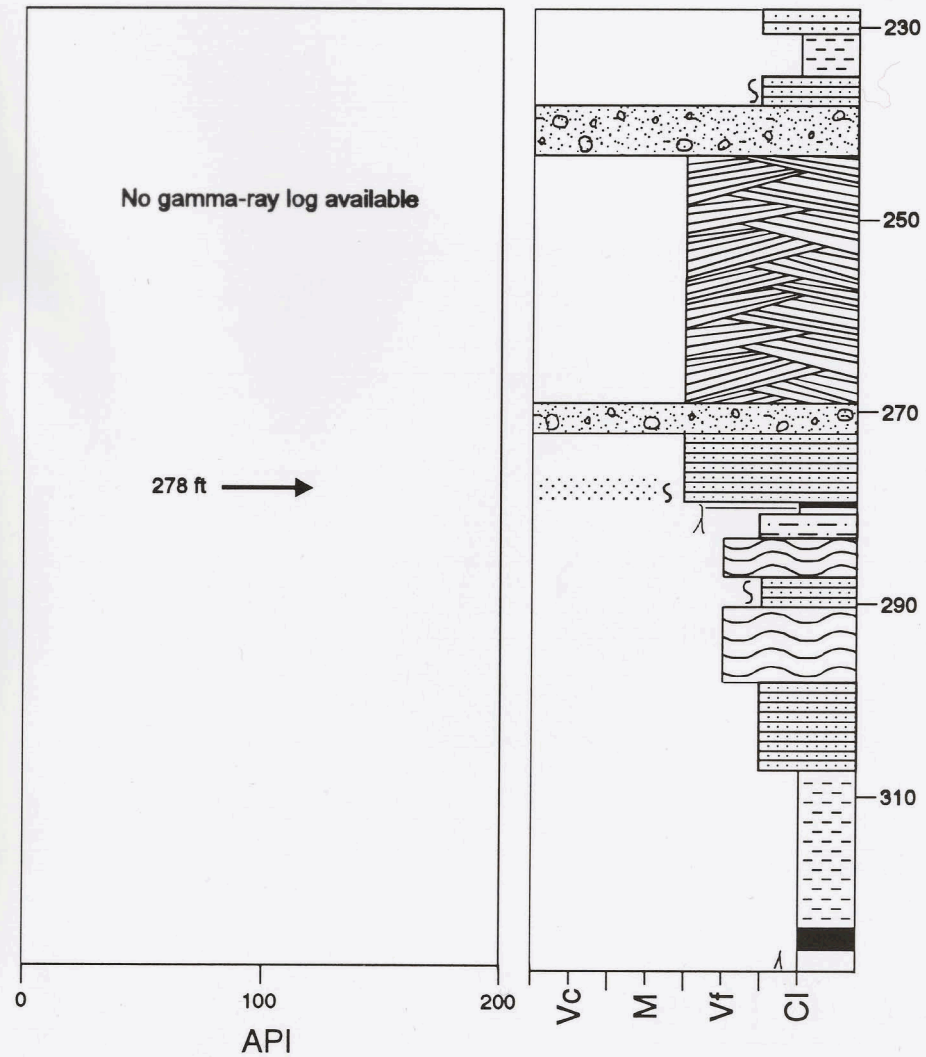


Illinois State Geological Survey COGEOMAP S-4
 Sec. 25 - T11S - R4E
 Johnson County, Illinois



Bioturbated Interlaminated Sandstone

Gamma-Ray Log



Ss i b 2 [548]

I. NAME: Bioturbated interlaminated sandstone
Formation: Tradewater

Ss	i	b	2
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II. DESCRIPTION:

Texture: Sand – fine-grained (0.125 - 0.250 mm)
subangular to subrounded

Composition: Sand – quartz with silica, kaolinite,
and siderite cement, carbon-
aceous material common

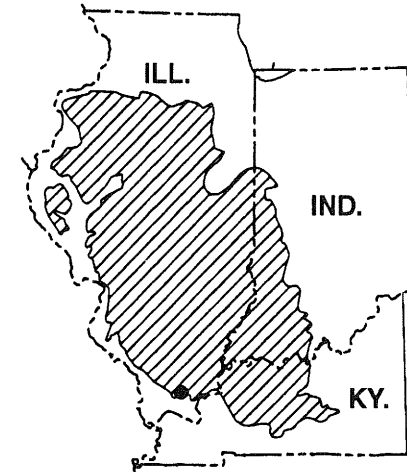
Sedimentary structures and features:

Bioturbation

Fossils: Trace fossils include *Teichichnus* and
Conosticus - *Astersoma*

III. GAMMA-RAY WELL-LOG CHARACTERISTICS:

No gamma-ray well-log available.

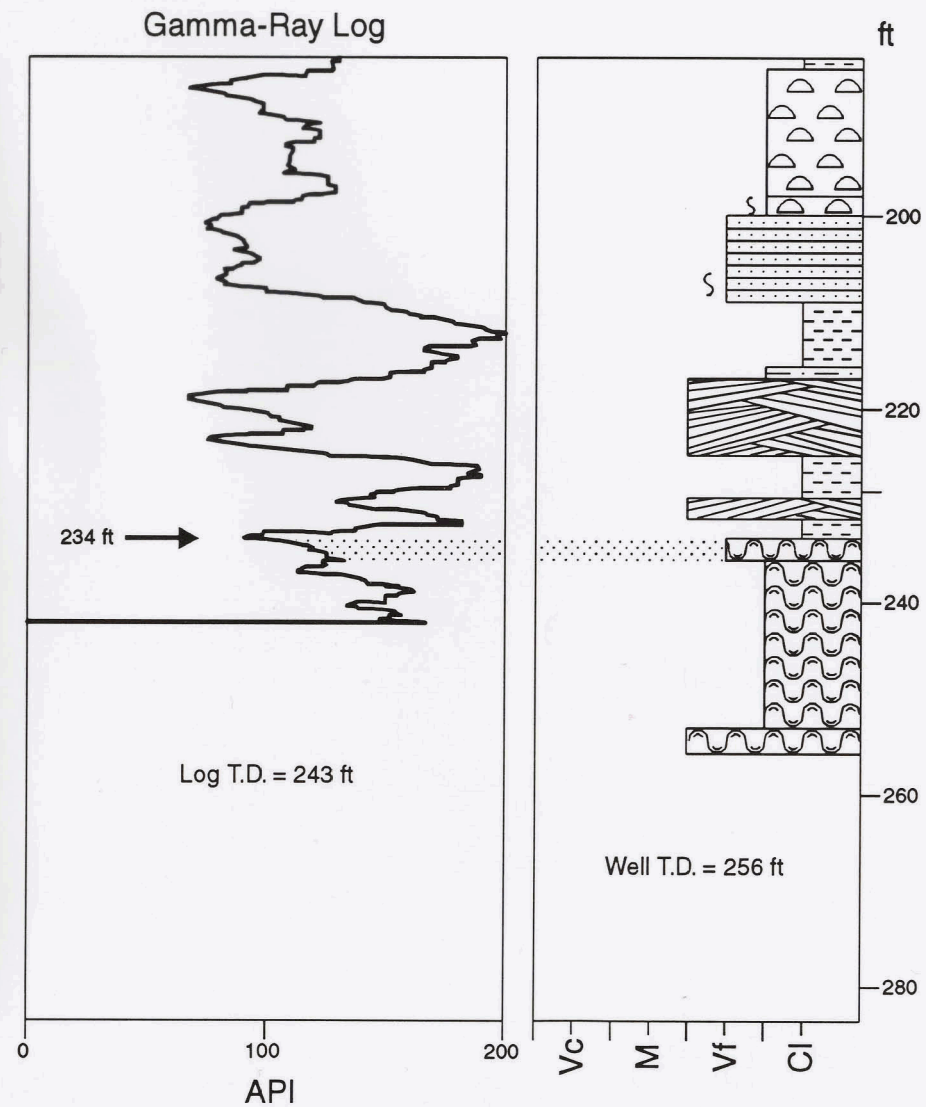


Map showing area of Pennsylvanian rocks
and location of corehole.

Illinois State Geological Survey COGEOMAP C-5
 Sec. 36 - T11S - R3E
 Johnson County, Illinois



Disturbed-Bedded Interlaminated Sandstone



Ss i d 1 [010 faulted]

I. NAME: Disturbed-bedded interlaminated sandstone

Formation: Tradewater

Ss	i	d	1
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II. DESCRIPTION:

Texture: Sand – very fine-grained
(0.0625 - 0.125 mm)
subangular to subrounded

Composition: Sand – quartz, small mudstone
clasts and carbonaceous
material concentrated along
bedding planes

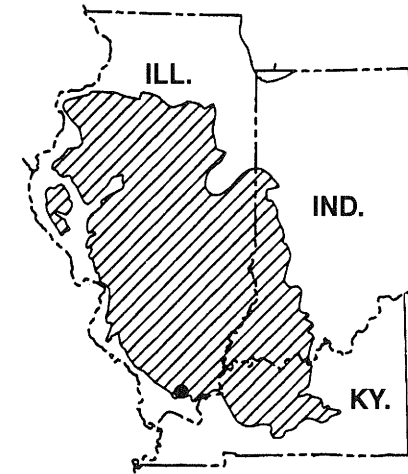
Sedimentary structures and features:

Microfaulting

Fossils: None observed

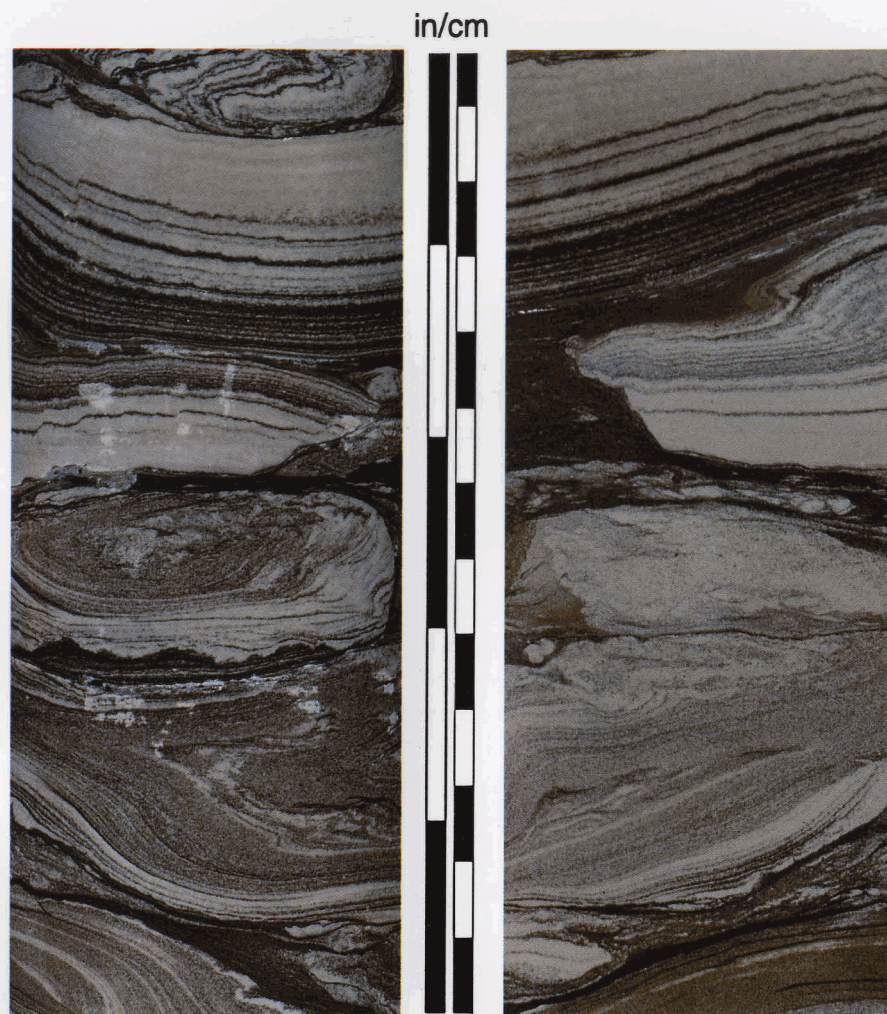
III. GAMMA-RAY WELL-LOG CHARACTERISTICS:

The abrupt changes in lithology from 255 ft to the top of the section results in an irregular gamma-ray well-log signature.

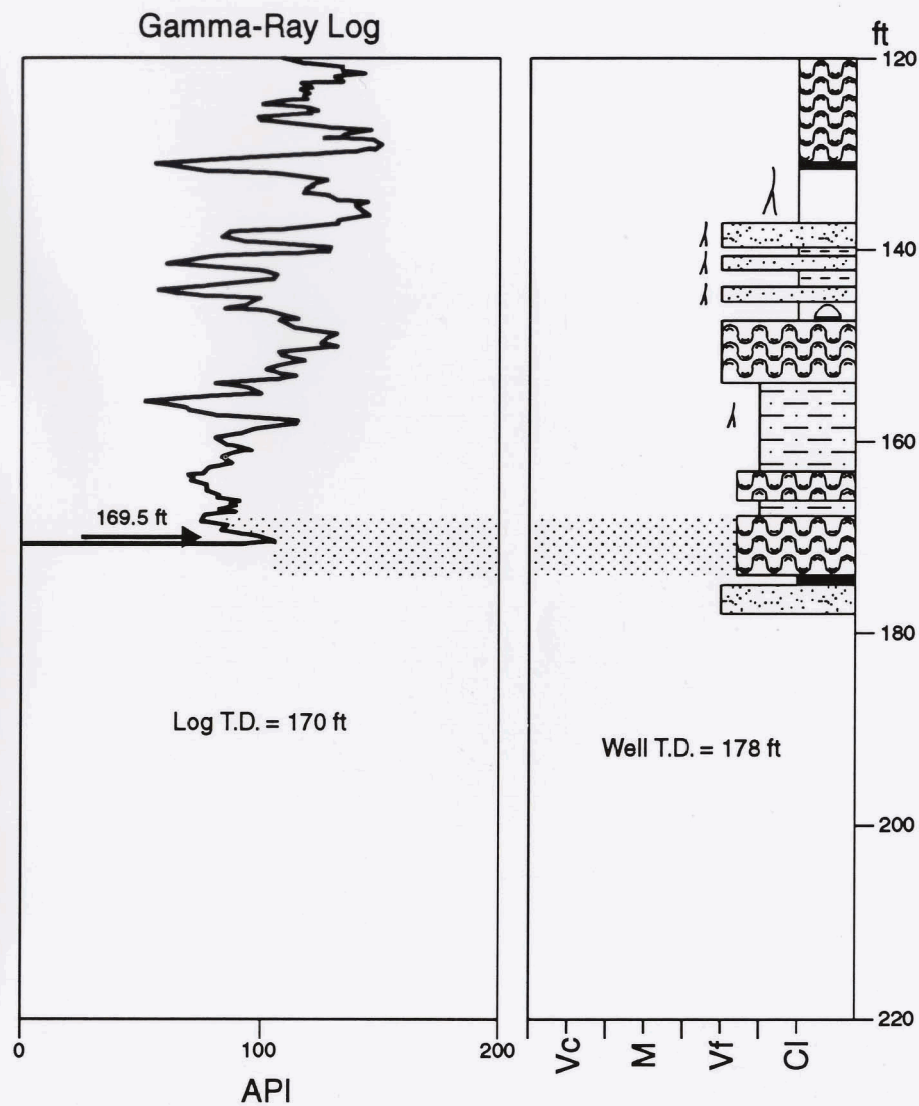


Map showing area of Pennsylvanian rocks and location of corehole.

NSWC Crane IGS-(D)5
 Sec. 20 - T5N - R3W
 Martin County, Indiana



Disturbed-Bedded Interlaminated Sandstone and Shale



Ss i d 2 [018]

I. NAME: Disturbed-bedded interlaminated
sandstone and shale
Formation: Mansfield

Ss	i	d	2
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II. DESCRIPTION:

Texture: Sand – very fine-grained
(0.0625 - 0.125 mm)
subangular to subrounded

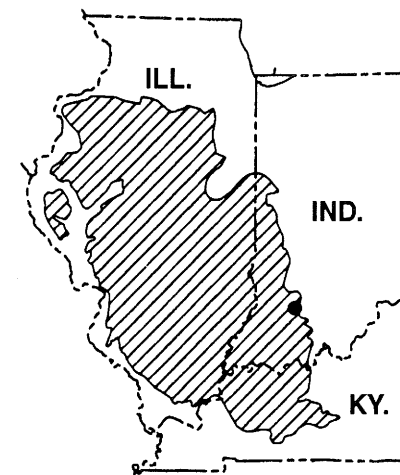
Composition: Sand – quartz with silica cement
Clay – unknown

Sedimentary structures and features:
Disturbed bedding

Fossils: None observed

III. GAMMA-RAY WELL-LOG CHARACTERISTICS:

The disturbed-bedded (slumped) facies represented in the photograph is part of an upward-fining succession (175 ft to 145 ft). The presence of abundant clay associated with the sandstone results in poorly developed bell-shaped gamma-ray well-log signature with a serrated character.

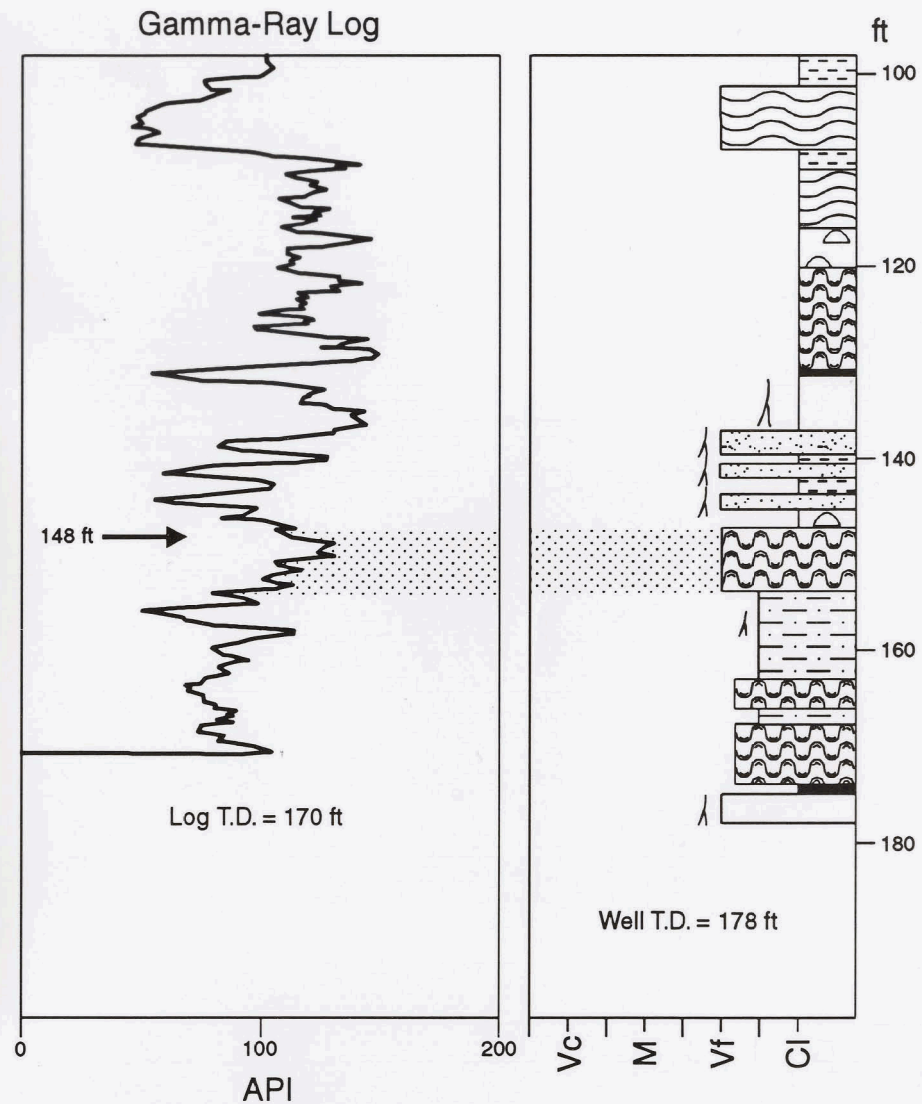


Map showing area of Pennsylvanian rocks
and location of corehole.

NSWC Crane IGS(D)5
 Sec. 20 - T5N - R3W
 Martin County, Indiana



Disturbed-Bedded Interlaminated Sandstone and Shale



Ss i d 3 [322.8 rip]

I. NAME: Disturbed-bedded interlaminated sandstone and shale
Formation: Mansfield

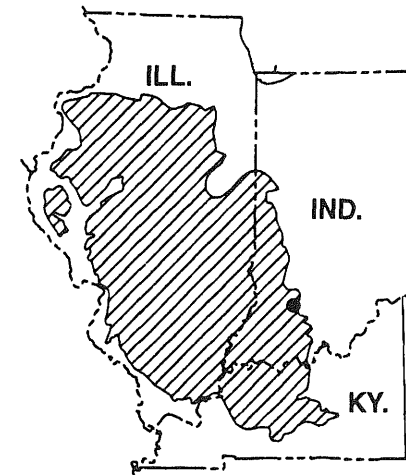
Ss	i	d	3
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II. DESCRIPTION:

Texture: Sand – very fine-grained
(0.0625 - 0.125 mm)
subangular to subrounded
Clay – (less than 0.0039 mm)
Composition: Sand – quartz with silica cement
Clay – unknown
Sedimentary structures and features:
Microfaulting, load-casted ripples,
lenticular bedding
Fossils: None observed

III. GAMMA-RAY WELL-LOG CHARACTERISTICS:

The vertical succession containing the disturbed-bedded sample represents a complex lithofacies assemblage dominated by fine-grained rocks with abruptly alternating lithologies and an upward-fining grain-size trend from the base of the columnar profile to the lenticular-bedded shale at 146 ft. The result is an irregular to slightly bell-shaped gamma-ray well-log signature.

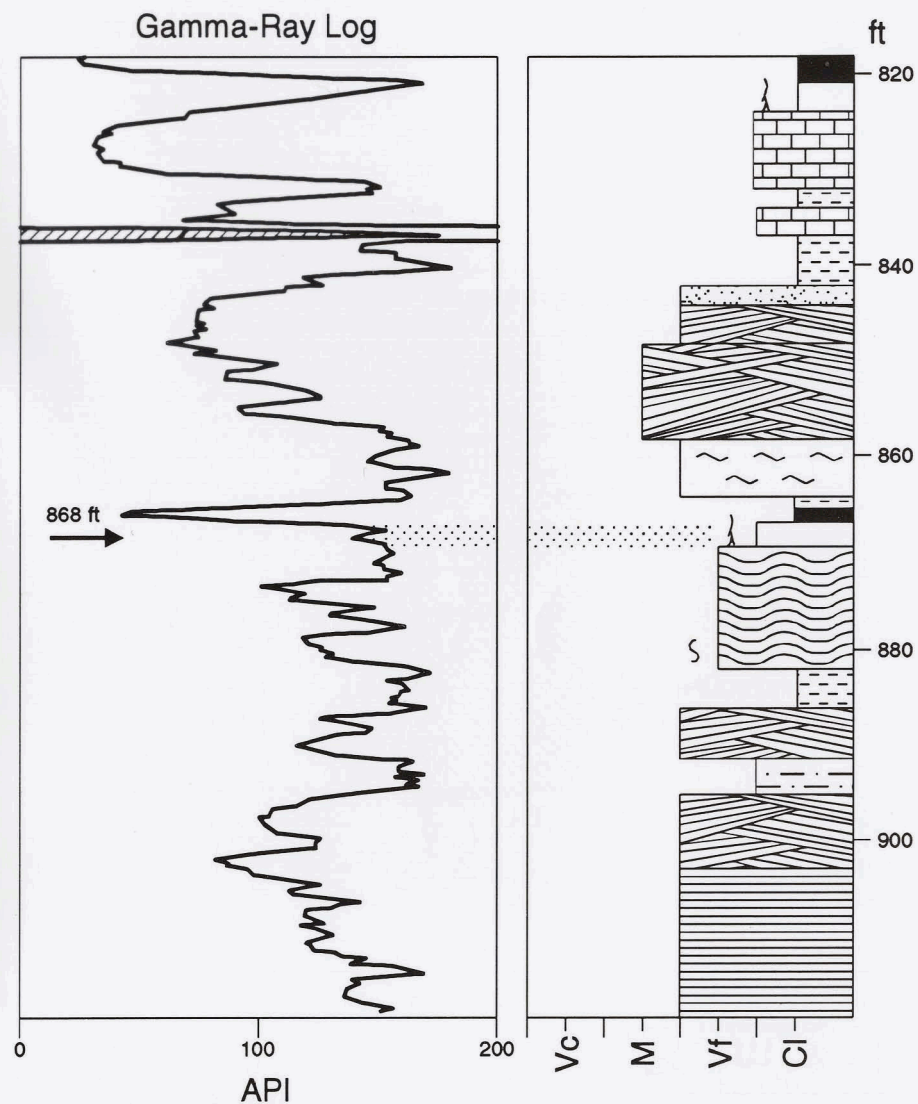


Map showing area of Pennsylvanian rocks and location of corehole.

Borehole 571
 Sec. 14 - M - 21
 Webster County, Kentucky



Rooted Massive Siltstone



Ft m r 1 [327]

I. NAME: Rooted massive siltstone
Formation: Carbondale

Ft	m	r	1
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II. DESCRIPTION:

Texture: Sand – very fine-grained
(0.0625 - 0.125 mm)
subangular to subrounded

Silt and clay – (less than 0.0625 mm)

Composition: Sand

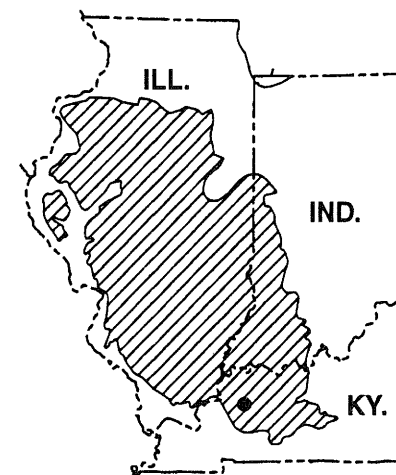
and silt – quartz with silica and clay
cement, approximately
25 percent of roots
pyritized, scattered mica
common

Clay – unknown

Sedimentary structures and features:

Bioturbation from rooting

Fossils: Fossil roots



Map showing area of Pennsylvanian rocks
and location of corehole.

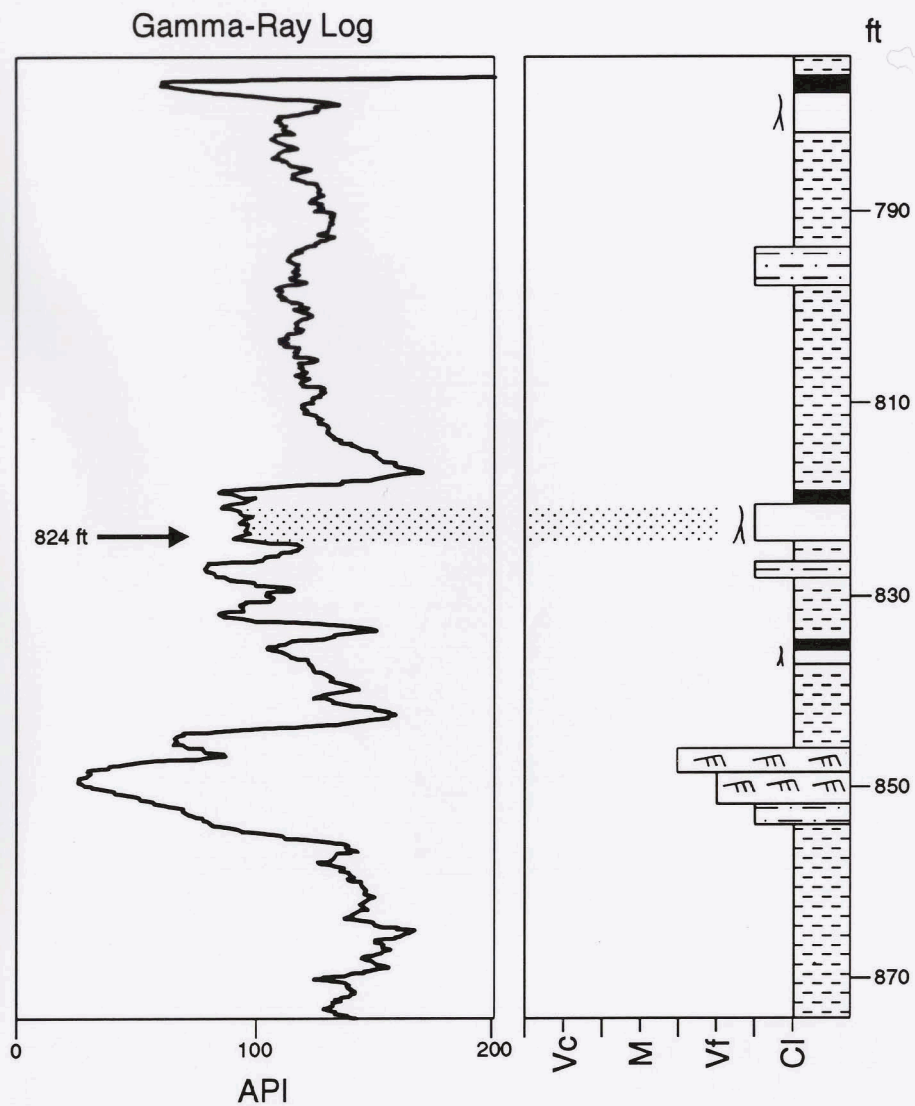
III. GAMMA-RAY WELL-LOG CHARACTERISTICS:

The gamma-ray well-log shows three vertical successions. From the base of the columnar profile (918 ft) to the coal (865 ft), the abrupt changes in grain size and slight upward-fining grain-size trend result in an irregular signature. The second interval which begins above the coal and ends with the radioactive shale at 840 ft shows a symmetrical gamma-ray well-log signature. The third interval beginning with the limestone at 838 ft and ending with the coal at the top of the columnar profile shows an irregular to slightly funnel-shaped gamma-ray signature.

Indiana Geological Survey SDH-285
 Sec. 35 - T5S - R9W
 Posey County, Indiana



Rooted Massive Siltstone



Ft m r 2 [337]

I. NAME: Rooted massive siltstone
Formation: Linton

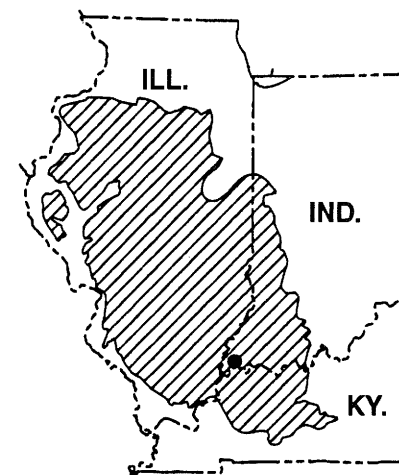
Ft	m	r	2
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II. DESCRIPTION:

Texture: Sand – very fine-grained
(0.0625 - 0.125 mm)
subangular to subrounded
Silt and clay – (less than 0.0625 mm)
Composition: Sand and silt – quartz with minor
mica
Clay – unknown
Sedimentary structures and features:
Bioturbation from rooting
Fossils: Fossil roots

III. GAMMA-RAY WELL-LOG CHARACTERISTICS:

The gamma-ray well-log shows a poorly developed funnel-shaped signature from the top of the ripple-bedded sandstone at 846 ft to the top of the coal at 820 ft.

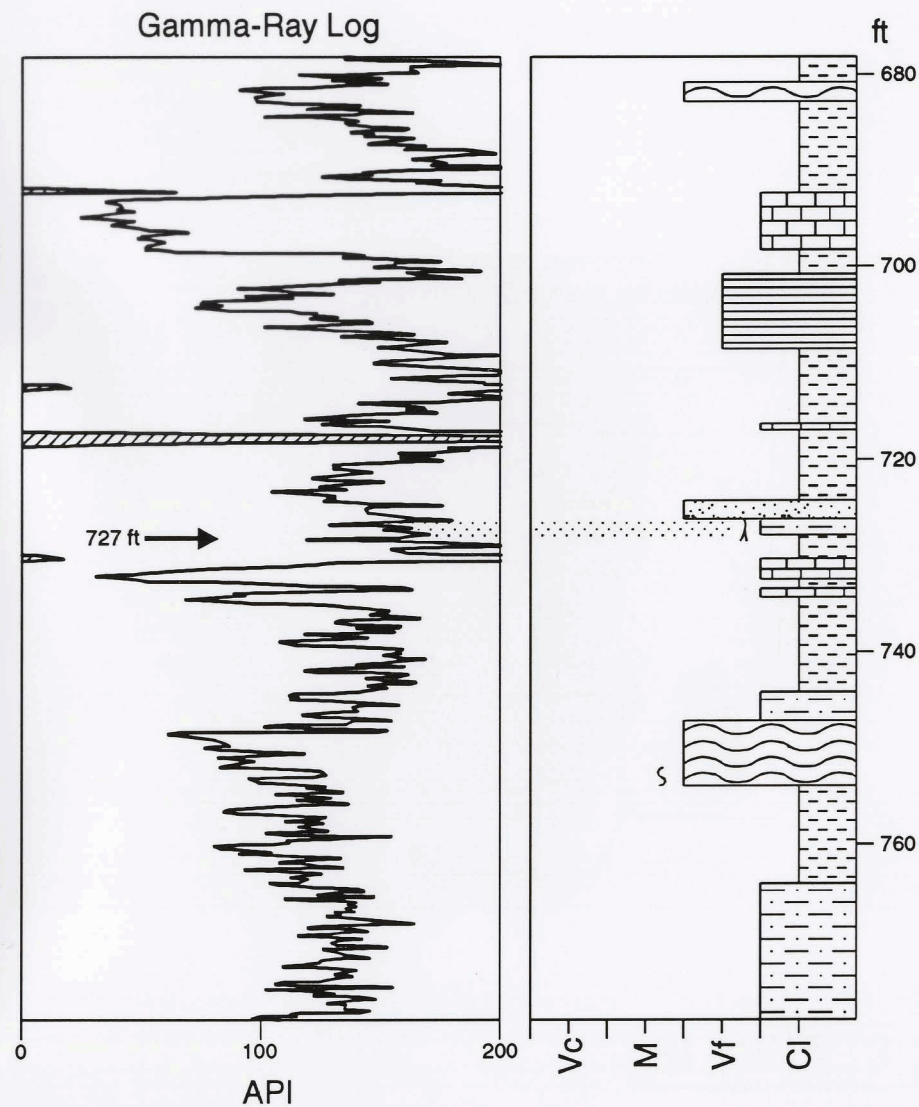


Map showing area of Pennsylvanian rocks and location of corehole.

Borehole No. 613
 Sec. 25 - M - 21
 Webster County, Kentucky



Rooted Massive Siltstone



Ft m r 3 [377]

I. NAME: Rooted massive siltstone
Formation: Shelburn (?)

Ft	m	r	3
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II. DESCRIPTION:

Texture: Clay – (less than 0.0039 mm)
Silt – (0.0039 - 0.0625 mm)
Sand – very fine-grained
(0.0625 - 0.250 mm)
subangular to subrounded

Composition: Clay – unknown
Silt and sand – quartz with minor
siderite

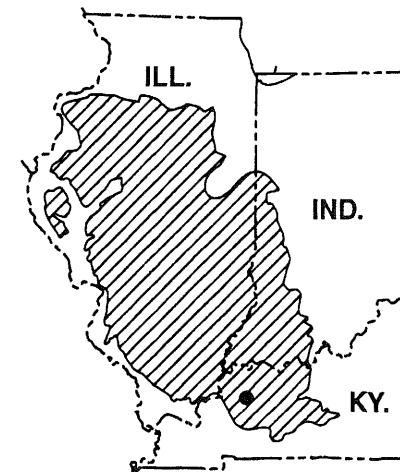
Sedimentary structures and features:

Mottled appearance due to rooting
and probable paleosol development

Fossils: Fossil roots

III. GAMMA-RAY WELL-LOG CHARACTERISTICS:

The columnar profile represents a stratigraphic succession dominated by shales with lesser amounts of sandstone and limestone. The high gamma-ray spikes at 690 ft and 717 ft are thin radioactive black shales. The lack of a significant grain-size trend and the abrupt change in lithologies result in an irregular gamma-ray well-log signature.

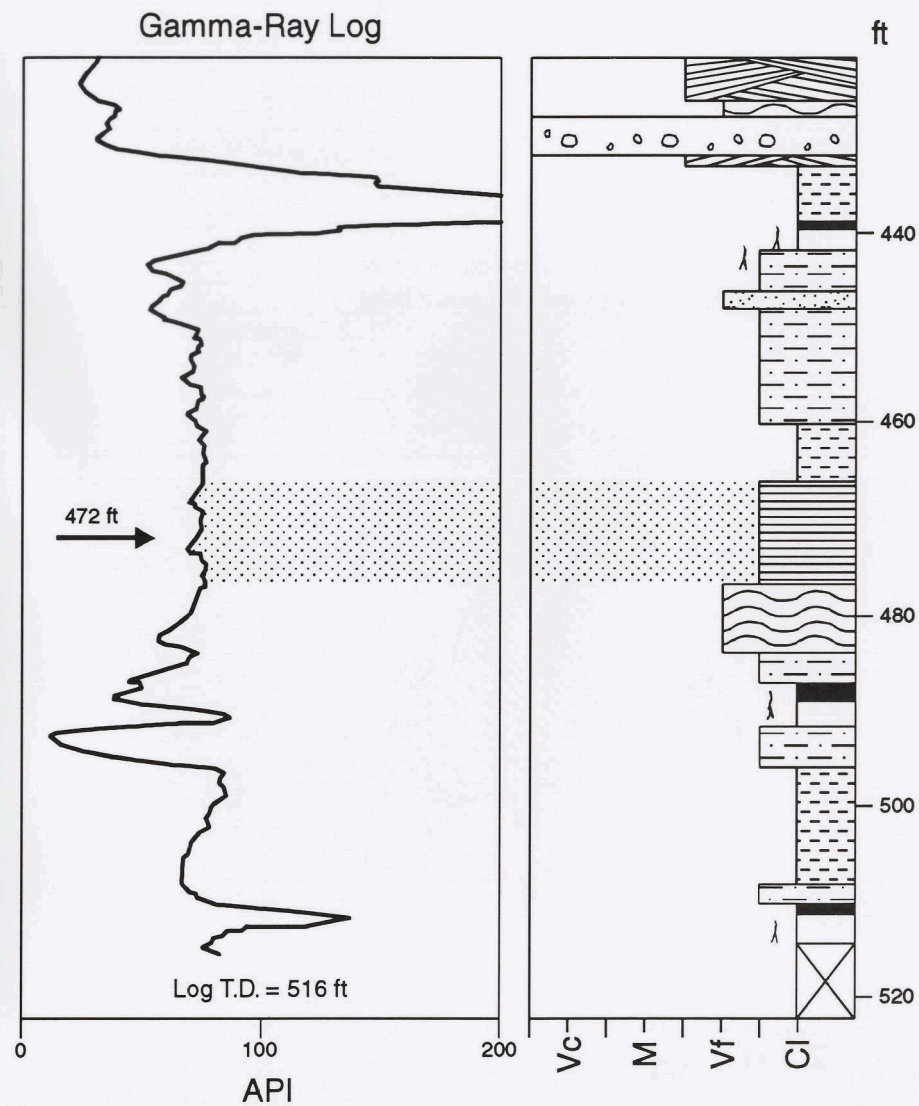


Map showing area of Pennsylvanian rocks and location of corehole.

Indiana Geological Survey SDH-322
 Sec. 29 - T2S - R9W
 Gibson County, Indiana



Horizontal-Bedded Siltstone



Ft h z 1 [363]

I. NAME: Horizontal-bedded siltstone
Formation: Brazil

Ft	h	z	1
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II. DESCRIPTION:

Texture: Silt – (0.0039 - 0.0625 mm)
Clay – (less than 0.0039 mm)

Composition: Silt – quartz with siderite, mica
abundant along bedding
planes

Clay – unknown

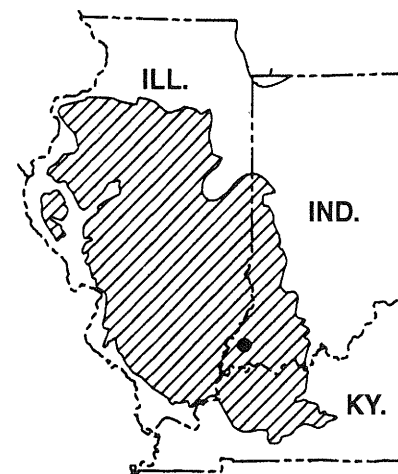
Sedimentary structures and features:

Horizontal bedding

Fossils: None observed

III. GAMMA-RAY WELL-LOG CHARACTERISTICS:

The gamma-ray well-log signature across the 100-foot interval represented by the columnar profile is best described as irregular. The high gamma-ray spike from 433 to 439 ft is a radioactive black shale.

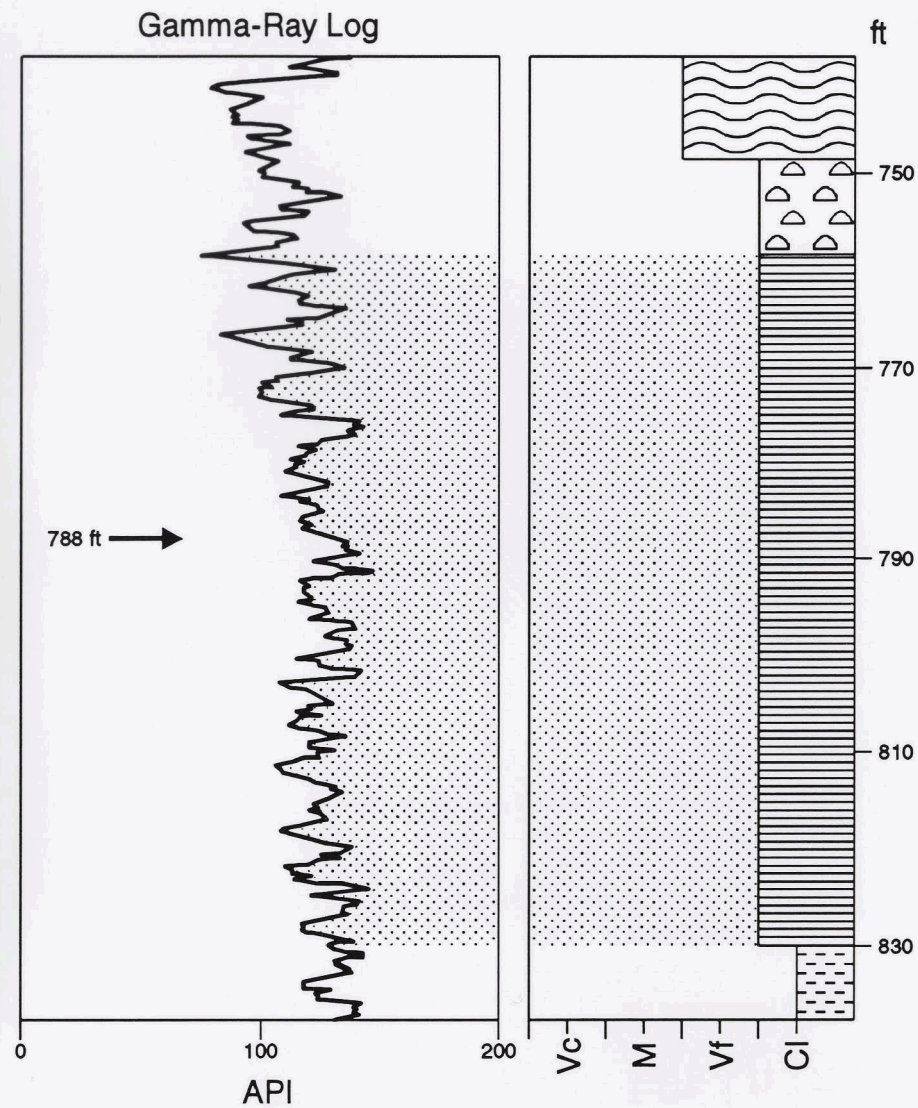


Map showing area of Pennsylvanian rocks
and location of corehole.

Borehole No. 593
Sec. 19 - M - 21
Webster County, Kentucky



Horizontal-Bedded Siltstone



Ft h z 2 [323.6]

I. NAME: Horizontal-bedded siltstone
Formation: Shelburn

Ft	h	z	2
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II. DESCRIPTION:

Texture: **Silt and clay** – (0.0030 - 0.0625 mm)
Minor sand – very fine-grained
(0.0625 -0.125 mm)

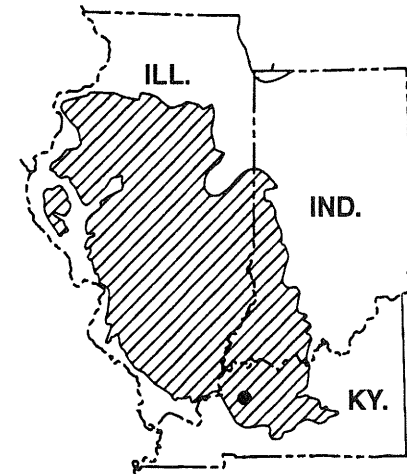
Composition: **Clay** – unknown, finely disseminated
plant debris
Silt and Sand – quartz with small
patches of siderite

Sedimentary structures and features:
Faint horizontal bedding, possible
rhythmic bedding

Fossils: Disseminated plant debris

III. GAMMA-RAY WELL-LOG CHARACTERISTICS:

The columnar profile shows a succession dominated by fine-grained facies which shows a gradual up-section increase in grain size. In response to this subtle upward-fining grain-size trend, the gamma-ray well-log shows a poorly developed funnel-shaped signature.

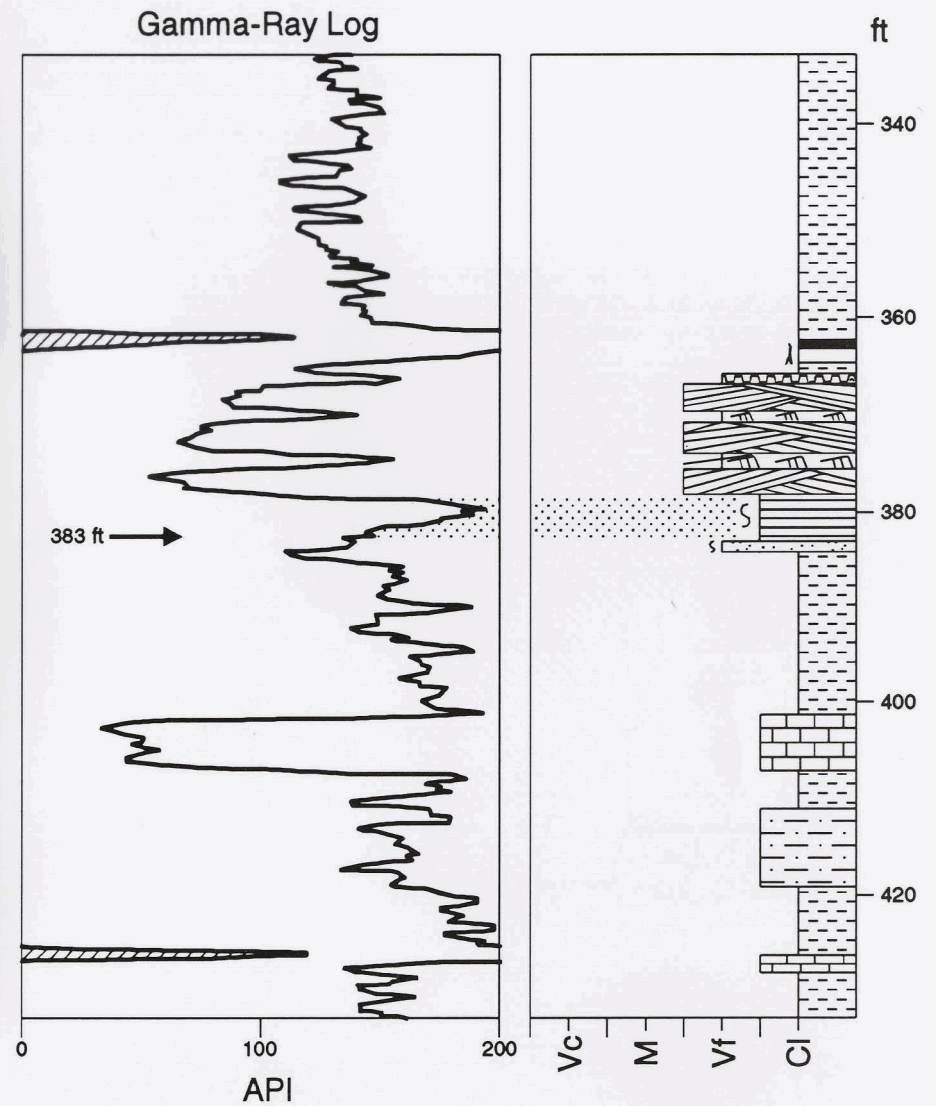


Map showing area of Pennsylvanian rocks and location of corehole.

Borehole No. 545
 Sec. 16 - M - 21
 Webster County, Kentucky



Bioturbated Horizontal-Bedded Siltstone



Ft h b 1 [328]

I. NAME: Bioturbated horizontal-bedded
siltstone
Formation: Patoka

Ft	h	b	1
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II. DESCRIPTION:

Texture: **Clay** – (less than 0.0039 mm)
Silt – (0.0039 - 0.0625 mm)

Composition: **Clay** – unknown
Silt – quartz with silica and
calcareous cement

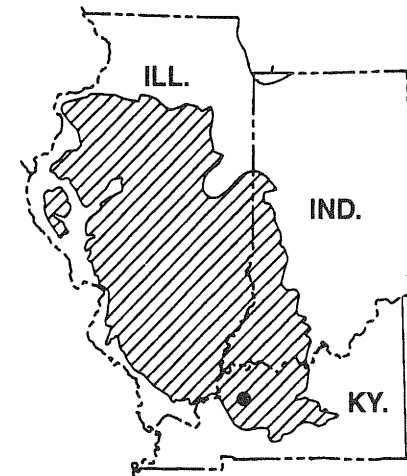
Sedimentary structures and features:

Horizontal lamination

Fossils: Bioturbation, brachiopod debris
including productids and productid
spines, echinodermal debris (includ-
ing spines), encrusting bryozoans,
gastropods

III. GAMMA-RAY WELL-LOG CHARACTERISTICS:

With the exception of the cross-bedded sandstone dominated interval (378 ft to 366 ft), the vertical succession shown by the columnar profile is dominated by fine-grained rocks. Therefore, the gamma-ray well-log reads at or near the shale baseline across most of the succession. The high gamma-ray spikes at 362 ft and 423 ft are radioactive black shales. The gamma-ray well-log curve shows an overall upward-fining trend from 378 ft to 362 ft resulting in an irregular bell-shaped gamma-ray signature.



Map showing area of Pennsylvanian rocks and location of corehole.