

Operator: The California Co.
 Farm: Kipps Anthracite Coal Co.
 Well No.: 1
 Location: Montgomery County
 1190' N of 37° 11'
 3209' W of 80° 27'

Geologic Log
 Samples 210'-9340'
 examined by John W. Huddle,
 U. S. Geological Survey
 July 1950

Elevation: 2484' D. F.
 2470' G. L.

Total Depth: 9336' Driller, 9340' Schl.
 Drilling Commenced: March 3, 1949
 Drilling Completed: P & A December 2, 1949
 Result: Dry hole

Depth		Price sandstone
210' - 220'	10'	Shale: silty, medium light-gray (N6), slightly fissile to nonfissile.
220' - 260'	40'	Like 210 - 220; sample interval 10ft.
260' - 270'	10'	Siltstone: argillaceous, light-gray (N7) and medium light-gray (N6), slightly fissile, mainly quartz but contains disseminated pyrite crystals and rare mica flakes; secondary enlargement of quartz crystals probable.
270' - 280'	10'	No sample.
280' - 340'	60'	Like 260 - 270; sample interval 10 ft.
340' - 350'	10'	Shale: silty, medium light-gray (N6), moderately fissile; contains a few mica flakes.
350' - 360'	10'	Shale 50%, siltstone 50%: shale, like 340 - 350; siltstone, medium light-gray (N6), slightly fissile, contains a few mica flakes and is siliceous, secondary enlargement?
360' - 370'	10'	Shale 70%, siltstone 30%: like 350-- 360.
370' - 410'	40'	Shale: like 340 - 350; sample interval 10 ft.
410' - 420'	10'	No sample.
420' - 430'	10'	Siltstone: medium light-gray (N6), mainly quartz but containing a few mica flakes, siliceous.
430' - 440'	10'	Shale: silty, medium light-gray (N6), slightly fissile.
440' - 450'	10'	No sample.
450' - 460'	10'	Siltstone: light-gray (N7), slightly fissile, mainly quartz with a few mica flakes, siliceous and secondary enlargement of quartz grains is probable.

460' - 470'	10'	Shale: medium light gray (N6), fissile, partly silty and includes a few mica flakes; siltstone, like 450 - 460, probably interbedded.
470' - 580'	110'	Like 460 - 470; sample interval 10 ft.
580' - 590'	10'	Siltstone: light-gray (N6), moderately fissile, mainly quartz with scattered mica flakes, slightly calcareous.
590' - 600'	10'	Like 580' - 590 with vein calcite chips.
600' - 610'	10'	Shale: silty, light-gray (N6), moderately fissile, with vein? calcite chips.
610' - 620'	10'	Siltstone: medium-gray (N5), moderately fissile, with vein calcite chips.
620' - 630'	10'	Like 610 - 620 with slickensides ? on calcite chips.
630' - 640'	10'	Shale: medium light-gray (N6), moderate fissility, slightly silty and micaceous, few calcite chips.
640' - 650'	10'	Like 630 - 640; siltstone, medium light-gray (N6) to light gray (N7), slightly fissile, partly calcareous and contains a few mica flakes.
650' - 660'	10'	Like 640 - 650.
660' - 670'	10'	Shale: silty, medium light-gray (N6), slightly fissile, with scattered mica flakes, rust spots due to pyrite (?), and calcite cleavage rhombs present.
670' - 680'	10'	Like 660 - 670.
680' - 690'	10'	Like 660 - 670 with 10% siltstone, argillaceous, very light gray (N8), massive, soft, and slightly calcareous.
690' - 700'	10'	Shale: medium light-gray (N6), moderately fissile, scattered mica flakes.
700' - 710'	10'	Like 690 - 700.
710' - 720'	10'	Like 690 - 700.
720' - 730'	10'	Shale: very light gray (N8), moderately fissile, scattered mica flakes, slightly calcareous.
730' - 750'	20'	Like 720 - 730; sample interval 10 ft.
750' - 760'	10'	Shale: medium light-gray (N6), moderately fissile, slightly silty and micaceous, weak HCl reaction.
760' - 770'	10'	Like 750 - 760, except no HCl reaction.
770' - 820'	50'	Like 750 - 760; sample interval 10 ft.

802' - 830'	10'	Like 750 - 760; contains a brachiopod spine.
830' - 890'	60'	Like 750 - 760; sample interval 10 ft.
890' - 900'	10'	Shale: calcareous, very light gray (N8), fissile, slightly silty.
900' - 910'	10'	Shale: light-gray (N7), moderately fissile, sparse mica flakes, very weak HCl reaction.
910' - 920'	10'	Like 900 - 910.
920' - 930'	10'	Shale: like 900 - 910, 60%; and very light gray (N8), fissile, slightly silty and micaceous; sample contains a cluster of secondary quartz crystals with a strong yellow-brown stain.
930' - 940'	10'	Like 920 - 930.
940' - 950'	10'	Like 920 - 930.
950' - 960'	10'	Shale: light-gray (N7), moderately fissile, slightly silty and micaceous.
960' - 970'	10'	Like 950 - 960.
970' - 980'	10'	Like 950 - 960, but somewhat more silty.
980' - 990'	10'	Siltstone 90%, limestone 10%: siltstone, micaceous, medium light-gray (N6), slightly fissile; limestone, silty, light brownish-gray (5YR 7/1), very finely crystalline.
990' - 1000'	10'	Siltstone: argillaceous, medium-gray (N5) and light-gray (N7), moderately fissile, slightly micaceous.
1000' - 1010'	10'	Like 900 - 1000.
1010' - 1020'	10'	Like 900 - 1000.
1020' - 1030'	10'	Like 990 - 1000.
1030' - 1040'	10'	Siltstone: grayish red-purple (5RP 4/2), slightly micaceous.
1040' - 1050'	10'	Siltstone: argillaceous, medium light-gray (N6), to very light gray (N8), moderately fissile, slightly micaceous.
1050' - 1060'	10'	Like 1040 - 1050.
1060' - 1070'	10'	Like 1040 - 1050.
1070' - 1080'	10'	Like 1040 - 1050, but sample has larger grayish red-purple siltstone chips, presumed to be cavings from 1030 - 1040.

1080' - 1090'	10'	Like 1040 - 1050.
1090' - 1100'	10'	Like 1040 - 1050; sample has a few pieces of bright coal containing pyrite.
1100' - 1110'	10'	Like 1040 - 1050; with cavings ? from 1030 - 1040.
1110' - 1160'	50'	Like 1040 - 1050; sample interval 10 ft.
Chemung formation ? - 690 ft.		
1160' - 1170'	10'	Shale: silty, medium-gray (N5), moderately fissile, slightly micaceous; samples contains fossil fragments.
1170' - 1180'	10'	Like 1160 - 1170, without fossil fragments, but containing vein calcite and a slickenside?
1180' - 1190'	10'	Shale: silty, medium-gray (N5) and light-gray (N7), moderately fissile, slightly micaceous.
1190' - 1200'	10'	Like 1180 - 1190, with a little vein calcite.
1200' - 1210'	10'	Like 1190 - 1200.
1210' - 1220'	10'	Shale: silty, medium dark-gray (N4), to medium light-gray (N6), moderately fissile, slightly micaceous.
1220' - 1230'	10'	Like 1210 - 1220, but partly calcareous and more silty.
1230' - 1240'	10'	Like 1210 - 1220.
1240' - 1250'	10'	Like 1210 - 1220.
1250' - 1260'	10'	Like 1210 - 1220, with 30% argillaceous siltstone; probably interbedded.
1260' - 1270'	10'	Like 1210 - 1220.
1270' - 1280'	10'	Like 1210 - 1220.
1280' - 1290'	10'	Like 1210 - 1220, contains a small piece of calcite crystal.
1290' - 1300'	10'	Like 1210 - 1220, contains small pieces of calcite crystals.
1300' - 1310'	10'	Like 1210 - 1220, contains small pieces of calcite crystals and pyrite.
1310' - 1360'	50'	Like 1210 - 1220; sample interval 10 ft.
1360' - 1370'	10'	Like 1210 - 1220; contains pieces of calcite crystals.

1370' - 1400'	30'	Like 1210 - 1220; sample interval 10 ft.
1400' - 1410'	10'	Shale: grayish yellow-green (5GY 7/2), fissile, soft, apparently mainly clay, probably interbedded with rocks like 1210 - 1220.
1410' - 1420'	10'	Shale 60%, siltstone 40%: shale, silty, medium light-gray (N6), slightly fissile, slightly micaceous; siltstone, argillaceous, very light gray (N8), slightly fissile, slightly calcareous and micaceous; calcite cleavage rhombs present.
1420' - 1430'	10'	Like 1410 - 1420, but lacks calcite rhombs.
1430' - 1480'	50'	Like 1420 - 1430; sample interval 10 ft.
1480' - 1490'	10'	Like 1410 - 1420; with a crinoid stem fragments.
1490' - 1500'	10'	Like 1410 - 1420 with a few pieces of grayish red-purple (5RP 4/2) siltstone.
1500' - 1510'	10'	Shale: medium light-gray (N6), fissile, slightly silty and micaceous.
1510' - 1520'	10'	Like 1500 - 1510.
1520' - 1530'	10'	Like 1500 - 1510.
1530' - 1540'	10'	Like 1500 - 1510, with interbedded ? shale, silty, white (N9), fissile.
1540' - 1550'	10'	Shale: silty, white (N9), fissile, noncalcareous.
1550' - 1560'	10'	Like 1540 - 1550.
1560' - 1570'	10'	Shale: medium-gray (N5), fissile, slightly silty and micaceous.
1570' - 1620'	50'	Like 1560 - 1570; sample interval 10' ft.
1620' - 1630'	10'	Shale: silty, grayish red-purple (5RP 4/2), massive, sparse mica flakes.
1630' - 1640'	10'	Shale: silty, light-gray (N7) and very light gray (N8), moderately fissile, slightly micaceous.
1640' - 1650'	10'	Like 1630 - 1640.
1650' - 1660'	10'	Like 1620 - 1630.
1660' - 1670'	10'	Siltstone: micaceous, arkosic ?, pale red-purple (5RP 6/2) and grayish red-purple (5RP 4/2), massive.

1670' - 1680'	10'	Like 1660'-1670; with grayish red-purple shale.
1680' - 1690'	10'	Shale: micaceous, medium light gray (N6), moderately fissile, slightly silty.
1690' - 1700'	10'	Like 1660 - 1670.
1700' - 1710'	10'	Shale: micaceous, medium-gray (N5), slightly fissile, slightly silty.
1710' - 1720'	10'	Siltstone: micaceous and arkosic ?, pale red-purple (5RP 6/2), grayish red-purple (5RP 4/2), and greenish-gray (5GY 6/7), slightly fissile.
1720' - 1730'	10'	Shale: micaceous, medium-gray (N5), massive.
1730' - 1740'	10'	Like 1730'- 1740.
1740' - 1750'	10'	Siltstone: like 1710 - 1720.
1750' - 1760'	10'	Siltstone: micaceous, very light gray (N8), moderately fissile.
1760' - 1770'	10'	Shale: micaceous, medium-gray (N5), moderately fissile, and slightly silty.
1770' - 1810'	40'	Like 1760 - 1770; sample interval 10 ft.
1810' - 1820'	10'	Siltstone: micaceous, arkosic ?, argillaceous, pale red purple (5RP 6/2) and grayish red-purple (5RP 4/2), moderately fissile.
1820' - 1830'	10'	Like 1810 - 1820 with greenish-gray shale.
1830' - 1840'	10'	Shale: medium-gray (N5) and light-gray (N6), moderately fissile, slightly micaceous and silty, calcite rhombs present.
1840' - 1850'	10'	Like 1830 - 1840.
Brallier shale - 350 feet.		
1850' - 1860'	10'	Like 1830 - 1840; with light-gray (N7), micaceous siltstone, probably interbedded, slightly calcareous.
1860' - 1950'	90'	Like 1850 - 1860; sample interval 10 ft.
1950' - 1960'	10'	Shale: micaceous, silty, medium-gray (N5), moderately fissile.

1960' - 1970'	10'	Like 1950 - 1960.
1970' - 1980'	10'	Like 1950 - 1960.
1980' - 1990'	10'	Shale: silty, very light gray (N8), fissile, soft, slightly micaceous.
1990' - 2000'	10'	Shale: silty, medium light-gray (N6) to very light gray (N8), moderately fissile, and slightly micaceous.
2000' - 2080'	80'	Like 1990 - 2000; sample interval 10 ft.
2080' - 2090'	10'	Like 1990 - 2000; but sample contains a few pieces of very dark gray (N2) shale with slickensides.
2090' - 2110'	20'	Like 1990 - 2000.
2110' - 2120'	10'	Like 1990 - 2000; and contains calcite cleavage rhombs.
2120' - 2330'	210'	Like 1990 - 2000; sample interval 10 ft.
2330' - 2340'	10'	Like 1990 - 2000; but the light-gray shale is very silty.
2340' - 2350'	10'	Like 1990 - 2000; and contains calcite cleavage rhombs.
2350' - 2430'	80'	Like 1990 - 2000; sample interval 10 ft.
2430' - 2440'	10'	Shale: silty, micaceous, dark-gray (N3), slightly fissile.
2440' - 2580'	140'	Like 1990 - 2000; sample interval 10 ft.
2580' - 2590'	10'	Like 1990 - 2000; sample contains calcite cleavage rhombs and euhedral quartz crystals, 1 mm-2 mm in size.
2590' - 2600'	10'	Like 2580' - 2590.
2600' - 3010'	410'	Like 1990 - 2000; sample interval 10 ft.
3010' - 3020'	10'	Like 1990 - 2000; and contains large fragments of silty limestone, chalky white (N9), probably cement.
3020' - 3140'	120'	Like 3010 - 3020; sample interval 10 ft.
3140' - 3150'	10'	Shale: silty, micaceous, medium dark-gray (N4), slightly fissile; sample contains quartz and calcite crystal fragments and cement ? chunks.
3150' - 3190'	40'	Like 3140 - 3150; sample interval 10 ft.

3190' - 3200'	10'	Like 3140 - 3150; but has one quartz pebble fragment? Millboro shale ? - 1400 feet
3200' - ³²³⁰ 2320 '	30'	Like 3140 - 3150; sample interval 10 ft.
3230' - 3270'	40'	Like 3140 - 3150; sample interval 10 ft.; but it lacks crystal fragments.
3270' - 3280'	10'	Shale: silty, micaceous, medium dark-gray (N4), medium-gray (N5), and medium light-gray (N6), moderately fissile, micaceous, calcite present.
3280' - 3340'	60'	Like 3270 - 3280; sample interval 10 ft.
3340' - 3400'	60'	Like 3270 - 3280; sample interval 10 ft.
3400' - 3410'	10'	Shale: medium dark-gray (N4), moderately to strongly fissile, slightly silty and micaceous with pyrite crystals or pieces of quartz and calcite crystals.
3410' - 3490'	80'	Like 3400 - 3410, but lacks quartz and calcite fragments; below 3420, some of the shale is not fissile; sample interval 10 ft.
3490' - 3500'	10'	Shale: silty, dark-gray (N3), massive or slightly fissile.
3500' - 3520'	20'	Like 3490 - 3500; sample interval 10 ft.
3520' - 3530'	10'	Shale: medium-gray (N5), slightly fissile, silty, micaceous, and contains disseminated pyrite crystals.
3530' - 3540'	10'	Shale: medium dark-gray (N4) to dark-gray (N3), slightly fissile, silty, and micaceous.
3540' - 3640'	100'	Like 3520 - 3540; sample interval 10 ft. with quartz crystals like in 3630 - 3640.
3640' - 3650'	10'	No sample.
3650' - 3660'	10'	Like 3530 - 3540.
3660' - 3670'	10'	Shale: dark-gray (N3) to grayish-black (N2), massive to moderately fissile, silty with sparse mica flakes of disseminated pyrite.
3670' - 3790'	120'	Like 3660 - 3670; sample interval 10 ft.
3790' - 3800'	10'	Shale: silty, medium dark-gray (N4), massive micaceous.
3800' - 3850'	50'	Like 3790 - 3800.
3850' - 3860'	10'	Shale: grayish-black (N2), massive to slightly fissile.

3860' - 3870'	10'	Shale; medium-gray (N5) to medium light-gray (N6), slightly fissile, micaceous and silty.
3870' - 4050'	180'	Like 3860 - 4870; sample interval 10 ft.
4050' - 4060'	10'	Like 3860 - 3870; with pieces of limonitic concretions.
4060' - 4070'	10'	Shale: medium-gray (N4), varying from moderately fissile and slightly silty to massive and very silty; laminated silty beds, some of which are light-gray (N7).
4070' - 4310'	240'	Like 4060' - 4070; samples at intervals of 10 ft.
4310' - 4320'	10'	Like 4060 - 4070; with interbedded siltstone, light-gray (N7), micaceous, slightly fissile.
4320' - 4330'	10'	Like 4060 - 4070; and contains vein quartz and pyrite.
4330' - 4340'	10'	Like 4060 - 4070; and contains vein quartz and pyrite.
4340' - 4510'	170'	Like 4060 - 4070; sample interval 10 ft.
4510' - 4520'	10'	Shale: grayish-black (N2) and medium-gray (N5), with grayish-olive (10Y 4/2) mottling, moderately fissile to fissile, rare "slickensides", slightly to very silty; sample contains quartz and calcite crystal fragments, and disseminated pyrite.
4520' - 4570'	50'	Like 4510 - 4520; sample interval 10 ft.
4570' - 4580'	10'	No sample.
4580' - 4630'	50'	Like 4510 - 4520; "slickensides" on calcite at 4580 - 4590; sample interval 10 ft.
4630' - 4640'	10'	No sample.
4640' - 4650'	10'	Shale: medium dark-gray (N4) to medium-gray (N5), moderately fissile, slightly silty, with minor amounts of disseminated pyrite and quartz and calcite crystals.
4650' - 4940'	290'	Like 4640 - 4650; sample interval 10 ft.
4940' - 4950'	10'	Shale: medium dark-gray (N4) to grayish-black (N2), moderately fissile, slightly silty, rare mica flakes, probably interbedded with lighter gray, very silty shale; sample contains disseminated pyrite and quartz and calcite fragments.
4950' - 4960'	10'	No sample.

4960' - 5340'	380'	Like 4940 - 4950; sample interval 10 ft.
5340' - 5350'	10'	Shale: medium light-gray (N6), moderately fissile, soft.
5350' - 5470'	120'	Like 4940 - 4950; sample interval 10 ft.
5470' - 5480'	10'	Shale: medium light-gray (N6), moderately fissile, silty.
5480' - 5580'	100'	Like 4940 - 4950.
5580' - 5590'	10'	Siltstone: medium light-gray (N6), massive, micaceous, siliceous.
5590' - 5600'	10'	Like 4940 - 4950.

Huntersville chert and related beds - 120 feet

5610' - 5620'	10'	Sandstone: very light gray (N8), very fine-grained, quartz in subangular to subrounded grains, rare mica, siliceous cement, low permeability.
5620' - 5630'	10'	Like 5610 - 5620; with some black stain.
5630' - 5640'	10'	Siltstone: calcareous, medium, light-gray (N6).
5640' - 5650'	10'	Like 5630 - 5640; but noncalcareous.
5650' - 5660'	10'	Like 5630 - 5640; but noncalcareous with calcite veins.
5660' - 5670'	10'	Like 5630 - 5640; but noncalcareous with calcite veins.
5670' - 5680'	10'	Like 5630 - 5640; strong HCl reaction.
5680' - 5690'	10'	Shale: calcareous, medium-gray (N5), moderately fissile, silty.
5690' - 5700'	10'	Shale and siltstone: shale, like 5680 - 5690; siltstone, calcareous, medium light-gray (N6).
5700' - 5710'	10'	Siltstone: like 5690 - 5700.
5710' - 5720'	10'	Siltstone: like 5690 - 5700; with very light gray (N8), very fine-grained sandstone.
5720' - 5730'	10'	Siltstone: medium light-gray (N6).

Clinton formation

Keefer sandstone member - 130 feet

5730' - 5740'	10'	Sandstone: white (N9), angular, very fine-grains of quartz in siliceous cement, breaks across grains.
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5740' - 5750' 10' Like 5730 - 5740:

Core chips description

5766' - 5770' 4' Sandstone: medium dark-gray (N4), very fine grains of quartz cemented by silica, secondary growth of grains probable, quartz crystals on fractures; partings of dark greenish-gray (5GY 4/1) shale, slickensided.

5770' - 5774' 4' Like 5766 - 5770.

5774' - 5778' 4' Sandstone: greenish-gray (5G 6/1), very fine quartz grains cemented by silica and includes chips of greenish-gray shale.

5778' - 5791' 13' No sample.

5791' - 5794' 4' Sandstone: grayish-black (N2), very fine quartz grains cemented by silica with secondary growth probable, some rounded, medium grains.

5797' - 5806' 9' Like 5791 - 5794; with dark greenish-gray (5GY 4/1), fissile shale, slickensided; bedding is apparently horizontal ?

5806' - 5816' 10' Like 5791 - 5794; with milky white vein quartz; siltstone, medium dark-gray (N4), siliceous.

5816' - 5860' 44' No sample.

Clinton formation

Cacapon sandstone member - 190 feet

5860' - 5870' 10' Sandstone and shale: sandstone, white (N9), very fine grained, subangular quartz grains, siliceous cement; shale, medium dark-gray (N4), moderately fissile, slightly silty.

5870' - 5880' 10' Like 5860 - 5870.

5880' - 5890' 10' Like 5860 - 5870.

5890' - 5900' 10' Like 5860'--5870; with some greenish-gray sandstone.

5900' - 5910' 10' Like 5860 - 5870.

5910' - 5920' 10' No sample.

5920' - 5930' 10' Like 5860 - 5870.

5930' - 5940' 10' Like 5860 - 5870:

5940' - 5950' 10' Like 5860 - 5870; probably interbedded with medium-gray (N5) shale and siltstone.

5950' - 5960'	10'	Sandstone and shale: sandstone, white (N9), vitreous, fine-grained quartz with black stain in places, siliceous cement; shale, medium-gray (N5), moderately fissile, slightly silty, probably interbedded.
5960' - 5970'	10'	Like 5950 - 5960.
5986' - 5993'	6'	Shale and sandstone: (core chips) shale, medium dark-gray (N4), fissile, hard; sandstone, medium-gray (N5), very fine-grained quartz, siliceous with vein quartz in fractures, slickensided.
5990' - 6000'	10'	Like 5987 - 5993.
6000' - 6010'	10'	Like 5987 - 5993; with some greenish-gray (5GY 6/1) shale.
6010' - 6020'	10'	Sandstone: hematitic, dusky red (5R 3/4), fine to medium, subrounded quartz grains, cemented by hematite.
6020' - 6030'	10'	No sample.
6030' - 6040'	10'	Sandstone and shale: sandstone, like 6010 - 6020; shale, greenish-gray (5GY 6/1), fissile, and slightly silty, probably some medium-gray (N5) shale is also present.
6040' - 6050'	10'	Like 6030 - 6040.
Clinch sandstone - 160 feet		
6050' - 6060'	10'	Sandstone: white (N9) and light greenish-gray (GY 8/1), fine- to medium-grained, poorly sorted, subangular to rounded grains of quartz in siliceous cement, low permeability.
6060' - 6070'	10'	Like 6050 - 6060.
6070' - 6120'	50'	Like 6050 - 6060; sample interval 10' ft.
6120' - 6131'	11'	No sample.
6131' - 6136'	5'	Sandstone: (core chips) white (N9) to medium dark-gray (N4), medium-grained, vitreous and milky quartz in a siliceous cement, low permeability; sample contains rounded granules of small pebbles.
6136' - 6141'	5'	Like 6131 - 6136 (core chips).
6140' - 6150'	10'	Like 6131 - 6136 (sample).
6144' - 6147'	3'	Like 6131 - 6136 (core chips).
6149' - 6150'	1'	Like 6131 - 6136 (core chips).

6150' - 6160'	10'	Like 6131 - 6136 (sample).
6150' - 6153'	3'	Like 6131 - 6136 (core), mainly white.
6160' - 6170'	10'	Like 6131 - 6136 (sample).
6170' - 6180'	10'	Like 6131 - 6136 (sample).
6180' - 6190'	10'	Like 6131 - 6136 (sample).
6190' - 6200'	10'	Like 6131 - 6136 (sample).
6200' - 6210'	10'	Like 6131 - 6136 (sample).
Juniata formation - 192 feet		
6210' - 6220'	10'	Shale: grayish-red (5R 4/2) and greenish-gray (5G 6/1), slightly fissile, silty and sparsely micaceous, grading into siltstone.
6220' - 6230'	10'	Like 6210 - 6220.
6230' - 6240'	10'	Like 6210 - 6220.
6240' - 6250'	10'	Like 6210 - 6220.
6250' - 6260'	10'	No sample.
6260' - 6300'	40'	Like 6210 - 6220.
6300' - 6310'	10'	Sandstone: pale red (5R 6/2), fine to medium grains of quartz, mainly subangular, hematitic cement and stain, but breaks across grains, low permeability, probably interbedded red shale and siltstone.
6310' - 6330'	20'	No sample.
6330' - 6340'	10'	Like 6300 - 6310.
6340' - 6350'	10'	Siltstone: light-gray (N7) and greenish-gray (5G 6/1), massive, micaceous.
6350' - 6350'	10'	Like 6340 - 6350.
6360' - 6390'	30'	Like 6340 - 6350; sample interval 10 ft.
6389' - 6394'	5'	Shale and siltstone; (core) shale, grayish-red (10R 4/3), slightly fissile, sparse mica; siltstone, medium dark-gray (N4), mainly quartz, siliceous cement, low permeability.

6394' - 6399'	5'	Like 6389 - 6394.
6399' - 6402'	3'	Like 6389 - 6394; with calcite veins.
Insoluble residues		Martinsburg shale @72738 feet
6402' - 6407'	5'	Siltstone: medium-gray (N5) to brownish-gray (5YR 4/1), massive, mainly quartz with calcareous cement and calcite crystals; suggestion of phosphatic shell fragments.
6407' - 6412'	5'	Siltstone: medium-gray (N5), like 6402 - 6407.
6412' - 6417'	5'	Siltstone: medium-gray (N5), like 6402 - 6407; with a few pyrite crystals.
6417' - 6424'	7'	Like 6412 - 6417.
6424' - 6429'	5'	Like 6412 - 6417; with numerous pyrite crystals.
6429' - 6431'	4'	No sample.
6431' - 6433'	2'	Siltstone: medium-gray (N5), like 6402 - 6407, with medium-grained, calcareous sandstone interbedded, grains of quartz subrounded to rounded, also present in siltstone.
6433' - 6439'	6'	Like 6431 - 6433; with calcite veins.
6439' - 6440'	1'	No sample.
6440' - 6450'	10'	Siltstone: calcareous, medium light-gray (N6) to light-gray (N7), a few black minerals present but grains mainly quartz, slightly micaceous, some fine to medium sands grains present, rock appears siliceous in place, but has moderate HCl reaction (insoluble residue show siliceous cement in patches, considerable porosity and a few fossil molds), some quartz and calcite crystals present, sparingly fossiliferous.
6450' - 6540'	90'	Like 6440 - 6450; sample interval 10 ft.
6540' - 6550'	10'	Like 6440 - 6450; except more siliceous and less calcareous, weak or no HCl reaction.
6550' - 6580'	30'	Like 6540 - 6550; sample interval 10 ft.
6580' - 6660'	80'	Like 6540 - 6550; with interbedded medium-gray (N5), silty, micaceous shale, weak HCl reaction on the shale below 6620 ft;; sample interval 10 ft.

6660' - 6670'	10'	Shale and siltstone: shale, medium dark-gray (N4) to grayish-black (N2), massive to slightly fissile, slightly silty, micaceous and calcareous, with weak HCl reaction; siltstone, like 6440 - 6450, perhaps cavings, but probably interbedded.
6670' - 6740'	70'	Like 6660 - 6670.
5740' - 6750'	10'	Shale and siltstone: shale, medium dark-gray (N4), massive to slightly fissile, slightly calcareous, silty and micaceous with a few fossil fragments; siltstone, medium-gray (N5) and medium light-gray (N6), massive, calcareous, slightly micaceous.
6750' - 6860'	110'	Like 6740 - 6750; with some calcite filled veins.
6860' - 6870'	10'	Like 6740- 6760; with thin interbed, very light gray (N8) limestone, more or less silty, fossiliferous and finely crystalline.
6870' - 7190'	320'	Like 6860 - 6870.
7190' - 7200'	10'	Limestone, siltstone, and shale: limestone, dark-gray (N3), dense, silty argillaceous, contains numerous fossil shells; siltstone, light-gray (N7), moderately fissile, very calcareous with calcite crystals; shale, dark-gray (N3), slightly fissile, slightly calcareous and silty.
7200' - 7250'	50'	Like 7190' - 7200.
7350' - 7356'	6'	No sample.
Core Chips		
7356' - 7361'	5'	Limestone: argillaceous, medium dark-gray (N4), dense, fossiliferous with wavy partings of dark-gray shale and calcite veins.
7361' - 7365'	4'	Like 7356' - 7361.
7365' - 7374'	9'	No sample.
7374' - 7379'	5'	Like 7356 - 7361.
7379' - 7384'	5'	Like 7356 - 7361.
7384' - 7389'	5'	Like 7356 - 7361.
7389' - 7394'	5'	Like 7356 - 7361.
7394' - 7398'	4'	Like 7356 - 7361; with interbedded medium dark-gray (N4), calcareous, fissile shale.

7398' - 7403'	5'	Like 7356-- 7361.
7403' - 7408'	5'	Like 7356 - 7461.
7408' - 7412'	4'	No sample. .
7412' - 7419'	7'	Like 7394 - 7398.
7419' - 7422'	3'	Like 7394 - 7398.
7422' - 7427'	5'	Like 7394 - 7398.
7427' - 7432'	5'	Like 7394 - 7398.
7432' - 7437'	5'	Like 7394 - 7398.
7437' - 7443'	6'	Limestone: medium dark-gray (N4), dense to very finely crystalline, argillaceous, fossiliferous.
7443' - 7446'	3'	No sample.
7446' - 7481'	35'	Like 7437 - 7443; with vein calcite.
7481' - 7486'	5'	Like 7437 - 7443; with vein calcite and interbedded shale.
7486' - 7491'	5'	Shale and limestone: shale, calcareous, medium dark-gray (N4), silty, fossiliferous; limestone, like 7437 - 7443.
7491' - 7496'	5'	Like 7486 - 7499.
7496' - 7501'	5'	Like 7486 - 7491; with calcite veins and some siltstone, dark-gray (N3), calcareous and fossiliferous.
7501' - 7506'	5'	Like 7486 - 7491; with abundant vein calcite.
7506' - 7511'	5'	Like 7501 - 7506.
7511' - 7516'	5'	Like 7501 - 7506.
7516' - 7522'	6'	Like 7501 - 7506.
7522' - 7530'	8'	No sample.
7530' - 7540'	10'	Limestone and shale: limestone, medium dark-gray (N4), dense to finely crystalline, argillaceous and fossiliferous; shale, dark-gray (N3), moderately fissile, slightly calcareous and silty, vein calcite present.

7540' - 8410'	870'	Like 7530'- 7540; quartz crystals in several sample; sample interval 10 ft.
8410' - 8420'	10'	Like 7530 - 7540; with calcareous, medium light-gray siltstone and pyrite.
8420' - 8910'	490'	Like 7530 - 7540; some silty shale or siltstone present.
8910' - 8920'	10'	Limestone, shale, and siltstone; limestone, medium light- to medium dark-gray (N4), dense to finely crystalline, slightly silty and argillaceous, fossiliferous, with calcite veins; shale, dark-gray (N3), massive to fissile, calcareous and slightly silty; siltstone, very light gray (N8), massive, quartz and black grains with considerable calcareous cement, vein calcite is present.
8920' - 9140'	220'	Like 8910 - 8920. Eggleston limestone - 160 feet
9140' - 9150'	10'	Siltstone: light-gray (N7), sandy containing grains of subangular quartz with a few black grains and chips, silty, micaceous, and calcareous with vein calcite, permeability low; sample contains phosphatic shells?
9150' - 9190'	40'	Like 9140 - 9150.
9190' - 9200'	10'	Shale, limestone, and metabentonite: shale, medium light to medium dark-gray (N6-4), slightly fissile, calcareous and silty, limestone, medium-gray (N4), finely crystalline, argillaceous and silty, sparingly fossiliferous; metabentonite, moderately yellow-green (5GY 7/4), waxy and translucent.
9200' - 9220'	20'	Like 9190 - 9200 with a medium light-gray (N6) shale with Black mica (biotite)? flakes, vein calcite and quartz crystals.
9220' - 9230'	10'	Like 9190 - 9200 with vein calcite and quartz crystals, slickensides on metabentonite and calcite, some pyrite.
9230' - 9260'	30'	Like 9220 - 9230.
9260' - 9270'	10'	Siltstone: medium light- to very light gray (N6-8), slightly fissile, calcareous, slightly micaceous, mainly quartz, with some pyrite, metabentonite cavings?

9270' - 9280'	10'	No sample.
9280' - 9290'	10'	Like 9260 - 9270.
9290' - 9300'	10'	Sandstone: light gray to very light gray (N7-8), very fine to medium-grained, mainly subangular quartz, micaceous, some large flakes calcareous, silty, low permeability.
Moccasin Limestone		
9300' - 9310'	10'	Limestone: medium dark-gray (N4), dense, slightly argillaceous (no red in sample, but reported in Company log sent to the Virginia Survey).
9310' - 9320'	10'	Like 9300 - 9310.
9320' - 9340'	20'	No sample.

Summary of formations:

Mississippian:

Price Formation 0-730 feet.

The Price formation, or Parrott member of the Price, is the surface formation at the location on Price Mountain. This interval consists of gray to dark gray, fine sandstone that weathers to a rust colored sandstone. Also, in near equal amounts, there occurs a light gray to gray and green siltstone. Minor amounts of finely crystalline limestone and few calcite veins occur at 590'-620'. Also the sandstones are, in places, quartzitic. The contact with the underlying Chemung is arbitrary and has been called the decreased sandstone and the increase shale and siltstone of the Chemung.

Devonian:

Chemung Formation 730±1440 feet. 700' thick.

As noted above, the top of the Chemung has been picked arbitrarily and, likewise, the contact with the underlying Brallier must be picked on minor lithologic changes. For the most part the Chemung is a gray to dark gray and black, fine, slightly calcareous sandstone grading to a gray and green, calcareous siltstone. Again, because of lithologic similarity, the boundary with the underlying Brallier is based on a general change in shale character.

Brallier formation 1440'-3198' 3758 feet.

The Brallier formation consists predominately of gray to dark gray, fine, quartzose sandstone grading into a dark gray siltstone with minor amounts of gray, gray-green and green shale.

Millboro formation 3198-5613 2415 feet.

The logical lithologic break between the Brallier and Millboro occurs at 3198. At this depth there is present a two foot quartz and chert conglomerate with the shales below this bed grading from a gray to dark gray or near black and increasing in percentage. There is a decrease in sand content but a continuance of the siltstone material.

Huntersville chert 5613-5737 124 feet.

In the subsurface at Price Mountain the Huntersville chert is an interbedded quartzitic sand and siliceous limestone. The sand is, for the most part, white to gray, fine, generally calcareous and very quartzitic. In fact, its appearance and drilling characteristics might justly denote it as a true quartzite. The limestone is very siliceous, generally finely crystalline, and argillaceous. Silification appears to be of secondary nature, a fact substantiated by surface outcrops. This formation was a possible objective but its non-porous nature and absence of fractures was unfavorable.

THE CALIFORNIA COMPANY #1 KIPPS ANTHRACITE COAL COMPANY
PRICE MOUNTAIN AREA, MONTGOMERY COUNTY, VIRGINIA

LOCATION: 1190' N of 37°11'; 3209' W of 80°27'. Two miles southwest of Blacksburg, Virginia, atop Price Mountain.

ELEVATION: D.F. 2484'; G.L. 2470'.

CONTRACTOR: Noble Drilling Company. Diesel-electric rig with Lee C. Moore 136-foot jack-knife.

TOTAL DEPTH: 9336' driller's total depth; 9340' Schlumberger total depth.

DRILLED: Spudded March 3, 1949; plugged December 2, 1949.

DRILLING RATE: Over-all average 34.5' per day. Maximum of 16 drill collars were used in quartzites. Diamond coring of quartzites was unsatisfactory in obtaining greater footage.

BITS USED: 300 rock bits; 7 conventional core bits; 15 diamond core bits.

BIT FOOTAGE: 1440-3198 - 100' 5737-5867 - 2' 6215-6402 - 8.3'
 3198-5613 - 89' 5867-6052 - 3' 6402-9145 - 100'
 5613-5737 - 14' 6052-6215 - 3' 9145-9303 - 60'

CASING RECORD: 92.84', 16" O.D. 65#; 1003.7', 10-3/4" C.P. 40.5#.

RESULTS: Dry and abandoned.

FORMATIONAL TOPS & GENERALIZED LITHOLOGY:

- 0- 730 Mississippian sand, siltstone, shale.
- 730-1440 Chemung sand, siltstone, shale.
- 1440-3198 Brallier shale, siltstone, sand.
- 3198-5613 Millsboro shale, siltstone, sand.
- 5613-5737 Huntersville, siliceous limestone and quartzite.
- 5737-5867 Keefer quartzite.
- 5867-6052 Rose Hill quartzite & ferruginous sand.
- 6052-6215 Clinch quartzite.
- 6215-6402 Juniata quartzite and red shale.
- 6402-9145 Martinsburg siltstone, shale, limy shale, & shaly limestone.
- Trenton member 7258-7412', possibly repeated 8880-9145'.
- 9145-9303 Eggleston sand, siltstone, bentonite.
- 9303-9340 Moccasin limestone.

SHOWS OF GAS: Non-commercial gas at 7350-7480', estimated 50 MCF. No oil shows.

POROSITY & PERMEABILITY: Core Lab analysis on interval 7355-7410' gave 0.0 n/d. permeability and .7 to 2.1 per cent porosity.

ELECTRICAL LOG: Schlumberger runs to 3012', 5997', and 9340'. Copies may be obtained from Mattoon White Print Company, Mattoon, Illinois, or Lynn Blue Print Company, 121 E. Short Street, Lexington, Kentucky.

VERTICAL SURVEY: Schlumberger photoclinoimeter run to 5340'.

SAMPLES: Cuts may be ordered from Evansville Sample Cut, 1116 Main Street, Evansville, Indiana. Set on file at Department of Geology, Virginia Polytechnic Institute at Blacksburg, Virginia.