

Sample Description

Clinchfield Coal Company Well No. 102

Interval

0-10	Gravel
10-23	Missing
23-35	Shale, gray, silty, micaceous; and siltstone, light gray, minutely peppered with black mineral, micaceous slightly calcareous cement.
35-43	Sandstone, mottled tan, fine-medium grained, sub-rounded, poorly sorted, with much calcareous cement, (approaches very sandyclastic limestone), micaceous, with numerous green and black minerals; and siltstone and shale as 23-35'.
43-50	Sandstone, white, fine grained, sub-rounded, rather well sorted, with numerous green (glauconite?) and black minerals, slightly calcareous cement, micaceous, friable.
50-56	Shale, gray, silty, micaceous, chunky, and some tan siltstone, peppered with black and reddish grains, micaceous.
56-61	Shale, gray, silty, micaceous, chunky.
61-65	Siltstone, light gray, peppered with black and some green minerals, sub-angular-sub-rounded grains, medium well sorted, slightly calcareous cement, micaceous.
65-73	Sandstone, white to light gray, fine grained, sub-angular - sub-rounded, medium well sorted, very slightly calcareous cement, micaceous, with numerous black minerals, and some light green mineral.
73-77	Sandstone, as 65-73.
77-79	Shale, gray, silty, micaceous.
79-84	Sandstone, light gray, very fine-fine grained, sub-rounded, rather well sorted, with numerous black and some light green minerals, micaceous, very slightly calcareous; some shale as 77-79, (cavings?).
84-90	Shale, gray, silty, micaceous, chunky; some sandstone as in 79-84 (cavings?).

Interval

90-95	Shale, as 84-90.
95-105	Shale, gray, micaceous, chunky.
105-112	Sandstone, light gray, very fine grained, sub-rounded, rather poorly sorted, micaceous, with numerous black minerals; shale as 95-105 (cavings?).
112-117	Missing.
177-124	Shale, light gray micaceous, silty, very slightly calcareous chunky.
124-129	Shale, as 117-124 but more calcareous.
129-135	Shale, light gray, calcareous, silty, micaceous, chunky.
135-142	Shale, light gray, micaceous, chunky.
142-148	Shale, gray, micaceous, slightly silty, chunky.
148-158	Shale, brown-gray, slightly micaceous; several chunks of coal.
158-165	Missing. Driller's log has coal from 155-158; sandy shale 158-203.
165-173	Siltstone, very light gray, sub-rounded, rather poorly sorted, very micaceous, numerous grains of black mineral, friable.
173-177	Sandstone, white, peppered with black and green (glauconite?) minerals, fine grained, sub-angular - sub-rounded, micaceous, friable, little with siliceous cement, numerous reddish-orange (staining?) grains, and few light purplish and brownish grains.
172(177?)-185	Sandstone as 173-177, less friable.
185-190	Siltstone, very fine, sub-rounded, finely peppered with black mineral, micaceous, friable, with some sandstone as above (cavings?).
190-195	Siltstone, as 185-190.
195-203	" " "

Interval

203-207	Siltstone, as 185-190, slightly calcareous.
207-215	Shale, gray, slightly silty and micaceous, hard.
215-220	" " " " " " "
220-225	" " " " " " "
225-230	Shale, gray, silty, micaceous, hard.
230-235	" " " " "
235-240	" " " " "
240-245	" " " " "
245-250	" " " " "
250-	" " " " " chunk of medium grained mottled sandstone, clear, red, orange (stain) quartz, black and green mineral grains.
255-263	Shale, as 250-?; some light green, fine grained sandstone peppered with black mineral, trace pyrite.
263-268	Shale as 255-263, some shale, medium dark gray, slightly micaceous, considerable pyrite.
268-275	Siltstone, light gray, sub-rounded, rather well sorted, very micaceous, with some green and black minerals, several pieces of coal.
275-281	Sandstone, very light gray, fine grained, mottled with brown grains and peppered with black and few green (glauconite?) minerals, very micaceous, slightly calcareous cement, some dark gray shale (cavings?).
281-286	Sandstone, as 275-281, cement more calcareous, some dark gray-black shale and little coal (cavings?).
286-291	Sandstone as 275-281, some dark gray-black coaly shale (cavings?).
291-300	Same as 286-291.
300-307	Sandstone, white, medium grained, sub-angular - sub-rounded, rather well sorted, peppered with black and green (glauconite?) minerals, micaceous, very slight calcareous cement, some gray, fine grained, sub-rounded, well sorted micaceous and carbonaceous shale (cavings?).

Interval

- 307-314 As 300-307, with brown grains, also piece orange micaceous shale, and trace calcite.
- 314-318 Sandstone, as 307-314, friable, more calcite.
- 318-330 Sandstone, as 307-314, some orange-red grains, some larger fragments of quartz, white, pinkish and greenish, shale dark gray-black, carbonaceous, and few small pieces of coal (cavings?), trace pyrite, conglomerate zone?
- 330-340 As 318-330, larger quartz fragments.
- 340-350 " " " " , sandstone, calcareous cement, (rest as above) trace "ironstone".
- 350-354 Siltstone, light gray, well sorted, calcareous, micaceous, several pieces of coal.
- 354-357 Sandstone, white, very fine-medium grained, slightly calcareous; shale, dark gray, slightly micaceous.
- 357-362 Shale, dark gray, slightly micaceous.
- 362-367 Missing.
- 367-375 Sandstone, white-light gray, fine grained, moderately well sorted, micaceous, some black minerals; shale gray-dark gray, micaceous.
- 375-383 Sandstone, white-light gray, fine-medium grained, peppered with black mineral, micaceous, some with slightly calcareous cement; shale, dark gray, trace pyrite, several pieces of coal.
- 383-392 Sandstone, white-light gray, fine-medium grained peppered with black mineral, micaceous, some with calcareous cement, shale, dark gray, micaceous, trace pyrite, few pieces of coal.
- 392-396 Sandstone, white-light gray, fine-medium grained, peppered with black mineral; shale, dark gray, slightly micaceous.
- 396-400 Sandstone, white, very light gray, very fine-fine grained, poorly sorted, micaceous, shale, dark gray.

Interval

400-412 Shale, medium dark gray (N4), slightly micaceous.

412-419 Same as 400-412, some pieces carbonaceous.

419-427 Same as 400-412.

427-435 Same as 400-412, slightly calcareous.

435-440 Same as 427-435, slightly silty.

440-445 " " "

445-453 Shale, medium dark gray (N4), very slightly calcareous.

453-458 " " " " "

458-464 " " " slightly calcareous, few pieces of coal.

464-473 Shale as 458-464, slightly micaceous.

473-482 Shale as 453-458, slightly micaceous.

482-490 Sandstone, light gray, very fine-fine grained, slightly peppered with black mineral; shale, dark gray, trace "ironstone".

490-495 Sandstone, white-very light gray, fine grained, fairly well sorted, peppered with black mineral, slightly calcareous cement; shale, dark gray.

495-501 Sandstone, white-light gray, fine grained, fairly well sorted, micaceous, peppered with black mineral, cement slightly calcareous; shale, dark gray (N3).

501-509 Shale, medium dark gray (N4), silty, some fine grained sandstone, slightly calcareous.

509-515 Shale, medium dark gray (N4), silty.

515-521 " " " "

521-530 Shale, medium gray (N5) - dark gray (N3), silty, micaceous, and sandstone, very light gray-medium gray, very fine grained, some cementing material calcareous.

Interval

- 530-535 Shale, medium dark gray (N4) - dark gray (N3), silty micaceous; sandstone, very light gray-medium light gray, very fine grained.
- 535-540 Sandstone, white, fine grained, well sorted, scattered black minerals, shale, dark gray (N3), micaceous, very slightly carbonaceous.
- 540-545 Same as 535-540.
- 545-552 Sandstone, white, very fine-fine grained, scattered black minerals, trace pyrite, some grains show limonitic staining; shale, dark gray, trace "ironstone", slightly silty.
- 552-553 Sandstone, white, little gray, very fine-fine grained, scattered black minerals, some shale, dark gray (N3) trace "ironstone".
- 553-555 Sandstone, white-light gray, very fine-fine grained, scattered black minerals, slightly micaceous; shale dark gray, few pieces of coal.
- 555-560 Sandstone, white-light gray, fine grained, well sorted, scattered black minerals, slightly micaceous, little shale, dark gray (N3).
- 560-563 Sandstone, white, fine-medium grained, fairly well sorted, some grains stained with limonite, slightly micaceous; shale, dark gray (N3) - grayish black (N2) trace "ironstone".
- 563-566 Sandstone, white, very fine-medium grained, little scattered black mineral and light gray mineral; shale, grayish black (N2).
- 566-571 Sandstone, white-light gray, fine grained, scattered black minerals, slightly micaceous; shale, medium dark gray (N4) - grayish black (N2).
- 571-576 Same as 566-571.
- 576-578 Sandstone, white-light gray, fine grained, scattered black minerals and light green mineral, slightly silty; little shale, medium dark gray (N4), trace pyrite.

Interval

- 578-582 Sandstone, white-light gray, fine grained, silty, scattered black minerals, little shale, medium dark gray (N4), trace "ironstone".
- 582-588 Sandstone, white, fine-course grained, some grains partially frosted; few pieces shale, dark gray.
- 588-593 Sandstone, white, fine-course grained, some grains stained with limonite, scattered black minerals.
- 593-599 Sandstone, white-- yellow (limonite stain), fine-course grained, slightly silty, few scattered black minerals.
- 599-604 Sandstone, white, fine-medium grained, few scattered black minerals, some grains stained with limonite, few quartz fragments (larger).
- 604-610 Sandstone, white-light gray, fine-course grained, poorly sorted, scattered black minerals; shale, dark gray (N3).
- 510-617 Sandstone, white, fine-medium grained, scattered black minerals.
- 617-629 Missing.
- 629-631 Sandstone, white-light gray, some grains slightly yellow (limonite staining), fine-course grained, few pieces shale, dark gray, scattered black mineral and a little green minerals.
- 631-636 Sandstone, white, fine-course grained, limonite staining, few pieces of black mineral.
- 636-641 Sandstone, white, medium-course grained, some grains stained by limonite, scattered black minerals and few pieces of green mineral, few pieces of shale, dark gray.
- 641-647 Sandstone, white, badly stained by limonite, medium-course grained, scattered black minerals.
- 647-652 Sandstone, white, medium-course grained, stained by limonite; shale, dark gray (N3).
- 652-663 Shale, medium dark gray, slightly micaceous, little sand.

Interval

- 663-669 Shale, medium dark gray, slightly micaceous, little sandy.
- 669-676 Sandstone, white-gray, fine-course grained, shaly scattered black and light green minerals; shale medium gray (N5) - dark gray (N3), slightly micaceous.
- 676-682 Same as 669-676.
- 682-687 Sandstone, white, fine-course grained, scattered black and light green minerals, few pieces limonite; shale, medium gray (N5) - medium dark gray (N4).
- 687-693 Sandstone, white-light gray (N7), fine-medium grained, slightly micaceous, scattered black minerals, few pieces of shale, dark gray (cavings?).
- 693-700 Sandstone, white, fine grained, angular, well sorted, scattered black minerals, trace "ironstone", few pieces of shale (cavings?).
- 700-703 Sandstone, white, fine-medium grained, peppered with black minerals, angular-sub-angular, few larger quartz fragments, few yellowish grains (limonite stain), very slightly micaceous.
- 703-706 Same as 700-703, few pieces dark gray shale, trace "ironstone".
- 706-711 Sandstone, white-light gray, many grains, yellow-reddish brown (limonite stain?), some black minerals, few pieces dark gray shale, trace pyrite.
- 711-716 Shale, dark gray (N3), very micaceous; and sandstone, shaly (or sandy shale), light gray-dark gray, fine grained, micaceous, few pieces black mineral, and sandstone, white-yellow (limonitic stain?), medium grained.
- 716-720 Sandstone, gray, very fine-fine grained, shaly, micaceous; shale, dark gray (N3), few pieces of coal.
- 720-725 Shale, medium-dark gray (N4), slightly micaceous, few pieces of sandstone as above (cavings?).



Interval

725-730	Shale, medium dark gray (N4), micaceous.
730-735	" " " " trace pyrite.
735-740	" " " slightly micaceous.
740-745	" " " very slightly micaceous.
745-750	" " " " " "
750-755	" " " micaceous, slightly silty.
755-760	" " " " " "
760-765	" " " " " "
765-773	" " " " " "
773-778	" " " " " "
<del>778-782</del>	" " " " " "
	Sandstone, gray very fine grained, shaley, micaceous.
782-790	Same as 778-782.
790-800	Sandstone, light gray-tan, micaceous, and shale, medium dark gray (N4) - grayish black (N2), micaceous.
800-812	Shale, light gray (N7) - medium dark gray (N4), silty-sandy, micaceous.
812-820	Same as 800-812.
820-830	Shale, medium gray (N5) - medium dark gray (N4), slightly micaceous.
830-842	Same as 820-830.
842-852	Shale, medium dark gray (N4), few pieces have banding of lighter shale, micaceous, slightly silty.
852-859	Shale, medium dark gray, slightly micaceous; and sandstone, very light gray (N8) - medium light gray (N6), fine grained, fairly well sorted, slightly micaceous, some black and a few light green minerals.

Interval

- 859-869 Sandstone, white-medium light gray, fine grained, fairly well sorted, peppered with black and some light green minerals, micaceous; shale, medium dark gray (N4).
- 869-875 Sandstone, light-medium gray, very fine-fine grained, shaley, micaceous, some black minerals; and shale, medium dark gray (N4), silty, micaceous.
- 875-885 Shale, medium dark gray (N4), some is sandy, micaceous.
- 885-898 Shale, medium dark gray (N4), micaceous, slightly silty, some sandstone, light-medium gray, very fine grained, some black mineral.
- 898-905 Sandstone, very light gray-medium gray, very fine grained, rather well sorted, shaley, peppered with black minerals, some shale, medium dark gray (N4), silty, micaceous, few pieces coal.
- 905-911 Sandstone, very light gray-medium gray, very fine grained, fairly well sorted, peppered with black minerals, micaceous, little shale, medium dark gray (N4), micaceous, silty.

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<u>Interval</u>	
911-919	Sandstone, very light gray-tan-medium dark gray, very fine grained, well sorted, peppered with black and some light green minerals, micaceous; few pieces of shale, grayish black (N2), micaceous (cavings?).
919-928	Shale, dark gray (N3), very slightly silty, slightly micaceous.
928-935	Same as 919-928.
935-942	Shale, medium dark gray (N4), very slightly silty, slightly micaceous.
942-950	Same as 928-935.
950-960	" " "
960-970	" " "
970-980	" " " some sandstone light-dark gray, very fine grained, very shaly, micaceous.
980-989	Same as 970-980.
989-995	Shale, medium dark gray (N4), sandy, micaceous; and sandstone, tan-light-medium gray, very fine grained, well sorted, micaceous.
995-1002	Same as 989-985, some larger fragments of quartz.
1002-1015	Shale, medium dark gray (N4), slightly silty, very slightly micaceous; and sandstone, light-medium gray, slightly calcareous.
1015-1025	Shale, medium dark gray (N4) - dark gray (N3), slightly silty, slightly micaceous; and sandstone, light-medium gray, very fine grained, shaly, micaceous, some cement slightly calcareous.
1025-1035	Shale, medium dark gray (N4), slightly silty, very slightly micaceous.
1035-1045	Same as 1025-1035. Few pieces sandstone, medium gray, very fine grained, shaly, cement slightly calcareous.

- 1045-1052 Shale, medium gray (N5) - medium dark gray (N4), silty-sandy, micaceous.
- 1052-1060 Shale, medium gray (N5) - medium dark gray (N4), very slightly micaceous; and sandstone, white-medium gray, very fine grained, well sorted, some shaly, very slightly micaceous, several pieces of coal.
- 1060-1070 Sandstone, white-gray, very fine grained, well sorted, few larger fragments of quartz, scattered black minerals, micaceous, some cementing material slightly calcareous; shale, dark gray (N3).
- 1070-1080 Sandstone, white-light gray, fine grained, few larger fragments quartz, scattered black and few light green minerals, slightly micaceous, few grains show limonitic staining; shale, medium gray (N5) - dark gray (N3).
- 1080-1090 Sandstone, very light gray-gray, fine grained rather well sorted, scattered black and few green minerals, slightly micaceous, few grains stained with limonite; shale, dark gray (N3), slightly micaceous, few pieces coal.
- 1090-1096 Sandstone, white-gray, fine grained, rather well sorted, scattered black mineral, few grains have limonitic staining, slightly micaceous; shale, dark gray (N3), slightly micaceous.
- 1096-1103 Sandstone, white, fine grained, well sorted, scattered black and few green (glauconite?) minerals, cement slightly calcareous, slightly micaceous, few pieces shale, dark gray (cavings?).
- 1103-1114 Sandstone, white-light gray, fine grained, few black and green (glauconite?) minerals, few grains with limonitic staining, little shale, (cavings?) as above, few pieces coal.
- 1114-1125 Shale, medium dark gray (N3), silty-sandy, very slightly micaceous, few pieces sandstone, gray, very fine grained.
- 1125-1135 Shale, medium dark gray, silty, sandstone, light-medium gray, shaly, very slightly micaceous.
- 1135-1145 Shale, medium gray (N5)-medium dark gray (N4), silty-sandy, very slightly calcareous.

- 1145-1152 Shale, medium dark gray (N4), sandy, slightly micaceous and some sandstone, gray, very fine grained, shaly, cement slightly calcareous.
- 1152-1160 Sandstone, light-medium gray, very fine grained, well sorted, scattered, black minerals; shale, dark gray (N3) silty-sandy, very slightly micaceous.
- 1160-1169 Siltstone, medium-medium dark gray (N4), shaly.
- 1169-1179 Siltstone-sandstone, medium-medium dark gray (N4), shaly.
- 1179-1192 Sandstone, light-medium gray, very fine grained, some scattered black minerals; shale, medium dark gray (N4).
- 1192-1200 Sandstone, tan-gray, very fine grained; shale, medium dark gray (N4).
- 1200-1210 Shale, medium dark gray (N4), slightly silty, very slightly micaceous.
- 1210-1222 Shale, sand as 1200-1210, few pieces sandstone, gray-tan, very fine grained (cavings?).
- 1222-1230 Shale, same as 1210-1222, and sandy shale or shaley sandstone, tan-medium dark gray.
- 1230-1248 Sandstone, white-gray, very fine grained, well sorted, slightly micaceous, cementing material calcareous, some scattered black minerals; shale, medium dark gray (N4)-dark gray (N3), slightly micaceous.
- 1248-1250 Sandstone, white-gray, very fine grained, well sorted, slightly micaceous, scattered black minerals; shale, dark gray (N3), some pieces shale, medium dark gray (N4), sandy.
- 1250-1260 Sandstone, same as 1248-1250, medium dark gray (N4) silty.
- 1260-1270 Sandstone, white-gray, very fine grained, well sorted, scattered black minerals, slightly micaceous, cement slightly calcareous, few pieces dark gray shale (cavings?).
- 1270-1280 Sandstone, white, fine grained, well sorted, scattered black minerals, few pieces dark gray shale (cavings?).
- 1280-1285 Sandstone, white-light gray-tan, very fine grained, scattered black minerals, slightly micaceous, few pieces dark gray shale (cavings?).

- 1285-1295 Sandstone, light gray-gray, fine-medium grained, scattered black minerals, few grains stained yellow-reddish brown (limonite?), slightly micaceous; shale, medium dark gray (N4)-dark gray (N3), slightly silty.
- 1295-1300 Sandstone, white, fine-coursegrained, larger fragments of quartz, scattered black minerals, some slightly micaceous; shale, medium dark gray (N4)-dark gray (N3), some is silty.
- 1300-1306 Sandstone, white, fine-medium grained, some larger quartz fragments, some grains stained with limonite, scattered black and few green minerals, very slightly micaceous, some shale, some medium-dark gray shale (cavings?).
- 1306-1309 Sandstone, white, very fine-medium grained, subangular-angular, some pieces stained with limonite, few scattered black minerals; few pieces medium dark gray (N4) shale, (cavings?).
- 1309-1314 Same as 1306-1309, trace "ironstone".
- 1314-1316 Sandstone, white, fine-medium grained, sub-angular - angular, some grains stained with limonite, few pieces dark gray shale, (cavings?).
- 1316-1324 Sandstone, white, fine-course grained, sub-angular--angular, some grains stained with limonite, few pieces grayish black shale, trace "ironstone".
- 1324-1331 Same as 1316-1324, few pieces gray sandstone, few pieces black minerals
- 1331-1338 Sandstone, white, fine-medium grained, few larger quartz fragments, few grains show limonitic staining, trace "ironstone", few pieces grayish black shale.
- 1338-1342 Sandstone, white, fine-course grained, sub-angular - angular, few pieces grayish black shale.
- 1342-1348 Same as 1338-1342.
- 1348-1354 " " " little limonitic staining, trace "ironstone".
- 1354-1360 Same as 1348-1354.

1360-1364 Same as 1338-1342, few scattered light green and black minerals.

1364-1368 Sandstone, white, fine-course grained, much limonitic staining, shale, grayish black.

1368-1370 Sandstone, white, fine-course grained, sub-angular - angular, few grains stained by limonite, few pieces grayish black shale.

1370-1377 Same as 1368-1370, trace "ironstone".

1377-1382 Same as 1370-1377, few scattered green (glauconite?) and black minerals.

1382-1386 Sandstone, white, fine-medium grained, few grains with limonitic staining, few scattered black minerals, little dark gray shale, trace "ironstone".

1386-1390 Sandstone, white, fine-course grained, very few grains stained with limonite, few scattered black minerals. some dark gray shale, trace "ironstone".

1390-1396 Sandstone as 1386-1390, few pieces dark gray shale (cavings?).

1396-1400 Same as 1390-1396, trace "ironstone".

1400-1407 " " " "

1407-1411 Sandstone, white, fine-course grained, few grains stained with limonite, very few scattered black and light green minerals, very few pieces dark gray shale (cavings?), trace "ironstone".

1411-1415 Sandstone, white-brownish, fine-course grained, sub-angular - angular, little limonitic staining; shale, grayish black (N2), trace "ironstone".

1415-1421 Same as 1411-1415.

1421-1427 Sandstone, white, fine-medium grained, few larger quartz fragments, sub-angular-angular, little limonitic staining, few pieces shale, dark gray (N3), trace "ironstone".

1427-1433 Sandstone as 1421-1427, very few pieces light green minerals, very few pieces dark gray shale (cavings?) trace "ironstone".

1433-1440

Same as 1427-1433.

1440-1450

Shale, medium dark gray (N4), silty; some sandstone, light-medium gray, very fine grained, very shaley, slightly micaceous, few larger quartz grains (cavings?) several pieces of coal.

1450-1460

Shale, and sandstone as 1440-1450, no coal.

1460-1470

Same as 1450-1460.

1470-1477

Sandstone, white-light gray, very fine-fine grained little limonitic staining, scattered black minerals, slightly micaceous, some cement slightly calcareous; shale, medium dark gray, silty, slightly micaceous, several pieces coal.



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Interval

- 1477-1487 Sandstone-siltstone, medium gray (N5)-medium dark gray (N4), shaly, slightly micaceous, several pieces coal.
- 1487-1500 Shale, medium dark gray (N4), slightly silty, slightly micaceous; and sandstone, medium gray, very fine grained, shaly, slightly micaceous, few pieces coal, shale + 60% sandstone + 40%.
- 1500-1513 Shale, medium gray (N5), slightly silty, very slightly micaceous.
- 1513-1523 Shale, medium dark gray (N4) - dark gray (N3), slightly micaceous, some slightly silty; and sandstone, light-medium gray, very fine-fine grained, few scattered black minerals, slightly micaceous, shale + 50%, sandstone + 50%.
- 1523-1529 Sandstone, white-medium gray, very fine-fine grained, scattered black minerals, few grains show limonitic staining; shale, medium dark gray (N4), slightly silty, slightly micaceous, + 10%.
- 1529-1538 Sandstone, white-gray, fine grained, sub-angular - angular, scattered black and few light green minerals, slightly micaceous; shale, medium dark gray (N4) - dark gray (N3), sandy, slightly micaceous, + 20%, several pieces coal.
- 1538-1543 Shale, medium gray (N5) - medium dark gray (N4), very slightly micaceous; sandstone, white-gray, fine grained (cavings?) + 1%, few pieces coal. p3? < ?
- 1543-1550 Sandstone, white-light gray, fine-medium grained, slightly micaceous; shale, medium gray (N5) - dark gray (N3), slightly micaceous + 30%.
- 1550-1560 Sandstone, white-light gray, very fine-medium grained, scattered black and green (glauconite?) minerals, slightly micaceous, little shale, dark gray + 1% and few pieces coal (cavings?).
- 1560-1570 Same as 1550-1560.

Interval

- 1570-1575 Same as 1550-1560.
- 1575-1582 Sandstone, white-gray, fine grained, scattered black and green (glauconite?) minerals; little dark gray shale + 1% and few pieces coal (cavings?).
- 1582-1592 Shale, medium gray (N5)-medium dark gray (N4), silty, very slightly micaceous.
- 1592-1599 Sandstone, white-gray, very fine grained, well sorted, some grains show limonitic staining, scattered black minerals; shale, medium dark gray (N4)-dark gray (N3), slightly micaceous, + 30%, trace "ironstone", several pieces coal.
- 1599-1610 Sandstone, very light-medium gray, very fine grained, well sorted, scattered black minerals, very slightly micaceous, slightly calcareous, cementing material; some shale (+ 5%) medium gray (N5)-medium dark gray (N4), slightly silty and slightly micaceous, few pieces coal.
- 1610-1615 Sandstone, white-gray, very fine grained, well sorted, scattered black minerals, very slightly micaceous; little shale (+ 1%) medium gray (N5)-dark gray (N3), sandy.
- 1615-1622 Sandstone, white-gray, very fine-fine grained, scattered black and few light green minerals, few grains show limonitic staining, several pieces dark gray shale (cavings?).
- 1622-1632 Same as 1615-1622, more limonitic stainings, trace "ironstone".
- 1632-1638 Sandstone, white, very fine-fine grained, some yellowish grains (limonite stain?); few pieces grayish black (N2) shale + 1% (cavings?).
- 1638-1645 Sandstone, white-gray, very fine-fine grained, few larger pieces yellowish brown, few scattered black minerals; and shale (+ 40%) medium dark gray (N4), slightly silty, very slightly micaceous.
- 1645-1655 Shale, medium dark gray (N4), very slightly micaceous.
- 1655-1665 Shale, medium gray (N5)-medium dark gray (N4), slightly silty, very slightly micaceous.

<u>Interval</u>		
	1665-1675	Same as 1655-1665, few pieces slightly brownish.
	1675-1687	Same as 1645-1655.
	1687-1697	" " "
	1697-1707	Shale, medium gray (N5), very slightly silty, very slightly micaceous.
<u>pp</u>	1707-1714	Shale, medium dark gray (N4), very slightly micaceous.
<u>mb</u>	1714-1723	Shale, medium gray (N5) silty, slightly micaceous, some calcareous.
	1733-1740	Shale, medium light gray (N6)-medium gray (N5), slightly silty, slightly calcareous.
	1740-1750	Shale, medium gray (N5)-reddish-greenish gray, silty, some is calcareous.
	1750-1759	Shale, medium dark gray (N4) - reddish-greenish gray, silty, some pieces shaly limestone or calcareous shale.
	1759-1765	Shale, medium dark gray (N4), some reddish gray, silty-sandy, micaceous, and calcareous sandstone ( <u>±</u> 5%), light gray, very fine grained.
	1765-1770	Shale, medium dark gray (N4)-dark gray (N3), very slightly silty and very slightly micaceous.
	1770-1775	Shale, medium light gray (N6)-medium dark gray (N4) - reddish-greenish gray, few pieces calcareous, few pieces sandy.
	1775-1785	Shale, medium gray (N5)-medium dark gray (N4)-reddish-greenish gray, some sandy and slightly micaceous and calcareous, trace pyrite.
	1785-1790	Same as 1775-1785, little more pyrite.

## Sample Description

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### Interval

1790-1800	Shale, medium gray (N5)-dark gray (N3)-reddish gray, little pyrite, some very slightly micaceous, very slightly silty.
1800-1810	Same as 1790-1800, no pyrite.
1810-1815	" " " " few pieces tan limestone.
1815-1823	Shale, medium gray (N5)-reddish gray; sandstone-siltstone (5%), gray-greenish, scattered black minerals, few pieces limestone, tan-gray, trace pyrite.
1823-1836	Same as 1815-1823 except more sandstone (30%), few light green minerals, no pyrite.
1836-1843	Shale, medium gray (N5)-reddish gray, very finely micaceous, very slightly calcareous, few pieces very calcareous, slightly silty.
1843-1846	Shale, medium gray (N5)-medium dark gray (N4)-grayish red, some finely micaceous; sandstone-siltstone (40%) medium gray-greenish tint, slightly calcareous, very slightly micaceous, trace pyrite.
1846-1851	Shale, medium dark gray (N4), slightly calcareous, few pieces white, very fine grained sandstone (cavings?).
1851-1858	Shale, medium dark gray (N4)-dark gray (N3), slightly calcareous; sandstone (5%), very light gray-medium gray-greenish tint, very fine grained, few scattered black minerals, slightly calcareous.
1858-1868	Sandstone, white-light gray-greenish tint, few grains show limonitic staining, few scattered black minerals; shale (40%), medium gray (N5)-dark gray (N3).
1868-1878	Same as 1858-1868 except shale (20%).
1878-1888	" " " " " very slightly micaceous.
1888-1898	Sandstone, white-medium gray - some with greenish tint, few scattered black minerals; shale (20%) medium gray, (N5)-medium dark gray (N4), very slightly micaceous.

Interval

- 1898-1904 Shale, medium dark gray (N4)-dark gray (N3), slightly micaceous; sandstone (15%) light-medium gray, very fine grained, few pieces with greenish tint, several pieces pyrite.
- 1904-1908 Shale, dark gray (N3)-grayish black (N2), few pieces green; sandstone (50%) white-dark gray (shaly), few scattered black minerals, several pieces pyrite.
- 1908-1915 Sandstone, white-light gray, very fine grained, scattered black minerals; shale, dark gray (N3), finely micaceous, few pieces show schistosity.
- 1915-1918 Sandstone, light gray, very fine grained, scattered black minerals, some grains stained by limonite; shale (1%) medium gray (N5)-dark gray (N3).
- 1918-1926 Sandstone, white, very fine grained, well sorted, few pieces medium dark gray shale (N4) (1%-cavings?).
- 1926-1934 Sandstone, white-light gray, very fine grained, scattered black minerals, some limonitic staining; shale (20%) medium gray (N5)-medium dark gray (N4), some finely micaceous.
- 1934-1941 Shale, medium dark gray (N4), finely micaceous, silty; sandstone (10%) light-medium gray, shaly, few scattered black minerals.
- 1941-1950 Shale, medium dark gray (N4), finely micaceous, some silty-sandy, some shaly, sandstone medium gray, very fine grained.
- 1950-1960 Shale, medium dark gray (N4), finely micaceous, silty; sandstone (30%), white-medium gray, some shaly, few scattered black minerals.
- 1960-1966 Same as 1950-1960, trace pyrite, less sandstone (10%).
- 1966-1972 Sandstone, white-tan-medium gray, very fine grained, calcareous, few pieces greenish sandstone, slightly micaceous, few scattered black minerals; shale (50%) medium dark gray (N4)-dark gray (N3), finely micaceous, silty.
- 1972-1977 Same as 1966-1972.

Interval

1977-1982 Sandstone, white-medium gray (shaly), very slightly micaceous; shale (15%), medium dark gray (N4), finely micaceous, silty.

1982-1988 Sandstone, very light gray-medium gray-brownish gray, very fine grained, scattered black minerals, very slightly micaceous; sand silty shale (40%), dark gray (N3), micaceous.

1988-1999 Same as 1982-1988, less shale (30%).

1999-2009 Same as 1982-1988, shale  $\pm$  50%, some pieces very slightly calcareous.

2009-2017 Sandstone, very light-medium gray, very fine grained, scattered black minerals, slightly calcareous; shale (1%), dark gray (N3), silty, micaceous.

2017?-2028 Same as 2009-2017, few greenish grains of sandstone; shale about 5%.

2028-2039 Shale, medium dark gray (N4), finely micaceous; little sandstone (1%) as in 2009-2017 (cavings?).

2039-2049 Same as 2028-2039.

2049-2060 " " " " less sandstone.

2060-2070 Shale, medium dark gray (N4), very finely micaceous.

2070-2080 " " " " " "

2080-2090 " " " " " "

2090-2100 No samples.

2100-2113 Same as 2060-2070, few brownish pieces.

2113-2123 Same as 2060-2070.

2123-2131 Shale, dark gray (N3), white spots in it, very slightly calcareous, very finely micaceous.

2131-2144 Shale, dark gray (N3) very finely micaceous.

2144-2152 " " " " " "

2152-2161 Shale, medium dark gray (N4), very finely micaceous, slightly silty.

Interval

- 2161-2171 Shale, medium dark gray (N4)-dark gray (N3)-reddish gray, finely micaceous, some is slightly silty, one piece sandy.
- 2171?-2179 Same as 2161-2171, none sandy.
- 2179- ? Shale, medium gray (N5)-dark gray (N3), finely micaceous, some slightly silty, few pieces calcareous.
- 2188-2193 Shale, medium dark gray (N4)-dark gray (N3), few pieces reddish gray, some slightly silty and finely micaceous; sandstone (30%), white-medium gray, very fine grained, scattered black minerals.
- 2193-2198 Shale, medium dark gray (N4), finely micaceous, slightly silty; sandstone (5%) white-medium gray, very fine grained, few scattered black minerals.
- 2198-2209 Shale, medium dark gray (N4)-dark gray (N3)-reddish brown, slightly silty, finely micaceous, some pieces very micaceous; sandstone (5%), white-gray-reddish brown, few scattered black minerals.
- 2209-2218 Shale, medium dark gray (N4), finely micaceous, slightly silty; sandstone (5%) light-medium gray, slightly micaceous, few scattered black minerals.
- 2218-2223 Shale, medium dark gray (N4)-dark gray (N3), some finely micaceous and silty; sandstone (50%) white-light gray, very fine grained, scattered black minerals,= very slightly micaceous.
- 2223-2230 Shale, medium dark gray (N4)-dark gray (N3), very slightly micaceous; sandstone (20%), white-light gray very fine grained, scattered black minerals.
- 2230-2233 Sandstone, white-medium gray, very fine grained, some shaly, few scattered black minerals, very slightly micaceous; shale (40%), medium dark gray (N4)-dark gray (N3), some silty and finely micaceous.
- 2233-2237 Sandstone, white, fine grained, sub-rounded - angular; shale (5%), dark gray (N3).
- 2237-2241 Sandstone, white, fine grained, well sorted, few scattered black and light green minerals, some grains show limonitic staining; shale (50%), dark gray (N3) few pieces green, very finely micaceous.

Interval

- 2241-2243 Sandstone, white, fine grained, scattered black and few green minerals, several pieces grayish black magnetic mineral (magnetite?); Shale, (40%) medium dark gray (N4)-grayish black (N2), some finely micaceous.
- 2243-2250 Sandstone, white-very light gray, fine grained few scattered black minerals, several pieces grayish black magnetic mineral (magnetite?); shale (20%), medium dark gray (N4)-grayish black (N2), few pieces slightly micaceous.
- 2250-2253 Sandstone, white, fine-medium grained, angular - sub-angular, few larger pieces quartz, some limonitic staining; shale (15%), grayish black (N2)-medium gray (N5) (little), some pieces finely micaceous, several pieces grayish black magnetic mineral (Magnetite?), some pyrite.
- 2350-2355 Shale, medium gray (N5)-medium dark gray-reddish gray, some finely micaceous; sandstone (40%), light gray-medium gray-brownish, very fine grained, some shaly, some micaceous.
- 2253-2258 Same as 2250-2253, less shale (10%), no pyrite, some very fine grained sandstone.
- 2258-2263 Sandstone, white, very fine-fine grained, few larger pieces, sub-rounded - angular; shale (10%) dark gray (N3)-grayish black (N2), some pieces grayish black magnetic mineral (Magnetite?).
- 2263-2267 Sandstone, white, fine-course grained, poorly sorted, angular - sub-angular, limonitic staining; shale (10%), medium dark gray (N4)-dark gray (N3)-reddish gray, few pieces dark gray magnetic mineral (magnetite?) few pieces pink earthy limestone.
- 2267-2269 Same as 2263-2267.
- 2269-2275 Sandstone, white, very fine-course grained, angular - sub-angular; shale (10%), dark gray (N3)-grayish black (N2), trace pyrite.
- 2275-2278 Same as 2267-2275, no pyrite.
- 2278-2285 Sandstone, white, fine-course grained, angular-sub-angular, limonitic staining; some pieces shaly; shale (15%), medium dark gray (N4)-grayish black (N2), ostracod found.
- 2285-2291 Shaly limestone-calcareous shale, medium dark gray (N4), finely micaceous; sandstone (40%), white, fine-course grained, angular - sub-angular, some pyrite.



Interval

- 2291-2297 Shale limestone-calcareous shale as in 2285-2291, few pieces light gray limestone, few pieces sandstone, white, medium grained (cavings?) trace pyrite.
- 2297-2304 Same as 2291-2297 no pyrite.
- 2304-2310 " " " " no sandstone.
- 2310-2330 " " " " "
- 2320-2333 Shaly limestone-calcareous shale, light gray-medium dark gray (N4), some finely micaceous and very slightly silty, some pyrite.
- 2333-2342 Same as 2320-2333, crinoid stem.
- 2342-2350 Shale, medium gray (N5)-medium dark gray (N4)-grayish red (5R 4/2) few pieces very soft light gray, calcareous, trace pyrite.
- 2350-2355 No samples.
- 2355-2360 Sandstone, light-medium gray, very fine grained, very slightly micaceous; shale (25%) medium dark gray (N4)-dark gray (N3)-reddish gray, some finely micaceous, trace pyrite.
- 2360-2365 Sandstone, light gray, very fine grained, scattered black minerals; shale (2%) medium dark gray (N4)-dark gray (N3)-reddish gray, some pyrite.
- 2365-2375 No samples.
- 2375-2381 Sandstone, white, fine grained, few scattered black minerals; shale (35%) medium dark gray (N4)-grayish black (N20), few pieces reddish gray, some finely micaceous.
- 2381-2387 Sandstone, white-- some gray, fine grained, angular - sub-angular, few scattered black minerals, few pieces shale and micaceous; shale (40%) medium dark gray (N4)-grayish black (N2) few pieces reddish, some pieces micaceous, some finely micaceous and some silty.
- 2387-2395 Same as 2381-2487 except less shale (25%) some green minerals (glauconite?) little limonitic staining.
- 2395-2398 Sandstone, white-light gray, fine grained, scattered black and few green (glauconite?) minerals, some pieces shaly, few pieces slightly calcareous; shale, medium dark gray (N4)-dark gray (N3)-grayish red (5R 4/2).

Interval

- 2398-2405 Sandstone, white-light gray, fine grained, scattered black minerals; shale (5%), medium dark gray (N4)-grayish black (N2)-reddish gray.
- 2405-2410 Same as 2398-2405, more shale (15%), few pieces dark gray magnetic mineral (magnetite?), some limonitic? staining.
- 2410-2418 Shale, medium dark gray (N4)-dark gray (N3), mostly finely micaceous, some silty; sandstone (40%), white-gray, some shaly, few scattered black minerals, few grains show limonitic (?) staining.
- 2418-2425 Sandstone, white-very light gray, very fine-fine grained sub-angular - angular; shale (40%) dark gray (N3).
- 2425-2431 Shale, medium gray (N5)-dark gray (N3), some pieces very micaceous, some silty-sandy, slightly calcareous; sandstone (15%) white-gray, very fine grained, some shaly, few scattered black and green (glauconite?) minerals, slightly calcareous.
- 2431-2440 Shale, medium gray (N5)-dark gray (N3)-grayish red (5R 4/2) some silty-sandy, some very micaceous, some calcareous, few pieces white fine grained sandstone.
- 2440-2444 Shale, medium gray (N5)-medium dark gray (N4)-reddish gray, very calcareous-non-calcareous, very slightly micaceous, some silty-sandy, few pieces light gray limestone.
- 2444-2448 Shale, medium gray (N5)-medium dark gray (N4)-reddish gray, some micaceous, some silty-sandy, few pieces white fine grained sandstone, few pieces calcareous.
- 2448-2455 Shale, light gray (N7)-medium dark gray (N4)-grayish red (5R 4/2), some very micaceous, some silty, some calcareous.
- 2455-2565 Grayish red (5R 4/2)-dark gray (N3), ± 50% very micaceous, few pieces silty.
- 2465-2475 Same as 2455-2465.
- 2475-2485 Shale, medium dark gray (N4)-dark gray (N3)-grayish red (5R 4/2), finely micaceous, some very micaceous, slightly calcareous; sandstone (20%) gray, very fine grained, shaly scattered black mineral, some slightly micaceous, calcareous, little pyrite.

Interval

- 2485-2490 Shale, medium dark gray (N4)-dark gray (N3), few pieces grayish red, slightly calcareous, some finely micaceous; sandstone (10%) as in 2475-2485, little pyrite.
- 2490-2495 Shale, medium dark gray (N4)-grayish red (5R 4/2)-brownish gray, some finely micaceous, silty; sandstone (1%), gray very fine grained, shaly.
- 2495-2500 Sandstone, brownish, very fine grained, scattered black minerals, slightly micaceous; shale (30%), medium dark gray (N4)-grayish black (N2)-reddish gray-brown, some silty and finely micaceous.
- 2500-2505 Same as 2495-2500.
- 2505-2512 Sandstone, gray, very fine grained, scattered black minerals, slightly micaceous; shale (10%) medium dark gray (N4)-grayish black (N2) reddish gray, some pieces micaceous, little limonitic staining.
- 2512-2518 Same as 2505-2512 except less shale (5%), few green minerals (glauconite?).
- 2518-2528 Shale, medium dark gray (N4)-dark gray (N3), few pieces reddish gray; some finely micaceous, some silty-sandy.
- 2528-2538 Shale, medium dark gray (N4)-dark gray (N3)-dark red-brown, very slightly micaceous; sandstone (20%), white to brown-gray, very fine grained.
- 2538-2545 Shale, medium gray (N5)-dark gray (N3), few pieces red, few with greenish tint, ± 25% silty-sandy, very slightly micaceous, some pyrite.
- 2545-2555 Same as 2538-2545.
- 2555-2565 Shale, medium dark gray (N4)-reddish gray, very slightly micaceous, very slightly calcareous, some slightly silty.

- 2565-2575 Shale, medium dark gray (N4), very finely micaceous, some pieces slightly silty, very slightly calcareous-calcareous.
- 2575-2596 Shale, medium gray (N5)-medium dark gray (N4), few pieces reddish gray, very slightly micaceous, some very slightly calcareous; sandstone-siltstone (40%) white-medium light gray, few scattered black minerals, very slightly calcareous.
- 2585-2596 Sandstone, white-medium light gray, very fine grained, scattered black minerals; shale (40%), medium dark gray (N4)-dark gray (N3), some pieces slightly micaceous, few slightly calcareous.
- 2596-2600 Same as 2585-2596, few pieces reddish gray shale,
- 2600-2611 Sandstone, white-light gray, very fine-fine grained, few scattered black minerals; shale (20%), medium dark gray (N4)-dark gray (N3), few pieces red, very slightly micaceous, some pyrite.
- 2611-2616 Same as 2600-2611, fine grained sandstone, some limonite staining.
- 2616-2620 Same as 2611-2616, no pyrite, less shale (10%).
- 2620-2625 Same as 2616-2620.
- 2625-2635 Shale, dark gray (N3)-medium dark gray (N4), very slightly micaceous, pyrite.
- 2635-2745 Shale, medium dark gray (N4), silty-sandy, very slightly micaceous, few pieces sandstone (1%), white-light gray, very fine grained, pyrite.
- 2645-2652 Same as 2635-2645, little pyrite.
- 2652-2655 Sandstone, white-medium gray, very fine grained, some shaly, few scattered black minerals; shale (40%), medium dark gray (N4)-dark gray (N3), pyrite.
- 2655-2659 Sandstone, white-medium gray, very fine grained, some shaly, scattered black minerals, some limonitic staining; shale (40%), medium dark gray (N4)-dark gray (N3), few pieces reddish gray, very slightly micaceous, few pieces silty, pyrite.
- 2659-2665 Same as 2655-2659, less shale (30%).

Interval

2665-2668

Same as 2655-2659, piece of white crystalline limestone cementing material in sandstone very slightly calcareous.

2668-2672

Sandstone, white-very light gray, very fine grained, few grains slightly calcareous; shale (25%), medium dark gray-grayish black (N2), several pieces reddish gray shale, little pyrite.

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Interval

- 2672-2677 Sandstone, white, very fine-grained, angular to sub-angular, free, very few clusters; shale (3%), grayish black (N2), trace pyrite.
- 2677-2682 Same as 2672-2677, more clusters, shale (5%), medium dark gray (N4) to grayish black (N2).
- 2682-2686 Sandstone, white, very fine-grained, angular, clustered few pieces shale, few scattered black minerals, limonitic staining, some of cementing material very slightly calcareous; shale (30%), medium dark gray (N4), to dark gray (N3), few pieces very slightly micaceous, trace pyrite.
- 2686-2690 Same as 2682-2686, no pyrite.
- 2690-2693 Sandstone as 2682-2686 (50%), shale (40%) as in 2682-2686, both covered by light tan calcareous silty to clayey material.
- 2693-2698 Sandstone, white to light gray, very fine-grained, angular to subangular, few scattered black minerals, free and in clusters (mostly free), few pieces slightly calcareous; shale (15%), medium dark gray (N4) to black (N1), trace pyrite.
- 2698-2705 No samples.
- 2705-2708 Sandstone, white to gray, very fine-grained, angular, (dirty) few scattered black and light green minerals, few pieces very slightly calcareous, some limonitic staining; shale (40%) medium dark gray (N4) to dark gray (N3), two or three reddish brown pieces and two or three greenish gray pieces noted, few pieces finely micaceous; (trace pyrite).
- 2708-2710 Sandstone, white to few light gray, very fine-grained, angular to subangular, free and clustered, few scattered medium dark gray (N4) to dark gray (N3); two or three pieces reddish brown, some pieces very slightly micaceous, trace pyrite.
- 2710-2713 Same as 2708-2710, shale about 30%.
- 2713-2718 Sandstone, white, fine to some medium-grained, angular, shale (2%), dark gray to black, trace coal.

Interval

- 2718-2721 Same as 2713-2718, little limonitic staining, shale 5%, no coal.
- 2721-2724 Same as 2718-2721, few pieces soft white calcareous slightly silty, material, shale 10%.
- 2724-2730 Shale, medium dark gray, silty-sandy, slightly micaceous, and sandstone (40%), white-gray, very fine-fine grained shaly.
- 2730-2735 Sandstone, white-gray, very fine - some fine grained, much is shaly, few scattered black minerals; shale (35%) medium dark gray (N4)-dark gray (N3), silty-non silty, slightly micaceous.
- 2735-2740 Sandstone, white-some gray, very fine grained, few scattered black minerals, few pieces shale; shale (30%) medium dark gray (N4) - several pieces medium gray (N5) trace pyrite.
- 2740-2745 Same as 2735-2740 except some limonitic staining and less shale - about 2% shale, two or three pieces reddish gray.
- 2745-2748 Same as 2740-2745.
- 2748-2750 " " " no red shale, some grayish black.
- 2750-2755 Sandstone, white, very fine-fine grained, free, few clusters, transparent, angular to sub-angular; shale, (3%) dark gray (N3)-black (N1).
- 2755-2761 Sandstone, white, very fine-little fine grained, shale, dark gray - black, slight amount silty material over sample.
- 2762-2769 Shale, medium dark gray-dark gray; sandstone, white, fine-medium grained, angular to sub-angular, some soft white calcareous silty material, cements some sand and shale fragments.
- 2769-2771 Sandstone, white, fine grained, angular to subangular; shale (25%) medium gray-medium dark gray; white to pink soft calcareous material (silty) covering sample, in pieces and cementing sandstone and shale fragments, several pieces coal, little limonitic staining.

Interval

- 2771-2773 Sandstone, white, fine grained, angular-sub-angular mostly free clusters, limonitic staining; shale (5%) dark gray-black, one or two pieces red.
- 2774-2778 Sandstone, white, very fine-fine grained, angular to sub-angular; shale (25%), medium dark gray, few pieces grayish black.
- 2778-2785 Sandstone, white, fine grained, angular to sub-angular, limonitic staining; shale (50%) dark gray (N3), several pieces medium gray shale, few pieces finely micaceous, trace pyrite, trace coal.
- 2785-2790 Shale, medium dark gray, slightly finely micaceous; sandstone (1%), gray, very fine grained, shaly, trace pyrite.
- 2790-2797 Shale, medium dark gray-dark gray, some pieces finely micaceous (slightly); sandstone (10%) white-gray, very fine grained, few scattered black minerals, some shaley, some limonitic staining, trace pyrite.
- 2797-2799 Same as 2790-2797.
- 2799-2803 Sandstone, white, very fine grained, angular, clustered, scattered black and few green (glauconite?) minerals, limonite staining, few pieces shaly; shale (10%) medium dark gray-grayish black, some pieces finely micaceous, trace coal.
- 2803-2808 Siltstone, very light gray-light gray, few scattered black minerals, non-calcareous to very calcareous, very slightly micaceous; shale (1%) medium dark gray-grayish black, trace coal.
- 2808-2815 Shale, medium gray-medium dark gray, some pieces finely micaceous (slightly), some silty; sandstone (5%) white-gray, very fine grained, light silty calcareous material, sandstone very slightly calcareous.
- 2815-2820 Sandstone, white, very fine grained, free-some clusters, angular, few pieces gray, few scattered black minerals, few pieces calcareous; shale (10%) grayish black, few pieces dark gray, several pieces very micaceous.
- 2820-2824 Sandstone (very fine grained)-siltstone (mostly sandstone) very light gray-light gray, some scattered black minerals, free and clustered, occasional piece calcareous; shale medium dark gray-grayish black, two or three red pieces, several pieces calcareous.



Interval

- 2824-2828 Sandstone, white; very fine grained, angular to sub-angular, free; shale (5%) dark gray (N3)-grayish black (N2).
- 2828-2831 Same as 2824-2828 except some sandstone clustered, few scattered black minerals, shale - 10%.
- 2831-2833 Sandstone, white, very fine grained, clustered, limonitic staining, few scattered black minerals, angular; shale (50%) medium dark gray to dark gray, two or three red pieces; several pieces soft pink calcareous material.
- 2833-2836 Same as 2831-2833, no red shale, no pink calcareous material; shale about 30%.
- 2936-2837 Same as 2833-2836, shale about 5%.
- 2831-2841 Sandstone, white, fine grained, angular to sub-angular, free, few clusters, few scattered black minerals; shale (3%) dark gray-black, two or three pieces soft white calcareous material.
- 2841-2843 Same as 2837-2841.
- 2843-2848 Sandstone, white-tan, fine grained, poorly sorted, mostly clustered, few scattered black minerals, few pieces calcareous, some limonitic staining; shale (5%) medium dark gray-dark gray.

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Interval	
2838-2851	Shale, medium dark gray, few pieces with reddish tint, few pieces lighter gray; sandstone (45%), white, very fine grained, occasional black mineral much limonitic stain, trace pyrite.
2851-2855	Shale, medium dark gray, very finely micaceous (slightly), non-calcareous to calcareous; sandstone (35%), white-light gray, very fine grained, occasional black mineral, slightly calcareous; limestone to dolomite (3%), medium gray, shale, pyrite (1%), limonitic staining.
2855-2860	Same as 2851-2855.
2860-2867	Shale, medium dark gray, calcareous, trace sandstone as above (cavings?).
2867-2873	Same as 2860-2867, only very slightly calcareous.
2873-2880	" " shale, slightly calcareous to calcareous to dolomitic.
2880-2890	" " " " " "
2890-2900	" " only few pieces calcareous, trace pyrite.
2900-2905	Same as 2890-2900.
2905-2915	" " no pyrite.
2915-2923	Shale, medium dark gray, few pieces medium gray, some pieces very finely micaceous (slightly); sandstone (40%), white to some light gray, very fine grained, some pieces very slightly calcareous, limonite stain, several pieces pyrite.
2923-2927	Sandstone, white, very fine grained, free, occasional cluster, limonite stain, few pieces slightly calcareous; shale (25%), medium dark gray-dark gray, trace pyrite.
2927-2935	Shale, medium dark gray-some medium gray, few pieces silty; sandstone (1%), white-light gray, very fine grained, trace pyrite.
2935-2942	Shale, medium gray-little medium dark gray, some pieces very finely micaceous, some slightly silty, very little limonite stain.
2942-2951	Shale, medium dark gray.
2951-2959	Shale, medium dark gray, non-calcareous to very calcareous, occasional piece silty, one very micaceous piece noted.
2959-2972	Same as 2951-2959, non-micaceous, occasional piece limestone, trace pyrite.

Interval

- 2972-2977 Shale, medium gray-medium dark gray-several with greenish tint, non-calcareous to calcareous, mostly non-calcareous; siltstone (15%), light gray-tan-reddish brown, slightly micaceous, very slightly calcareous to slightly calcareous to slightly calcareous, trace pyrite.
- 2977-2985 Shale, medium dark gray, non-calcareous to calcareous; siltstone, (1%), light gray, shaly, calcareous.
- 2985-2988 No samples.
- 2988-2995 Shale, medium dark gray, occasionally very slightly calcareous, trace sandstone, white, very fine grained, slightly calcareous, trace pyrite.
- 2995-3000 Shale, medium dark gray, non-calcareous to calcareous to few pieces shaly limestone.
- 3000-3005 Limestone, white-gray, clastic, shaly, occasional oolite; shale (40%) medium dark gray, non-calcareous to slightly calcareous.
- 2005-2010 Same as 3000-3005.
- 3010-3017 Shale, medium dark gray, non-calcareous to calcareous to shaly limestone; sandstone (25%), white-gray, very fine grained, slightly calcareous, shaly.
- 3017-3025 Shale, medium gray-medium dark gray, non-calcareous to slightly calcareous; siltstone (30%) to very fine grained sandstone, very light gray, free and clusters, calcareous; silty material (light gray) covering sample, very calcareous.
- 3025-3029 Shale, medium gray, some very finely micaceous; siltstone (50%) very light gray (N8), medium light gray (N6), shaly, very slightly calcareous.
- 3027-3035 Shale, medium dark gray, non-calcareous to calcareous, very finely micaceous (slightly); limestone (15%) white-gray, shaly, trace pyrite very little limonite stain.
- 3035-3039 No samples.
- 3039-3047 Shale, medium dark gray, very slightly micaceous (very finely); sandstone (25%), very light gray-gray, shaly, non-calcareous to calcareous, trace limonite stain.
- 3047-3050 No samples.
- 3050-3054 Sandstone, white-light gray, very fine grained, free and clusters, soft, very calcareous cement in clusters, some limonite stain; shale (15%) medium dark gray, non-calcareous to calcareous.

Interval

- 3054-3058 Sandstone, white, clusters and free, occasional black minerals, non-calcareous to calcareous, limonite stain; shale (15%) medium gray-medium dark gray, two or three with reddish tint.
- 3061-3071 Shale, medium dark gray; sandstone (2%) medium gray, very fine-grained grained and shaly, occasionally slightly calcareous, trace pyrite.
- 3071-3078 Same as 3061-3071, less than 1% sandstone.
- 3078-3080 " " " " " little pink - very light gray silty material, calcareous.
- 3080-3087 Same as 3061-3071, sandstone about 5%, slightly calcareous, very little silty calcareous material, shale non-calcareous to very slightly calcareous.
- 3087-3100 Shale, medium dark gray, occasionally very slightly calcareous, two or three brownish tint; sandstone (1%) gray, very fine-grained, shaly, slightly calcareous, trace pyrite.
- 3100-3110 Shale, medium dark gray, very finely micaceous, non-calcareous to calcareous; limestone (2%) gray-white, shaly, trace pyrite, one or two crinoid stems.
- 3110-3112 No samples.
- 3112-3126 Shale, medium dark gray.
- 3126-3160 No samples.
- 3160-3164 Shale, medium, dark gray, non-calcareous to calcareous; limestone (5%) gray-white, shaly, clastic-non-clastic, trace pyrite, trace fossils.
- 3164-3174 No samples.
- 3174-3178 Same as 3160-3164, no pyrite, no fossils.
- 3178-3188 Shale-calcareous shale-shaly limestone; shale, medium dark gray, some pieces very slightly micaceous; shaly limestone (2%) medium gray-medium dark gray, trace pyrite.
- 3188-3197 Shale, medium dark gray, non-calcareous to slightly calcareous; limestone (10%) gray-white, clastic, one or two pieces dense, shaly, very oolitic zones.
- 3197-3204 Shale, same as 3188-3197; limestone (25%) gray-white, clastic, few pieces dense, occasional oolite, mostly shaly.

Interval

- 3204-3211 Shale, medium dark gray, some calcareous shale, most in non-calcareous; limestone (25%), gray-white, shaly, some clastic.
- 3211-3217 Shale, medium dark gray; calcareous shale-shaly limestone (25%) gray-white.
- 3217-3226 Shale, medium dark gray, non-calcareous to slightly calcareous; few pieces limestone (1%) gray, shaly.
- 3226-3237 Shale, same as 3217-3226, occasional piece limestone, little light gray silty material, calcareous.
- 3237-3245 Shale, dark gray; limestone (10%) gray-white, shaly, trace fossil.
- 3245-3250 Same as 3237-3245, few pieces calcite, limestone 15%.
- 3250-3257 Same as 3245-3250, shale medium dark gray, occasional oolite.

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Interval

- 3257-3266 Shale, medium dark gray (N4), very finely micaceous, calcareous (to dolomitic), several pieces non-calcareous; limestone (1%), white-gray, clastic, trace pyrite.
- 3266-3274 Same as 3257-3266.
- 3274-3278 " " " more limestone - 10%.
- 3278-3281 Shale, medium dark gray (N4)-dark gray (N3), non-calcareous to calcareous; limestone (3%), clastic, shaly, trace pyrite.
- 3281-3287 Same as 3278-3281 except no dark gray shale, more limestone - 50%, no pyrite.
- 3287-3292 Limestone dark gray-white, clastic, much is shaly, very occasional oolite; shale (35%), dark gray (N3)-medium dark gray (N4).
- 3292-3297 Limestone, medium dark gray-white, shaly; shale (5%) medium dark gray (N4).
- 3297-3304 Limestone, gray-white, clastic, few pieces dense, some shaly, slightly oolitic; shale (20%), dark gray-medium dark gray, non-calcareous to calcareous.
- 3304-3310 Limestone, medium dark gray-white, shaly, some clastic, occasional oolite, one or two pieces calcate; shale (5%) medium dark gray (N4), trace pyrite.
- 3310-3314 Same as 3304-3310, shale about 1%.
- 3314-3321 Limestone, gray-white, few pieces brownish gray, shaly, some clastic, one or two pieces dense; shale (40%) medium dark gray-some dark gray, non-calcareous to calcareous.
- 3321-3327 Same as 3314-3321, no brownish or dense limestone, shale 50%.
- 3327-3338 Shale, dark gray (N3)-medium dark gray (N4), very calcareous to shaly limestone, white-gray (mostly very calcareous shale - 95%), little very soft earthy calcareous material, light gray, trace pyrite.
- 3338-3350 Same as 3327-3338 except shale is medium dark gray, no pyrite, no soft earthy material.
- 3350-3358 Limestone, dark gray-light gray, very shaly, some clastic; about 3% calcareous shale, dark gray.
- 3358-3363 Limestone, medium dark gray-light gray, very shaly, some clastic.

Interval

- 3363-3367 Limestone, dark gray-white, clastic and dense (30% - dark gray), oolitic zones, occasional piece dark gray shale.
- 3367-3373 Same as 3363-3367.
- 3373-3380 Limestone, medium brownish gray-white, dense few clastic, occasional piece oolitic, few pieces very finely crystalline.
- 3380-3386 Same as 3373-3380, none oolitic.
- 3386-3390 Gray-brownish gray-white, dense-clastic, few pieces oolitic, some reddish brown iron material.
- 3390-3392 Same as 3386-3390, no iron material.
- 3392-3395 Limestone, dark gray-white, dense and clastic, few pieces oolitic, occasional piece dark gray shale.
- 3395-3400 Same as 3392-3395, little more is clastic, few pieces very finely crystalline.
- 3400-3405 Same as 3392-3395.
- 3405-3410 Limestone, medium gray-medium brownish gray-white, dense and clastic, occasional piece oolitic, one or two pieces calcite.
- 3410-3418 Same as 3405-3410 no calcite.
- 3418-3422 Same as 3392-3395.
- 3422-3429 Limestone, medium dark gray-white, shale to dense-clastic, occasional oolite, few pieces soft earthy.
- 3429-3433 Same as 3422-3429, occasional piece medium dark gray shale, one piece pink soft earthy limestone piece calcite.
- 3433-3436 Limestone-gray-white-little brownish gray, clastic-very finely crystalline, few pieces dense, some pieces oolitic, some pieces shaly.
- 3436-3442 Same as 3433-3436, only occasional oolite.
- 3442-3452 Limestone, medium dark gray-white, clastic-dense (10%), moderately oolitic.
- 3452-3457 Same as 3442-3452, one or two calcite crystals.
- 3457-3463 Limestone, medium dark gray-white, very finely crystalline-clastic, occasional oolite, some shaly, little very light gray, soft silty material, calcareous, trace pyrite.

Interval

- 3463-3475 Same as 3457-3463, no pyrite.
- 3475-3482 Limestone, medium dark gray-white, shaly, some clastic-finely crystalline.
- 3482-3487 Same as 3475-3482, one or two pieces calcite.
- 3482-3497 Limestone, dark gray-white, dense-some very finely crystalline, some clastic, occasional oolite.
- 3497-3503 Limestone, dark gray-white, dense-very finely crystalline-shaly, some clastic.
- 3503-3512 Limestone, white-gray-light brownish gray, clastic, moderately oolitic.
- 3512-3516 Same as 3503-3512, moderately oolitic zones, some is dense (1%), trace dark gray shale.
- 3516-3521 Limestone, white-gray, clastic-some very finely crystalline.
- 3521-3531 Limestone, gray-white-little brownish gray, clastic, some very finely crystalline-dense.
- 3531-3536 Limestone, brownish gray-white, dense-very finely crystalline, little clastic.
- 3536-3543 Limestone, brownish gray-white, clastic, little dense, oolitic zones, occasional piece dark gray shale.
- 3543-3549 Limestone, same as 3536-3543, little powdery calcareous material over sample, no shale, piece calcite, occasional dense piece.
- 3549-3555 Same as 3543-3549.
- 3555-3562 Limestone, medium brownish gray-white, dense-very finely crystalline, few piece clastic.
- 3562-3571 Limestone, medium brownish gray-white, clastic, oolitic, some pieces finely crystalline-dense (10%), one or two piece calcite.
- 3571-3579 Same as 3562-3571.
- 3579-3583 Limestone, brownish gray-white, clastic-dense-very slightly oolitic.
- 3583-3588 Same as 3579-3583, only occasional oolite, little silty calcareous material.



Interval

- 3588-3597 Limestone, brownish gray-white, dense, very finely crystalline, few pieces chalky, occasional piece clastic, sideritic (?).
- 3597-3603 Same as 3588-3597, occasional oolite.
- 3603-3608 " " " "
- 3608-3621 " " mostly dense, few pieces very oolitic.
- 3621-3628 " " very occasional oolite, mostly dense.
- 3628-3635 " " " " " limestone medium brownish gray-white.
- 3635-3645 Same as 3628-3635, limestone more gray, several pieces quartz, transparent-milky, white-orange tint.
- 3645-3654 Same as 3635-3645, one piece quartz noted.
- 3654-3663 Limestone, gray (little brownish tint)-white, dense, few pieces clastic, few pieces soft, earthy, two or three pieces calcite, two or three pieces quartz as in 3635-3645.
- 3663-3671 Limestone, medium gray-white, dense-very finely crystalline, some (3%) is clastic and oolitic, piece of calcite noted fragment of quartz as above.
- 3671-3676 Same as 3663-3671 except not oolitic, only occasional piece clastic, no calcite or quartz, trace siderite(?).
- 3686-3691 Same as 3676-3686, brownish tint to some limestone.
- 3691-3703 Limestone, medium dark gray-white, dense-few pieces clastic, few pieces soft earthy, little silty material.
- 3703-3709 Limestone-medium gray-medium dark gray-very light gray, shaly-dense, occasional piece clastic, little silty material, some pieces soft, earthy.
- 3709-3720 Limestone, medium dark gray-very light gray, shaly, few pieces soft earthy, occasional pieces medium dark gray shale, one or two oolites noted,
- 3720-3723 Limestone, same as 3703-3709, very occasional oolite.

Interval

- 3723-3730 Limestone, medium dark gray-very light gray, few pieces with brownish tint, dense-shaly, occasional piece clastic, few pieces (very light gray) earthy, several pieces grayish brown chert.
- 3720-3736 Same as 3723-3730, limestone is shaly, not dense.
- 3736-3747 Shale, medium dark gray-medium gray, non-calcareous to slightly calcareous, little silty calcareous material, used as cementing material in one or two pieces, trace pyrite.
- 3747-3758 Same as 3736-3747, silty material not used as cement; two or three pieces limestone (cavings?), some shale very finely micaceous.
- 3758-3768 Shale, medium gray (N5)-little medium dark gray (N4), few pieces very slightly calcareous, glauconite(?), few pieces very finely micaceous, little silty calcareous material, very occasional piece limestone, white-gray, one soft earthy piece limestone.
- 3768-3774 Shale, medium dark gray, slightly silty, very slightly micaceous, one piece reddish gray, one piece reddish orange, one piece calcite, broken pieces of quartz (cavings?).
- 3774-3780 Same as 3768-3774 except no calcite, no red or reddish orange shale.
- 3780-3787 Same as 3774-3780, shale more silty-sandy.
- 3787-3793 " " several pieces soft earthy limestone, two or three pieces calcite, several pieces red shale.
- 3793-3800 Shale, medium dark gray (N4)-medium gray (N5)-few pieces light gray, very slightly micaceous, occasionally very slightly calcareous, occasional piece brownish gray limestone, trace pyrite, little limonite stain.
- 3800-3806 Shale, medium dark gray-medium gray, some with reddish tint, slightly silty; limestone (3%) white-gray, mostly soft, white earthy other gray, clastic-dense, slightly sideritic (?).
- 3806-3815 Shale, medium gray (N5)-medium dark gray (N4), slightly silty, very slightly micaceous, trace pyrite, trace gray limestone (cavings?).
- 3815-3823 Shale, medium gray, slightly silty, very slightly micaceous, little silty material.
- 3823-3830 Same as 3815-3823 only very slightly silty, some pieces very slightly calcareous, trace pyrite.

Interval

- 3830-3839 Same as 3823-3830, no pyrite, one piece soft earthy limestone.
- 3839-3857 Same as 3830-3839 one or two pieces soft earthy limestone.
- 3857-3863 Shale, medium gray, much very calcareous silty material covering shale, about 1% brownish gray-white limestone.
- 3863-3877 Same as 3857-3863 not as much silty material, trace pyrite.
- 3877-3884 Shale, medium dark gray-some medium gray, 50% silty-sandy, non-calcareous to slightly calcareous, trace limestone, two or three pieces broken quartz, trace pyrite.
- 3884-3890 Same as 3877-3884, no quartz.

- 3890-3902 Shale, medium dark gray (N4) to medium gray (N5), slightly micaceous; siltstone (5%), very light gray (N8) to light gray (N7), slightly calcareous.
- 3902-3917 Shale, medium dark gray to medium light gray (N6), one or two with brownish tint, slightly finely micaceous, few pieces slightly silty; siltstone (1%) as in 3890-3902.
- 3917-3922 Same as 3902-3917, trace pyrite.
- 3922-3928 Sandstone (60%), very light gray (N8) to medium light gray (N6), very fine-grained to siltstone, shaly, slightly calcareous; shale, medium dark gray, some silty, slightly finely micaceous; pyrite, disseminated.
- 3928-3940 Shale, medium dark gray to light brownish gray, slightly micaceous, silty, some slightly calcareous, little brownish silty material; siltstone (5%), medium dark gray to brownish gray, shaly, slightly calcareous.
- 3940-3951 Siltstone, medium gray to pale yellowish brown (10YR 5/6) to light gray, shaly, slightly micaceous, occasionally very slightly calcareous; shale (10%) medium dark gray, trace pyrite.
- 3951-3958 Siltstone to very fine-grained sandstone (15%), very light gray to medium dark gray, slightly calcareous, some pieces slightly micaceous; shale (15%) medium dark gray, trace pyrite.
- 3958-3968 Same as 3951-3958, scattered black minerals.
- 3968-3981 Shale, medium dark gray, much is silty, micaceous to non-calcareous, occasionally slightly calcareous; siltstone (30%) very light gray to medium dark gray, shaly, some slightly calcareous, some slightly micaceous.
- 3981-3985 Shale, medium dark gray, some slightly calcareous; siltstone (5%), very light gray to medium dark gray, slightly calcareous; trace coal, trace pyrite.
- 3985-3990 Siltstone (60%), very light gray to medium gray, shaly, some pieces slightly calcareous, occasionally slightly micaceous; shale, medium dark gray to medium gray, few brownish gray, some silty, slightly finely micaceous, few pieces slightly calcareous; trace pyrite.
- 3990-4000 Same as 3985-3990, more shale - 70%.
- 4000-4018 Shale, medium gray, very slightly micaceous, occasionally very slightly calcareous; siltstone (10%) medium light gray, shaly, slightly calcareous.
- 4018-4036 Same as 4000-4018, some medium dark gray shale, one soft clayey piece.

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4036-4047	Same as 4018-4036, no clayey pieces.
4047-4060	Shale, medium dark gray to few brownish gray to two or three pieces reddish gray; siltstone (10%) very light gray to medium gray, occasional piece calcareous.
4060-4073	Shale, medium dark gray, little white silty material, slightly very finely micaceous.
4073-4085	Same as 4060-4073, very little silty material.
4085-4091	Shale, medium gray, little tan silty material.
4091-4107	" " " " "
4107-4125	" " " " "
4125-4140	" " " " "
4140-4150	Shale, medium dark gray, very little tan silty material.
4150-4164	" " " " "
4164-4176	" " " " "
4176-4188	" " " " "
4188-4201	" " " " "
4201-4210	Shale, medium gray, very little tan silty material.
4210-4220	" " " " "
4220-4235	" " " " "
4235-4245	" " " " "
4245-4256	" " " " "
4256-4267	Shale, medium dark gray.
4267-4284	" " " occasional piece with silty material.
4284-4297	" " gray, trace tan silty material.
4297-4312	" " " " "
4312-4328	" " " occasionally slightly micaceous.

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- 4328-4343 Shale, medium dark gray, trace tan silty material.
- 4343-4361 " " " " " " " "
- 4361-4378 " " dark " " " " " "
- 4378-4399 " " " " trace pyrite.
- 4399-4415 " " " " one or two pieces white opaque quartz fragments.
- 4415-4433 " " " " " " " " " " " "
- 4433-4450 Shale, medium dark gray, several pieces slightly silty and very slightly calcareous, trace pyrite, some pieces slightly micaceous.
- 4450-4456 Shale, between medium dark gray and dark gray, slightly micaceous, some pieces silty and slightly calcareous.
- 4456-4472 Shale, dark gray to some medium dark gray, some slightly silty; siltstone (5%) gray, shaly, slightly calcareous.
- 4472-4493 Shale, medium gray to medium dark gray, occasional pieces silty, few slightly micaceous.
- 4508- Shale, medium gray to some medium dark gray, few pieces slightly micaceous.

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