

UNITED PRODUCING COMPANY

United Carbon, Serial number 1-1527.

Location: 3000' south of 37° 15'; 9500' west of 81° 55'

Buchanan County, Virginia

Elevation: Derrick, 2252'

Interval

- 2113-2119 Graywacke, calcareous to very slightly calcareous, light gray (N7), fine-grained, subangular, very poorly sorted, about 65% quartzose, considerable black, gray shale, and green (part chlorite, and part glauconite?) inclusions, medium sized flakes of muscovite (?), moderately well cemented.
- 2119-2130 Shale, medium gray (N5), very finely micaceous.
- 2130-2136 Graywacke, light gray (N7), very fine-grained, approaching siltstone, subrounded, moderately well sorted, about 60% quartzose, brown and gray inclusions, micaceous, moderately well cemented.
- 2136-2140 Graywacke, very light gray (N7.5), very fine-grained, subangular, poorly sorted, about 65% quartzose, considerable green (mostly chlorite?), black and gray (partly shaly) inclusion, very micaceous, moderately well cemented.
- 2140-2152 Graywacke, very fine-grained (approaching fine-grained), as above.
- 2152-2160 Graywacke, fine-grained, very poorly sorted, " .
- 2160-2170 Graywacke, as above, (approaching very fine-grained).
- 2170-2180 Ditto. Very slightly calcareous, to little calcareous.
- 2180-2189 Ditto. Very slightly calcareous, medium fine-grained brownish inclusions.
- 2189-2197 Shale, silty, medium dark gray (N4), micaceous, 60%; shale, partly carbonaceous, medium dark gray (N3.6), part with trace of very finely micaceous material, 35%; coal, high luster, conchoidal fracture, little slightly shaly, 5%.

Interval

- 2197-2203 Graywacke, very fine-grained, light gray (N7), subangular, poorly sorted, about 60% quartzose, very fine-grained black, green, and gray inclusions, micaceous, part very slightly calcareous, moderately well cemented.
- 2203-2210 Graywacke, as above, very poorly sorted (some fine-grained), less green inclusion (part glauconitic?) and larger per cent of dark inclusions, some coarse-grained, few very coarse-grained broken quartz fragments (cavings?).
- 2210-2219 Ditto. Part with calcareous cement, crystalline, some large flakes of muscovite (?).
- 2219-2227 Ditto. Non-calcareous to very slightly calcareous, fine-grained.
- 2227-2229 No sample.
- 2229-2230 Graywacke, very light gray (N8), very fine-grained, subangular to subrounded, moderately well sorted, about 95% quartzose, dark very fine-grained inclusions, slightly micaceous, very few very small clusters.
- 2227-2235 Graywacke, very slightly calcareous, light gray (N6.5), very fine- to fine-grained, subangular, very poorly sorted, about 65% quartzose, dark, gray and very fine-grained green inclusions, micaceous, moderately well cemented.
- 2235-2244 Graywacke, as above, non-calcareous to very slightly calcareous, fine-grained, well cemented, few clusters.
- 2244-2251 Ditto. Some medium-grained size, about 85% quartzose.
- 2251-2256 Ditto.
- 2256-2262 Ditto.
- 2250-2257 (Two sets of samples from same interval).
Shale, silty, medium gray (N5), slightly micaceous.
- 2257-2267 Limestone, brownish gray (5YR 4/1), very finely clastic.
- 2267-2274 Siltstone, medium light gray (N6), very coarse-grained, (approaching very fine-grained graywacke, subrounded, moderately well sorted, about 60% quartzose, dark and small green inclusions, very slightly calcareous, well cemented.
- 2262-2270 (Two sets of samples from same interval).
Graywacke, light gray (N7), fine-grained, subangular, very poorly sorted, about 85% quartzose, dark, gray, and few green inclusions, moderately friable

Interval	
2270-2279	Graywacke, medium light gray (N7), very fine-grained, subangular to subrounded, poorly sorted, about 80% quartzose, dark and little green inclusions, well cemented.
2276-2278	(Two sets of samples from same interval). Graywacke, as above, calcareous, trace of pyrite.
2278-2286	Shale, medium dark gray (N4) micaceous.
2279-2286	Graywacke, very light gray (N8), non-calcareous, as 2276-2278.
2281-2293	Graywacke, as above, non-silty to silty cement, about 75% quartzose.
2293-2300	Graywacke, light gray (N7), very fine-grained, subrounded, moderately well sorted, silty cement, about 80% quartzose, considerable brown and gray inclusions, part shale inclusions, micaceous, moderately well cemented.
2300-2308	Ditto. Some medium-grained partly frosted grains, subangular, very poorly sorted.
2308-2316	Ditto. Part of green inclusions glauconite (?), very few clusters.
2316-2324	Ditto. Fine-grained, some reddish inclusions and chlorite.
2324-2330	Ditto.
2330-2339	Shale, medium dark gray (N4), minute black inclusions.
2339-2348	Graywacke, very light gray (N8), subangular, very poorly sorted (very fine- to coarse-grained), slightly conglomeratic?, about 80% quartzose, considerable green (glauconite?) and little chlorite, black (part shale) inclusions, micaceous.
2348-2357	Shale, medium dark gray (N4), finely micaceous.
2357-2367	Graywacke, as 2339-2348, very slightly calcareous.
2367-2371	Ditto. Non-calcareous.
2371-2381	Ditto. Very slightly calcareous.
2381-2386	No sample.
2386-2392	Graywacke, as above, slightly conglomeratic, some coarse-grained broken quartz fragments.
2392-2400	Ditto. Moderately conglomeratic, some medium-grained rose quartz.

Interval

- 2400-2408 Shale, medium gray (N5), finely micaceous to very finely micaceous, trace brownish gray (5YR 4/1), very finely clastic limestone.
- 2408-2415 Shale, grayish red (10R 4/2), very finely micaceous.
- 2415-2425 Shale, as above, partly calcareous.
- 2425-2435 Limestone, slightly shaly, grayish red (10R 4/2), light brownish gray (5YR 6/1), and brownish gray (5YR 4/1), very finely clastic.
- 2425-2444 Shale, calcareous, medium gray (N5), very finely micaceous.
- 2445-2450 Shale, grayish red (10R 4/2), very finely micaceous.
- 2450-2455 Ditto.
- 2455-2460 Shale, slightly silty, slightly calcareous, medium light gray (N6), finely micaceous.
- 2460-2470 Siltstone, calcareous, medium light gray (N6), coarse-grained, subrounded, moderately well sorted, peppered with dark inclusions, moderately well cemented.
- 2470-2480 Ditto.
- 2480-2490 Shale, very silty to silty, calcareous, medium dark gray (N4), trace micaceous material.
- 2490-2495 Graywacke, calcareous, medium light gray (N6), very fine-grained, subangular to subrounded, poorly sorted, dark shale inclusions, pyrite, peppered with dark and some green inclusions, slightly micaceous, moderately well cemented.
- 2495-2500 Ditto. Light gray (N7).
- 2500-2506 Graywacke, very light gray (N8), non-calcareous, very fine-grained (approaching siltstone), subrounded to subangular, moderately well sorted, silt cement, peppered with brown and black inclusions, slightly micaceous, moderately well cemented.
- 2506-2513 Graywacke, as above, slightly to very slightly calcareous.
- 2513-2520 Ditto. Slightly calcareous.
- 2520-2528 Shale, very silty (part shaly siltstone), medium gray (N5), micaceous.
- 2528-2536 Siltstone, slightly calcareous, to non-calcareous, slightly sandy, medium light gray (N6), coarse-grained, subrounded, dark inclusions, slightly micaceous.

Interval

- 2536-2543 Siltstone, as 2528-2536, very slightly calcareous, light gray (N7).
- 2543-2550 Ditto.
- 2550-2557 Shale, medium dark gray (N4), micaceous.
- 2557-2568 Siltstone, slightly calcareous, light gray (N7), coarse-grained, subrounded, moderately well sorted, peppered with dark inclusions, well cemented.
- 2568-2580 Shale, slightly silty, medium dark gray (N4), micaceous.
- 2580-2589 Siltstone, calcareous, medium light gray (N6), coarse-grained, subrounded, moderately poorly sorted, dark inclusions, micaceous, some fragments showing interbanding with shale as above.
- 2589-2598 Siltstone, as above, non-calcareous, very coarse-grained.
- 2598-2607 Ditto.
- 2607-2616 Ditto. Sandy.
- 2616-2521 Ditto.
- 2621-2626 Shale, dark gray, finely micaceous, 50%; shale, dark grayish purple, with some nodules about 1mm., 25%; shale, grayish red (5R 4/2), trace very finely micaceous material, 10%; gray, as siltstone above, 15%.
- 2626-2670 No sample.
- 2670-2679 Shale, dark gray (N3), slight trace of very finely micaceous material, (resinous shine).
- 2679-2688 Shale, as above, (some medium light gray (N6), finely micaceous shale and grayish red shale cavings (?), small pyritized gastropod.
- 2688-2697 Ditto. (Piece of yellowish gray (5Y 8/1) flint).
- 2697-2700 Graywacke, extremely light gray (N8.5), very fine-grained (approaching siltstone), subrounded, moderately well sorted, silt cement, about 90% quartzose, dark gray and brown inclusions, slightly micaceous, moderately well cemented.
- 2700-2704 Graywacke, as above, to well cemented.
- 2704-2707 Siltstone, medium-grained, as graywacke, above, 75%; shale, grayish red purple (5RP 4/2), trace very finely micaceous material, 10%; shale, very dark dusky purple (5P 1/2), trace very finely micaceous material, 15%.

Interval

- 2707-2710 Graywacke, as siltstone above, 50%; shale, grayish purple (5P 4/2), 15%; grayish purple (5RP 4/2), 10%; shale, very dark dusky purple, as above, 25%.
- 2710-2716 Siltstone, slightly shaly, grayish red (10 R 4/2), medium-grained, subrounded, moderately well sorted, 50%; siltstone, dusky red (10R 3/2), subrounded, moderately well sorted, slightly micaceous, 30%; siltstone, medium light gray (N6), coarse-grained, subrounded, moderately well sorted, slightly micaceous, 20%.
- 2716-2722 Siltstone, as above, very coarse-grained, approaching very fine-grained graywacke.
- 2722-2728 Graywacke, very light gray (N8), very fine-grained, subrounded, moderately well sorted, about 93% quartzose, very fine-grained black and green inclusions, large flakes of muscovite (?), moderately well cemented.
- 2728-2736 Ditto.
- 2736-2740 Ditto, with few laminations of medium light gray (N6), silty, micaceous shale.
- 2740-2745 Ditto.
- 2745-2750 Ditto.
- 2750-2757 Ditto.
- 2757-2767 Shale, silty, medium gray (N5), micaceous.
- 2767-2774 Shale, very sandy, medium light gray (N6).
- 2774-2776 Graywacke, calcareous, light gray (N7), very fine-grained, moderately well sorted, about 90% quartzose, peppered with dark inclusions, moderately well cemented, 80%; limestone, very finely clastic, light brownish gray (5YR 6/1), very slightly shaly 20%.
- 2776-2687 Shale, silty, medium light gray (N6), micaceous.
- 2787-2797 Shale, slightly silty, medium light gray (N6), finely micaceous.
- 2797-2807 Shale, silty, medium light gray (N6), finely micaceous.
- 2807-2821 Shale, silty to non-silty, medium gray (N5), finely micaceous, considerable very light gray (N8), pinkish gray (5YR 8/1), yellowish gray (5Y 8/1), angular chert fragments.
- 2821-2831 Shale, very silty, medium gray (N5), slightly micaceous; coal, shale, 5%.

Interval

- 2831-2845 Shale, medium gray (N5), finely micaceous.
- 2845-2848 Siltstone, slightly calcareous, sandy, medium light gray (N6), subangular, very poorly sorted, considerable green and dark inclusions, slightly micaceous, 80%; limestone, very finely clastic, medium light gray (N6), slightly shaly, 20%; trace dolomite, very shaly, limy, very finely clastic, light brownish gray (YR 6/1), and light olive gray (5Y66/1), hard, trace pyrite.
- 2848-2855 Siltstone, as above,
- 2855-2861 Siltstone, medium gray (N5), non-calcareous, as above.
- 2861-2868 Graywacke, calcareous, medium light gray (N6), very fine-grained, subangular, very poorly sorted, about 80% quartzose, dark inclusions, micaceous, well cemented; trace pyrite.
- 2868-2875 Graywacke, very calcareous.
- 2875-2881 Graywacke, very calcareous, very light gray (N8), fine-grained, subangular, very poorly sorted, about 90% quartzose, dark and small green inclusions, moderately well cemented; considerable pyrite.
- 2881-2886 Limestone, medium clastice with finely clastic matrix, medium light gray (N6), very slightly shaly, fossiliferous (fragments of macrofossils), few pieces showing contact with very calcareous graywacke, 80%; limestone, very finely clastic, very light gray (N8), slightly crinoidal, 20%.
- 2886-2889 Graywacke, very light gray (N8.5), calcareous, very fine-grained, subangular, moderately well sorted, very few small cluster, about 95% quartzose, few brown inclusions.
- 2889-2891 Ditto.
- 2891-2893 Graywacke, very light gray (N8.5), fine-grained, subangular, moderately poorly sorted, very slightly calcareous, about 95% quartzose, gray and black very fine-grained inclusions, few clusters, moderately well cemented, iron staining probably from bit.
- 2893-2897 Graywacke, as above, non-calcareous, approaching quartzose sandstone, few small clusters.
- 2897-2900 Ditto.
- 2900-2901 Ditto. Very poorly sorted.
- 2900-2902 Ditto. Very fine-grained, very few clusters.

Interval

2902-2904	Graywacke, as 2900-2902, fine-grained, few small clusters, considerable staining, probably from bit.
2904-2909	Ditto. Very few very small clusters, little staining.
2909-2912	Ditto.
2912-2914	Ditto. Few small clusters, considerable staining (bit?); moderately well cemented to moderately friable.
2914-2918	Ditto.
2918-2921	Ditto.
2921-2925	Ditto. More clusters.
2925-2927	Ditto. Few small clusters.
2927-2929	Ditto. (approaching very fine-grained).
2929-2932	Ditto, more very small clusters and more staining (bit?).
2932-2935	Ditto. White (N9), very fine-grained, some very fine-grained green inclusions.
2935-2938	Ditto. Fine-grained, some large clusters.
2938-2940	Ditto.
2940-2943	Ditto, few small clusters.
2943-2846	Ditto, very few very small clusters, little staining.
2946-2947	Ditto, very fine-grained, very slightly peppered with dark inclusions, very few clusters, approaching quartzose sandstone.
2947-2949	Ditto.
2949-2951	Ditto. One fine-grained rose colored inclusion noted.
2951-2953	Ditto, calcareous, fine-grained, very few small clusters.
2953-2955	Ditto, slightly calcareous, very few very small clusters.
2955-2957	Ditto, non-calcareous, very poorly sorted with some approaching medium-grained, few small clusters, more dark inclusions, much iron staining (bit?).
2957-2960	Ditto.
2960-2962	Ditto.

Interval

- 2962-2964 Ditto. About 90% quartzose, considerable dark and green very fine-grained inclusions and pepperings, part chlorite, very slightly calcareous, more clusters, moderately friable, considerable staining (bit?).
- 2964-2967 Ditto. Fewer clusters, trace crystal of pyrite.
- 2967-2971 Ditto. Very fine-grained, very fine-grained inclusions, more clusters, moderately well cemented, trace pyrite.
- 2971-2976 Graywacke, as above, calcareous, considerable, brownish and some green and gray inclusions, with at least one lamination of pyrite and interbeds of medium dark gray (N4), very calcareous graywacke, medium dark gray (N4), clastic limestone, medium dark gray (N4), finely micaceous slightly silty shale.
- 2976-2979 Graywacke, as above, very slightly calcareous, predominantly clustered, moderately well cemented to moderately friable, 80%; interbedded (?) with graywacke, medium light gray (N6), very fine-grained, subangular, poorly sorted, silt cement, about 80% quartzose, dark inclusions, well cemented.
- 2979-2984 Graywacke, as above, and interbedded with medium gray (N5), finely micaceous shale.
- 2982-2988 Shale, medium pale grayish purple (5P 5/2) $\frac{7}{8}$ few pieces silty, trace very finely micaceous material, 50%; graywacke, as above, very poorly sorted, considerable coarse-grained quartz, about 85% quartzose, 50%.
- 2988-2994 Shale, as above, part of shale very slightly calcareous, graywacke, slightly calcareous.
- 2994-3004 Limestone, very shaly, approaching calcareous shale, medium dark gray (N4), fossiliferous (fragments of macrofossils), 90%; limestone, clastic, light brownish gray (N5YR 6/1), slightly mottled with very light gray (N8) limestone, slightly fossiliferous (macrofossil fragments), 10%; very slight trace of pyrite.
- 3004-3011 Limestone, as above, medium dark gray shaly limestone, non-fossiliferous, 85%; brownish gray and very light gray limestone, slightly crinoidal, 15%; trace pyrite.
- 3011-3018 Limestone, as above, medium dark gray, slightly crinoidal, 95%; brownish gray and very light gray limestone, slightly crinoidal, 5%.
- 3018-3025 Ditto. Medium dark gray, slightly mottled with light gray, no crinoid fragments noted.
- 3025-3032 Ditto. Slightly shaly, part approaching medium clastic, trace megafossil fragments and crinoids.

Interval

- 3032-3038 Ditto. Shaly, clastic.
- 3038-3046 Ditto. Slightly fossiliferous, fragments of megafossils. to slightly crinoidal, slightly mottled with very light gray limestone, hard.
- 3046-3057 Shale, grayish red (10R 4/2), trace finely micaceous matter, 75%; shale, dark greenish gray (50Y 4/1), very slightly calcareous, trace very finely micaceous matter, part with dark nodules, 25%.
- 3057-3068 Shale, grayish red, as above, 90%; chert, very light gray (N8), yellowish gray (5Y 8/1), pinkish gray (5YR 8/1), dark yellowish orange (10YR 6/6), broken, angular to coarse-grained size.
- 3068-3073 Ditto.
- 3073-3085 Shale, grayish red, as above.
- 3085-3089 Siltstone, sandy, greenish gray (5GY 6/1), subrounded, coarse-grained, poorly sorted, peppered with dark inclusions, slightly micaceous, 70%; siltstone, pale red (10R 6/2), coarse-grained (approaching very fine-grained graywacke), subrounded, poorly sorted, 10%; shale, dark greenish gray (5GY 4/1), very finely micaceous, part with dark nodules, 20%.
- 3089-3100 Shale, grayish red (5R 4/2), slightly trace of micaceous matter.
- 3100-3109 Shale, very silty, grayish red (10R 4/2), micaceous, moderately well cemented, 40%; siltstone, shaly, grayish red (5R 4/2), poorly sorted, micaceous, moderately well cemented, 40%; siltstone, shaly, greenish gray (5GY 6/1), very slightly calcareous, very poorly sorted, micaceous, moderately well cemented, 20%.
- 3109-3114 Siltstone, sandy (approaching very fine-grained graywacke), grayish red, very slightly calcareous, as above, 50%; shale, grayish red (10R 4/2), resinous luster, slightly trace very finely micaceous material, 50%.
- 3114-3119 No sample.
- 3119-3122 Limestone, oolitic, medium light gray (N6), very finely clastic matrix, oolites darker in color and 2/3 mm. in diameter, 20%; limestone, clastic, very light gray, small percent crystalline, very slightly oolitic, 15%; shale, very dusky red (10R 2/2), very finely micaceous, 50%; limestone, clastic, medium gray (N5), 10%; graywacke, calcareous, very light gray (N8), subangular, very poorly sorted, moderately friable, 5%.

Interval

- 3122-3125 Shale, grayish red (10R 4/2), very micaceous, 70%; shale, calcareous, medium light grayish red (5R 5/2), 15%; limestone, pale red (5R 6/2), clastic, 10%; dolomite, shaly, limy, very finely crystalline, pale red (5R 6/2), 5%.
- 3125-3130 Siltstone, calcareous, pale red (5R 6/2), subrounded, poorly sorted, dark peppered, 75%; shale, grayish red (10R 4/2), finely micaceous, 25%, trace medium gray (N5), shale.
- 3130-3135 Shale, medium gray (N5), very slightly calcareous, finely micaceous, 40%; shale, slightly silty, dark gray (N3), very slightly calcareous, micaceous, 30%; shale, dark reddish brown (10R 3/4), very finely micaceous, 20%.
- 3135-3143 Siltstone, slightly calcareous, medium red (5R 5/2), coarse-grained, very poorly sorted, 40%; shale, grayish red (10R 4/2), very slightly calcareous, very micaceous, 30%; shale, medium dark gray (N4), calcareous to non-calcareous, micaceous, 30%.
- 3143-3150 Shale, grayish red (10R 4/2), trace very finely micaceous material, resinous luster, 80%; limestone, very shaly, very finely clastic, medium red (10R 5/2), 10%; limestone, very shaly, very finely clastic, light gray to medium light gray (N7-6), 10%.
- 3150-3160 Shale, calcareous, medium gray (N5), 50%; limestone, medium gray and medium dark gray (N5-4), finely clastic, 25%; shale, slightly to very slightly silty, grayish red (10R 4/2), micaceous, 25%.
- 3160-3170 Shale, silty, slightly calcareous, grayish red (10R 4/2), with interbedded (?) limestone (10%), finely clastic, medium red (10R 5/2), very slightly shaly.
- 3170-3180 Siltstone, slightly calcareous to calcareous, slightly sandy, medium light gray (N6), coarse-grained, poorly sorted, slightly micaceous; trace pyrite.
- 3180-3190 Limestone, very shaly, medium dark gray (N4), very finely clastic, 50%; shale, very calcareous, medium dark gray (N4), 50%. Trace pyrite.
- 3190-3200 Shale, medium dark gray (N4), very slightly calcareous, very finely micaceous, 50%; coal, shaly, 10%; siltstone, sandy, calcareous, medium light gray (N6), poorly sorted, micaceous, 30%; shale, dark grayish red (10R 3.5/2), trace very finely micaceous material, 10%.

Interval

- 3200-3210 Shale, dusky red (1OR 2.5/2).
- 3210-3220 Shale, medium gray (N5), micaceous, 50%; shale, silty, grayish red (1OR 4/2), slightly to very slightly calcareous, 40%; limestone, very shaly, very finely clastic, grayish red (1OR 4/2), 10%.
- 3220-3230 Shale, silty, calcareous, grayish red (1OR 4/2), micaceous, slightly fissile.
- 3230-3240 Shale, dark grayish red (1OR 3.5/2), very slightly calcareous, micaceous; few pieces show contact with medium light gray (N6), and medium gray (N5), micaceous shale, probably thin lenses (5% of sample).
- 3240-3250 Shale, medium gray (N5), very slightly calcareous, finely micaceous, slightly fissile, 50%; and shale, silty, grayish red (5R 3.5/2), very slightly calcareous, micaceous, 50%.
- 3250-3256 Shale, silty, grayish red, as above, 50%; and shale, grayish red (1OR 4/2), very finely micaceous, 50%.
- 3256-3260 Graywacke, very light gray (N8), very fine-grained, sub-rounded to subangular, poorly sorted, silt cement, about 80% quartzose, peppered with dark inclusions, slightly micaceous, very small clusters.
- 3260-3265 Ditto.
- 3265-3270 Ditto, strongly peppered with green and some dark inclusions, very slightly calcareous, larger clusters, more micaceous, moderately well cemented.
- 3270-3275 Ditto.
- 3275-3279 Ditto, with approximately equal green and dark pepperings, about 85% quartzose, very small clusters.
- 3279-3283 Ditto.
- 3283-3292 Shale, medium gray (N5), some dark gray (N3), very finely micaceous, slightly fissile, 60%; shale, dusky red purple (5RP 3/2), trace very finely micaceous material, 25%; shale, grayish red (1OR 4/2), resinous luster, 15%.
- 3292-3296 Shale, silty, brownish medium gray (5YRN 5/1), about 50%; shale, dark greenish gray (5GY 4/1), resinous luster, about 50%.

Interval

- 3296-3300 Shale, grayish purple (5P 4/2), to light grayish purple (5P 4,5/2), trace very finely micaceous material, dark inclusions, 50%; graywacke, medium light gray (N6), very fine-grained, subangular, very poorly sorted, about 75% to 85% quartzose, dark and green inclusions, slightly micaceous, moderately friable to moderately well cemented, 50%.
- 3300-3303 Graywacke, as above very few to very small clusters.
- 3303-3307 Graywacke, as above.
- 3307-3312 Siltstone, very light gray, medium-grained, subangular to subrounded, poorly sorted, 40%; shale, silty, medium light gray (N6), slightly micaceous, 30%; shale, medium gray (N5), finely micaceous, 20%; shale, medium dark gray (N4), trace very finely micaceous material, 10%.
- 3312-3314 Graywacke, very light gray (N8.5), very fine-grained, subangular, poorly sorted, about 25% quartzose, dark inclusions, very slightly micaceous, moderately friable, 60%; graywacke, greenish gray (5GY 6/1), very fine-grained, subangular, poorly sorted, about 85% quartzose, dark and green inclusions, slightly micaceous, moderately well cemented, 40%.
- 3314-3317 Graywacke, very light gray, as above, some moderately well cemented.
- 3317-3322 Graywacke, as above, small clusters.
- 3322-3327 Shale, medium gray (N5.5), resinous luster, 50%; shale, slightly silty, medium gray (N4.5), very finely micaceous, 50%.
- 3327-3333 Siltstone, light gray (N7), fine-grained, subrounded, moderately well sorted, peppered with dark inclusions, 50%; siltstone, greenish gray (N5GY 6/1), medium-grained as light gray siltstone, 50%.
- 3333-3339 Shale, silty, grayish red (10R 4/2), finely micaceous.
- 3339-3345 Shale, slightly calcareous, grayish purple (5P 4/2), trace very finely micaceous material; about 10% yellowish gray chert (5Y 8/1), part freshly broken and part appearing weathered.
- 3345-3351 Shale, medium gray (N5), slightly trace very finely micaceous material.

Interval

- 3351-3358 Limestone, medium light gray (N6), and light brownish gray (5YR 6/1), very finely clastic, some mottling by very light gray limestone, part medium clastic, slightly oolitic (1/2 mm. in diameter).
- 3358-3362 Graywacke, very light gray (N8.5), very fine-grained (approaching siltstone), subrounded, poorly sorted, about 90% quartzose, dark inclusions, very slightly micaceous, moderately friable to moderately well cemented, 60%; siltstone, medium dark greenish gray (50GY 5/1), fine-grained, subrounded, poorly sorted, part shaly, 40%.
- 3369-3366 Graywacke, very light gray, as above, about 95% quartzose, very small clusters.
- 3366-3369 Graywacke, as above, very fine-grained.
- 3369-3372 Ditto.
- 3372-3373 Ditto.
- 3373-3376 Ditto.
- 3376-3379 Ditto.
- 3379-3381 Ditto.
- 3381-3382 Ditto.
- 3382-3388 Siltstone, medium light gray (N6), coarse-grained to medium-grained, some black peppering, well cemented, some pieces showing contact with shale, 70%; shale, silty, medium dark gray (N4.5), finely micaceous, 30%.
- 3388-3392 Graywacke, white (N8.8), very fine-grained subangular, very poorly sorted, about 92% quartzose, green and dark peppering, trace red inclusions, moderately well cemented.
- 3392-3397 Shale, dark gray (N3), trace very finely micaceous material.
- 3397-3404 Shale, dark greenish gray (5GY 4/1), trace very finely micaceous material, 55%; siltstone, shaley, greenish gray (5GY 6.1), fine-grained, poorly sorted, slightly micaceous, 30%; limestone, shaly, medium dark gray (N4), very finely clastic, 5%; shale, medium dark gray (N4), very slightly calcareous, 5%; shale, dark reddish brown (10R 3/4), resinous luster, 5%; trace pyrite.

Interval

- 3404-3410 Shale, dark grayish red (5R 3/2), trace finely micaceous material, 75%; siltstone, slightly sandy, greenish gray (5GY 6/1), very slightly calcareous, medium-grained, to coarse-grained, poorly sorted, slightly micaceous, 25%.
- 3410-3416 Shale, blackish red (5R 2.5/2), trace micaceous, 65%; shale, medium dark gray (N4), very finely micaceous, 35%.
- 3414-3419 Graywacke, calcareous, greenish gray (5GYN 6/1), very fine-grained, subangular, very poorly sorted, about 75% quartzose, considerable green and some dark inclusions, slightly micaceous, 70%; shale, dark reddish brown (10R 3/4), resinous luster, extremely finely micaceous with few larger mica flakes, 30%.
- 3419-3424 Shale, medium dark gray (N4), trace very finely micaceous material.
- 3424-3433 Shale, dark gray (N3), trace very finely micaceous material, very slightly fissile.
- 3433-3441 Ditto.
- 3441-3450 Shale, medium dark gray (N4), part slightly calcareous, very slightly micaceous; trace shaly dark gray (N3), finely clastic limestone, pyrite, and splintery coal.
- 3450-3460 Shale, medium gray (N5), part very slightly silty, considerable very fine-grained to silt sized black inclusions.
- 3460-3470 Shale, dark greenish gray (5GY 4/1), few dark gray inclusions, 50%; shale, dark gray (N3), very finely micaceous, 50% considerable yellowish gray (5Y 8/1) and some light gray (N7), and trace purple angular chert fragments, few pieces apparently weathered; considerable pyrite.
- 3470-3480 Shale, slightly calcareous, medium red (5R 5/2), little very slightly silty, very finely micaceous, part mottled with medium light gray (N6), 60%; shale, slightly silty to silty, slightly calcareous, medium light gray (N6), some dark inclusions, trace very finely micaceous material, 40%.
- 3480-3487 Siltstone, medium light gray (N6), part sandy, fine-grained, very poorly sorted, dark inclusions, well cemented, micaceous 60%; shale, medium brownish gray (5YR 5/1), very finely micaceous, 20%; shale, medium dark gray (N4), trace very finely micaceous material 20%; trace pyrite and light olive gray limy dolomite.

<u>Interval</u>	
3487-3496	Shale, medium light gray (N6), very slightly calcareous, slight trace of mica, 50%; shale, brownish gray (5YR 4/1), very slightly calcareous, trace very finely micaceous material, 50%.
3496-3500	Shale, medium gray (N5), part silty, trace very finely micaceous material.
3500-3506	Siltstone, medium light gray, medium-grained to very coarse-grained (approaching very fine-grained graywacke), subangular, very poorly sorted, dark inclusions, micaceous, moderately friable to very well cemented, 80%; graywacke, calcareous, very light gray (N8.5), very fine-grained (approaching siltstone, subangular, poorly sorted, about 90% quartzose, dark, very fine-grained, peppered inclusions, 20%.)
3506-3512	Graywacke, as above, non-calcareous, 30%; shale, dark gray to medium dark gray (N3-4), very finely micaceous, 60%; chert, yellowish gray (5Y 8/1), and light gray to very light gray (N7-8), angular with some apparently weathered, 10%; considerable pyrite.
3512-3518	Shale, slightly silty to silty, medium gray (N5.5), 90%; Shale, carbonaceous, dark gray (N3), 10%.
3518-3523	Siltstone, very light gray (N8), very coarse-grained (approaching very fine-grained graywacke), subangular to subrounded, poorly sorted, about 90% quartzose, considerable black and some green inclusions, well cemented; trace pyrite.
3524-3530	Ditto.
3530-3528	Shale, grayish purple (5NP 4/2), very finely micaceous, 60%; shale, dark reddish brown (10R 3/4), trace very finely micaceous material resinous luster, 40%; trace light brownish gray (5YR 6/1), very limy shale.
3538-3548	Shale, silty to some non-silty, medium light gray (N6), very finely micaceous.
3548-3560	Graywacke, slightly calcareous, white (N8.8), very fine-grained, subangular to subrounded, poorly sorted, about 95% quartzose, dark and black inclusions, well cemented.
3560-3565	Graywacke, as above, very well cemented to some moderately friable.
3565-3571	Graywacke, as above, calcareous, fine-grained (approaching very fine-grained).

Interval

- 3571-3575 Shale, slightly silty to very silty, medium dark gray (N4), 70%; siltstone, sandy, medium gray (N5), coarse-grained, very poorly sorted, 30%; considerable pyrite.
- 3575-3581 Siltstone, medium light gray (N4), as above, 50%; siltstone, very light gray (N8.5), very coarse-grained, moderately well sorted, about 90% quartzose, black inclusions, very well cemented.
- 3581-3585 Siltstone, very light gray, as above, slightly micaceous, moderately well cemented.
- 3585-3589 Graywacke, very fine-grained, as siltstone above, moderately well cemented to moderately friable, very few very small cluster.
- 3589-3593 Graywacke, as above, more subangular grains, part slightly calcareous, poorer sorting.
- 3593-3597 Ditto. Fine-grained, non-calcareous.
- 3597-3600 Ditto. Very few, very small clusters.
- 3600-3601 Graywacke, white (N9), very small clusters show very few inclusions, approaching quartz sandstone (many small bit fragments).
- 3601-3603 Ditto.
- 3603-3605 Ditto. Some iron staining (bit?).
- 3605-3606 Ditto.
- 3606-3607 Ditto. Some green inclusions noted and few medium-grained quartz, no staining.
- 3607-3609 Ditto. No medium-grained quartz noted.
- 3609-3612 Ditto. Very fine-grained.
- 3612-3613 Ditto. Poorly sorted.
- 3613-3616 Ditto. Better sorting, considerable silt size.
- 3616-3615 Siltstone, as above.
- 3616-3618 Graywacke, white (N8.8), very fine-grained, as above, few clusters about 95% quartzose, non-calcareous, moderately well sorted, moderately friable.
- 3618-3620 Graywacke, as above, less clustered, fine- to fine-grained quartz, about 3%; chert, yellowish gray (5Y 8/1), some broken and angular, and some weathered appearing, little iron staining.

Interval

- 3620-3625 Graywacke, as above, small clusters, peppered with dark inclusions.
- 3625-3627 Siltstone, as above, very few very small clusters.
- 3627-3629 Graywacke, as above, very fine-grained, very poorly sorted, part clustered, moderately well cemented, moderately friable, considerable iron staining.
- 3629-3630 Graywacke, as above, fewer clusters, less peppering with dark inclusions, nonstaining.
- 3630-3633 Shale, calcareous to non-calcareous, medium gray to medium dark gray (N5-4), very finely micaceous.
- 3633-3542 Shale, silty to slightly silty, medium gray (N5), micaceous.
- 3642-3650 Ditto.
- 3650-3653 No sample.
- 3653-3655 Siltstone, medium light gray to light gray (N6-7), medium-grained to coarse-grained, subrounded, poorly sorted, slightly micaceous.
- 3655-3660 Shale, slightly calcareous to very slightly calcareous, medium gray (N5).
- 3660-3668 Shale, medium dark gray (N4), very slightly calcareous, trace very finely micaceous material.
- 3668-3675 Shale, as above, slightly calcareous to calcareous.
- 3675-3685 Ditto. Slightly calcareous to non-calcareous.
- 3685-3687 Ditto. Non-calcareous.
- 3687-3689 Graywacke, very light gray (N8), very fine-grained, subangular, very poorly sorted, about 85% quartzose, peppered with dark inclusions, moderately well cemented, few very coarse-grained angular broken quartz fragments.
- 3689-3691 Graywacke, as above, subangular to subrounded, slightly micaceous, moderately well cemented to well cemented, quartz grains loose.
- 3691-3695 Shale, medium gray, trace very finely micaceous material, 60%; shale, very silty, medium gray (N5), very finely micaceous, 40%.

Interval

- 3695-3696 Graywacke, light gray to white (N7-9), very fine-grained, subrounded to subangular, very poorly sorted, considerable silt cement, about 85% quartzose, well cemented, 75%; shale, medium dark gray (N4), trace very finely micaceous material, 25%.
- 3696-3699 Graywacke, white (N9), as above.
- 3699-3794 Shale, medium dark gray (N4), trace very finely micaceous material.
- 3704-3705 Shale, as above.
- 3705-3707 Graywacke, white (N8.8), very fine-grained, (approaching fine-grained), subangular to subrounded, moderately well sorted, about 95% quartzose, very fine-grained black and brown inclusions, mostly loose grains, moderately well cemented to moderately friable.
- 3707-3711 Graywacke, about 1/2 loose grains, as above.
- 3711-3714 Graywacke, as above, mostly loose grains.
- 3714-3717 Ditto. Very poorly sorted, fine-grained and few angular medium-grained quartz, about 90% quartzose.
- 3717-3719 Ditto. Fine-grained, no medium-grained quartz noted.
- 3719-3721 Ditto, very fine-grained, few clusters, very well cemented to moderately well cemented.
- 3721-3722 Ditto.
- 3722-3726 Shale, medium light gray (N6), coarse-grained, green and dark gray inclusions slightly micaceous, moderately well cemented.
- 3726-3733 Shale, very silty, medium gray (N5), micaceous, 40%; shale, silty to slightly silty, medium gray (N5), finely micaceous, 40%; shale, medium dark gray (N4), trace very finely micaceous material, 20%.
- 3733-3742 Shale, medium dark gray (N4), trace very finely micaceous material.
- 3742-3747 Limestone, shaly, medium dark gray (N4), 80%; limestone, shaly, finely clastic, medium gray to light gray (N5-7).
- 3747-3752 Siltstone, slightly calcareous, medium light gray (N6), medium-grained to very coarse-grained, slightly micaceous, very well cemented.

Interval

- 3752-3757 Siltstone, as above.
- 3757-3764 Shale, medium dark gray (N4), trace very finely micaceous material.
- 3764-3770 Shale, medium gray (N5), very slightly silty, very slightly calcareous, very finely micaceous.
- 3770-3777 Shale, medium dark gray (N4), very finely micaceous.
- 3777-3783 Shale, trace calcareous material, slightly fissile.
- 3783-3790 Limestone, shale, medium dark gray (N4), finely clastic, part approaching medium clastic.
- 3790-3792 Shale, medium dark gray (N4), very slightly calcareous, very finely micaceous, trace macrofossil.
- 3792-3796 Limestone, medium clastic, medium gray (N5), oolitic (1/3 mm. in diameter), very slightly shaly, 50%; limestone, shaley, medium light gray (N6), very finely clastic, 50%.
- 3796-3801 Shale, calcareous to very calcareous, medium light gray (N6).
- 3801-3806 Limestone, medium dark gray (N4), to medium gray (N5), finely clastic, very slightly shaly.
- 3806-3912 Limestone, very shaly, medium light gray (N6), very finely clastic.
- 3912-3817 Limestone, as above, medium-grained.
- 3817-3822 Shale, medium dark gray (N4), trace very finely micaceous material.
- 3822-3829 Limestone, shaly, medium gray (N5), finely clastic.
- 3829-3835 Graywacke, very light gray (N8), very fine-grained, subangular to subrounded, moderately well sorted, about 92% quartzose, slightly peppered with dark and brown inclusions slightly micaceous, moderately well cemented to well cemented.
- 3835-3840 Siltstone, medium gray (N5), little partly shaly, very slightly micaceous, well cemented, 50%; shale, medium gray (N5), non-silty to silty, micaceous, 50%.
- 3840-3844 Shale, medium dark gray (N4.5), very slightly silty, finely micaceous.

Interval

- 3844-3855 Shale, as above, non-silty, very finely micaceous, part very slightly fissile.
- 3855-3860 Graywacke, very light gray (N8), very fine-grained, very slightly calcareous, subangular to subrounded, moderately well sorted, about 95% quartzose, slightly peppered with dark inclusions, 50%; siltstone, medium light gray (N6), medium-grained, slightly micaceous, very well cemented, 50%.
- 3860-3866 Graywacke, trace pyrite.
- 3866-3870 Shale, silty to non-silty, medium dark gray (N4), micaceous, very hard, slightly fissile.
- 3870-3880 Shale, as above, medium gray (N5), non-silty.
- 3880-3886 Shale, medium dark gray (N3.8), very finely micaceous, very small fragments, moderately soft.
- 3886-3895 Shale, medium dark gray (N4.2), trace very finely micaceous material, very hard, slightly fissile.
- 3895-3904 Shale, medium gray (N5), very finely micaceous, very slightly fissile, moderately hard.
- 3904-3915 Shale, medium gray (N5), part very slightly calcareous, trace very finely micaceous material, moderately hard to hard, very slightly fissile.
- 3915-3925 Shale, medium dark gray (N4), very slightly calcareous, very finely micaceous; with possible streak of medium dark gray (N4), finely clastic, very slightly shaly, slightly crinoidal limestone.
- 3925-3930 Shale, calcareous, very slightly silty, medium dark gray (N4), micaceous, fossiliferous (crinoids and gastropods); trace pyrite.
- 3930-3936 Shale, as above, very calcareous (approaching limestone), crinoids and trace of macrofossil fragments.
- 3936-3941 Shale, as above, some of shale showing contact with finely clastic, medium dark gray (N4), very slightly shaly limestone.
- 3941-3951 Limestone, medium gray (N5), finely clastic, very slightly shaly, fossiliferous, (crinoidal, gastropods, fish scale?).

Interval

- 3951-3961 Shale, medium gray (N5), very slightly calcareous, to slightly calcareous.
- 3961-3972 Limestone, medium light gray to medium dark gray (N6-4), finely clastic, very few very coarsely crystalline pieces, very slightly shaly, fossiliferous (macro-fossil fragments and foraminifera?); trace pyrite.
- 3972-3977 Limestone, as above, crinoidal.
- 3977-3982 Limestone, slightly shaly, medium dark gray (N4), very finely clastic.
- 3982-3987 Limestone, medium dark gray (N3.5), very slightly shaly.
- 3987-3998 Shale, medium gray (N5), non-calcareous to some calcareous, very finely micaceous.
- 3998-4003 Shale, calcareous, medium dark gray (N4.5), trace very finely micaceous material.
- 4003-4012 Shale, medium gray (N5), very slightly calcareous, finely micaceous, slightly fissile.
- 4012-4018 Limestone, slightly shaly, medium dark gray (N4), somewhat mottled with light gray, finely clastic to some very finely clastic, very few pieces very coarsely crystalline, very small pieces.
- 4018-4023 Limestone, shaly, larger fragments.
- 4023-4029 Limestone, shaly medium gray (N5), very finely clastic.
- 4029-4036 Limestone, as above, medium dark gray (N4),; trace coarsely crystalline light gray (N6), limestone.
- 4036-4040 Limestone, brownish gray (N5YR 4/1), slightly mottled, with light gray, medium clastic, few pieces coarsely crystalline, some nodular inclusions, slightly crinoidal, very slightly oolitic (?), very slightly shaly.
- 4040-4048 Limestone, as above, no oolites (?) noted, more coarsely crystalline pieces.
- 4048-4054 Ditto.
- 4054-4066 Shale, calcareous to very slightly calcareous, medium gray (N5), very finely micaceous, very slightly fissile; trace pyrite.

Interval

- 4066-4076 Shale, as above, slightly calcareous to very slightly calcareous.
- 4076-3086 Shale, as above.
- 4086-4091 Limestone, slightly shaly, brownish gray (N55YR 4/1), medium clastic, with few coarsely crystalline light gray pieces, crinoidal.
- 4091-4098 Limestone, as above, more mottled with light gray and slightly more coarsely crystalline pieces, trace bryozoan smaller fragments.
- 4098-4101 Ditto.
- 4101-4110 Shale, calcareous, slightly calcareous, medium dark gray (N4.5), very finely micaceous.
- 4110-4115 Shale, calcareous to very calcareous (approaching limestone), dark gray (N3.5), trace very finely micaceous material.
- 4115-4123 Limestone, shaly, medium dark gray (N4), with some mottling with light gray, finely crystalline.
- 4123-4128 Limestone, medium dark gray (N4), medium crystalline, some mottling with light gray nodules and very few colites, trace very coarsely crystalline limestone, very slightly crinoidal; very slightly shaly.
- 4128-4133 Shale, medium gray (N5), very slightly calcareous, very slightly micaceous.
- 4133-4138 Limestone, medium dark gray (N4), slightly mottled with light gray, medium clastic to some coarsely clastic, slightly oolitic, very slightly crinoidal, very slightly shaly.
- 4138-4144 Limestone, as above, considerable mottling with light gray.
- 4144-4157 Shale, very calcareous, dark gray (N3), very finely micaceous.
- 4151-4158 Limestone, medium dark gray (N4), considerable mottling, with light gray (N7), medium crystalline, fossiliferous, crinoidal and bryozoan, some coarsely crystalline light gray fragments.
- 4158-4165 Shale, calcareous to very calcareous, dark gray (N3), slightly crinoidal, very slightly micaceous.

Interval

4165-4170 Same as 4158-4165.

4170-4180 Ditto.

4180-4194 Shale, very calcareous, medium dark gray (N4), finely micaceous.

4194-4201 Limestone, shale, medium dark gray (N4), finely clastic, slightly mottled with light gray limestone.

4201-4208 Ditto.

4208-4214 Limestone, medium dark gray (N4), medium clastic to finely clastic, oolitic, slightly oolitic (diameter to 1 mm.), oolites medium dark gray, slightly mottled with light gray.

4214-4220 Limestone, as above, medium brownish gray (5YR 5/1), very oolitic (1 mm. in diameter and contrasting).

4220-4226 Limestone, light brownish gray (5YR 6/1), very finely clastic, very slightly shaly, 80%; limestone, white (N9), very finely clastic, 20%.

4226-4232 Limestone, as above, medium brownish gray (N5YR 5/1).

4232-4235 Limestone, as above, 85%; limestone, white, (N9), very finely clastic and coarsely crystalline 15%.

4235-4240 Ditto. Dark brownish gray (N5 YR 3/1), 85%; white limestone, 15%.

4240-4245 Ditto. Very slightly mottled with light gray.

4245-4251 Limestone, dark brownish gray (N 5YR 3/1), finely clastic to medium clastic, slightly mottled with light gray, very slightly shaly.

4251-4257 Limestone, medium light gray (N6), to medium gray (N5), very finely clastic, slightly mottled with light gray.

4257-4263 Ditto.

4263-4268 Ditto.

4268-4273 Ditto. Cherty, angular some very coarse-grained size, light brownish gray (5YR 6/1) chert fragments, some light brownish gray very finely clastic limestone.

4273-4278 Limestone, light brownish gray (5YR 6/1), very finely clastic, slightly cherty, as above.

Interval

4278-4283	Limestone, same as in sample 4273-4278.
4283-4291	Limestone, medium dark gray (N4), slightly mottled with light gray, medium clastic, slightly oolitic (1/2 to 2/3 mm. in diameter).
4291-4300	Ditto. Moderately oolitic.
4300-4305	Ditto. Medium gray (N5), finely clastic to some medium clastic, slightly oolitic.
4305-4310	Ditto.
4310-4315	Limestone, dark gray (N3), very finely clastic, part very slightly mottled, with light gray, very slightly shaly.
4315-4322	Limestone, as above, slightly shaly.
4322-4332	Limestone, as above, part finely clastic to little medium clastic.
4332-4340	Ditto. Shaly, part finely clastic to little medium clastic, some very fine-grained angular quartz inclusions.
4340-4346	Ditto. No quartz inclusions noted.
4346-4351	Limestone, very shaly, medium dark gray (N4.5), very finely clastic to some finely clastic.
4351-4359	Limestone, light brownish gray (5YR 6/1), oolitic, medium clastic.
4359-4366	Limestone, possible lense of light gray to very light gray (N7-8) medium clastic limestone, 15%.
4366-4397	Limestone, medium light gray (N6), very finely clastic, very slightly shaly.
4397-4403	Limestone, slightly shaly, light gray to very light gray (N7-8), medium clastic, slightly oolitic, (1/3 mm. in diameter), part very finely clastic.
4403-4410	Limestone, medium brownish gray (5YR 5/1), very finely clastic to medium clastic, slightly oolitic (1/3 mm. in diameter), fossiliferous (crinoids and few fragments).
4410-4419	Limestone, slightly shaly, medium dark gray (N4), medium clastic, oolitic, sl

Interval

- 4419-4428 Limestone, as above, to some medium dark gray, very finely clastic.
- 4428-4433 Limestone, medium brownish gray (5YR 5/1), medium clastic to very finely clastic, part oolitic (1/2 mm. in diameter), 75%; limestone, very light gray (N8), very finely clastic to finely clastic, 25%.
- 4433-4438 Limestone, brownish gray, very finely clastic.
- 4438-4446 Limestone, very shaly, medium red (5R 5/2), finely clastic.
- 4446-4453 Limestone, medium light brownish gray (5YR 5/1-6/1), medium clastic to very finely clastic, part oolitic (1/3 mm. in diameter).
- 4453-4459 Limestone, medium dark gray (N5), medium clastic, oolitic (1/2 mm. in diameter).
- 4459-4465 Limestone, brownish gray (5YR 4/1), very finely clastic, little mottling with light gray.
- 4465-4470 Ditto.
- 4470-4473 Limestone, as above, more mottling with light gray.
- 4473-4476 Ditto, (N5YR 4/1), very slightly shaly.
- 4476-4484 Limestone, as above, shaly, medium dark gray (N4).
- 4484-4491 Limestone, medium gray (N5), medium clastic, oolitic (1/2 mm. in diameter), some mottling with light gray and slightly shaly.
- 4491-4499 Ditto.
- 4499-4505 Limestone, slightly cherty, medium dark gray (N4), very finely clastic, chert medium-grained to coarse-grained size, light brownish gray (5YR 6/1), trace shaly material.
- 4505-4513 Limestone, light brownish gray (5YR 6/1), very finely clastic to finely clastic, very slightly shaly.
- 4513-4520 Limestone, as above, medium gray (N5).
- 4520-4527 Limestone, as above, medium gray (N6), part mottled with light gray.
- 4527-4532 Limestone, medium dark gray (N4), very finely clastic.
- 4532-4539 Limestone, medium gray (N4.8), medium clastic, oolitic (1/3 mm. to 1/2 mm. in diameter), slightly mottled with light gray.

Interval

- 4539-4547 Limestone, dark brownish gray (4YR 3.5/1), very finely clastic, very slightly shaly, (covered with white to light gray powder).
- 4547-4555 Ditto.
- 4555-4560 Shale, very calcareous, grayish purple (5P 4/2).
- 4560-4565 Limestone, medium gray (N5), finely clastic, very slightly shaly.
- 4565-4570 Limestone, brownish medium light gray (6N5YR 6/1), medium clastic to coarsely clastic, very oolitic (diameter 3/4 mm.).
- 4570-4579 Ditto.
- 4579-4587 Ditto.
- 4587-4597 Ditto, considerable mottling, with light gray.
- 4597-4507 Limestone, medium light brownish gray, finely crystalline to finely clastic, very slightly shaly.
- 4607-4616 Limestone, as above, slightly shaly, part oolitic (1/3 mm. in diameter), few broken rounded, quartz grains.
- 4625-4632 Limestone, slightly dolomitic, medium dark gray (N4), medium clastic, slightly oolitic (1/3 mm. in diameter), very slightly shaly.
- 4632-3641 Ditto, slightly mottled; limestone, and some light gray (N7), finely clastic to medium clastic, soft, (note in envelope "show or gas").
- 4641-4650 Limestone, medium light gray (N6), finely clastic to medium clastic, very slightly dolomitic; about 20% very coarsely crystalline white calcite and some white quartz, (note: gauged 15/10 with 1 inch).
- 4650-4658 Limestone, slightly dolomitic, medium dark gray (N4), finely clastic; and limestone very light gray (N8), finely clastic, soft; considerable very light gray and light gray (N7), chert fragments (note: 15/10 to 1 inch).
- 4658-4663 Limestone, slightly dolomitic, slightly shaly to very slightly shaly, dark gray (N3), very finely clastic; considerable light brownish gray (5YR 6/1), chert fragments.
- 4663-4668 Limestone, dolomitic, light brownish gray (5YR 6/1), very finely crystalline to very finely clastic, cherty (light brownish chert, apparently bedded).

Interval

- 4668-4676 Limestone, dolomitic, slightly shaly, dark brownish gray (5YR 3/1), very finely clastic.
- 4676-4782 Ditto, slightly dolomitic, very finely clastic to very finely crystalline.
- 4682-4686 Limestone, dolomitic, slightly shaly, medium light bronish gray (5YR 5/1), very finely clastic to very finely crystalline.
- 4686-4695 Shale, grayish purple (5P 4/2).
- 4695-4704 Shale, as above, silty, part very slightly calcareous, very slightly micaceous.
- 4704-4711 Shale, medium dark gray (N4), very finely micaceous.
- 4711-4718 Shale, silty, light gray (N7), slightly micaceous.
- 4718-4728 Shale, medium dark gray (N4), very finely micaceous.
- 4728-4733 Shale, medium gray (N5), part slightly silty, very finely micaceous.
- 4733-4740 Shale, slightly silty, medium dark gray (N4), slightly micaceous.
- 4740-4748 Shale, slightly silty, medium gray (N5), slightly micaceous.

Interval

- 4748-4754 Shale, slightly silty, medium dark gray (N4), very finely micaceous.
- 4754-4760 Siltstone, medium light gray (G), medium-grained, sub-rounded, poorly sorted, very slight calcareous, some bluish green inclusion, slightly micaceous.
- 4760-4767 Siltstone, very calcareous, very light gray (N8), as above, 50% limestone, very light gray (N8), very finely clastic, fossiliferous (macrofossil fragments).
- 4767-4771 Siltstone, very light gray (N8), coarse-grained, subrounded, poorly sorted, slightly micaceous, very slightly calcareous, dark peppering, moderately friable to moderately well cemented.
- 4771-4778 Siltstone, micaceous, well cemented.
- 4778-4784 Ditto.
- 4784-4790 Ditto.
- 4790-4795 Ditto. Light gray (N7).
- 4795-4800 Ditto. Medium light gray (N6), possible lense of medium gray (N5), silty, finely micaceous shale.
- 4800-4805 Ditto.
- 4805-4808 Ditto. Sandy, very light gray (N8), moderately friable to well cemented.
- 4808-4813 Shale, slightly silty to silty, medium dark gray (N4.5), finely micaceous.
- 4813-4821 Siltstone, medium light gray (N6), coarse-grained, sub-rounded, poorly sorted, peppered with dark inclusions, finely micaceous, moderately well cemented.
- 4821-4827 Ditto.
- 4827-4834 Shale, silty, medium dark gray (N4), finely micaceous.
- 4834-4842 Shale, as above, very silty.
- 4842-4847 Siltstone, very light gray (N8), medium-grained, sub-rounded, poorly sorted, peppered with dark inclusions, trace slightly calcareous material, finely micaceous, some pyrite.
- 4847-4851 Ditto.

Interval

- 4851-4858 Ditto. Light gray (N7).
- 4858-4863 Ditto.
- 4863-4869 Ditto, fine-grained.
- 4869-4875 Shale, very silty, medium light gray (N6), very finely micaceous.
- 4875-4885 Shale, as above, slity.
- 4885-4895 Graywacke, silty, medium light gray (N6), subangular to subrounded, very poorly sorted, about 80% quartzose, very fine-grained to silt size inclusions, slightly micaceous.
- 4895-4904 Conglomerate, calcareous, part of matrix graywacke, as above, quartz fragments, white to rose to yellowish gray, medium-grained to very coarse-grained, part angular and broken, part rounded and frosted.
- 4904-4915 Siltstone, shaly, medium brownish gray (5YR 6/1), medium-grained, subrounded, poorly sorted, slightly micaceous.
- 4915-4923 Ditto.
- 4923-4928 Shale, medium gray (N5), very finely micaceous.
- 4928-4932 Siltstone, sandy (approaching silty graywacke), light gray (N7), subangular to subrounded, very poorly sorted very slightly calcareous, slightly micaceous, very well cemented.
- 4932-4940 Siltstone, as above, very light gray (N8), trace pyrite.
- 4940-4947 Shale, medium gray (N5), very finely micaceous.
- 4947-4954 Siltstone, slightly calcareous, light gray (N7), fine-grained, subangular to subrounded, very poorly sorted, slightly micaceous, moderately well cemented to well cemented, several pieces of pyrite.
- 4954-4960 Ditto. Very slightly calcareous.
- 4960-4969 Shale, medium light gray (N5.8), very finely micaceous.
- 4969-4974 Siltstone, very light gray to light gray (N8-7), very poorly sorted, slightly calcareous, medium-grained, subrounded, slightly micaceous, trace pyrite.
- 4974-4982 Shale, silty, medium gray (N5), finely micaceous, fossiliferous (pyritized plant fragment?), considerable pyrite in sample.

Interval

4982-4990	Shale, medium gray (N5), very slightly silty, very finely micaceous.
4990-5000	Shale, as above, part slightly silty.
5000-5006	Shale, medium dark gray (N4.5), very finely micaceous, some pyrite in shale, some pyritized plant fragments(?). hard.
5006-5014	Ditto.
5014-5022	Shale, as above, very slightly silty; no fossils noted.
5022-4030	Shale, as above, non-silty.
5030-5045	Shale, very slightly silty, as above.
5045-5055	Shale, as above, very slightly fissile.
5055-5063	Shale, silty, medium dark gray (N4), very finely micaceous, trace pyrite; and siltstone, medium light gray, medium-grained, very poorly sorted, well cemented.
5063-5070	Shale, medium dark gray (N4), very finely micaceous, slightly fissile.
5070-5078	Shale, as above, trace pyrite.
5078-5085	Shale, silty, medium dark gray (N4), slightly fissile, slightly micaceous; siltstone, shaly, medium gray (N5), fine-grained, subrounded, very poorly sorted.
5085-5095	Shale, very silty, medium gray (N5), very slightly micaceous.
5095-5105	Shale, medium dark gray (N4), finely micaceous, part very slightly silty, slightly fissile; trace pyrite.
5105-5114	Shale, silty, medium gray (N5), very finely micaceous.
5114-5126	Shale, medium dark gray (N4), very finely micaceous, part very slightly silty, very slightly fissile.
5126-5136	Shale, as above, very slightly silty.
5136-5148	Shale, as above, slightly fissile.
5148-5160	Shale, as above, to non-silty.
5160-5170	Shale, as above, with possible streak of siltstone, medium gray (N5), fine-grained, subrounded, moderately well sorted, moderately well cemented.
5170-5178	Ditto.

Interval

- 5178-5185 Shale, as above; siltstone, medium light gray (N6).
- 5185-5192 Siltstone, medium light gray (N6); and shale, medium dark gray (N4), as above, very slightly silty, very finely micaceous, slightly fissile.
- 5192-5203 Ditto.
- 5203-5215 Shale, silty to very slightly silty, medium gray to medium dark gray (N5-4), very slightly micaceous, slightly fissile.
- 5215-5222 Shale, medium dark gray (N4), very slightly micaceous, slightly fissile.
- 5222-5232 Siltstone, medium gray (N5), subrounded, very poorly sorted, micaceous, moderately well cemented to well cemented.
- 5232-5244 Shale, medium dark gray (N4), very finely micaceous, slightly fissile.
- 5244-5253 Shale, medium gray (N5), very slightly silty, finely micaceous, chunky to very slightly fissils.
- 5253-5256 Siltstone, medium light gray (N6), subrounded, medium-grained, very poorly sorted, slightly micaceous, well cemented.
- 5256-5266 Shale, medium dark gray (N4), very finely micaceous, slightly fissile.
- 5266-5274 Shale, slightly silty to some silty, medium gray (N4.5), very finely micaceous, slightly fissile.
- 5274-5283 Siltstone, medium gray (N5.5), very fine-grained, subrounded, poorly sorted, well cemented.
- 5283-5290 Shale, silty to very slightly silty, medium light gray (N6), trace very finely micaceous material, chunky to very slightly fissile.
- 5290-5300 Shale, silty medium gray (N5), slightly micaceous.
- 5300-5310 Shale, (N4.5), very silty, trace pyrite.
- 5310-5320 Shale, as above, part approaching siltstone.
- 5320-5322 Siltstone, light gray (N7), medium-grained, subrounded, poorly sorted, slightly micaceous, well cemented.
- 5322-5325 Siltstone, as above, medium light gray (N6).

Interval

- 5325-5328 Siltstone, as above, light gray (N7), some peppering with black inclusions.
- 5328-5331 Ditto.
- 5331-5333 Ditto. Very light gray (N8), very slightly calcareous.
- 5333-5335 Ditto.
- 5335-5337 Ditto, (N7.5), to non-calcareous, well cemented to very well cemented.
- 5337-5340 Ditto. Very slightly calcareous.
- 5340-5343 Ditto.
- 5343-5346 Ditto. Very slightly calcareous to non-calcareous, well cemented.
- 5346-5348 Ditto. (N8.5), very slightly calcareous.
- 5348-5351 Siltstone, light brownish gray (5YR 6/1), medium-grained, subrounded, moderately well sorted, very slightly micaceous, moderately well cemented.
- 5351-5355 Siltstone, very light gray (N8), coarse-grained, subrounded, poorly sorted, slightly micaceous, slightly peppered with dark inclusions, moderately well cemented.
- 5355-5358 Ditto.
- 5358-5360 Shale, medium dark gray (N4), very finely micaceous, with thin streak of limestone, light brownish gray (5YR 6/1), very finely clastic.
- 5360-5367 Shale, silty, medium gray (N5), slightly micaceous, very slightly fissile.
- 5367-5377 Ditto.
- 5377-5387 Shale, medium gray (N5), finely micaceous, very slightly fissile.
- 5387-5397 Ditto.
- 5397-5408 Shale, as above, part very slightly silty.
- 5408-5416 Ditto.
- 5416-5424 Shale, very silty, medium dark gray (N4), slightly micaceous; some siltstone medium brownish gray (5YR 5/1), coarse-grained, subrounded, poorly sorted, dark inclusions, slightly micaceous, well cemented.

Interval

5424-5433 Siltstone, as above.

5433-5445 Shale, medium gray (N5), part silty to slightly silty, finely micaceous.

5445-5454 Shale, silty, medium gray (N5), finely micaceous.

5454-5462 Ditto.

5462-5470 Shale, medium dark gray (N4), very finely micaceous.

5470-5476 Shale, slightly silty, medium gray (N5), finely micaceous.

5476-5486 Siltstone, medium gray (N5), coarse-grained, subrounded, poorly sorted, slightly micaceous, well cemented.

5486-5493 Ditto. Medium light gray (N6), very slightly calcareous.

5493-5501 Siltstone, as above, and shale, medium dark gray (N4.5), slightly silty to non-silty, very finely micaceous.

5501-5510 Shale, as above, non-silty.

5510-5518 Siltstone, medium light gray (N6), medium-grained, subrounded, poorly sorted, slightly micaceous, well cemented; and shale, silty to non-silty, medium gray (N5), finely micaceous.

5518-5526 Shale, very silty to slightly silty, medium gray (N5), finely micaceous.

5526-5534 Siltstone, medium light gray (N6), medium-grained, subrounded, poorly sorted, some dark inclusions, very slightly micaceous, well cemented.

5534-5541 Siltstone, as above, and shale, silty, brownish black (5YR 2/1), medium-grained, subrounded, poorly sorted, micaceous, moderately well cemented.

5541-5550 Shale, medium dark gray (N4), very slightly silty, very finely micaceous.

5550-5557 Siltstone, medium light gray (N6), medium-grained, subrounded, poorly sorted, very well cemented.

5557-5565 Siltstone, as above, slightly micaceous.

5565-5575 Shale, silty to non-silty, medium gray (N5), finely micaceous.

Interval

- 5575-5585 Shale, medium dark gray (N4), non-silty to very slightly silty, very finely micaceous, slightly fissile.
- 5585-5593 Siltstone, medium light gray (N6.5), medium-grained sub-rounded, poorly sorted, very slightly micaceous, well cemented.
- 5593-5600 Shale, medium gray (N5), part very lightly silty, finely micaceous, very slightly fissile.
- 5600-5608 Siltstone, medium light gray (N6), medium grained, sub-rounded, poorly sorted, very well cemented.
- 5608-5618 Shale, silty to non-silty, medium gray (N5), micaceous to finely micaceous, part slightly fissile.
- 5618-5630 Siltstone, medium light gray (N6), to light gray (N7), coarse-grained, subrounded, poorly sorted, slightly micaceous, very well cemented.
- 5630-5641 Shale, non-silty to slightly silty, medium gray (N5), finely micaceous to micaceous.
- 5641-5650 Shale, as above, to silty.
- 5650-5660 Siltstone, medium light gray (N6), medium-grained, sub-rounded, poorly sorted, trace calcareous material, very well cemented; and shale, medium gray (N5), very finely micaceous, trace silty material.
- 5660-5667 Shale, as above, part silty.
- 5667-5673 Siltstone, medium light gray (N6), coarse-grained, sub-rounded, poorly sorted, slightly micaceous, some peppering with dark inclusions, well cemented.
- 5673-5681 Siltstone, as above; and shale, medium dark gray (N4), non-silty and some silty, very finely micaceous.
- 5681-5690 Shale, medium dark gray (N4), as above.
- 5690-5698 Shale, medium dark gray (N4), very finely micaceous.
- 5698-5713 Siltstone, medium light gray (N6), very slightly sandy, coarse-grained, subrounded, very poorly sorted, very slightly micaceous, well cemented.
- 5713-5723 Shale, medium dark gray (N4), non-silty to slightly silty, very finely micaceous, slightly fissile.
- 5723-5732 Shale, silty, medium dark gray (N4), micaceous to very micaceous, part fissile; and siltstone, light gray (N7), very coarse-grained, subrounded, poorly sorted, slightly micaceous, slightly peppered with dark inclusions.

Interval

- 5732-5741 Siltstone, medium light gray (N6), medium-grained, sub-rounded, poorly sorted, slightly micaceous to micaceous, slightly peppered with dark inclusions, well cemented; and shale, silty to non-silty, medium gray (N5), slightly micaceous, part slightly fissile.
- 5741-5753 Ditto.
- 5753-5762 Ditto. Very finely micaceous.
- 5762-5771 Shale, silty to nonsilty, medium gray (N5), very finely micaceous.
- 5771-5780 Shale, silty, medium gray (N5), micaceous, part slightly fissile.
- 5780-5789 Shale, silty to very silty, medium dark gray (N4), micaceous.
- 5789-5799 Siltstone, medium light gray (N6), medium-grained, sub-rounded, poorly sorted, slightly micaceous, well cemented; and shale, silty to very silty, medium gray (N5), micaceous, slightly fissile.
- 5799-5806 Siltstone, light gray (N7), coarse-grained, subrounded, poorly sorted, slightly micaceous, well cemented; and shale, medium light gray (N5.5), very finely micaceous, very slightly fissile.
- 5806-5814 Shale, silty to non-silty, medium gray (N5), micaceous to very finely micaceous, very slightly fissile.
- 5814-5824 Siltstone, light gray (N7), medium-grained, subrounded, poorly sorted, slightly micaceous, well cemented.
- 5824-5838 No samples.
- 5838-5847 Siltstone, medium light gray (N5.5), very slightly sandy, coarse-grained, subrounded, very poorly sorted, finely micaceous, well cemented; and shale, medium gray (N5), part very slightly silty, finely micaceous.
- 5847-5855 Shale, very silty to silty, medium gray (N5), micaceous.
- 5855-5866 Siltstone, slightly sandy, medium light gray (N6), medium-grained, subrounded, poorly sorted, micaceous, well cemented.
- 5866-5873 Siltstone, as above; and some shale, slightly silty, medium dark gray (N4), micaceous, slightly fissile.
- 5873-5883 Shale, medium gray (N5), very finely micaceous.

Interval

- 5883-5892 Shale, very silty to silty, medium gray (N5), micaceous.
- 5893-5904 Siltstone, sandy, medium light gray (N6), subrounded, very poorly sorted, slightly micaceous, well cemented.
- 5904-5916 Shale, medium dark gray (N4), trace finely micaceous material, slightly fissile.
- 5916-5927 Siltstone, shaly, medium light gray (N6), medium-grained, subrounded, poorly sorted, micaceous, moderately well cemented.
- 5927-5934 Shale, medium gray (N5), silty to non-silty, micaceous, slightly fissile.
- 5934-5942 Shale, slightly silty, medium dark gray (N4), micaceous, slightly fissile; siltstone, medium light gray (N6), very slightly sandy, subrounded, poorly sorted, micaceous, well cemented.
- 5942-5951 Shale, medium dark gray (N4.5), very finely micaceous, slightly fissile.
- 5951-5959 Siltstone, medium light gray (N6), medium-grained, subrounded, poorly sorted, slightly micaceous, well cemented, little very coarse-grained, approaching graywacke.
- 5959-5968 Shale, medium dark gray (N4), very finely micaceous, slightly fissile.
- 5968-5978 Siltstone, light gray (N7), medium-grained, subrounded, poorly sorted, very slightly micaceous, well cemented.
- 5978-5986 Shale, part slightly silty, medium dark gray (N4), very finely micaceous, slightly fissile.
- 5986-5995 Shale, as above, trace very finely micaceous material.
- 5995-6000 Ditto.
- 6000-6009 Shale, (N3.5), very finely micaceous, some fissile; some siltstone, medium gray (N4), micaceous, very well cemented.
- 6009-6019 Shale, as above, very finely micaceous to slightly micaceous.
- 6019-6024 Shale, medium gray (N5), very finely micaceous; and siltstone, light gray (N7), part very fine-grained, and part fine-grained, very slightly micaceous, well cemented.
- 6024-6031 Shale, medium dark gray (N4), very finely micaceous, slightly fissile, (sample needed washing).

Interval

6031-6038 Same as 6024-6031.

6038-6044 Ditto.

6044-6054 Shale, silty to very silty, (some approaching siltstone), medium light gray (N6), micaceous, hard.

6054-6064 Shale, silty, medium dark gray (N4), micaceous, hard, slightly fissile.

6064-6074 Siltstone, light gray (N7), medium-grained, subrounded, moderately well sorted, slightly micaceous, moderately well cemented, very well cemented.

6074-6083 Shale, medium gray (N5), very finely micaceous.

6083-6093 Shale, medium dark gray (N4), trace very finely micaceous material, very slightly fissile; and siltstone, shaly, light gray (N7), very fine-grained, subrounded, moderately well sorted, well cemented.

6093-6109 Shale, medium gray (N5), very finely micaceous.

6109-6118 Shale, as above, slightly fissile.

6118-6125 Shale, medium dark gray (N4), very finely micaceous.

6125-6131 Siltstone, light gray (N7), medium-grained, subrounded, poorly sorted, slightly micaceous, moderately well cemented.

6131-6140 Shale, medium gray (N5), part silty, micaceous, slightly fissile.

6140-6149 Siltstone, medium light gray (N6), fine-grained, subrounded, poorly sorted, micaceous, moderately well cemented to very well cemented.

6149-6155 Shale, dark gray (N3), finely micaceous, slightly fissile to fissile.

6155-6161 Siltstone, medium light gray (N6), medium-grained, subrounded, moderately well sorted, moderately well cemented to well cemented.

6161-6169 Ditto.

6169-6177 Shale, medium dark gray (N4), very finely micaceous, slightly fissile.

6177-6185 Siltstone, shaly, medium light gray (N6), very fine-grained, subrounded, slightly micaceous moderately well cemented.

Interval

- 6185-6190 Shale, medium dark gray (N4), very finely micaceous; and shale, silty, brownish gray (5YR 4/1), micaceous.
- 6190-6196 Shale, silty, medium gray (N5), micaceous.
- 6196-6202 Shale, medium gray (N5), finely micaceous, fissile.
- 6202-6207 Siltstone, light gray (N7), medium-grained, subrounded, moderately well sorted, very slightly micaceous, moderately well cemented.
- 6207-6210 Shale, medium dark gray (N4), very finely micaceous.
- 6210-6218 Shale, medium dark gray (N4.5), very finely micaceous to micaceous, fissile.
- 6218-6229 Shale, dark gray (N3), fissile, trace micaceous material, containing many spherical pyrite (?) deposits, some angular pyrite deposits.
- 6229-6239 Shale, medium gray (N5), very finely micaceous.
- 6239-6248 Shale, as above, trace very finely micaceous material, (resinous luster), sample needs washing).
- 6248-6258 Shale, very silty (approaching siltstone), medium light gray (N6), micaceous to slightly micaceous.
- 6258-6268 Shale, dark gray (N3), very finely micaceous, fissile, some spherical pyrite (?) nodules embedded in shale.
- 6268-6278 Siltstone, medium light gray (N6), fine-grained, subrounded, moderately well sorted, slightly micaceous, well cemented.
- 6278-6290 Shale, medium gray (N5), very finely micaceous.
- 6290-6299 Ditto.
- 6299-6307 Ditto. Trace very finely micaceous material.
- 6307-6317 Shale, medium dark gray (N4), very finely micaceous, fissile, few embedded pyrite (?) spherules.
- 6317-6321 Siltstone, medium light gray (6), medium-grained, subrounded, poorly sorted, slightly micaceous, well cemented.
- 6321-6327 Shale, silty to very silty, medium gray (N5), micaceous, hard.
- 6329-6340 Ditto.

Interval

- 6340-6348 Shale, sandy, medium dark gray (N4), micaceous.
- 6348-6355 Shale, medium dark gray (N4.8), very finely micaceous.
- 6355-6362 Shale, sandy, medium dark gray (N3.5), micaceous.
- 6362-6373 Shale, medium dark gray (N4), slightly silty to non-silty, finely micaceous.
- 6373-6381 Shale, as above, (sample needs washing).
- 6381-6384 No sample.
- 6384-6390 Shale, dark gray (N3), part silty and part non-silty, finely micaceous, slightly fissile, few pyrite (?) spherules.
- 6390-6400 Shale, medium gray (N5), finely micaceous to very finely micaceous, little very silty; and siltstone, light gray (N7), very fine-grained, very slightly calcareous, very slightly micaceous, well cemented; numerous pieces angular pyrite, both with siltstone and shale.
- 6400-6412 Shale, dark gray (N3), very slightly micaceous, slightly fissile; trace magnetite.
- 6412-6422 Shale, silty, medium light gray (N6), micaceous, fissile; considerable pyrite.
- 6422-6428 Shale, slightly silty, medium gray (N5), micaceous.
- 6428-6439 Shale, medium light gray (N6), very finely micaceous, slightly fissile; considerable pyrite.
- 6439-6451 Shale, as above, very slightly silty to some silty.
- 6451-6459 Siltstone, medium light gray (N6), very coarse-grained (approaching sandstone), subrounded, moderately well sorted, very slightly micaceous, moderately well cemented; and shale, dark gray (N3), non-silty to some silty, micaceous, slightly fissile, few pyrite (?) spherules.
- 6459-6467 Siltstone, as above,
- 6467-6474 Ditto.
- 6474-6489 Shale, medium gray (N5), very finely micaceous, chunky.
- 6489-6497 Shale, grayish black (N2), very finely micaceous, resinous luster; considerable pyrite in sample.

Interval

6497-6500 Shale, medium gray (N5), very finely micaceous, chunky to very slightly fissile.

6500-6514 Ditto.

6514-6524 Shale, very silty, medium light gray (N6), finely micaceous.

6524-6534 No sample.

6534-6536 Shale, grayish black (N2), very finely micaceous, resinous luster.

6536-6546 Shale, as above; and shale, medium gray (N5), fissile.

6546-6560 Shale, medium gray as above.

6560-6571 Shale, grayish black (N2), very finely micaceous; some pyrite in sample.

6571-6585 Ditto, fissile, small part very slightly dolomitic.

6585-6598 Ditto, (non-dolomitic).

6598-6613 Ditto.

6613-6618 Ditto, approaching black (N4).

6614-6635 Ditto.

6635-6640 Shale, light gray and very light gray (N7-8), very slightly silty, very slightly calcareous, finely micaceous.

6640-6650 Shale, medium gray (N5), very finely micaceous.

6650-6663 Shale, medium light gray (N6), very finely micaceous.

6663-6665 No sample.

6665-6669 Shale, dark gray to grayish brown (N3-2), very finely micaceous, fissile to slightly fissile, some crystals of white, very slightly calcareous mineral.

6669-6680 Shale, medium light gray (N6), very slightly calcareous, trace very finely micaceous material.

6680-6689 Shale, medium gray (N5), trace very finely micaceous material.

6689-6692 Shale, medium light gray (N6), very finely micaceous.

6692-6700 Ditto.

Interval

6700-6713 Shale, as above, slightly fissile, very slight trace of calcareous material.

6713-6733 Ditto.

6722-6731 Shale, brownishgray (5YR 4/1), very finely micaceous, fissile.

6731-6742 Shale, dark gray (N3.5), very carbonaceous to slightly carbonaceous, slightly micaceous, fissile.

6742-6745 Shale, medium gray (N5), finely micaceous, slightly fissile.

6745-6753 Shale, as above, very finely micaceous.

6753-6767 Shale, medium dark gray (N4), very finely micaceous, fissile.

6767-6775 Shale, medium light gray (N6), very finely micaceous, slightly fissile.

6775-6785 Ditto.

6785-6789 Shale, very carbonaceous (approaching shaly coal), grayish black (?), very finely micaceous.

6789-6808 Ditto.

6808-6813 Shale, medium gray (N5), very finely micaceous, fissile.

6813-6818 Ditto.

6818-6824 No sample.

6824-6838 Siltstone, light gray (N7), very fine-grained, subrounded, moderately well sorted, very finely micaceous, moderately friable.

Samples run by Elosie Jacobsen
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