

UNITED PRODUCING COMPANY

Yukon Pocahontas Coal Company, No. 5-1647

Topographic Location: 11,000' South of 37° 15'; 15,500' West 81° 55'
(revised location).
Richlands Quadrangle (NW), Buchanan County, Virginia

Elevation: 1826.4' (ground).

Total Depth: 4358'.

Interval

- 0-10 Sandstone: argillaceous, grayish yellow (5Y 8/4-7/6), (weathered), brown stains, fine- to medium-grained, white and dark mica flakes, not oriented; mainly quartz grains, non-calcareous, low porosity.
- 10-20 Sandstone: argillaceous, micaceous, pale yellowish brown (10YR 6/2), fine- to medium-grained, quartz grains, angular to subangular, quartz, mica, feldspar primary, occasional black grains, low porosity, brown stains.
Siltstone: micaceous, medium light gray (N6), weak HCl reaction, few black mica flakes--probably a contact in this interval.
- 20-26 Siltstone: similar to siltstone in sample 10-20, few black, sand size grains.
- 26-33 Mudstone: micaceous, medium gray (N5), non-calcareous, silty.
- 33-40 Mudstone: micaceous, silty, medium gray (N5), non-calcareous, medium hard.
- 40-48 Like 33-40.
- 48-56 Like 33-40, very weak HCl reaction.
- 56-61 Like 33-40, with interbedded siltstone.
- 61-68 Like 33-40, with interbedded siltstone.
- 68-77 Mudstone: micaceous, medium dark gray (N4), non-calcareous, medium hard.
- 77-82 Like 68-77.
- 82-90 Like 68-77 plus bright coal and medium gray siltstone.

Interval

Water at 94'.

- 90-99 Like 82-90 with bright coal and siltstone.
- 99-108 Sandstone: friable quartz, micaceous, clear and milky quartz grains, medium-grained; very light gray (N8) mica and greenish grains (not glauconite), angular and subangular, (loose grains); coal; bright, less than 5% of sample, probably cavings, non-calcareous.
- 108-112 Like 99-108 with coal and greenish-gray, black grains.
- 112-116 Like 99-108, yellow-brown stain near black mica.
- 116-122 Sandstone, silty, very light gray (N8), micaceous, mainly clear and mildy quartz, also white and black mica, black and greenish gray grains. Sample contains chip of flint, clay?, and coal (is this caving?). (Can't find above), medium-grained, brown stains, few chunks mainly loose grains, porosity low, non-calcareous.
- 122-128 Sandstone, silty, slightly calcareous (weak HCl reaction), very light gray (N8), mainly quartz grains, but contains a few white and black mica flakes, black grains, fine- to medium-grained, subangular to subrounded, porosity low, moderately hard, few lumps, mainly loose grains.
- 128-138 Like 122-128.
- 138-146 Sandstone: silty, slightly calcareous, weak HCl reactions, very light gray and dark gray, medium- to coarse-grained, clear and milky quartz dominant, subangular to subrounded, dark grains rare in light gray, abundant in dark gray, few green grains, several chips flint clay, conchoidal fracture, dusky yellowish brown, (10YR 2/2), some black organic matter?, yellow-brown stain and green stain? on quartz perhaps related and due to weathering, medium hard, low porosity.
- 146-151 Like 138-146, lacks flint clay, but sample contains few chips of bright coal.
- 151-156 Like 138-146, lacks flint clay and coal.
- 156-161 Like 138-146, includes flint clay and coal.
- 161-167 Like 138-146, lacks flint clay and coal.
- 167-172 Like 138-146, lacks flint clay and coal.
- 172-178 (Water at 173') that is, just above break--
Mudstone, silty, dark gray (N3), non-calcareous, not shaly, medium hard, forms chips.

Interval

178-184	Like 172-178.
184-190	Like 172-178, plus very little bright coal.
190-200	Siltstone: sandy, medium light gray (N6), mainly angular quartz, few mica flakes, yellow-brown stain; coal, loose grains.
200-205	Like 190-200.
205-210	Like 190-200.
210-215	Sandstone: very light gray (N8), mainly milky quartz grains, few black grains, mica flakes and green grains, medium-to coarse-grained, yellow-brown stains, friable?, loose grains, subangular, medium hard.
215-220	Like 210-215, low porosity, silty.
220-226	Like 210-215, low porosity, silty; few chips.
226-232	Like 210-215.
232-238	Like 210-215; some chips of mudstone, dark gray (N3).
238-243	Like 210-215.
243-248	Like 210-215, few coal, bright blocks.
248-255	Like 210-215; few black shale chips.
255-262	Like 210-215.
262-268	Like 210-215.
268-275	Like 210-215.
275-279	Like 210-215; few quartz chips, probably from pebbles.
279-284	Like 210-215; fine-grained more abundant, perhaps--pulverized?
284-289	Like 279-284.
289-295	Mudstone, grayish black (N2),
295-300	Siltstone: sandy, micaceous, very light gray (N8), grains, angular to subangular, secondary enlargement?, few black grains, very fine sandy, no HCl reaction.
300-307	Sandstone, silty, very light gray (N8), medium-grained, mainly milky and clear quartz grains, and broken pebbles? plus black and green grains and mica flakes. Pyrite chips of dull coal? and black shale.

Interval

- 307-311 Mudstone: dark gray (N3), micaceous, non-calcareous, plus 50% of material like 300-307, caving? coal?
- 311-315 Siltstone: sandy, light gray (N7), very fine sand grains, mica flakes, subangular, black and green grains, moderate HCl reaction.
- 315-319 Like 311-315.
- 319-327 Mudstone: silty, medium gray (N5), non-calcareous, micaceous.
- 327-334 Mudstone, shaly, grayish black (N2), non-calcareous.
- 334-342 Like 327-334.
- 342-347 Sandstone, medium light gray (N6), very fine grains plus silt, mainly clear and milky quartz, mica flakes, non-calcareous.
- 347-353 Siltstone: medium gray (N5), slightly calcareous (weak HCl reaction), micaceous.
- 347-359 Sandstone, like 342-347, 80%; like 327-334, 20%.
- 353-361 Mudstone, micaceous, medium gray (N5), moderate HCl reaction.
- 361-374 Mudstone, medium dark gray (N4), no HCl reaction, (forms chips), (shaly?).
- 374-381 Like 361-374.
- 381-388 Like 361-374.
- 388-400 Like 361-374, interbedded silty mudstone.
- 405-410 Like 361-374.
- 410-415 Mudstone, silty, medium dark gray (N4), non-calcareous, forms chips.
- 415-420 Mudstone, silty medium gray (N5), non-calcareous, forms chips.
- 420-425 Mudstone, silty, micaceous, non-calcareous, medium light gray (N6), few iron sulfide nodules.
- 425-433 Like 420-429; 10% sandstone, like 433-440.
- 433-440 Sandstone, light gray (N7), fine-grained, micaceous with scattered dark grains, silty, probably low permeability, grains subangular, weak HCl reaction.
- 440-446 Like 433-440.

Interval

446-453	Like 433-440.
453-458	Like 433-440 with small carbonized plant fragments.
458-463	Mudstone, medium dark gray (N4), micaceous, shaly, non-calcareous.
463-471	Like 453-463.
471-478	Sandstone, light gray (N7 to N8), fine-grained, micaceous, non-calcareous, few black grains, silty, with low permeability.
478-488	Like 471-478.
488-495	Sandstone, like 471-488; with thin interbedded silty mudstone, medium dark gray (N4), and small nodules of iron sulfide.
495-500	Like 488-495.
500-507	No sample.
507-510	Coal in chunks 1 to 10 mm. in length; vitrain, dull and bright attritus present.
510-521	Siltstone, medium light gray (N6) and medium dark gray (N4), micaceous, non-calcareous, argillaceous.
521-526	Like 510-521.
526-534	Siltstone, medium light gray (N6), micaceous, argillaceous, and very weak HCl reaction.
534-540	Like 526-534.
540-547	Like 526-534.
547-553	Mudstone, medium gray (N5), micaceous, shaly, forms chips, no HCl reaction.
553-562	Like 547-553.
562-569	Sandstone, light gray (N7) to (N8), fine- to medium-grained, micaceous, subangular grains, few black grains, silty, no HCl reaction, low permeability.
569-579	Like 562-565.
579-587	Like 562-565.
587-595	Like 562-565.
597-605	Siltstone, medium light gray to medium dark gray (N4-N6),

Interval

	micaceous, no HCl reaction.
605-616	Mudstone, medium dark gray (N4), silty, micaceous, shaly, no HCl reaction.
616-623	Like 605-616.
623-635	Like 605-616.
635-650	Like 605-616.
650-664	Like 605-616.
664-669	Like 605-616.
669-678	Sandstone, light gray (N7), fine-grained, mainly quartz with few black grains, subangular, micaceous, no HCl reaction, silty, low permeability.
678-688	Like 669-678, but sample pulverized.
688-698	Like 678-688.
698-708	Like 678-688.
708-715	Like 678-688.
722-730	Siltstone, medium gray (N5), non-calcareous, carbonaceous and micaceous, shaly, no HCl reaction. Sample contains 30% sand from above?
730-736	Sandstone, like 669-678, and siltstone chips, 30% like 722-730.
736-748	Mudstone, medium gray (N5), shaly, forms chips, no HCl reaction.
748-762	Like 738-748.
762-772	Like 738-748.
772-782	Like 738-748.
782-809	Like 738-748.
809-818	Like 738-748.
818-827	Like 738-748.
827-830	Like 738-748.
830-839	Sandstone, medium light gray (N6), fine-grained, silty, micaceous, mainly quartz with less than 5% black grains. No HCl reaction, low permeability. Carbonaceous films.

Interval

839-847 Like 830-839.

859-865 Like 830-839.

865-875 Mudstone, medium gray (N5), shaly, forms chips, no HCl reaction.

875-883 Sandstone, like 830-839.

883-900 Siltstone, medium light gray (N8), micaceous, argillaceous, no HCl reaction, shaly.

900-912 Like 883-900.

912-922 Like 883-900.

922-932 Like 883-900.

932-937 No sample.

937-950 Mudstone, medium gray (N5), silty, micaceous, shaly, weak HCl reaction.

950-960 Like 937-950.

960-970 Like 937-950, lacks HCl reaction.

970-980 Like 960-970.

980-993 Like 960-970.

993-1001 Like 960-970, chunks of shale.

1001-1011 Like 960-970.

1011-1019 Sandstone, light gray (N7), fine-grained, micaceous, mainly angular to subangular quartz grains, silty with low permeability, weak HCl reaction.

1019-1033 Mudstone, medium dark gray (N4), micaceous, silty, and shaly; and bright coal.

1033-1043 Siltstone, medium gray (N5), micaceous and argillaceous with shaly stuncture, no HCl reaction.

1043-1054 Like 1033-1034.

1054-1067 Sandstone, light gray (N7), fine-grained, micaceous, silty, low permeability, grains angular to subangular, no HCl reaction.

1067-1071 Like 1054-1067 with brown iron or flakes.

1071-1082 Like 1054-1067.

Interval

1082-1092	Like 1054-1067.
1092-1100	Like 1054-1067.
1100-1109	Like 1054-1067.
1109-1119	Mudstone, medium dark gray (N4), micaceous, shaly, forms large chips, no HCl reactions.
1119-1134	Like 1109-1119.
1134-1145	Like 1109-1119.
1145-1156	Like 1109-1119.
1156-1165	Like 1109-1119.
1165-1175	Like 1109-1119.
1176-1187	Like 1109-1119.
1187-1197	Like 1109-1119, except dark gray (N3).
1197-1203	Siltstone, sandy, medium gray (N5), weak HCl reaction.
1203-1219	Siltstone, light gray (N7), micaceous, low permeability, no HCl reaction, 30%; Mudstone, silty, dark gray (N3), 30%; Coal, bright with thin layers of dull attritus, 40%.
1229-1231	Mudstone, silty, medium dark gray (N4), shaly structure.
1231-1239	Sandstone, silty, light gray (N7), very fine-grained, micaceous, low permeability, no HCl reaction.
1239-1245	Like 1231-1239.
1245-1252	Sandstone, silty, light gray (N7), fine-grained, micaceous, grains angular, permeability low, no HCl reaction, forms loose grains and 1 mm. chips.
1252-1257	Like 1245-1252.
1257-1263	Like 1245-1252.
1263-1272	Like 1245-1252.
1272-1281	Mudstone, silty, medium gray (N5), micaceous, shale structure, no HCl reaction.
1281-1291	Mudstone, and coal; mudstone, carbonaceous, dark gray (N3), shale structure; and bright coal, 5, to 10% of sample.

Interval

1291-1299	Sandstone, silty, light gray (N7), micaceous, fine angular grains, mainly quartz with few black grains and carbonaceous films, no HCl reaction, permeability low.
1299-1307	Like 1291-1299.
1307-1312	Like 1291-1299.
1312-1317	Like 1291-1299.
1317-1324	Like 1291-1299 (pulverized, harder?).
1324-1330	Like 1291-1299.
1330-1340	Like 1291-1299.
1340-1350	Mudstone, silty, medium gray (N5), no HCl reaction, no shale structure, chunks.
1350-1360	Like 1340-1350.
1360-1370	Like 1340-1350.
1370-1383	Like 1340-1350, but some shale structure present.
1383-1391	No sample.
1391-1398	Like 1340-1350.
1398-1405	Sandstone, silty, light gray (N7), micaceous, very fine-grained, mainly angular quartz grains, with few black grains and carbonaceous films, permeability probably low.
1405-1417	Mudstone, silty, dark gray (N3), carbonaceous with shale structure, and containing bright coal, no HCl.
1417-1425	Mudstone, silty, medium to dark gray (N4), with shale structure, micaceous, no HCl reaction.
1425-1430	Like 1417-1425.
1430-1440	Missing.
1440-1447	Like 1417-1425 probably with interbedded light gray (N7) siltstone.
1447-1454	Like 1417-1425.
1454-1465	Like 1417-1425.
1465-1475	Like 1417-1425.
1475-1485	Like 1417-1425.

Interval

1485-1492	Like 1417-1425.
1492-1495	Sandstone, silty, light gray (N7), micaceous, mainly angular quartz grains with few black grains, no HCl reaction, probably low permeability.
1495-1500	Like 1492-1495.
1501-1510	Like 1492-1495.
1510-1513	Like 1492-1495.
1513-1515	(Lee? top) Sandstone, yellowish gray (5Y 8/1) (due to rust staining?) medium-grained, micaceous, conglomeratic?, mainly angular quartz grains, few coarse, permeability?
1515-1518	Sandstone, yellowish gray (5Y 8/1), fine-grained, micaceous, angular, quartz grains; coal, bright and dull present, less than 2% of sample.
1518-1521	Like 1515-1518 with few medium grains.
1521-1524	Like 1515-1518, pulverized and lacks coal.
1524-1527	Missing.
1527-1533	Like 1521-1524.
1534-1539	Sandstone, very light gray (N7) to yellowish gray (5Y 8/1), micaceous, fine- to medium-grained, conglomeratic?, grains mainly angular quartz, partly pulverized.
1539-1544	Like 1534-1539.
1544-1549	Like 1534-1539.
1549-1551	Like 1534-1539.
1551-1555	Like 1534-1539.
1555-1565	Like 1534-1539.
1565-1570	Like 1534-1539.
1570-1574	Like 1534-1539.
1574-1577	Like 1534-1539.
1577-1581	Like 1534-1539.
1584-1591	Like 1534-1539.
1591-1594	Like 1534-1539.
1594-1597	Like 1534-1539.

Interval

1597-1600	Like 1534-1539.
1600-1602	Like 1534-1539.
1602-1604	Like 1534-1539.
1604-1608	Like 1534-1539 with about 5% coal in sample.
1608-1616	Sandstone, conglomeratic, very light gray (N8), sample composed of angular and clear quartz fragments 0.125 to 8.0 mm. in diameter, and 1% coal particles.
1616-1621	Like 1608-1616 with pyrite nodules and coal grains in the sandstone.
1621-1626	Mudstone, silty, and bone coal, dark gray (N3), micaceous, no HCl reaction, pyrite nodules.
1626-1636	Sandstone, silty, medium light gray (N6), very micaceous, fine, angular quartz grains, low permeability, weak HCl reaction.
1636-1643	Like 1626-1636 with coal particles and pyrite nodules.
1642-1650	Like 1626-1636.
1650-1656	Like 1626-1636, but no HCl reaction.
1656-1662	Like 1626-1636, but no HCl reaction.
1662-1670	Mudstone, silty, medium gray (N5), micaceous, shale structure, no HCl reaction.
1670-1679	Like 1662-1670.
1679-1687	Sandstone, silty, medium light gray (N6), micaceous, mainly fine to medium sized, angular quartz grains with a few dark grains, low permeability, no HCl reaction.
1687-1697	Like 1679-1687.
1697-1704	Like 1679-1687 with interbedded? silty, medium dark gray (N4), mudstone.
1704-1709	Like 1679-1687.
1709-1714	Like 1679-1687.
1714-1717	Like 1679-1787.
1717-1722	Mudstone, medium light gray (N5), with shale structure, no HCl reaction.

Interval

1722-1730	Like 1717-1722.
1730-1739	Like 1717-1722.
1739-1746	Siltstone, medium light gray (N6), micaceous with fine, angular grains of quartz.
1746-1755	Like 1739-1746.
1755-1763	Like 1739-1746.
1763-1765	No sample.
1765-1773	Coal, bright attritus.
1773-1783	Mudstone, silty, medium gray (N5) with shale structure, micaceous, no HCl reaction.
1790-1800	Siltstone, sandy, medium light gray (N6), micaceous, with weak HCl reaction, low permeability.
1800-1808	Mudstone, silty, medium gray (N5), with shale structure and no HCl reaction.
1808-1816	Like 1800-1808.
1816-1824	Like 1800-1808.
1824-1833	Like 1800-1808.
1833-1840	Siltstone, medium light gray (N6), micaceous, no HCl, pulverized sample.
1840-1846	Like 1833-1840.
1846-1854	Like 1833-1840.
1854-1864	Mudstone, silty, medium gray (N5), with shale structure, no HCl reaction.
1864-1873	Like 1854-1864 but includes a few coal fragments.
1873-1883	Like 1854-1864.
1883-1885	Siltstone, sandy, medium light gray (N6), micaceous, no HCl reaction, low permeability.
1885-1889	Like 1883-1885 with coal fragments.
1889-1896	Like 1883-1885.
1896-1903	Sandstone, silty, very light gray (N8), micaceous, fine to medium-grained, angular to subrounded, grains mainly quartz, no HCl reaction.

Interval

1903-1909	Like 1896-1903.
1909-1932	Like 1896-1903, weak HCl reaction.
1932-1941	Like 1896-1903, interbedded medium gray mudstone probably present.
1941-1950	Like 1896-1903.
1950-1954	Like 1896-1903.
1954-1957	Like 1896-1903.
1957-1962	Like 1896-1903 with moderate HCl reaction.
1962-1969	Like 1896-1903 with moderate HCl reaction.
1969-1874	Like 1896-1903.
1974-1978	Like 1896-1903.
1978-1999	Like 1896-1903.
1999-2006	Like 1896-1903, weak HCl reaction.
2006-2014	Like 1896-1903.
2014-2019	Like 1896-1903.
2019-2024	Like 1896-1903.
2024-2034	Mudstone, silty, medium gray (N5), micaceous, no HCl reaction.
2034-2041	Sandstone, silty, medium light gray (N6), micaceous, medium grains, angular and subangular, weak HCl reaction on some fragments.
2041-2047	Missing.
2047-2053	Sandstone, silty, light gray (N7) to yellowish gray (5Y 8/1), micaceous, medium- to fine-grained, angular, clear quartz grains, with a few black grains and carbonaceous films, low permeability, weak HCl reaction on some pieces.
2053-2058	Like 2047-2053.
2058-2063	Like 2047-2053.
2063-2070	Like 2047-2053.
2070-2082	Like 2047-2053; no coal,; dark mudstone, silty 5% of sample.

Interval

2082-2092	Mudstone, silty, medium gray (N5); and 20% grayish red (10R 4/2), weak HCl reaction, with shale structure.
2092-2099	Like 2082-2092.
2097-2104	Mudstone, grayish red (10R 4/2), with shale structure, no HCl reaction.
2104-2112	Like 2097-2104.
2112-2122	Sandstone, light olive gray (5Y 6/1), angular, fine- to medium-grained, mainly quartz, weak HCl reaction, probably interbedded medium gray (N5), siltstone.
2122-2127	Mudstone, silty, medium light gray (N6), micaceous, shale structure, weak HCl reaction.
2122-2132	Like 2122-2127.
2132-2140	Like 2122-2127, with grayish red (10R 4/2), mottling.
2140-2150	Like 2122-2127 with interbedded grayish red mudstone.
2150-2159	Like 2122-2127.
2159-2169	Like 2122-2127, no HCl reaction.
2169-2179	Like 2122-2127, no HCl reaction.
2179-2188	Mudstone, silty, medium gray (N5), lacks shale structure, micaceous, no HCl reaction.
2188-2199	Mudstone, silty, medium dark gray (N4), micaceous, lacks shale structure, no HCl reaction.
2199-2209	Like 2188-2199.
2209-2220	Like 2188-2199, with interbedded light gray (N7) siltstone.
2220-2227	Siltstone, argillaceous, medium gray (N5), with shale structure, micaceous, grains mainly quartz, no HCl reaction.
2227-2231	No sample.
2231-2244	Like 2220-2227 with interbed of very light gray (N8), calcareous, silty, mudstone.
2244-2252	Mudstone, silty, medium gray (N5), to medium dark gray (N4), with shale structure, micaceous, no HCl reaction.
2252-2261	Like 2244-2252.

Interval

2261-2271	Like 2244-2252.
2277-2280	Like 2244-2252.
2280-2289	Like 2244-2252.
2289-2301	Like 2244-2252.
2301-2313	Like 2244-2252.
2313-2326	Like 2244-2252.
2326-2339	Like 2244-2252.
2339-2351	Like 2244-2252.
2351-2361	Like 2244-2252, grayish black (N2).
2361-2371	Like 2351-2361, with interbedded light gray (N7), siltstone, micaceous and weak HCl reaction.
2371-2377	Like 2361-2371.
2377-2382	Sandstone, silty, very light gray (N8), micaceous, fine, angular grains, mainly quartz, with sparse black grains, low permeability, slightly HCl reaction.
2383-2387	Like 2377-2382.
2387-2394	Like 2377-2382.
2394-2398	Like 2377-2382.
2398-2404	Mudstone, medium dark gray (N4), slightly silty and micaceous, massive, no HCl reaction.
2404-2410	Siltstone, medium light gray (N6); and interbedded dark gray (N3), mudstone.
2410-2316	Like 2404-2410.
2416-2521	Siltstone, medium light gray (N6), micaceous with carbonaceous films, no HCl reaction.
2421-2431	Mudstone, medium gray (N5), slightly silty with shale structure. No HCl reaction.
2431-2440	Mudstone, silty, medium light gray (N6), micaceous, moderate HCl reaction.
2440-2449	Mudstone silty, dark gray (N3), micaceous with shale structure, few bright coal fragments.

Interval

2449-2458	Like 2440-2449, but lacks coal.
2458-2471	Mudstone, silty, medium dark gray (N4), massive, no HCl reaction.
2471-2472	Like 2458-2471.
2472-2482	Mudstone, like 2458-2471; sandstone; and limestone. Sandstone, light gray (N7), silty, fine, subangular and subrounded grains of quartz; limestone, light olive gray (5Y 6/1), dense, strong HCl reaction, less than 5% of sample.
2482-2492	Like 2472-2482.
2492-2495	(Princeton?) Sandstone, silty, very light gray (N8), calcareous, micaceous, fine-grained, angular and subangular, low permeability, moderate HCl reaction; 20% dark gray mudstone.
2495-2497	Like 2492-2495.
2497-2501	Like 2492-2495, but weak HCl reaction.
2501-2503	Like 2497-2501.
2503-2507	Like 2497-2501.
2507-2509	Like 2497-2501.
2509-2511	Like 2497-2501.
2511-2512	Like 2497-2501.
2512-2514	Like 2497-2501.
2514-2516	Like 2497-2501.
2516-2518	Like 2497-2501.
2518-2521	Like 2497-2501.
2521-2525	Like 2497-2501.
2525-2529	Like 2497-2501.
2529-2533	Like 2497-2501.
2533-2537	Like 2497-2501.
2537-2539	Like 2497-2501.

Interval!

2539-2541	Like 2497-2501.
2541-2544	Like 2497-2501.
2544-2545	Like 2497-2501.
2545-2547	Like 2497-2501.
2547-2548	Like 2497-2501.
2548-2551	Like 2497-2501.
2551-2554	Like 2497-2501.
2554-2555	Like 2497-2501.
2555-2557	Like 2497-2501; 50% black mudstone.
2557-2561	Like 2497-2501; 60%;black mudstone.
2561-2565	Like 2497-2501.
2565-2568	Like 2497-2501.
2568-2570	Like 2497-2501.
2570-2572	Like 2497-2501.
2572-2575	Like 2497-2501.
2575-2578	Like 2497-2501.
2578-2579	Like 2497-2501.
2579-2583	Like 2497-2501.
2583-2586	Like 2497-2501.
2586-2590	Like 2497-2501.
2590-2593	Like 2497-2501.
2593-2596	Like 2497-2501.
2596-2599	Like 2497-2501.
2599-2600	Like 2497-2501.
2600-2602	Like 2497-2501.
2602-2604	Like 2497-2501.

Interval

2604-2608	Like 2497-2501.
2608-2610	Like 2497-2501.
2610-2612	Like 2497-2501.
2612-2617	Like 2497-2501.
2617-2620	Like 2497-2501.
2620-2623	Like 2497-2501.
2623-2624	Like 2497-2501.
2624-2626	Like 2497-2501.
2626-2627	Like 2497-2501.
2627-2629	Like 2497-2501.
2629-2630	Like 2497-2501.
2630-2632	Like 2497-2501.
2631-2634	Like 2497-2501.
2634-2636	Like 2497-2501.
2636-2537	Like 2497-2501.
2637-2638	Like 2497-2501.
2638-2639	Like 2497-2501.
2639-2640	Like 2497-2501.
2640-2643	Like 2497-2501.
2643-2645	Like 2497-2501.
2645-2647	Like 2497-2501.
2647-2649	Like 2497-2501.
2649-2653	(Avis limestone?) Limestone, medium gray to medium dark gray (N4-5), strong to moderate HCl reaction, dense, silty, pyrite nodules present.
2653-2663	Like 2649-2653.
2663-2669	Like 2649-2653.

Interval

- 2669-2677 Like 2649-2653, with fragments of crinoid stems and brachiopods.
- 2686-2693 Like 2649-2653, with fragments of crinoid stems and brachiopods.
- 2693-2702 Like 2649-2653, strong HCl reaction on some pieces.
- 2702-2713 Like 2649-2653.
- 2713-2725 Mudstone, dark reddish brown (10R 3/4), massive, no HCl reaction.
- 2725-2733 Like 2713-2725, 80% of sample; 20% of sample, mudstone, silty, greenish gray (5G 6/1), probably interbedded.
- 2733-2744 Mudstone, dark reddish brown, (10R 3/4), massive, greenish gray (5G 6/1), mottling, no HCl reaction.
- 2743-2755 Like 2733-2744.
- 2755-2762 Mudstone, silty, interbedded grayish red (5R 4/2), 70%; and medium-gray (N5), 30%, massive, no HCl reaction.
- 2762-2772 Like 2755-2762.
- 2772-2780 Mudstone, 70%; and sandstone, 30%; Mudstone, like 2755-2762; and sandstone, silty, very light gray (N8), micaceous, very coarse-grained, no HCl, low permeability.
- 2780-2787 Like 2772-2780.
- 2787-2791 Like 2772-2780.
- 2791-2800 Like 2772-2780.
- 2800-2805 Sandstone, silty, very light gray (N8), fine angular quartz grains with a few black grains and mica flakes, no HCl reaction, low permeability; interbedded grayish red mudstone, (20-30%).
- 2805-2810 Like 2800-2805.
- 2810-2815 Mudstone, 70%; and siltstone, 30% interbedded, dark gray (N3), 50% and grayish red (5R 4/2), 20%, massive mudstone; siltstone, medium gray, micaceous, very weak HCl reaction.
- 2815-2821 Like 2810-2815 with 50% grayish red mudstone; 25% gray mudstone; and 25% siltstone.
- 2821-2829 Mudstone, medium gray (N5), and grayish red (5R 4/2), micaceous, massive, HCl reaction none to moderate.

Interval

2829-2833	Like 2821-2829.
2833-2839	Like 2821-2829.
2839-2849	Like 2821-2829.
2849-2857	Like 2821-2829, shale structure in gray mudstone.
2857-2867	Like 2821-2829.
2868-2870	Siltstone, sandy, pale red (5R 6/2), massive, micaceous, HCl reaction moderate.
2870-2879	Mudstone, grayish red (5R 4/2), massive, slightly calcareous, moderate HCl reaction.
2879-2885	Like 2870-2879.
2885-2896	Mudstone, medium gray (N5), silty, massive, calcareous, moderate HCl reaction.
2896-2901	Mudstone, grayish red (5R 4/2), massive, no HCl reaction.
2901-2905	Like 2896-2901.
2905-2911	Siltstone, greenish gray (5GY 6/1), sandy, micaceous, massive, with weak HCl reaction.
2911-2914	Like 2905-2911.
2914-2918	Like 2905-2911.
2918-2922	Like 2905-2911.
2922-2926	Like 2905-2911, except light gray (N7).
2926-2931	Mudstone, silty, medium gray (N5), micaceous, massive, no HCl reaction.
2931-2936	Siltstone, light gray (N7), sandy, micaceous with weak HCl reaction.
2936-2941	Like 2931-2936.
2941-2946	Like 2931-2936 with 30% interbedded, grayish red massive mudstone.
2946-2950	Like 2931-2936.
2950-2953	Like 2931-2936.

Interval

- 2953-2959 Like 2931-2936.
- 2959-2964 Like 2931-2936.
- 2964-2969 Like 2931-2936, probably interbedded with grayish red mudstone.
- 2969-2973 Like 2931-2936.
- 2973-2977 Like 2931-2936.
- 2977-2984 Mudstone, silty, medium gray (N5), massive, very weak HCl reaction, and interbedded grayish red (5R 4/2) mudstone, massive with slick surfaces.
- 2984-2989 Siltstone, medium gray (N5), massive, very weak HCl reaction, sand and micaceous.
- 2989-2995 Like 2984-2989 with interbedded impure, dense, medium gray limestone, moderate HCl reaction; and grayish red mudstone.
- 2995-3003 Mudstone, medium dark gray (N4), massive, very weak HCl reaction.
- 3003-3013 Limestone, medium dark gray (N4), dense, moderate HCl reaction.
- 3013-3020 Siltstone, medium gray (N5), micaceous, weak HCl reaction.
- 3020-3028 Like 3013-3020.
- 3028-3038 Limestone, and mudstone; limestone, dense, medium dark gray (N4), moderate HCl reaction; mudstone, grayish red (5R 4/2), massive and non-calcareous; and mudstone, massive, medium gray (N5), silty.
- 3038-3047 Like 3028-3038.
- 3047-3055 Mudstone, 80%; and siltstone, 20%. Mudstone, grayish red (5R 4/2) and medium gray (N5), no HCl reaction; massive, red and shaly gray. Siltstone, very light gray (N8), micaceous, sandy, calcareous, moderate HCl reaction.
- 3055-3058 Like 3047-3055.
- 3058-3064 Mudstone, grayish red (5R 4/2) and medium gray (N5); red, massive, and non-calcareous; gray, shaly, silty, and non-calcareous.
- 3064-3079 Mudstone, medium light gray (N6), with shale structure, non-calcareous.

Interval

3079-3090 Like 3064-3079.

3090-3098 Like 3064-3079.

3098-3111 Like 2064-2079.

3111-3121 Mudstone, medium gray (N5), silty, massive, with no HCl reaction; with interbedded dense, gray limestone; pyrite.

3121-3128 Like 3111-3121.

3128-3135 Like 3111-3121 with interbedded grayish red (5R 4/2), calcareous mudstone.

3135-3141 Siltstone, light gray (N7), sandy, micaceous, and calcareous.

3141-3143 Sandstone, silty, light gray (N7), micaceous, calcareous, strong HCl reaction, very fine-grained, mainly subangular quartz, low permeability.

3143-3153 Like 3141-3143.

3153-3163 Mudstone, silty, medium light gray (N6), and grayish red (5R 4/2), weak HCl reaction, shaly structure, in gray mudstone.

3162-3171 Mudstone, medium light gray (N6), shale structure, no HCl reaction.

3171-3177 Mudstone, 80%; and sandstone, 20%; mudstone, medium light gray (N6), silty, massive, no HCl reaction; sandstone, very light gray (N8), silty, very fine-grained, micaceous, non-calcareous, and low permeability.

3177-3181 Like 3171-3177.

3181-3188 Mudstone, 70% medium gray (N5), and 30% grayish red, silty, micaceous, massive, no HCl reaction.

3188-3197 Like 3181-3188.

3197-3205 Like 3181-3188 with gray shaly mudstone and dense red-gray limestone, interbedded.

3205-3210 Like 3197-3205.

3210-3214 Like 3197-3205.

3214-3221 Siltstone, medium light gray and light gray (N6-7), micaceous, with pyrite nodules, no HCl reaction.

Interval

3221-3225	Siltstone, very light gray (N8), sandy with very fine quartz grains and mica flakes, weak to moderate HCl reaction.
3225-3230	Like 3221-3225.
3230-3233	Like 3221-3225.
3233-3237	Like 3221-3225.
3237-3240	Sandstone, silty, very light gray (N8), very fine-grained, micaceous, weak to moderate HCl reaction.
3240-3245	Like 3237-3240.
3245-3250	Like 3237-3240.
3250-3252	Like 3237-3240.
3252-3253	Like 3237-3240 except fine-grained.
3253-3254	Like 3252-3253.
3254-32555	Like 3252-3253.
3255-3260	Like 3252-3253.
3260-3263	Like 3252-3253 with medium light gray (N6) siltstone interbedded.
3263-3270	Like 3260-3263.
3270-3272	Like 3260-3263.
3272-3275	Like 3260-3263.
3275-3281	Siltstone, pale red, (5R 6/2), micaceous, with weak HCl reaction.
3281-3286	Mudstone, medium light gray (N6), massive with weak HCl reaction.
3286-3291	Mudstone, silty, medium dark gray (N4), massive.
3291-3294	Sandstone, silty, very light gray (N8), fine-grained, subangular to rounded grains of quartz with mica flakes, no HCl reaction.
3295-3299	Mudstone, silty, medium light to medium dark gray (N6 to 4), massive, no HCl reaction.

Interval

- 3299-3304 Mudstone, calcareous, silty, medium gray (N5), with shale structure, moderate HCl reaction.
- 3304-3312 Mudstone, silty, medium gray (N5), micaceous, shale structure, 75%; and grayish red (5R 4/2), silty mudstone, non-calcareous and no HCl reaction.
- 3312-3321 Like 3304-3312 with gray siltstone.
- 3321-3331 Like 3304-3312 with gray siltstone.
- 3331-3337 Mudstone, silty, medium gray (N5), massive, no HCl reaction, and medium gray and light gray laminations on some fragments.
- 3337-3339 Sandstone, silty, very light gray (N8), very fine quartz grains, no HCl reaction.
- 3339-3343 Siltstone, light gray (N7), and medium gray (N5), micaceous, no HCl reaction.
- 3343-3353 Like 3339-3343.
- 3353-3355 Like 3339-3343.
- 3355-3356 Sandstone, silty, very light gray (N8), micaceous, very fine-grained, mainly angular quartz, no HCl reaction, low permeability.
- 3356-3359 Like 3355-3356, except light gray (N7).
- 3359-3364 Siltstone, light gray (N6-7), micaceous, no HCl reaction.
- 3364-3370 Like 3359-3364.
- 3370-3373 Sandstone, silty, very light gray, micaceous, fine, angular quartz grains, no HCl reaction.
- 3373-3376 Like 3370-3373.
- 3376-3377 Like 3370-3373.
- 3377-3378 Like 3370-3373.
- 3378-3382 Like 3370-3373.
- 3382-3384 Like 3370-3373.
- 3384-3389 Mudstone, medium dark gray (N4), with shale structure, no HCl reaction.
- 3387-3395 Mudstone, like 3384-3389, except moderate HCl reaction, calcareous in part.

Interval

3395-3404	Like 3384-3389.
3404-3409	Like 3384-3389.
3409-3416	No sample.
3416-3421	Like 3384-3389.
3421-3428	Like 3384-3389.
3428-3434	Like 3384-3389, except calcareous, in part.
3434-3439	Mudstone, 50% and limestone, 40%. Mudstone, like 3384-3389 and interbedded limestone, medium dark gray (N4), dense or very finely crystalline; mottled with light gray.
3439-3445	Like 3434-3439.
3445-3450	Limestone, medium dark gray (N4), mostly dense, but some "oolitic"; "oolites" solid grains--no concentric structure, mottled light gray.
3450-3456	Like 3445-3450.
3456-3459	Like 3450-3456.
3459-3467	Mudstone, silty, medium dark gray (N4), shale structure, calcareous in part, and micro-nodules in some chips. Few chips very light gray, fine-grained sandstone.
3467-3475	Like 3459-3467, but lacks micro-nodules and sandstone.
3475-3489	Like 3467 3475.
3489-3500	Like 3467-3489 with pyrite nodules.
3500-3511	Like 3467-3489.
3511-3519	Like 3467-3489.
3515-3531	Like 3467-3489.
3531-3539	Like 3467-3489.
3539-3546	Like 3467-3489.
3546-3555	Like 3467-3489.
3555-3563	Like 3467-3489, plus crinoid stem.
3563-3573	Like 3467-3489, plus crinoid stem.

Interval

- 3573-3581 Like 3467-3489.
- 3581-3590 Like 3467-3489.
- Started comparing with Eloise T. Jacobsen's log.
- 3590-3598 Like 3467-3489, moderate HCl reaction with crinoid tems.
- 3598@3606 Like 3590-3598.
- 3606-3614 Mudstone, silty; medium dark gray (N4), micaceous, with shale structure; about 20% is calcareous with moderate HCl reaction, fossil fragments.
- 3614-3621 Like 3606-3614.
- 3621-3631 Mudstone, and limestone, about 70% like 3606-3614; and 30% limestone, light gray (N7), very finely crystalline.
- 3631-3637 Mudstone, dark gray (N3), with shale structure, no HCl reaction, none to strong, silty in part and containing fossil fragments.
- 3637-3644 Mudstone, calcareous, medium gray (N5), with shale structure, and sparse fossil fragments, HCl reaction, moderate to strong.
- 3644-3650 Like 3637-3644.
- 3650-3658 Like 3637-3644.
- 3658-3666 Like 3637-3644, medium dark gray (N4).
- 3666-3671 Like 3658-3644.
- 3671-3676 Like 3658-3666.
- 3676-3680 Like 3658-3666, no HCl reaction on some fragments.
- 3680-3692 Like 3658-3666, with abundant crinoid fragments.
- 3692-3700 Like 3658-3666, very crinoidal.
- 3700-3714 Mudstone, calcareous, medium gray (N5), with shale structure, moderate HCl reaction, slightly micaceous.
- 3714-3723 Mudstone, calcareous, medium dark gray (N4), massive, moderate HCl reaction, fossil fragments.
- 3723-3733 Mudstone, medium dark gray (N4), with shale structure, slightly calcareous, weak HCl reaction except for pieces with fossil fragments.

Interval

3733-3743	Like 3723-3733.
3743-3753	Like 3723-3733.
3753-3760	Like 3723-3733.
3760-3762	Like 3723-3733.
3762-3770	Like 3723-3733, with some nodules of calcite?
3770-3773	Like 3723-3733, with some nodules of calcite?, similar to oolites.

Samples examined by JohnWW. Huddle
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