

GGs no. 3080

Wheeler County, Georgia

Southern Natural Gas Co., Ronnie Towns no. 1

TD 4075

logged to 3850

logged by Arthur Gregory, completed June 19, 1976.

terminology from Maher (1964)

* after a number means that a paleontological sample was taken and is included in the sample envelope.

Note. This is the first well ever logged by Mr. Gregory. He was taking the courses in mineralogy simultaneously with the logging.

- (0-60 no samples
- 60-70* 70% chalky quartz sand, colorless, very light grey, moderate yellow green, grey green, very coarse grain, angular, medium sorted
25% limy sandstone aggregate, very coarse grain
5% mica, lignite, phosphate, aragonite fossils
* magnetic spheroid(1)(meteor?); phosphate
- 70-80* 75% chalky quartz sand, colorless, various colors, very coarse grain, angular, medium sorted
25% limy sandstone aggregate, some bright red, very coarse grain; *magnetic spheroids; phosphate
- 80-90* 80% chalky quartz sand, colorless, various colors, very coarse grain, angular, medium sorted
20% limy sandstone aggregate, very coarse grain
* pelecypod, obsidian?, shell fragments; phosphate
- 90-100 85% clean quartz sand, colorless, light grey, coarse grain, angular, well sorted, with mica, garnet inclusions
15% limy sandstone aggregate, very coarse grain
obsidian?; phosphate
- 100-110 90% quartz sand, colorless, light grey, coarse grain, angular, well sorted, with mica, garnet inclusions
10% limy sandstone aggregate, very coarse grain
phosphate, feldspar
- 110-120* 95% quartz sand, colorless, light grey, coarse grain, angular, well sorted, with mica, garnet inclusions
5% limy sandstone aggregate, very coarse grain
phosphate, mica, glauconite
- 120-130* 95% quartz sand, colorless, light grey, coarse grain, angular, well sorted, with mica, garnet inclusions
5% limy sandstone aggregate, very coarse grain
phosphate, mica, glauconite, amphibole?
- 130-140 97% quartz sand, colorless, very light grey, coarse grain, angular, well sorted
3% limy sandstone aggregate, white, quartz mica inclusions, very coarse grain, angular
phosphate, mica, feldspar, obsidian?
- change
- 140-150* 85% quartz sand, colorless, very light grey, very coarse grain, angular, medium sorted
12% sandy limestone, with quartz, mica, feldspar inclusions, very coarse grain, angular, poorly sorted
3% clayey shale, soft, flat, grey yellow green
a few pieces of clay, moderate orange pink
phosphate, mica, feldspar, obsidian?
* grey clay, foraminiferan

- 150-160
 - 75% quartz sand, colorless, very light grey, coarse grain, angular, well sorted
 - 20% sandy limestone, with quartz, mica feldspar inclusions, very coarse grain, angular, poorly sorted
 - 5% clayey shale, soft, flat, grey yellow green
a few pieces of clay, moderate orange pink phosphate, mica, feldspar, obsidian?

- 160-170
 - 75% quartz sand, colorless, very light grey, coarse grain, angular, well sorted
 - 20% sandy limestone, with quartz, mica, feldspar inclusions, very coarse grain, angular, poorly sorted
 - 5% clayey shale, soft, flat, grey yellow green
a few pieces of clay, moderate orange pink phosphate, mica, feldspar, obsidian?

- change
170-180*
 - 45% limy sandstone aggregate, with quartz, feldspar inclusions, poorly sorted, very porous, angular, very coarse grain
 - 35% quartz sand, colorless, light grey
 - 10% fossil shell fragments
 - 5% clayey shale, soft, flat or bent, grey yellow green
 - 5% quartz sand, light grey, various colors, rounded
 - * sharks tooth, coiled foraminifera; phosphate, lignite

- 180-190*
 - 45% limy sandstone aggregate, with quartz, feldspar inclusions, poorly sorted, very porous, angular, very coarse grain
 - 35% quartz sand, colorless, light grey, very coarse grain, angular
 - 5% quartz sand, light grey, various colors, coarse grain, rounded
 - 10% fossil shell fragments
 - 5% clayey shale, soft, flat or bent, grey yellow green
 - * sharks tooth, phosphate chip, olive black, flat, smooth phosphate, lignite

- 190-200
 - 45% limy sandstone aggregate, with quartz, feldspar inclusions, very porous, very coarse grain, subangular, medium sorted
 - 35% quartz sand, colorless, light grey, very coarse grain, angular
 - 5% quartz sand, light grey, various colors, coarse grain, rounded
 - 10% fossil shell fragments
 - 5% clayey shale, soft, flat or bent, grey yellow green
phosphate, lignite

- 200-210
 - 45% limy sandstone aggregate, with quartz, feldspar inclusions, very porous, very coarse grain, sub angular, medium sorted
 - 35% quartz sand, colorless, light grey, very coarse grain, angular
 - 5% quartz sand, light grey, various colors, coarse grain, rounded
 - 10% fossil shell fragments
 - 5% clayey shale, soft, flat or bent, grey yellow green
phosphate, lignite

- change
210-220
- 20% calcium carbonate flakes, soft, flat, colorless, silky nonporous, very coarse grain, subangular, poorly sorted
 - 20% clayey sandstone, soft, medium light grey, very porous
 - 20% quartz sand, colorless, nonporous, very coarse grain, angular
 - 18% shell fragments
 - 2% clayey shale, grey yellow green, fine grain, subrounded; phosphate
- 220-230*
230-240*
- 20% calcium carbonate flakes, soft, flat, colorless, silky, nonporous, very coarse grain, subangular, poorly sorted
 - 20% clayey sandstone, soft, medium light grey, very porous
 - 20% quartz sand, colorless, nonporous, very coarse grain, angular
 - 18% shell fragments
 - 2% clayey shale, grey yellow green, fine grain, subrounded
 - * amphibole; phosphate
- 240-250
- 20% calcium carbonate flakes, soft, flat, colorless, silky, nonporous, very coarse grain, subangular, poorly sorted
 - 20% clayey sandstone, soft, medium light grey, very porous
 - 20% quartz sand, colorless, nonporous, very coarse grain, angular
 - 18% shell fragments
 - 2% clayey shale, grey yellow green, fine grain, subrounded phosphate
- change
250-260
- 40% quartz sand, colorless, very light grey, nonporous, coarse grain, subangular, some rounded, medium sorted
 - 25% clay, grey yellow green, fine grain, subrounded
 - 10% calcium carbonate flakes, soft, colorless, silky, nonporous, very coarse grain, angular
 - 10% shell fragments, moderate orange pink, very coarse grain, angular
 - 10% clayey sandstone, soft, medium light grey very porous, angular
 - 5% lignite, phosphate, obsidian?
- change
260-270
- 60% clay, soft, grey yellow green, nonporous, fine grain, medium sorted
 - 10% quartz sand, colorless, very light grey, nonporous, coarse grain, subangular, some rounded
 - 10% clayey sandstone, soft, medium light grey, very porous, angular
 - 8% calcium carbonate flakes, soft, colorless, silky, nonporous, very coarse grain, angular
 - 8% shell fragments, moderate orange pink, very coarse grain, angular
 - 4% limy sandstone aggregate; phosphate, lignite, obsidian?
- 270-280
- 45% clay, soft, grey yellow green, nonporous, fine grain medium sorted
 - 12% quartz sand, colorless, very light grey, nonporous coarse grain, subangular, some rounded
 - 12% calcium carbonate flakes, soft, colorless, silky, nonporous, very coarse grain, angular
 - 11% limestone, very light grey
 - 10% shell fragments, moderate orange pink, very coarse grain, angular
 - 10% clayey sandstone, soft, medium light grey, very porous, angular phosphate, lignite, obsidian?

- 280-290* 45% clay, soft, grey yellow green, nonporous, fine grain
 290-300 medium sorted
- 12% quartz sand, colorless, very light grey, nonporous
 coarse grain, subangular, some rounded
- 12% calcium carbonate flakes, soft, colorless, silky,
 nonporous, very coarse grain, angular
- 11% limestone, very light grey
- 10% shell fragments, moderate orange pink, various colors,
 very coarse grain, angular
- 10% clayey sandstone, soft, medium light grey, very porous,
 angular;
- * sharks tooth; phosphate, lignite, obsidian?
- 300-310 45% clay, soft, grey yellow green, nonporous, fine grain
 310-320 medium sorted
- 12% quartz sand, colorless, very light grey, nonporous
 coarse grain, subangular, some rounded
- 12% calcium carbonate flakes, soft, colorless, silky,
 nonporous, very coarse grain, angular
- 11% limestone, very light grey
- 10% shell fragments, various colors, very coarse grain, angular
- 10% clayey sandstone, soft, medium light grey, very porous, angular
 a few foraminiferans, phosphate, lignite, obsidian?
- 340-350* 45% claystone, soft, grey yellow green, nonporous, fine grain,
 medium sorted
- 10% quartz sand, colorless, very light grey, nonporous
 coarse grain, subangular, some rounded
- 10% calcium carbonate flakes, soft, colorless, silky,
 nonporous, very coarse grain, angular
- 8% limestone, very light grey
- 17% shell fragments, various colors, very coarse grain, angular
- 10% clayey sandstone, soft, medium light grey, very porous, angular
 * sharks tooth; foraminiferans, phosphate, lignite, obsidian?
- 350-360* 45% claystone, soft, grey yellow green, nonporous, fine grain,
 medium sorted
- 10% quartz sand, colorless, very light grey, nonporous
- 7% calcium carbonate flakes, soft, colorless, silky,
 nonporous, very coarse grain, angular
- 13% limestone, very light grey
- 18% shell fragments, various colors, very coarse grain, angular
- 7% clayey sandstone, soft, medium light grey, very porous, angular
 * sharks tooth; foraminiferans, phosphate, lignite, obsidian?
- change 360-370* 75% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
 medium to coarse grain, medium sorted
- 25% claystone, soft, grey yellow green, nonporous, fine grain
 some calcium carbonate flakes; phosphate
- 370-380 75% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
 medium to coarse grain, medium sorted
- 22% claystone, soft, grey yellow green, nonporous, fine grain
 some calcium carbonate flakes
- 3% sandy claystone, medium light grey; phosphate

- 380-390 75% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
medium to coarse grain, medium sorted
22% claystone, soft, gray yellow green, nonporous, fine grain
3% sandy claystone, medium light grey
some calcium carbonate flakes; phosphate
- 390-400 75% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
medium to coarse grain, medium sorted
22% claystone, soft, gray yellow green, occasional grey blue,
nonporous, fine grain
3% sandy claystone, medium light grey
some calcium carbonate flakes, some colorless quartz sand,
one piece of limy sandstone(cave?); phosphate
- 400-410 80% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
medium to coarse grain, medium sorted
18% claystone, grey yellow green, fine grain, very small
amount of grey blue claystone, very coarse grain
2% quartz sand, colorless, coarse grain; phosphate
- 410-420* 80% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
medium to coarse grain, medium sorted
18% claystone, grey yellow green, fine grain, very small
amount of grey blue, very coarse grain
2% quartz sand, colorless, light grey, coarse grain
presence of feldspar, presence of sandy claystone
* gastropod
- 420-430 80% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
430-440 medium to coarse grain, medium sorted
18% claystone, grey yellow green, fine grain,
2% quartz sand, colorless, light grey, coarse grain
presence of feldspar, presence of sandy claystone; phosphate
- 440-450 85% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
450-460 medium to coarse grain, medium sorted
13% claystone, grey yellow green, fine grain
2% quartz sand, colorless; phosphate
- 460-470 90% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
470-480 medium to coarse grain, medium sorted
8% claystone, grey yellow green, fine grain
2% quartz sand, colorless; phosphate
- 480-490 95% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
490-500 medium to coarse grain, well sorted
3% claystone, grey yellow green, soft, nonporous, fine grain
2% quartz sand, colorless, coarse grain
feldspar, calcium carbonate flakes, phosphate

- 500-510 95% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
medium to coarse grain, well sorted
3% claystone, grey yellow green, soft, nonporous, fine grain
2% quartz sand, colorless, coarse grain
calcium carbonate flakes, almost no phosphate
- 510-520 95% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
520-530 medium to coarse grain, well sorted
530-540 3% claystone, grey yellow green, soft, nonporous, fine grain
2% quartz sand, colorless, coarse grain
calcium carbonate flakes, phosphate
- 540-550* 95% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
medium to coarse grain, well sorted
3% claystone, grey yellow green, soft, nonporous, fine grain
2% quartz sand, colorless, coarse grain
small amount of sandy claystone (cave?), glauconite?
calcium carbonate flakes, phosphate
- 550-560 95% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
medium to coarse grain, well sorted
3% claystone, grey yellow green, soft, nonporous, fine grain
2% quartz sand, colorless, coarse grain
pelecypod, calcium carbonate flakes, phosphate
- 560-570 95% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
medium to coarse grain, well sorted
3% claystone, grey yellow green, soft, nonporous, fine grain
2% quartz sand, colorless, coarse grain
lignite, calcium carbonate flakes, phosphate
- 570-580* 95% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
589-590 medium to coarse grain, well sorted
4% quartz sand, colorless, coarse grain
1% claystone, grey yellow green, soft, nonporous, fine grain
lignite, calcium carbonate flakes, phosphate
- 590-600* 95% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
600-610 medium to coarse grain, well sorted
4% quartz sand, colorless, coarse grain
1% claystone, grey yellow green, soft, nonporous, fine grain
* pelecypod, oolitic limestone?
small amount of fossiliferous aggregate, limestone cemented
lignite, calcium carbonate flakes, phosphate
- 610-620 96% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
620-630 coarse to medium grain, well sorted
630-640 4% quartz sand, colorless, coarse grain
small amount of fossiliferous aggregate, limestone cemented
calcium carbonate flakes-thicker and very few
lignite, phosphate
- 640-650* 96% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
coarse to medium grain, well sorted
4% quartz sand, colorless, coarse grain
* calcium carbonate rhombohedral crystal; lignite, phosphate

- 650-660* 96% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
660-670 coarse to medium grain, well sorted
(670-680 4% quartz sand, colorless, coarse grain
680-690 * calcium carbonate rhombohedral crystal, fang shaped sharks tooth
phosphate, lignite
- 690-700* 96% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
fossils are less distinct, coarse to medium grain,
well sorted
4% quartz sand, colorless, coarse grain
more limestone aggregate; phosphate, lignite
* pelecypod
- 700-710* 96% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
710-720 coarse to medium grain, well sorted, (less distinct)
720-730 4% quartz sand, colorless, coarse grain
* resinous sucrosic dolomite: calcium carbonate particles held
together by limestone cement, grey orange, fine to med grain
phosphate, lignite
- 730-740 90% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
coarse to medium grain, well sorted, (less distinct)
5% resinous sucrosic dolomite, grey orange, some grey green
medium grain
5% quartz sand, colorless, coarse grain, subrounded
one piece of mica, some feldspar, lignite, phosphate
- (740-750 86% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
coarse to medium grain, well sorted, (less distinct)
7% resinous sucrosic dolomite, grey orange, some grey green
medium grain
7% quartz sand, colorless, coarse grain, subrounded
phosphate, lignite
- 750-760 80% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
coarse to medium grain, well sorted, (less distinct)
10% resinous sucrosic dolomite, grey orange, some grey green,
limestone cemented, medium to fine grain
10% quartz sand, colorless, coarse grain subrounded
phosphate, lignite
- change
760-770 50% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
770-780 coarse to medium grain, medium sorted
35% quartz sand, colorless, medium grain, subrounded
15% resinous sucrosic dolomite, grey orange, some grey green,
limestone cemented, medium to fine grain
phosphate, lignite
- 780-790 50% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
coarse to medium grain, medium sorted
35% quartz sand, colorless, medium grain, subrounded
15% resinous sucrosic dolomite, grey orange, some grey green,
limestone cemented, medium to fine grain
a few extra large pieces of lignite; phosphate

- 790-800 50% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
800-810 coarse to medium grain, medium sorted
- 310-820 30% quartz sand, colorless, medium grain, subrounded
- 820-830 20% resinous sucrosic dolomite, grey orange, limestone cemented,
830-840 medium to fine grain
large pieces of lignite; phosphate
- 840-850 60% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
coarse to medium grain, medium sorted
25% quartz sand, colorless, medium grain, subrounded
15% resinous sucrosic dolomite, grey orange, limestone cemented,
medium to fine grain
phosphate, lignite
- 850-860 60% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
860-870 coarse to medium grain, medium sorted
25% quartz sand, colorless, medium grain, subrounded
15% resinous sucrosic dolomite, grey orange, limestone cemented,
medium to fine grain
feldspar, phosphate, lignite
- 870-880 50% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
880-890 coarse to medium grain, medium sorted
35% quartz sand, colorless, medium grain, subrounded
15% resinous sucrosic dolomite, grey orange, limestone cemented,
medium to fine grain
phosphate, lignite
- 890-900 50% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
coarse to medium grain, medium sorted
35% quartz sand, colorless, medium grain, subrounded
15% resinous sucrosic dolomite, grey orange, limestone cemented,
medium to fine grain
- change: small amount of limy sandstone with many accessories--mica
phosphate, lignite
- 900-910 50% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
coarse to medium grain, medium sorted
35% quartz sand, colorless, medium grain, subrounded
15% resinous sucrosic dolomite, grey orange, limestone cemented,
medium to fine grain
micaceous limy sandstone; phosphate, lignite
- 910-920 50% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
coarse to medium grain, medium sorted
5% micaceous limy sandstone, speckled, white, coarse grain
35% quartz sand, colorless, medium grain, subrounded
10% resinous sucrosic dolomite, grey orange, limestone cemented,
medium to fine grain
phosphate
- 920-930 40% micaceous limy sandstone, speckled, white, coarse grain
30% microcoquina, grey pink, carbonate, foraminiferans, bryzoans,
coarse to medium grain, medium sorted
25% quartz sand, colorless, medium grain, subrounded
5% resinous sucrosic dolomite, grey orange, limestone cemented,
medium to fine grain
almost no phosphate; lignite

- 930-940 40% micaceous limy sandstone, speckled, white,
coarse grain
30% microcoquina, grey pink, carbonate, foraminiferans,
bryzoans, coarse to medium grain, medium sorted
25% quartz sand, colorless, medium grain, subrounded
5% resinous sucrosic dolomite, grey orange, limestone
cemented, medium to fine grain
change lignite; no phosphate
- 940-950 55% micaceous limy sandstone, speckled, white,
coarse grain
20% microcoquina, grey pink, carbonate, foraminiferans,
bryzoans, coarse to medium grain, medium sorted
20% quartz sand, colorless, medium grain, subrounded
5% resinous sucrosic dolomite, grey orange, limestone
cemented, medium to fine grain
lignite; no phosphate
- 950-960 no change
- 960-970 65% micaceous limy sandstone, speckled, white,
coarse grain
15% microcoquina, grey pink, carbonate, foraminiferans,
bryzoans, coarse to medium grain, medium sorted
15% quartz sand, colorless, medium grain, subrounded
5% resinous sucrosic dolomite, grey orange,
limestone cemented, medium to fine grain
lignite
- 970-980 60% micaceous limy sandstone, speckled, white,
coarse grain
15% microcoquina, grey pink, carbonate, foraminiferans,
bryzoans, coarse to medium grain, medium sorted
20% quartz sand, colorless, feldspar also present,
medium grain, subrounded
5% resinous sucrosic dolomite, grey orange,
limestone cemented, medium to fine grain
lignite
- 980-990 55% micaceous limy sandstone, speckled, white,
coarse grain
15% microcoquina, grey pink, carbonate, foraminiferans,
bryzoans, coarse to medium grain, medium sorted
25% quartz sand, colorless, feldspar also present
medium grain, subrounded
5% resinous sucrosic dolomite, grey orange,
limestone cemented, medium to fine grain
no lignite(?)
- 990-1000 55% micaceous limy sandstone, speckled, white,
coarse grain
10% microcoquina, grey pink, carbonate, foraminiferans,
bryzoans, coarse to medium grain, medium sorted
30% quartz sand, colorless, feldspar, medium grain,
subrounded
5% resinous sucrosic dolomite, grey orange,
limestone cemented, medium to fine grain

- 1000-1010 55% micaceous limy sandstone, speckled, white,
coarse grain
10% microcoquina, grey pink, carbonate, foraminiferans,
bryzoans, coarse to medium grain, medium sorted
30% quartz sand, colorless, feldspar, medium grain,
subrounded
5% resinous sucrosic dolomite, grey orange,
limestone cemented, medium to fine grain
one piece of lignite
- 1010-1020 55% micaceous limy sandstone, speckled, white,
coarse grain
30% quartz sand, colorless, feldspar, medium grain,
subrounded
10% fossil fragments, calcium carbonate, coarse to
medium grain
5% resinous sucrosic dolomite, grey orange,
limestone cemented, medium to fine grain
lignite
- 1020-1030 50% micaceous limy sandstone, speckled, white,
coarse grain
35% quartz sand, colorless, feldspar, medium grain,
subrounded
10% fossil fragments, calcium carbonate, coarse to
medium grain
5% resinous sucrosic dolomite, grey orange,
limestone cemented, medium to fine grain
-
- 1030-1040 55% fossil fragments, calcium carbonate, white,
very light grey, pink grey, moderate brown,
coarse grain, medium to poor sorted
44% quartz sand, colorless, medium to coarse grain,
subangular, some rounded
1% glauconite, medium grain
a few large pieces of unknown brown aggregate,
phosphate
change
- 1040-1050 60% fossil fragments, calcium carbonate, white,
very light grey, pink grey, coarse grain,
well sorted
39% quartz sand, colorless, medium to coarse grain,
subangular, some rounded
1% glauconite, medium grain
one large piece of unknown brown aggregate,
phosphate
- 1050-1060 60% fossil fragments, calcium carbonate, white,
very light grey, pink grey, coarse grain,
well sorted
39% quartz sand, colorless, medium to coarse grain,
subangular, some rounded
1% glauconite, medium grain
phosphate

- 1060-1070* sudden change in particle size
 75% calcium carbonate (limestone) flakes, dense, chalky, very coarse grain: 2-3 millimeters long, angular, medium sorted; some very porous
 calcium carbonate flakes, nacreous; some are porous on one side, fossil fragments
 5% limestone, fossil fragments, white coarse grain
 8% quartz, colorless, medium to coarse grain
 2% glauconite, replaces foraminiferans; weathered mica, gypsum, echinoid spine
 * calcium carbonate with bore hole
 no phosphate
- 1070-1080** 75% calcium carbonate (limestone) flakes, chalky, very coarse grain; 2-3 millimeters long, angular, medium sorted, some are very porous
 5% limestone, fossil fragments, coarse grain
 8% quartz, colorless, medium to coarse grain
 2% glauconite
 * mica, weathered, iron stained; gypsum?
 * shark teeth
- 1080-1090* 76% calcium carbonate (limestone) flakes, very coarse grain, some very porous on one side, shell fragments
 14% limestone fossil fragments, coarse grain
 6% quartz, medium to coarse grain, angular
 4% glauconite, larger; mica, weathered, lignite
 shark tooth
 one piece of limy quartz aggregate, coarse grain, sucrosic
 two pieces of phosphate-cave
- 1090-1100 74% calcium carbonate (limestone) flakes, very coarse grain, shell fragments
 10% limestone, fossil fragments, coarse grain
 10% quartz sand, medium to coarse grain, angular
 6% glauconite, medium to coarse grain; mica
- 1100-1110 sudden change in particle size
 75% quartz sand, colorless, coarse grain, angular, well sorted
 25% glauconite, coarse grain, subangular, replaces foraminiferans
 skeletal fragments, limestone fragments
 phosphate
- 1110-1120 75% quartz sand, colorless, coarse grain, angular, well sorted
 25% glauconite, coarse grain, subangular, replaces foraminiferans
 limestone fragments, shark tooth,
 small amount of phosphate

- 1120-1130 75% quartz sand, colorless, coarse grain, angular, well sorted
25% glauconite, coarse grain, subangular, replaces foraminiferans
limestone, very coarse to coarse grain
phosphate, shark tooth
- 1130-1140 50% quartz sand, colorless, some dark yellow orange chert, coarse grain, angular, well sorted
35% glauconite, replaces foraminiferans
15% calcium carbonate shell fragments, very coarse to coarse grain; sandy limestone
some limy sandstone with glauconite inclusions
phosphate, shark teeth
- 1140-1150 50% quartz sand, colorless, coarse grain, subangular, well sorted; some limy sandstone
20% calcium carbonate plates, limestone, shell fragments, very coarse grain; some sandy limestone
30% glauconite, replaces foraminiferans
phosphate
- 1150-1160 95% quartz sand, colorless, coarse grain, well sorted
2% calcium carbonate plates, limestone shell fragments, very coarse grain; some sandy limestone
3% glauconite, replaces foraminiferans
phosphate
- 1160-1170 94% quartz sand, colorless, coarse grain, well sorted
limy sandstone
sandy limestone, with glauconite, clay inclusions, dense, white, calcium carbonate inside
3% calcium carbonate plates, fossil fragments
3% glauconite, appears weathered, less distinct
phosphate
- 1170-1180 94% quartz sand, colorless, coarse grain, well sorted
3% glauconitic sandy limestone
calcium carbonate plates, fossil fragments
3% glauconite; phosphate
- 1180-1190 94% quartz sand, colorless, coarse grain, well sorted
3% glauconitic sandy limestone
calcium carbonate plates, fossil fragments
3% glauconite; phosphate
- 1190-1200 94% quartz sand, colorless, coarse grain, well sorted
3% glauconitic sandy limestone
calcium carbonate plates, fossil fragments, very coarse grain
3% glauconite; phosphate

- 1200-1210* 98% quartz sand, colorless, coarse grain subrounded, well sorted; feldspar?
1% glauconitic limy sandstone calcium carbonate plates, fossil fragments, very coarse grain
1% glauconite,* replaces shark tooth, anhydrite? phosphate
- 1210-1220 99% quartz sand, colorless, coarse grain, well sorted
1% calcium carbonate plates, fossil fragments, very coarse grain
small amount of sandy silty shale, medium grey phosphate, shark teeth, glauconite
- 1220-1230 99% quartz sand, colorless, coarse grain, well sorted
1% fossil fragments, very coarse grain
small amount of sandy silty shale, medium grey phosphate, glauconite
- Tail
1230-1270 no cuttings
change
- UK, 1270-1280* 55% slightly fissile, olive grey, calcareous 5%, micaceous, shaley claystone, very coarse grain, poorly sorted
40% fine to very fine grain sand, clay, quartz, and glauconite
5% fossil fragments, very coarse grain
some limestone, striated calcite
- 1280-1290 50% slightly fissile, olive grey, calcareous 5% micaceous, shaley claystone, very coarse grain, poorly sorted
26% fine to very fine grain sand, clay, quartz, and glauconite
20% fossil fragments, very coarse grain
4% quartz sand, colorless, coarse grain
- 1290-1300 85% slightly fissile, olive grey, calcareous 5%, micaceous, shaley claystone, very coarse grain, poorly sorted
7% very fine grain sand, clay and quartz
5% fossil fragments, very coarse grain
3% quartz sand, colorless, coarse grain
glauconite
- 1300-1310* 65% limy glauconitic quartz aggregate, light grey, very coarse grain, medium sorted
30% shaley claystone, very coarse grain
3% quartz sand, colorless, coarse grain
2% fossil fragments, calcium carbonate flakes
phosphate, glauconite
- 1310-1320 60% limy glauconitic quartz aggregate, light grey, very coarse grain, medium sorted
32% shaley claystone, very coarse grain
4% quartz sand, colorless, coarse grain
4% fossil fragments
phosphate, glauconite

change

- 1320-1330 35% quartz sand, colorless, coarse grain, subangular,
some garnet inclusions, well sorted
25% limy glauconitic quartz aggregate, very coarse
grain
20% shaley claystone, very coarse grain
20% fossil fragments
obsidian, amphibole?
glauconite, phosphate, mica, foraminifera
- 1330-1340 35% quartz sand, colorless, coarse grain, subangular,
some garnet inclusions, well sorted
25% limy glauconitic quartz aggregate
15% shaley claystone, very coarse grain
25% fossil fragments
glauconite, phosphate, mica
- 1340-1350 45% quartz sand, colorless, coarse grain, subangular,
25% limy glauconitic quartz aggregate
10% shaley claystone, very coarse grain
20% fossil fragments
glauconite, phosphate, mica
- 1350-1360* 50% quartz sand, colorless, coarse grain, subangular
20% limy glauconitic quartz aggregate
10% shaley claystone, with pyrite crystals on some
20% fossil fragments
glauconite, phosphate, mica
- 1360-1370 50% quartz sand, colorless, coarse grain, subangular
20% limy glauconitic quartz aggregate
10% claystone
20% fossil fragments
some sucrosic quartz
glauconite, phosphate, mica
- 1370-1380 40% quartz sand, colorless, coarse grain, subangular
some sucrosic quartz with micaceous inclusions
20% limy glauconitic quartz aggregate
20% claystone, shale
20% fossil fragments
glauconite, phosphate, mica
- 1380-1390 40% quartz sand, coarse to medium grain, medium sorted
25% claystone, shale
20% limy glauconitic quartz aggregate
10% fossil fragments
glauconite, phosphate, mica
- 1390-1400 35% quartz sand, colorless, coarse to medium grain,
some with garnet inclusions, medium sorted
25% claystone, shale
20% limy, glauconitic quartz aggregate
20% fossil fragments
foraminiferans, glauconite, phosphate, mica

- 1400-1410 30% quartz sand, colorless, coarse to medium grain,
some with garnet inclusions, medium sorted
25% claystone, shale
20% limy glauconitic quartz sandstone (aggregate)
25% fossil fragments
sandy limestone, medium grey, porous
foraminiferans, glauconite, phosphate, mica
- 1410-1420 30% quartz sand, colorless, coarse to fine grain,
subrounded, some sucrosic limy quartz aggregate,
medium sorted
20% claystone, shale
20% limy glauconitic quartz sandstone (aggregate)
30% limestone, very light grey, white, fossil fragments,
coarse grain
foraminiferans, glauconite, phosphate, mica
- 1420-1430* 30% quartz sand, coarse to fine grain, subrounded to
subangular, poorly sorted
30% limestone, very light grey, white, fossil fragments,
coarse grain
20% limy glauconitic quartz sandstone
20% claystone, shale
foraminiferans, glauconite, phosphate, mica
- 1430-1440 50% quartz sand, colorless, coarse to fine grain,
subrounded to subangular, medium sorted
20% limestone, very light grey, white, fossil fragments,
coarse grain
15% limy glauconitic quartz sandstone, sandy glauc-
onitic limestone
15% claystone, shale, presence of metal sulfides
foraminiferans, glauconite, phosphate, mica
- 1440-1450 50% quartz sand, colorless, white, coarse to medium
grain, medium sorted
15% limy glauconitic quartz sandstone, sandy glauc-
onitic limestone, limy sandstone, coarse grain
20% limestone, very light grey, white, fossil fragments,
coarse grain
15% claystone, shale
bryozoa, glauconite, phosphate, mica
- 1450-1460 60% quartz sand, colorless, white, coarse to medium
grain, medium sorted
10% limy glauconitic sandstone, sandy limestone,
limy sandstone (sucrosic), coarse grain
15% limestone, fossil fragments, coarse grain
15% claystone, shale, olive grey, porous, chalc-
opyrite present
bryozoa, glauconite, phosphate, mica

- 1460-1470 60% quartz sand, colorless, white, coarse to medium grain, medium sorted
 10% limy glauconitic sandstone, sandy limestone, limy sandstone(sucrosic), coarse grain
 15% limestone, fossil fragments, coarse grain
 15% claystone, shale, olive grey, porous, chalcoppyrite present, coarse grain
 bryozoa cavities filled with glauconite, chalcoppyrite
 pelecypod, bryozoa, glauconite, phosphate, mica, shark teeth
- 1470-1480 no change
- 1480-1490 60% quartz sand, colorless, white, coarse to medium grain, medium sorted
 10% limy glauconitic sandstone, sandy limestone, limy sandstone(sucrosic), coarse grain
 15% limestone, fossil fragments, coarse grain
 15% claystone, shale, olive grey, porous, chalcoppyrite present, coarse grain
 bryozoa cavities filled with chalcoppyrite, glauconite
 lignite, bryozoa, glauconite, phosphate, mica, shark teeth
- 1490-1500 no change
- 1500-1510 60% quartz sand, colorless, white, coarse to medium grain, subrounded, medium sorted
 10% clayey glauconitic limy sandstone, sandy limestone, limy sandstone
 15% fossil fragments, limestone
 15% claystone, shale, olive grey, some porous, coarse grain
 chalcoppyrite, shark tooth, little mica, phosphate
 bryozoa cavities filled with chalcoppyrite, glauconite
- 1510-1520 60% quartz sand, colorless, white, coarse to medium grain, subrounded, medium sorted
 10% clayey glauconitic limy sandstone, sandy limestone, limy sandstone
 15% claystone, shale, olive grey, medium dark grey, some porous, coarse grain
 15% fossil fragments, little limestone
 biotite, chalcoppyrite, mica, bryozoa, phosphate
- 1520-1530 50% quartz sand, colorless, white, coarse to medium grain, subrounded, medium sorted
 10% clayey glauconitic limy sandstone
 20% claystone, shale, olive grey, medium dark grey, some porous, coarse grain
 20% fossil fragments
 bryozoa, mica, glauconite, phosphate

- 1530-1540 50% quartz sand, colorless, white, coarse to medium grain, subrounded, medium sorted
10% clayey glauconitic limy sandstone
20% claystone, shale, olive grey, medium dark grey, some porous, coarse grain
20% fossil fragments
bryozoa, mica, glauconite, phosphate
- 1540-1550 no change
- 1550-1560 50% quartz sand, colorless, white, coarse to medium grain, subrounded, medium sorted
10% clayey glauconitic limy sandstone
20% claystone, shale, olive grey, medium dark grey, some porous, coarse grain
20% fossil fragments
foraminifera, bryozoa, shark tooth, mica, glauconite, phosphate
- change
1560-1570 30% shale, claystone, olive grey medium dark grey, coarse grain, medium sorted
25% clayey glauconitic limy sandstone, sandy limestone, medium grey
20% quartz sand, colorless, feldspar present
25% fossil fragments, calcite flakes
small amount of limy claystone
foraminifera, bryozoa, mica, glauconite, phosphate
- 1570-1580 30% shale, claystone, olive grey, medium dark grey, coarse grain, medium sorted
25% clayey glauconitic limy sandstone, sandy limestone, medium grey
20% quartz sand, coarse to medium grain
25% fossil fragments, calcium carbonate flakes
pyrite, chalcopyrite, foraminifera, bryozoa, mica, glauconite, phosphate
- 1580-1590 30% shale, claystone, olive grey, medium dark grey, coarse grain, medium sorted
25% clayey glauconitic limy sandstone, sandy limestone
20% quartz sand, coarse to medium grain
25% fossil fragments, calcium carbonate flakes
pyrite, foraminifera, bryozoa, mica, glauconite, phosphate
- 1590-1600 30% shale, claystone, olive grey, medium dark grey, coarse grain, medium sorted
25% clayey glauconitic limy sandstone, sandy limestone
20% quartz sand, coarse to medium grain
25% fossil fragments, calcium carbonate flakes
pyrite, foraminifera, bryozoa, mica, glauconite, phosphate

change

- 1600-1610 40% quartz sand, colorless, coarse grain,
medium sorted
20% clayey glauconitic limy sandstone, sandy limestone
20% shale, claystone, olive grey, medium dark grey,
coarse grain
20% fossil fragments, calcium carbonate flakes
mica, phosphate, glauconite
- 1610-1620 no change
- 1620-1630 40% quartz sand, colorless, coarse grain,
medium sorted
15% clayey glauconitic limy sandstone, sandy limestone
25% shale, claystone, medium dark grey, coarse grain
20% fossil fragments, calcium carbonate flakes
shark teeth, mica, phosphate, glauconite
- 1630-1640* 40% quartz sand, colorless, coarse grain,
medium sorted
20% clayey glauconitic limy sandstone, sandy limestone
20% shale, claystone, medium dark grey, coarse grain
20% fossil fragments, calcium carbonate flakes
* spherical object, brown; shark tooth
mica, phosphate, glauconite
- 1640-1650 40% quartz sand, colorless, coarse grain,
medium sorted
20% clayey glauconitic limy sandstone
20% shale, claystone, medium dark grey, coarse grain
20% fossil fragments, calcium carbonate
bryozoa, mica, phosphate, glauconite
- 1650-1660 30% quartz sand, colorless, coarse grain, angular
medium sorted
25% clayey glauconitic limy sandstone, pyrite in-
clusions
25% shale, claystone, medium dark grey, coarse grain
20% fossil fragments
shark teeth, bryozoa, mica, phosphate, glauconite
- 1660-1670* 30% quartz sand, colorless, coarse grain, angular
medium sorted
25% clayey glauconitic limy sandstone
25% shale, claystone, medium dark grey, coarse grain
20% fossil fragments
* concentric circular concretions?, pelecypods,
sandstone aggregate- silica cemented?
bryozoa, mica, phosphate, glauconite

- 1670-1680 25% quartz sand, colorless, coarse grain, angular,
medium sorted
30% clayey glauconitic limy sandstone,
pyrite, mica inclusions
20% shale, coarse grain
25% fossil fragments
bryozoa, mica, phosphate, glauconite
- 1680-1690 no change
- 1690-1700 25% quartz sand, colorless, coarse grain, angular,
medium sorted
30% clayey glauconitic limy sandstone,
pyrite, mica inclusions
20% shale, coarse grain
25% fossil fragments, calcium carbonate flakes
bryozoa, mica, phosphate, glauconite
- 1700-1710 25% quartz sand, colorless, coarse grain, angular,
medium sorted
30% clayey glauconitic limy sandstone,
pyrite, mica inclusions
20% shale, coarse grain
25% fossil fragments, calcium carbonate flakes
foraminifera, bryozoa, mica, phosphate, glauconite
- 1710-1720 25% quartz sand, colorless, coarse grain, angular,
medium sorted
30% clayey glauconitic limy sandstone,
pyrite, mica inclusions
20% shale, coarse grain
25% fossil fragments, calcium carbonate flakes
foraminifera, bryozoa, mica, phosphate, glauconite
- 1720-1730 25% quartz sand, colorless, coarse grain, angular,
medium sorted
30% clayey glauconitic limy sandstone,
pyrite, mica inclusions
20% shale, coarse grain
25% fossil fragments, calcium carbonate flakes
foraminifera, bryozoa, mica, phosphate, glauconite
- change
1730-1760 70% shale, micaceous claystone, medium dark grey,
olive black, olive grey, very coarse grain,
medium sorted
10% fossil fragments, calcium carbonate flakes
10% limy sandstone
10% quartz sand, coarse grain
bryozoa, mica, phosphate, glauconite

- 1760-1790 70% shale, micaceous claystone, medium dark grey,
olive grey, very coarse grain, medium sorted
10% fossil fragments, calcium carbonate flakes
10% limy sandstone
10% quartz sand, coarse grain
bryozoa, mica, phosphate
- 1790-1820 no sample
- 1820-1850 64% shale, micaceous claystone, medium dark grey,
olive grey, very coarse grain, medium sorted
12% fossil fragments
12% limy sandstone
12% quartz sand, coarse grain
ostracod, glauconite, bryozoa, mica, phosphate
- 1850-1880 64% shale, micaceous claystone, medium dark grey,
olive grey, very coarse grain, medium sorted
12% fossil fragments, calcium carbonate flakes
12% limy sandstone-glauconite, pyrite, mica inclusions
12% quartz sand, coarse grain
lignite present
ostracod, glauconite, bryozoa, mica, phosphate,
gastropod
- change
1880-1910 70% quartz sand, colorless, medium to coarse grain,
subrounded, medium sorted
10% shale, claystone, medium dark grey, very coarse
grain
10% limy sandstone-glauconite, pyrite, mica inclusions
10% fossil fragments, calcium carbonate flakes
much mica; foraminifera, bryozoa, phosphate
- 1910-1930 no change
- 1930-1960 70% quartz sand, colorless, medium to coarse grain,
subrounded, medium sorted
10% shale, claystone, medium dark grey, very coarse
grain
10% limy sandstone-glauconite, pyrite, mica inclusions
10% fossil fragments, calcium carbonate flakes
much mica, a little biotite
foraminifera, bryozoa, phosphate
- 1960-1980 no sample
change
- 1980-2010 30% quartz sand, colorless, medium to coarse grain,
subrounded, medium sorted
25% shale, claystone, medium dark grey, olive grey,
very coarse grain
25% large shell fragments, calcium carbonate flakes
20% limy sandstone-glauconite, pyrite, mica inclusions
gilsonite present; much mica
bryozoa, pelecypods, spines, glauconite, phosphate

change

- 2010-2030 95% shale, claystone, medium grey, olive grey,
olive black, medium to coarse grain,
medium sorted
5% quartz sand, rounded; calcium carbonate flakes,
fossil fragments, limy sandstone
mica, gilsonite present
some shale has calcium carbonate present
foraminifera, mica, spines, glauconite, phosphate
- 2030-2050 95% shale, claystone, medium grey, olive grey,
medium to coarse grain, medium sorted
5% quartz sand, calcium carbonate flakes,
limy sandstone, mica
foraminifera, glauconite, phosphate
- 2050-2070 95% shale, claystone, medium grey, olive grey,
medium to coarse grain, medium sorted
5% quartz sand, calcium carbonate flakes,
limy sandstone, mica
bryozoa, ostracods, foraminifera, glauconite,
phosphate
- 2070-2090 95% shale, claystone, medium grey, olive grey,
medium to coarse grain, medium sorted
5% quartz sand, calcium carbonate flakes,
limy sandstone, mica, lignite
spines, gastropods, ostracods, foraminifera,
glauconite, phosphate
- 2090-2110 95% shale, claystone, medium grey, olive grey,
medium to coarse grain, medium sorted
5% quartz sand, calcium carbonate flakes,
limy sandstone, mica, lignite
bryozoa, foraminifera, spines, glauconite,
phosphate
- 2110-2140 95% shale, claystone, medium grey, olive grey,
medium to coarse grain, medium sorted
5% quartz sand, calcium carbonate flakes,
limy sandstone, mica, lignite
ostracods, bryozoa, foraminifera, glauconite,
phosphate
shipworm
- 2140-2170 no sample
- 2170-2200 95% shale, claystone, medium grey, olive grey,
medium to coarse grain, medium sorted
5% quartz sand, calcium carbonate flakes,
limy sandstone, mica
ostracods, bryozoa, foraminifera, glauconite
phosphate

change

2200-2230

70% quartz sand, colorless, white, coarse grain,
subrounded, medium sorted
15% shale, claystone, medium grey, olive grey,
medium to coarse grain
10% calcium carbonate flakes, shell fragments
5% limy sandstone
lignite, spines, ostracods, foraminifera,
mica, glauconite, phosphate

2230-2260

70% quartz sand, colorless, white, coarse grain,
subrounded, medium sorted
15% shale, claystone, medium grey, olive grey,
medium to coarse grain
10% calcium carbonate flakes, shell fragments
5% limy sandstone
lignite, spines, ostracods, foraminifera,
mica, glauconite, phosphate

2260-2290

70% quartz sand, colorless, white, coarse grain,
subrounded, medium sorted
15% shale, claystone, medium grey, olive grey,
medium to coarse grain
10% calcium carbonate flakes, shell fragments
5% limy sandstone
lignite, pyrite, ostracods, bryozoa, mica,
glauconite, phosphate

change

2290-2320

50% lignite, brown black, very coarse grain,
medium sorted
49% shale, claystone, medium grey, olive grey,
medium to coarse grain
1% quartz sand, calcium carbonate flakes, mica
pelecypods, glauconite, phosphate

2320-2350

85% quartz sand, colorless, white, coarse grain,
subrounded, medium sorted
15% lignite, brown black, very coarse grain
cave: ostracods, spines, bryozoa, foraminifera,
glauconite, phosphate

2350-2380

95% quartz sand, colorless, white, coarse grain,
subrounded, medium sorted
5% lignite, brown black, very coarse grain
cave?: foraminifera, bryozoa, mica,
glauconite, phosphate
marine fossils in terrestrial sediment

2380-2410

97% quartz sand, colorless, white, coarse grain,
subrounded, medium sorted
3% lignite, brown black, very coarse grain
ostracods, bryozoa, mica, glauconite, phosphate

2410-2440

90% quartz sand, colorless, white, coarse grain,
subrounded, medium sorted
10% lignite, brown black, very coarse grain
ostracods, mica, glauconite, phosphate

- 5080 (25)
- 2440-2470 95% quartz sand, colorless, white, coarse grain,
subrounded, medium sorted
5% lignite, brown black, very coarse grain
bryozoa, mica, glauconite, phosphate
- 2470-2500* 98% quartz sand, colorless, white, coarse grain,
subrounded, well sorted
2% lignite, brown black, very coarse grain
* seed pod
bryozoa, mica, glauconite, phosphate
- 2500-2530 92% quartz sand, colorless, white, coarse grain,
subrounded, medium sorted
8% lignite, brown black, very coarse grain
foraminifera, bryozoa, mica, glauconite, phosphate
- 2530-2560 45% quartz sand, colorless, white, coarse grain,
subrounded, medium sorted
35% lignite, brown black, very coarse grain
20% shale, claystone, medium to coarse grain
bryozoa, mica, glauconite, phosphate
- 2560-2590 50% lignite, brown black, very coarse grain,
medium sorted
47% shale, medium to coarse grain
3% calcium carbonate flakes, fossil fragments,
quartz sand, mica; phosphate
- 2590-3620 55% quartz sand, colorless, white, coarse grain,
subrounded, medium sorted
25% lignite, brown black, very coarse grain
20% shale, medium to coarse grain
- 2620-2650 35% quartz sand, colorless, white, coarse grain,
subrounded, medium sorted
30% shale, claystone, medium to coarse grain
35% lignite, brown black, very coarse grain
foraminifera, mica, phosphate
- 2650-2680 40% lignite, brown black, very coarse grain,
medium sorted
30% shale, claystone, medium to coarse grain
20% quartz sand, colorless, coarse grain, subrounded
10% mica
no phosphate found; almost no glauconite
foraminifera
- 2680-2710 60% quartz sand, colorless, coarse grain, subrounded,
medium sorted
25% lignite, brown black, very coarse grain
10% shale, claystone, medium to coarse grain
5% mica
bryozoa

- 2710-2740 80% quartz sand, colorless, coarse grain, subrounded,
medium sorted
15% lignite, brown black, very coarse grain
5% shale, claystone, medium to coarse grain
much mica
- 2740-2770 75% quartz sand, colorless, coarse grain, subrounded,
medium sorted
15% lignite, brown black, very coarse grain
10% shale, claystone, medium to coarse grain
ostracods, mica, foraminifera
- change
2770-2800 85% lignite, brown black, very coarse grain,
medium sorted
10% quartz sand, colorless, coarse grain, subrounded
5% shale, claystone, medium to coarse grain
mica
- 2800-2830 75% quartz sand, colorless, coarse grain, subrounded,
medium sorted
15% lignite, brown black, very coarse grain
10% shale, claystone, medium to coarse grain
mica, phosphate
- 2830-2860 65% quartz sand, colorless, coarse grain, subrounded,
medium sorted
20% shale, claystone, medium to coarse grain
15% lignite, brown black, very coarse grain
sucrosic limy sandstone
mica, glauconite
- 2860-2890 60% shale, claystone, medium to coarse grain
30% lignite, brown black, very coarse grain
10% quartz sand, sucrosic limy sandstone,
calcium carbonate flakes
mica, glauconite
- 2890-2920 87% shale, claystone, medium to coarse grain
10% lignite, brown black, very coarse grain
3% fossil fragments, calcium carbonate flakes
ostracods, mica, glauconite
- 2920-2950* 75% quartz sand, sucrosic limy sandstone,
medium sorted
15% shale, claystone, medium to coarse grain
10% lignite, brown black, very coarse grain
* appears to be a seed
- 2950-2980 90% shale, claystone, medium to coarse grain,
medium sorted
7% lignite, brown black, very coarse grain
3% quartz sand, sucrosic limy sandstone,
calcium carbonate flakes
bryzoa, ostracod, mica

- 2980-3010* 65% quartz sand, sucrosic limy sandstone,
coarse grain, subangular, medium sorted
30% shale, claystone, medium to coarse grain
medium sorted
5% lignite, brown black, very coarse grain
* anhydrite?
mica, glauconite
- change
3010-3040 75% quartz sand, colorless, coarse grain, subangular,
medium sorted
25% shale, claystone, medium to coarse grain
small amount of lignite, calcium carbonate,
mica; glauconite
- 3040-3070 90% quartz sand, colorless, white, coarse grain,
subangular, medium sorted
10% shale, claystone, medium to coarse grain
small amount of lignite, calcium carbonate
some graphite?
small amount of sucrosic quartz, not limestone
cemented
foraminifera, mica
- 3070-3100 85% quartz sand, sucrosic quartz sandstone,
coarse grain, subangular, medium sorted
15% shale, claystone, medium to coarse grain,
medium sorted
lignite, mica, glauconite, phosphate
- 3100-3130 80% quartz sand, sucrosic quartz sandstone,
coarse grain, subangular, medium sorted
limy glauconitic sandstone
small amount of limy sandy claystone
20% shale, claystone, medium to coarse grain
a few chunks of lignite, some pyrite
bryozoa, mica, glauconite, phosphate
- 3130-3160* 85% quartz sand, sucrosic (sometimes limestone
cemented) quartz sandstone, coarse grain,
medium sorted
15% shale, olive grey, very coarse grain.
a few lignite chunks
* twinned feldspar, bryozoa?
mica, glauconite, phosphate
- 3160-3190 85% quartz sand, sucrosic quartz, colorless, white,
coarse grain, medium sorted
15% shale, olive grey, very coarse grain, fissile,
micaceous, slightly clayey
few lignite chunks
foraminifera, bryozoa, mica, glauconite, phosphate

- 3190-3220 80% quartz sand, sucrosic quartz, white, colorless,
 coarse grain, medium sorted
 20% shale, olive grey, very coarse grain, fissile,
 micaceous, slightly clayey
 some lignite
 bryozoa, mica, glaucenite, phosphate
- 3220-3250* 80% quartz sand, sucrosic quartz, white, colorless,
 coarse grain, medium sorted
 20% shale, olive grey, very coarse grain, fissile,
 micaceous, slightly clayey
 labradorite feldspar??
 some lignite
 * flat micaceous material, other unusual pieces
 bryozoa, mica, glauconite, phosphate
- 3250-3280 50% shale, olive grey, very coarse grain, fissile,
 micaceous, slightly clayey, medium sorted
 40% quartz sand, sucrosic quartz, limy sandstone,
 white, colorless, coarse grain, medium sorted
 10% mica
 small amount of lignite
 foraminifera: rodulus, crystolarius
 glauconite, phosphate
- 3280-3310 80% quartz sand, white, colorless, pale yellow orange,
 moderate orange pink, coarse to medium grain,
 subangular, medium sorted
 20% shale, micaceous, dark inclusions, olive grey,
 fissile, very coarse grain
 small amount of mica, lignite
 foraminifera: rodulus
 glauconite, phosphate
- 3310-3340 missing
- 3340-3370 missing
- 3370-3400 missing
- 3400-3430 missing

- 3430-3460* 90% quartz sand, white, colorless, pale yellow orange, moderate orange pink, coarse to medium grain, subangular, medium sorted
 10% shale, medium dark grey (different from mostly olive grey), fissile, very coarse grain
 small amount of limy sandstone, limy claystone
 * igneous rock?, granite?, garnet, mica, quartz? fossil? garnet?
 lignite, obsidian, glauconite, phosphate
- 3460-3490 98% quartz sand, white, colorless, pale yellow orange, moderate orange pink, coarse to medium grain, subangular, well sorted
 glauconitic limy sandstone, glauconitic sandstone
 2% shale, medium dark grey, sandy claystone
 igneous rock?, glauconite, phosphate
- 3490-3520* 98% quartz sand, white, colorless, pale yellow orange, moderate orange pink, coarse to medium grain
 subangular, well sorted
 micaceous glauconitic sandstone,
 glauconitic limy sandstone
 2% shale, medium dark grey (cave?)
 * unusual brown fossil
 shiny black obsidian?, metallic minerals
 gilsonite?, phyllite granite, igneous rock
 glauconite, phosphate
- 3520-3550* 99% quartz sand, white, colorless, pale yellow orange, moderate orange pink, coarse to medium grain
 subangular, well sorted
 glauconitic limy quartz
 quartz grains with garnet, metallic mineral inclusions
 1% shale, moderate dark grey
 garnet (several pieces), obsidian?, lignite
 glauconite, phosphate
- 3550-3580 98% quartz sand, white, colorless, pale yellow orange, moderate orange pink, coarse to medium grain
 well sorted
 small amount of micaceous glauconitic limy sandstone
 2% shale, moderate dark grey, very coarse grain
 obsidian?, glauconite, phosphate
- change
 3580-3610 80% quartz sand, white, pale yellow orange, moderate orange pink, coarse grain, medium sorted
 much orange, pink, yellow quartz
 glauconitic limy sandstone, limy sandstone
 20% shale, moderate grey, moderate dark grey, clayey
 obsidian, glauconite, phosphate

- 3000 (28)
- 3610-3640* 50% shale, medium dark grey, fissile, clayey,
very coarse grain, medium sorted
- 49% quartz sand, white, pale yellow orange,
moderate orange pink, coarse grain
arkose, * much feldspar, white, orange,
striated; sucrosic quartz, limy quartz
- 1% soft clayey shale, moderate reddish brown,
micaceous inclusions
- * sponge spicules
small amount of grey clay; few metallic minerals
lignite, mica, glauconite, phosphate
- 3640-3670 50% shale, medium grey, medium dark grey, fissile,
soft, clayey, very coarse grain,
medium to well sorted, micaceous inclusions
- 48% quartz sand, feldspar, white, pale yellow orange,
moderate orange pink, coarse grain
arkose, sucrosic quartz, limy quartz,
glauconitic limy sandstone
- 2% soft clayey shale, moderate reddish brown,
micaceous inclusions
lignite, small amount of grey clay, sponge spicules,
black carbonaceous material
mica, glauconite, phosphate
- 3670-3700* 65% shale, medium grey, medium dark grey, fissile,
soft, clayey, very coarse grain, medium sorted
- 3% soft clayey shale, medium reddish brown,
micaceous inclusions
- 32% quartz sand, feldspar, arkose, white, pale yellow
orange, moderate orange pink,
coarse grain
sucrosic quartz, limy quartz
black carbonaceous material; sponge spicules
shell fragments, mica, glauconite, phosphate
- change
3700-3730* 80% quartz sand, feldspar, arkose, white, colorless,
pale yellow orange, moderate orange pink,
coarse grain, subangular, medium sorted
sucrosic quartz, limy quartz
- 20% shale, medium dark grey, and clay, medium grey,
soft, micaceous inclusions
small amount of soft clayey shale, medium
reddish brown
- * basement rock: indurated sandstone, pale reddish
brown, coarse grain
breaks up into smaller hard grains
small amount little glauconite (cave)
shiny black carbon?-material very similar to
black nodules which give phosphate test
metallic mineral inclusions;
tourmaline crystal-individual grain
small amount of pale yellowish orange limonite?
fissile, soft, coarse grain

- 3730-3760* *1% basement rock: indurated, pale reddish brown sandstone, coarse grain, subrounded, sandstone breaks around the hard grains
 92% shale, medium dark grey, soft, fissile, clayey, very coarse grain, medium sorted
 2% soft clayey shale, moderate reddish brown, micaceous inclusions, also dark reddish brown
 5% quartz sand, feldspar, white, colorless, moderate orange pink
 small amount of lignite, obsidion(carbonaceous?), fissile
 small amount of limonite: pale yellow orange, soft, fissile, coarse grain
 mica, glauconite, phosphate
- 3760-3790* 97% shale, medium dark grey, medium grey, soft, fissile, clayey, very coarse grain, medium sorted
 2% soft clayey shale, moderate reddish brown, micaceous inclusions
 also some slightly harder, soft clayey shale, dark reddish brown
 1% quartz sand, feldspar, white, moderate orange pink, coarse grain
 * basement material: pale reddish brown sandstone, indurated, coarse grain
 lignite, mica, glauconite, phosphate
- 3790-3820 basement: indurated, pale reddish brown sandstone, coarse grain, sandstone breaks around the harder grains; triassic?
 93% shale, medium dark grey, medium grey, soft, fissile, clayey, micaceous, very coarse grain medium to well sorted
 1% soft clayey shale, moderate reddish brown, micaceous inclusions, very soft
 soft clayey shale, dark reddish brown
 5% quartz sand, feldspar, white, moderate orange pink, coarse grain
 1% lignite, mica
 sponge spicules, pelecypods
 small amount of limonite?, pale yellow orange, soft
 glauconite, phosphate
- 3820-3850* *25% basement: indurated, pale reddish brown sandstone, coarse grain, (harder than previous pieces of sandstone-will not shatter between forceps) Paleozoic?? or pre-Cretaceous??
 50% shale, medium dark grey, medium grey, soft, fissile, clayey
 some micaceous, glauconitic, metallic, or quartz inclusions
 also dark reddish brown shale(harder)
 25% quartz sand, feldspar, glauconitic limy sandstone
 metallic mineral chunks
 lignite, fossil shell fragments, pelecypods, mica, glauconite, phosphate