray, hard, smooth;  
finely carb; thin coal stringers;
- 1.67' Coal: NBB, STA, vitr rich
- Floor Clay: med lt gray, mottled, soft, smooth  
carb debris
- 7.07' total

Composite face-channel  
Request no. 16518

C-21044



FORM 180 W

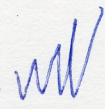
CROWN III

SAMPLE 1      67' North, 25' west of  
center; or 2573' from north line, 2615'  
from west line, Sect. 1, T. 11N - R. 6W.  
MACOUPIN

SAMPLE 2      550' south, 28' east, of  
center; or 2090' from south line,  
2612' from east line, Section 1,  
11N - 6W.      MACOUPIN

HILLSBORO

SITE 1

1950' west of center  
(2640' NL, 690' west line) =   
Section 18      T. 7N - R. 2W.  
Montgomery

SITE 2      500' N, 2090' W of center  
(2140' NL, 550' WL) ~~2090' W~~  
Section 13      T. 7N - R. 3W  
Montgomery

monterey I Macoupin County

Sample #1

SW, NW, SW, NW Sec. 35, (10N), 7W

1830' from NL, 250' from WL

Sample #2

NW, NW, NW, SW sec. 35, (9N), 7W

2480 SL, 250 WL