

UNITED PRODUCING COMPANY

Yukon-Pocohontas Coal Company

Number 4-V-1646

Topographic Location: 7500' South of 37 15'; 12,000' West of 81 55'
Richland Quadrangle (NW), Buchanan County, Virginia.

Interval

- 140-144 Graywacke, very light gray (N8), medium-grained, subangular to angular, very poorly sorted, about 85% quartzose, bluish gray chert and some dark and greenish inclusions, micaceous, silt and shale cement, moderately well cemented, mostly loose grains.
- 144-148 Ditto.
- 148-152 Graywacke, as above, with angular quartz fragments trace very coarse-grained size, about 50%; coal, part very high luster and conchoidal fracture, part blocky, and very slightly shaly, about 20%; shale, silty, medium gray (N5), micaceous, about 30%; trace pyrite.
- 152-156 Graywacke, medium light gray (N6), very fine-grained, subangular to subrounded, poorly sorted, about 65% quartzose, dark inclusions, micaceous to very micaceous, much shale and silt cement, moderately well cemented.
- 156-160 Ditto.
- 160-168 Graywacke, calcareous to non-calcareous, light gray (N7), very fine-grained, subangular, poorly sorted, about 80% quartzose, minute dark inclusions, slightly micaceous, shale and silt cement, moderately friable, predominantly loose grains.
- 168-178 Graywacke, slightly calcareous to non-calcareous, as above, clustered, moderately well cemented to well cemented.
- 178-182 Graywacke, medium light gray (N6), as above, non-calcareous, about 50%. Shale, very silty to silty, medium gray (N5), very micaceous, about 50%.

Interval

- 192-186 Graywacke & shale, as above, about 20% coal, part very high luster, blocky and part slightly shaly.
- 186-190 Shale, medium gray (N5), slightly fissile, finely micaceous.
- 190-194 Shale, slightly silty to silty, medium light gray (N6), micaceous.
- 194-198 Coal, very high luster, conchoidal fracture, trace plant fossils, about 15%; shale, carbonaceous to slightly carbonaceous, medium dark gray to dark gray (N4-3), about 15%; graywacke, medium light gray (N6), very fine-grained, subangular, silt and shale cement, about 75% quartzose, dark inclusions, micaceous, about 70%.
- 198-202 Graywacke, light gray (N7), as above, predominantly loose grains.
- 202-207 Shale, slightly silty, medium gray (N5), micaceous, about 50%; graywacke, medium light gray (N6), as above, about 50%.
- 207-212 Graywacke, calcareous, medium light gray (N6), very fine-grained, subangular to subrounded, poorly sorted, about 80% quartzose, dark inclusions, micaceous, moderately well to well cemented, trace coal.
- 212-217 Shale, silty, non-silty, medium gray (N5), finely micaceous, about 50%; graywacke, as above, non-calcareous, about 50%; more coal.
- 217-221 Shale, medium gray (N5), very finely micaceous, very slightly fissile.
- 221-227 Shale, medium gray (N5), slightly fissile, very finely micaceous.
- 227-233 Ditto.
- 233-239 Shale, slightly silty, medium dark gray (N4), finely micaceous.
- 239-245 Ditto, slightly silty to some silty.
- 245-251 Shale, as above, part very silty and slightly calcareous to calcareous, slightly micaceous.
- 251-261 Ditto.
- 261-269 Ditto.

Interval

- 269-274 Ditto.
- 274-285 Ditto.
- 285-288 Graywacke, very light gray (N8), very fine-grained, sub-angular poorly sorted, about 85% quartzose, dark and few green inclusions, micaceous (larger flakes muscovite and few flakes chlorite), silt and shale cement, moderately friable, most loose grains; coal, about 15%; some carbonaceous shale.
- 288-291 Ditto; slight trace coal, as above.
- 291-296 Ditto.
- 296-300 Ditto, very poorly sorted.
- 300-303 Ditto.
- 305-310 Graywacke, as above, 85%; shale, silty to very silty, medium gray (N5), very micaceous.
- 310-315 Shale, medium brownish gray (5NYR 4/1), very finely micaceous, slight resinous luster, about 80%; coal, about 15%; shale, carbonaceous, dark gray (N3), fissile, about 5%.
- 315-320 Shale, slightly silty to some very silty, medium light gray (N6), finely micaceous, about 85%; shale, medium gray (N5), finely micaceous, about 15%.
- 320-327 Graywacke, light gray (N7), fine-grained, subangular to angular very poorly sorted, (much very fine-grained size), about 85% quartzose, dark inclusions, large flakes muscovite, silt cement, moderately poorly cemented, predominantly loose grains.
- 327-334 Ditto, many coarse-grained size quartz, part appearing freshly broken.
- 334-335 Ditto, very light gray (N8), loose grains.
- 339-344 Ditto, fine-grained to medium-grained, and few clusters, light gray (N7), about 60% quartzose.
- 344-350 Ditto.
- 350-355 Ditto, more coarse-grained angular quartz fragments; about 15% coal, most slightly shale, and little very carbonaceous shale.
- 355-360 Shale, non-silty to some very silty, medium-gray to medium dark gray (N5-4), little slightly carbonaceous, micaceous; little medium light gray (N6) siltstone and very fine-grained graywacke.

Interval

- 360-365 Ditto.
- 365-374 Shale, medium dark gray (N4), very slightly fissile, very finely micaceous.
- 374-381 Ditto.
- 381-387 Shale, non-silty to silty, medium dark gray (N4), finely micaceous; about 15% coal, very shaly, and carbonaceous shale.
- 387-390 Graywacke, very light gray (N8), very fine-grained to fine-grained, subangular, very poorly sorted, about 85% quartzose, dark and green inclusions, micaceous (large flakes muscovite), silt and shale cement, moderately well cemented, predominantly loose grains.
- 390-394 Ditto, fine-grained to very fine-grained.
- 394-400 Ditto, very slightly calcareous.
- 400-408 Ditto, non-calcareous.
- 408-412 Ditto, few small clusters with calcareous cement.
- 412-416 Ditto, trace phlogopite and chlorite.
- 416-423 Ditto, few small clusters with slightly calcareous cement.
- 423-427 Ditto, part clustered, very slightly calcareous.
- 427-430 Ditto, very few clusters, non-calcareous, moderately friable.
- 430-434 Ditto, few clusters.
- 434-438 Ditto, fine-grained, predominantly clusters, moderately well cemented, very slightly calcareous.
- 438-443 Ditto, fine-grained to very fine-grained, predominantly loose grains.
- 443-448 Ditto, calcareous.
- 448-455 Shale, non-silty to slightly silty, medium gray (N5), finely micaceous, part very slightly calcareous.
- 455-461 Shale, non-silty to very silty, slightly calcareous to calcareous, medium gray (N5), micaceous; some (about 10%) siltstone, calcareous, medium light gray (N6), very coarse-grained.
- 461-467 Graywacke, calcareous, medium light gray (N6), very fine-grained (approaching siltstone), subangular, poorly sorted (much siltstone and shale), about 65% quartzose, dark inclusions, very micaceous (muscovite and some chlorite), moderately well cemented.

Interval

467-472	Shale, slightly calcareous to calcareous, non-silty to some silty, medium gray (N5), finely micaceous.
472-477	Ditto, slightly silty to very silty.
477-482	Shale, silty to sandy, very slightly calcareous, medium gray (N5), finely micaceous.
482-488	Ditto, slightly calcareous.
488-499	Shale, slightly silty to non-silty, medium gray (N5), very finely micaceous.
499-505	Ditto.
505-513	Ditto, non-silty to very slightly silty.
513-517	Graywacke, very light gray (N8.5), fine-grained, subangular, very poorly sorted, about 90% quartzose, dark and some light green inclusions, micaceous, silt and shale cement, moderately friable, predominantly loose grains.
517-522	Ditto, some chlorite noted.
522-527	Ditto.
527-531	Ditto.
531-536	Ditto.
536-539	Ditto, some phlogopite noted.
539-544	Ditto, some medium-grained quartz.
544-548	Ditto.
548-552	Ditto, some medium-grained chert noted.
552-556	Ditto, medium-grained to fine-grained.
556-562	Ditto.
562-570	Ditto, calcareous.
570-574	Ditto.
574-580	Ditto, non-calcareous.
580-586	Ditto, fine-grained, few coarse-grained angular quartz pieces.
586-591	Shale, medium dark gray (N4), part slightly fissile, small part silty to sandy, finely micaceous.
591-596	Ditto.

Interval

596-601	Shale, medium dark gray (N4), part slightly fissile, very finely micaceous.
601-607	Ditto.
607-612	Ditto.
612-617	Ditto.
617-621	Ditto.
621-626	Ditto.
626-637	Ditto, sample needs washing.
631-637	Shale, as above, about 85%; shale, very silty to sandy, as above, grading to graywacke, medium light gray (N6), very fine-grained, subangular, poorly sorted, silt and shale cement, moderately poorly cemented, about 15%.
637-642	Sample missing.
642-649	Sample as 631-637': shale, non-silty, about 65%; graywacke, mostly loose grains.
649-656	Shale, very silty to non-silty, medium dark gray (N4), finely micaceous.
565-663	Ditto.
663-670	Shale, as above, about 85%; siltstone, sandy, light gray (N6.8), very coarse-grained, micaceous, about 15%.
670-675	Ditto: shale, 70%; siltstone, as above, grading to very fine-grained graywacke, about 60% quartzose, about 30%.
675-682	Coal, shaly to shale, very carbonaceous, about 20%; graywacke, medium light gray (N6), very fine-grained, subangular, poorly sorted, about 80% quartzose, small dark and few green inclusions, slightly micaceous, moderately friable, about 50%; shale, very silty to non-silty, medium dark gray (N4), finely micaceous, about 30%.
682-687	Graywacke, very light gray (N8), as above.
687-694	Graywacke, slightly calcareous, light gray (N7), very fine-grained, subangular to subrounded, poorly sorted about 75% quartzose, brown, dark and few green inclusions, micaceous (muscovite, some phlogopite and chlorite), silt and shale cement, moderately well cemented.
694-699	Ditto.

Interval

- 699-704 Shale, non-silty to slightly silty, medium dark gray (N4), very finely micaceous.
- 704-713 Shale, dark medium gray (N4.5), very slightly fissile, part very slightly silty, very finely micaceous.
- 713-718 Shale, medium dark gray (N4), slightly to very slightly fissile, very fine micaceous.
- 718-723 Ditto.
- 723-728 Graywacke, light gray (N7), very fine-grained, subangular, very poorly sorted, about 70% quartzose, dark and brown inclusions, very micaceous (muscovite and some phlogopite and chlorite), silt cement, moderately well to moderately poorly cemented.
- 728-733 Ditto.
- 733-738 Ditto.
- 738-746 Ditto, about 60% quartzose.
- 746-755 Ditto.
- 755-760 Graywacke, as above, about 60%; shale, very silty to non-silty, medium gray and medium light gray (N5-6), micaceous to very finely micaceous; little very carbonaceous shale.
- 760-765 Graywacke, as above, about 70%; shale, carbonaceous, dark gray (N3), about 20%; shale, very silty to some non-silty, medium gray (N5), micaceous, about 10%; trace pyrite and coal.
- 765-770 Graywacke, light gray (N7), very fine-grained, subangular, moderately poorly sorted, loose grains; about 80% quartzose, numerous large flakes muscovite and some small flakes chlorite noted.
- 770-775 Graywacke, light gray (N7), very fine-grained, subangular, very poorly sorted, about 70% quartzose, dark, brown, and some green inclusions, very micaceous to micaceous (muscovite and some chlorite), silt cement, moderately well cemented.
- 775-780 Graywacke, light gray (N7), very fine-grained, subangular, moderately poorly sorted, loose grains, about 80% quartzose, numerous flakes muscovite and some of chlorite; some (about 15%) coal in sample and trace carbonaceous shale.
- 780-788 Shale, very sandy, medium gray (N5), micaceous.

Interval

- 788-796 Coal, high luster, blocky to semi-blocky, about 30%; shale, very sandy, as above, grading to medium light gray (N6), very fine-grained graywacke.
- 796-808 Graywacke, medium light gray (N6), very fine-grained, subangular, very poorly sorted, about 65% quartzose, dark inclusions, very micaceous, silt cement, moderately well cemented.
- 808-810 Ditto, calcareous cement, and many brown inclusions.
- 810-815 Ditto, very light gray (N8), non-calcareous, about 80% quartzose, green inclusions, part chlorite.
- 815-820 Ditto.
- 820-830 Graywacke, light gray (N7), very fine-grained, subangular to subrounded, moderately poorly sorted, about 85% quartzose, dark inclusions, micaceous, silt cement, very slightly calcareous, well cemented, about 70%; shale, silty to very silty, medium dark gray (N4), finely micaceous to micaceous, about 30%.
- 830-841 Shale, as above, about 70%; graywacke, about 30%.
- 841-850 Ditto.
- 850-860 Ditto, shale, about 80%; graywacke, about 20%.
- 860-866 Ditto.
- 866-874 Ditto.
- 874-876 Graywacke, very light gray (N8), fine-grained, subangular to angular, very poorly sorted, about 80% quartzose, dark and some green inclusions, micaceous, silt and shale cement, moderately well cemented.
- 876-881 Ditto, moderately friable, many loose grains, few of clusters slightly calcareous.
- 881-891 Ditto.
- 891-899 Graywacke, white (N8.8), very fine-grained, subangular to angular, poorly sorted, loose grains, few dark and green grains, and numerous flakes muscovite.
- 899-907 Graywacke, very light gray (N8.5), medium-grained, subangular to angular, very poorly sorted, about 85% quartzose, gray, dark, and few green inclusions, micaceous (some muscovite and chlorite), silt cement, moderately well cemented to moderately friable, predominantly loose grains.

Interval

- 907-910 Graywacke, as above, some coarse-grained quartz appearing freshly broken; few clusters slightly calcareous.
- 910-918 Ditto, fine-grained, to very fine-grained non-calcareous, more muscovite.
- 918-925 Ditto.
- 925-930 Ditto, about 80% quartzose.
- 930-935 Ditto, very fine-grained, loose grains.
- 935-948 Ditto, subangular to subrounded, moderately well sorted.
- 948-956 Shale, very slightly silty to silty, medium dark gray (N4), very finely micaceous, about 60%; graywacke, light gray and medium light gray (N7-6), very fine-grained, subangular to subrounded, moderately well sorted, about 70% quartzose, dark inclusions, micaceous, moderately friable, about 40%.
- 956-963 Graywacke, light gray (N7), as above.
- 963-970 Ditto, small part slightly to very slightly calcareous.
- 970-980 Shale, dark medium gray (N4.5), part slightly fissile, very finely micaceous, about 70%; graywacke, as above, about 30%.
- 980-986 Shale, as above.
- 986-994 Ditto, to some silty to very silty.
- 994-1002 Ditto.
- 1002-1010 Shale, as above, non-silty.
- 1010-1018 Shale, nonsilty to silty, medium dark gray (N4), very finely micaceous.
- 1018-1026 Shale, very sandy, medium gray to medium light gray (N5-6), very finely micaceous, grading to graywacke, slightly calcareous, light gray (N7), fine-grained, subangular to angular, very poorly sorted, about 75% quartzose, dark and green inclusions, slightly micaceous, much silt and shale cement, moderately well cemented.
- 1026-1036 Graywacke, as above, non-calcareous, about 80%; coal, very slightly shaly, trace plant fossil, and little shale, slightly carbonaceous, medium dark gray (N4), very finely micaceous, about 20%. (note on sack: ga# 1030'-33', 1/10 W. 1" 21,000).

Interval

1036-1045 Graywacke, as above.

1045-1051 Ditto, predominantly loose grains.

1051-1059 Shale, silty, medium gray (N5), micaceous, about 70%; graywacke, light gray (N7), fine-grained, subangular to angular very poorly sorted, about 85% quartzose, dark and green inclusions, slightly micaceous, much silt cement, moderately well cemented, 50%.

1059-1066 Ditto.

1066-1074 Graywacke, as above, predominantly loose grains.

1074-1082 Ditto, more large flakes muscovite, some chlorite noted.

1082-1092 Ditto, about 80% quartzose.

1092-1102 Ditto.

1102-1111 Coal, shaly, about 20%; shale, silty, medium gray (N5), finely micaceous, about 50%; graywacke, as above, about 30%.

1111-1116 Graywacke, light gray (N7), fine-grained, subangular, poorly sorted, about 80% quartzose, dark, brownish and few green inclusions, micaceous, silt cement, moderately friable to moderately well cemented.

1116-1121 Shale, non-silty to silty, medium gray (N5), very finely micaceous.

1126-1128 Graywacke, very light gray (N8), very fine-grained, subangular, poorly sorted, about 90% quartzose, dark inclusions, slightly micaceous, much silt cement, moderately well cemented, about 70%; shale, as above, about 30%.

1128-1132 Graywacke, as above, silt cement.

1132-1137 Ditto.

1137-1144 Ditto, many loose grains.

1144-1152 Ditto, predominantly loose grains.

1152-1160 Ditto, loose grains to clusters, moderately well cemented to moderately friable.

1160-1167 Ditto, predominantly clustered.

1167-1173 Ditto, predominantly loose grains.

1173-1179 Ditto, very fine-grained to fine-grained, slightly calcareous, fine-grained, part with about 80% quartzose, some phlogopite and chlorite noted; well cemented.

Interval

- 1179-1186 Graywacke, as above, fine-grained, as above, non-calcareous predominantly loose grains.
- 1186-1194 Ditto, slightly to very slightly calcareous.
- 1194-1204 Graywacke, light gray (N7), fine-grained, angular to subangular, very poorly sorted, about 75% quartzose, dark and few green inclusions, micaceous, much silt and shale cement, moderately well to well cemented.
- 1204-1212 Shale, silty to non-silty, small part carbonaceous, medium gray (N5), finely micaceous.
- 1212-1221 Graywacke, light gray (N7), fine-grained, angular to subangular, very poorly sorted, about 80% quartzose, dark inclusions, slightly micaceous, much silty and shale cement, moderately well cemented to moderately friable.
- 1221-1236 Ditto, very slightly calcareous, predominantly loose grains.
- 1236-1246 Shale, very silty, medium gray (N5), micaceous, (sample needs washing).
- 1246-1256 Shale, carbonaceous to slightly carbonaceous dark gray (N3), very finely micaceous, about 30%; coal, about 10%; shale, very silty, as above 60%; trace pyrite.
- 1256-1260 Shale slightly silty to small part silty, medium gray (N5), very finely micaceous.
- 1260-1270 Graywacke, non-calcareous to slightly calcareous, light gray (N7), very fine-grained, subangular, poorly sorted, about 85% quartzose, dark inclusions, slightly micaceous, silt cement, well cemented.
- 1270-1280 Siltstone, medium light gray (N6), medium-grained, dark inclusions, slightly micaceous, about 40%; shale, silty to slightly silty, medium dark gray (N4), very finely micaceous, about 60%.
- 1280-1292 Shale, very silty, medium gray (N5), micaceous, about 75%; graywacke, light gray (N7), very fine-grained (approaching siltstone), subangular, moderately well sorted, about 80% quartzose, dark inclusions, micaceous, well cemented, about 25%.
- 1292-1300 Ditto. Shale, very silty to some non-silty and very finely micaceous, about 60%; graywacke, about 40%.
- 1300-1310 Ditto. Shale, very slightly silty to some very silty, about 40%; graywacke, about 60%.

Interval

- 1310-1320 Shale, slightly silty, medium dark gray (N4), very finely micaceous.
- 1320-1330 Ditto.
- 1330-1336 Shale, medium dark gray (N4), very finely micaceous, about 60%; siltstone, coarse-grained, grading to very fine-grained graywacke, light gray (N7), about 85% quartzose, dark inclusions, slightly micaceous, subangular, moderately poorly sorted, moderately well, well cemented, about 40%.
- 1336-1345 Shale, very silty, some slightly silty, medium dark gray (N4), slightly micaceous, about 60%; graywacke, as above, light gray and medium light gray (N7-6), about 40%.
- 1345-1356 Graywacke, white (N8.8), fine-grained, subangular to angular, very poorly sorted, about 90% quartzose, dark inclusions, slightly micaceous, silt and shale cement, moderately well cemented to moderately friable.
- 1356-1361 Ditto, predominantly loose grains.
- 1361-1368 Ditto, few medium-grained quartz, about 95% quartzose.
- 1369-1374 Ditto, more medium-grained to coarse-grained angular quartz fragments.
- 1374-1379 Shale, silty to very silty, dark gray (N3), finely micaceous.
- 1379-1383 Graywacke, as 1369-1374, few medium-grained quartz.
- 1383-1388 Ditto, very fine-grained to fine-grained.
- 1388-1393 Sample missing.
- 1393-1395 Graywacke, fine-grained, as 1383-1388, several medium-grained angular broken quartz, trace very coarse-grained quartz.
- 1395-1400 Ditto, fine-grained to medium-grained, some coarse-grained quartz fragments, no very coarse-grained quartz noted.
- 1400-1405 Ditto.
- 1405-1409 Ditto, conglomeratic, medium-grained, numerous angular quartz fragments to granule size, some iron staining.
- 1409-1415 Ditto, more very coarse-grained quartz fragments.
- 1415-1421 Ditto, trace smoky quartz noted; no granule size fragments noted.

Interval

- 1421-1427 Ditto, very conglomeratic, numerous granule and few large granule size quartz fragments.
- 1427-1433 Ditto, about 90%; coal, slightly shaly, graywacke, light gray (N7), very fine-grained, and shale, medium dark gray (N4), very finely micaceous, about 10%.
- 1433-1438 Graywacke, slightly conglomeratic, medium-grained, few fragments of granule and larger (to 6 mm.) size.
- 1438-1444 Ditto, conglomeratic, many very coarse-grained quartz fragments.
- 1444-1450 Ditto.
- 1450-1458 Ditto to very coarse-grained size, about 90%; shale, sandy to silty, dark gray (N3), finely micaceous to micaceous, about 10%.
- 1458-1461 Shale, silty, medium gray (N5), micaceous. (Note on sack: "show of gas 1461!").
- 1461-1464 Coal, high luster, blocky; slight trace pyrite.
- 1464-1471 Graywacke, very light gray (N8), fine-grained, subangular to angular, very poorly sorted, about 75% quartzose, dark, brown, and green inclusions, slightly micaceous, silt cement, moderately well cemented, predominantly loose grains and very small clusters.
- 1471-1478 Ditto.
- 1478-1484 Ditto.
- 1484-1490 Ditto, slightly calcareous.
- 1490-1497 Ditto, light gray (N7), slightly calcareous to calcareous, fine-grained to few subrounded, medium-grained quartz, and some angular medium-grained quartz fragments.
- 1495-1505 Ditto, very fine-grained.
- 1505-1512 Ditto, slightly calcareous.
- 1512-1522 Ditto, very fine-grained to fine-grained, non-calcareous.
- 1522-1527 Ditto, slightly calcareous to calcareous.
- 1527-1532 Shale, very silty to sandy, medium light gray (N6), micaceous.
- 1532-1540 Shale, as above, about 85%; siltstone, light gray (N7), very coarse-grained (approaching very fine-grained graywacke), micaceous, shale cement, moderately well cemented, about 15%.

Interval

- 1540-1550 Shale, as above.
- 1550-1557 Graywacke, very light gray (N8), fine-grained, subangular to angular, very poorly sorted, about 85% quartzose, fine-grained dark and few green inclusions, slightly micaceous, silt and some shale cement, moderately well cemented.
- 1557-1562 Shale, medium gray (N5), very finely micaceous, shale resinous luster, about 90%; siltstone, light gray (N7), very coarse-grained, grading to very fine-grained graywacke, dark inclusions, slightly micaceous, well cemented.
- 1562-1572 Graywacke, slightly calcareous, light gray (N7), very fine-grained, subangular to subrounded, poorly sorted, about 80% quartzose, dark inclusions, micaceous, silt cement, moderately well cemented.
- 1572-1582 Shale, slightly silty, medium light gray (N6), finely micaceous.
- 1582-1592 Shale, silty to very silty (approaching shaly siltstone), medium light gray (N6), finely micaceous.
- 1592-1599 Coal, very high luster, blocky; little slightly shaly coal; trace plant fossil.
- 1599-1608 Shale, medium gray (N5), very finely micaceous, about 50%; coal, as above, about 50%.
- 1608-1620 Shale, non-silty to some silty, medium gray (N5), finely micaceous.
- 1620-1629 Siltstone, medium light gray (N6), coarse-grained, subangular to subrounded, moderately well sorted, part shaly, micaceous, about 50%; shale, non-silty to silty, medium gray (N5), very finely micaceous, about 50%.
- 1629-1636 Shale, medium dark gray (N4), very finely micaceous, about 80%; siltstone, sandy, medium light gray (N6), coarse-grained, very poorly sorted, slightly micaceous to micaceous, about 20%.
- 1636-1642 Ditto; shale, about 60%, siltstone, sandy, about 40%.
- 1642-1652 Graywacke, very light gray (N8), fine-grained, angular to subangular, very poorly sorted, about 85% quartzose, dark inclusions, slightly micaceous, silt cement, moderately well cemented to moderately friable.
- 1652-1662 Ditto, loose grains.

- 1662-1668 Graywacke, as above, very small clusters.
- 1668-1680 Ditto, loose grains; about 10% shale, silty to very silty, medium light gray (N6), very finely micaceous; trace coal.
- 1680-1690 Shale, very silty, medium gray (N5), slightly micaceous, graywacke, as above, about 50%.
- 1690-1698 Shale, silty to non-silty, medium-grained to some medium dark gray (N5-4), very finely micaceous.
- 1698-1707 Shale, very slightly silty to some silty, medium gray (N5), very finely micaceous; trace graywacke, slightly calcareous, light gray (N7), fine-grained.
- 1707-1717 Graywacke, slightly calcareous, very light gray (N8), fine-grained, subangular, very poorly sorted, about 85% quartzose, dark and green inclusions, micaceous (muscovite and some chlorite), silt and shale cement, moderately well cemented to moderately friable, about 50%; shale, slightly silty to silty, medium gray (N5), micaceous, about 50%.
- 1717-1727 Ditto; graywacke, about 70%; shale, silty, about 30%; trace coal.
- 1727-1730 Graywacke, light gray (N7.5), very slightly calcareous, as above.
- 1730-1738 Ditto, very light gray (N8), about 80% quartzose, more green inclusions.
- 1738-1747 Ditto.
- 1747-1763 Ditto, non-calcareous, predominantly loose grains.
- 1763-1768 Ditto.
- 1768-1771 Ditto.
- 1771-1775 Ditto, very fine-grained..
- 1775-1778 Ditto.
- 1778-1782 Ditto, fine-grained.

1778-1782' last available sample.
 Samples examined by Eloise T. Jacobsen
 Geologist, U.S. Geological Survey,
 Lexington, Kentucky.
 April, 1950.

Interval

2190-2195 Shale: micaceous, medium gray (N4), massive.

2105-2203 Shale: like 2190-2195.

2203-2208 Shale: dark gray (N3).

2208-2214 Sandstone: very light gray (N8), coarse-grained, sub-angular, hard.

2214-2217 Sandstone: like 2208-2214.

2217-2244 No sample.

2244-2248 Sandstone, very light gray (N8), very coarse- to medium-grained, hard, subangular.

2248-2250 Sandstone: like 2244-2248.

2250-2255 Sandstone, like 2244-2248.

2255-2260 Shale, silty, medium dark gray (N5), micaceous.

2260-2264 Shale, like 2255-2260.

2264-2266 Sandstone, like 2244-2248.

2266-2272 Shale: dark gray (N3), massive.

2272-2277 Sandstone: like 2244-2248.

2277-2283 Shale: like 2266-2272.

2283-2288 Shale: like 2266-2272.

2288-2294 Shale: like 2266-2272.

2294-2298 Shale: like 2266-2272.

2298-2308 Shale: medium dark gray (N5), slightly micaceous.

2308-2317 Shale: like 2298-2308.

2317-2323 Shale: like 2298-2308.

2323-2330 Shale: silty, medium dark gray (N4).

2330-2340 Shale, like 2323-2330, pyritic.

2340-2349 Limestone: medium gray (N5), medium crystalline.

2349-2356 Limestone: medium gray (N5), silty, micaceous.

Interval

2356-2362	Limestone: like 2349-2356.
2362-2370	Shale: micaceous, medium gray (N4).
2370-2372	Shale: like 2362-2370, slightly calcareous.
2372-2377	Limestone, medium gray (N4), finely to medium crystalline.
2376-2383	Limestone: like 2372-2377, 70%; limestone, very light gray (N8), finely to medium crystalline.
2383-2391	Sandstone: white (N9) to very light gray (N8), medium- to coarse-grained, slightly calcareous.

Samples examined by Oren A. Sams
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Lexington, Kentucky
August 2, 1950.