

Georgia Geological Survey no. 505

Marion County, Georgia

Lee Oil and Natural Gas Co., F. N. Winkler no. 1

Drilling permit no. 51

Completed October 5, 1956 TD 4010 Feet

Ground level: 600 feet

No geophysical data available.

Logged by Gilbert L. Treadwell, completed February 12, 1976, to depth 3225

* after the depth means that a microfossil slide was made of some of the material in the sample. This is in the sample envelope.

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Lithologic summary

- 0-150 no samples
- 150-160 sandy, limy shale, with glauconite and mica
- 160-190 shaly, sandy limestone, with glauconite and mica
- 190-770 samples are dominantly medium to coarse grained, angular quartz sand with occasional interbedded limestone (310-440) and shale. Also micaceous and occasionally glauconitic, pyritic and phosphatic (420-450), lignitic and feldspathic (470-530).
- 770-1500 shaly, clayey, micaceous sand with occasional interbedded shale; also glauconite, phosphate, and pyrite
- 1500-2410 rather pure feldspathic sand with little change.
- 2410 new, grayish red arkose; sand percentage is usually dominant; the arkose percentage varies from 10 to 50%. As the depth increases, the arkose becomes more densely packed, with less interstitial space, and appears quite granitic. This is thought to be the base of the Cretaceous, as lithified rock appears in the samples.

0-150 no samples

150-160*

Leached, tough, fissile, stained (iron), medium gray (N5) and pale yellowish brown (10YR6/2), micaceous, glauconitic, limonitic, fossiliferous, waxy, sandy (10%), limy (3%) shale.

The sand is medium-coarse grained (1/4-1mm), angular, vitreous and often iron-stained.

The limestone is dense, light gray (N7). Also shell fragments.

Megafossil slide made and microfossil slide made. Megafossils and microfossils (Foram).

160-170*

Leached, hard, iron stained, very light gray (N8), micaceous, pyritic, glauconitic, limonitic, slightly fossiliferous (olecy pod imprints, dull, nonporous-porous, dense, microcrystalline, shaly (10%), sandy (20%) limestone. Some limestone as pearly white, nacreous shell fragments. The sand is medium-coarse grained (1/4-1mm), vitreous, angular.

The shale is as above, medium gray (N5) and pale yellowish brown (10YR6/2).

170-180

same as above. Some limestone is very pale orange (10YR8/2)

180-190*

Leached, hard, iron stained, very light gray (N8)-very pale orange (10YR8/2), micaceous, glauconitic, limonitic, fossiliferous, dull, shaly (10%), sandy (20%), limestone.

190-200

Leached, hard, iron stained, clear-colorless, micaceous, pyritized limonitic, vitreous, medium sorted, fine-very coarse grained (1/8-2mm), slightly limy (2%), shaly (23%) sand (75%). Quartz sand, angular.

200-210

Fresh sand (with limonitic shale) slightly micaceous, limonitic, pyritized, vitreous, colorless to grayish, fine-very coarse grained (1/8-2mm) medium sorted, angular, shaly (10%) quartz sand.

210-220

Missing

220-230

little change

Leached, hard, some iron stain, colorless to gray (N7), lignitic micaceous, pyritic, limonitic, vitreous, fine-very coarse grained, (1/8-2mm), angular-slightly round, shaly (10%) quartz sand.

The shale is like that at first (150-160) waxy, dominant pale yellowish brown (10YR6/2), altering to limonite.

Some pieces of bright, white, crystalline with rectangular cleavage, probable anhydrite or feldspar.

The anhydrite would not seem to be common in the environment represented by this lithology.

The mineral may not be anhydrite: it may be anhydrite and be in place or be caved. Probable feldspar. Also some garnet chunks.

230-240

Fresh and leached, iron stain, colorless-light gray (N7), micaceous, pyritic, limonitic, lignitic, vitreous, well sorted, fine-very coarse grains and granules (1/8-3mm), colorless, white, gray, shaly (3%) sand.

Those grains less than 1mm (1/2mm is dominant size) are usually angular, vitreous and clear.

Those larger, are usually subrounded-rounded, translucent gray

and white to dark gray.

- 240-250 Fresh and leached, iron stained, colorless-gray, micaceous limonitic, lignitic, vitreous, fine-very coarse grained and granule (1/3-3mm) average 1.5mm, medium sorted, angular-subrounded, shaly (13%) sand.
- 250-260 Slightly iron stained, dominant colorless, micaceous, limonitic, lignitic (2%), vitreous, fine-very coarse grained (1/8-2mm), average 1/2mm, well sorted, angular, shaly (5%) sand.
- 260-270 Fresh, clear, colorless to white, limonitic, micaceous, vitreous, fine-very coarse grained (1/8-2mm) average 1mm, angular sand (100%).
very pure, fresh, uniform, sand.
- 270-280 Fresh, clear-white, limonitic, micaceous, vitreous, lignitic, fine-coarse (1/8-1mm), average (1.4mm), angular, sand (100%).
- 280-290 Fresh, colorless-white, translucent, limonitic, micaceous, lignitic, fine-very coarse grained (1/8-2mm), average 1mm, angular sand (100%).
- 290-300 no change
- 300-310 Leached, iron stained, clear (shale moderate red (5R4/6), dark yellowish orange (10YR6/6) and pale brown (5YR5 2), micaceous, lignitic, limonitic, vitreous, fine-very coarse grained (1/8-2mm) average 1/2, medium sorted, angular, shaly (20%), sand. A bit of well sorted limestone cemented sandstone.
- 310-320* Micaceous, pyritic, limonitic, fossiliferous (shell (plecypod fragments, forams), vitreous, fine-coarse grained (1/8-1mm) average 1/2mm, angular, limy (5%), shaly (10%) sand. well sorted. The shale is as above; waxy, pale brown 5YR5/2 and iron stained.
The limestone is as light gray (N7), sandy, porous, micro-crystalline chunks. Also plectypod shell fragments, nacreous shell layers.
- 320-330 same as above
- 330-340 Slightly micaceous, pyritic, limonitic, fossiliferous (many shell fragments plectypod), vitreous, colorless to gray, fine-very coarse grained (1/8-2mm), well sorted, average 1/4mm, angular, limy (10%) sand. Limestone is shell fragments and sandy, light gray (N7), limestone.
- 340-350 Colorless, gray, micaceous, pyritic, limonitic, fossiliferous, well sorted, fine-very coarse grained (1/8-2mm) average 1/4mm, angular limy (20%) sand. The limestone is dominantly as oyster and scallop shell fragments, many pearly layers, some pyritized.
- 350-360 Clear, cloudy white to iron stained, micaceous, pyritic, limonitic, glauconitic, fossiliferous, fine-very coarse grained (1/8-2mm), average 1/4mm, well sorted (wide range but most grains are approximately 1/4mm), angular, vitreous, limy (20%) sand.

Very sandy (fine grained, clear, angular) light gray (N7), microcrystalline limestone. Also some pleocypled fragments, and bryzoa

Also bits of moderately reddish brown (10R4/6), slightly sandy clay, like red soil clay.

360-370

little change

Clear-cloudy white, gray, micaceous, slightly glauconitic, limonitic, fossiliferous (pleocypled fragments, bryzoa), vitreous, well sorted, angular, fine-very coarse grained (1/8-2mm), average 1/4mm, shaly (5%), limy (15%) sand.

370-380*

Clear-cloudy white, gray, micaceous, limonitic, lignitic, fossiliferous, vitreous, angular, medium sorted, fine-very coarse grained (1/8-2mm), average 1/4mm, clayey (moderate reddish brown 5%), limy (25%) sand.

The limestone is as above: Very sandy, very fine grained (1/16-1/8mm), angular sand in light gray (N7) microcrystalline matrix. Also shell fragments that show little alteration, still pearly gray and shiny. Microfossil slide made. Gastropods.

380-390*

Clear-cloudy white and gray, micaceous, limonitic, fossiliferous, vitreous, angular, well sorted fine-coarse grained (1/8-1mm) average 1/2mm, shaly, as above, (5%), limy (20%), sand.

The limestone is less sandy, more clayey, medium light gray (N6). Microfossil slide made.

390-400*

Microfossil slide made (ostracod). Same as above.

400-410

missing

410-420

Clear-cloudy white, gray, micaceous, phosphatic, limonitic, fossiliferous (megafossil), vitreous, angular, range-very fine to very coarse (1/16-2mm) average .35 mm, well sorted, clayey (5%) limy (30%) sand.

Limestone is very sandy again, fine grained (1/8-1/4), angular light gray (N7), dense, microcrystalline. Also many macrofossil fragments.

420-430*

Microfossil slide made Clear, more cloudy white and gray, iron stained, micaceous, phosphatic, pyritic, limonitic, lignitic, garnetiferous, fossiliferous (megafossils, microfossils), vitreous, well sorted, subangular, fine-very coarse grained (1/8-2mm), average 1/4mm, limy (3%), clayey (2%), shaly (10%) sand.

430-440

85% quartz sand dominantly colorless, some iron stained, also cloudy white-gray, with mica, pyrite and limonite, vitreous, subangular, fine-very coarse grained (1/8-2mm), average 1/2mm, well sorted. Some garnet chunks?

10% limestone. Some of the very sandy (fine grained angular) light gray (N7) dense, microcrystalline type again. Also macrofossils (oyster and clam fragments), ostracod.

3% claystone. Moderate reddish brown (10R4/6), sandy.

2% phosphate. Shiny, black rounded. 1/2-2mm.

- 440-450 Clear, iron stained, micaceous, pyritic, lignitic, limonitic, phosphatic, vitreous, subangular, fine-coarse grained, 1/8-1mm, average 1/4mm, well sorted clayey (3%), limy (3%) sand.
- 450-460 same with less limestone
- 460-470 Megascopic color, light gray (N7), clear, cloudy white-gray, iron stained, micaceous, limonitic, phosphatic, lignitic, slightly fossiliferous (megafossils, microfossils), vitreous, subangular, fine-very coarse grained (1/8-2mm), average 1/4mm, well sorted, limy (5%), clayey (5%), as moderate reddish brown (10R4/6) like above, also medium light gray (N6), medium grained sandy, porous claystone; sand (90%).
- 470-480 Quartz sand is the same. More claystone (12%) both 10R4/6 and N6 type.
A large piece (2cm) of cement is present with reddish brown clayey stain or coating. This might indicate that the staining or coating of the quartz sand above is a result of dulling or washing. A few pieces of possible feldspar, bright, white, crystalline.
- 480-490* Microfossil slide made. Clear, light orange, yellow, some red stain, micaceous limonitic, fine-very coarse grained (1/8-2mm), average 1mm, medium sorted, angular, vitreous, slightly shaly, slightly limy, sand.
- 490-500 same as above
- 500-510 same. Coarse grained sand, stained yellow or orange, angular.
- 510-520* Microfossil slide made. Clear, yellow, orange and red stained, micaceous, feldspathic, vitreous, angular, fine-very coarse grained, limonitic, slightly fossiliferous (microfossils), (1/8-2mm), average 1mm, sand (100%).
- 520-530 Micaceous, limonitic, lignitic, phosphatic, feldspathic, vitreous, angular, fine-very coarse grained, average 1mm, medium sorted, slightly limy, shaly (3%) sand.
- 530-540 Back to megascopic: light gray (N7), clear, clean, lignitic, limonitic, micaceous, phosphatic, fine-coarse grained (1/8-1mm) average 1/4mm, well sorted, shaly (10%, pale yellowish brown 10YR6/2 altering to limonite; and medium dark gray (N4) slightly sandy type) sand.
- 540-550 Clean, clear, micaceous, limonitic, lignitic, vitreous, angular, fine-coarse grained (1/8-2mm), average 1/2mm. very well sorted. shaly (3%) sand.
- 550-560 Well sorted, average 1/2mm, limonitic, shaly sand as above
- 560-570* Microfossil and megafossil slides made. Little change from above.

- 570-580 Clean, clear, micaceous, limonitic, lignitic, vitreous, angular, fine-medium grained (1/8-1/2mm), average 1/2mm, very well sorted, shaly (10% both types as above pale yellowish brown 10YR6/2 ^{after} limonite dark yellowish orange 10YR6/6 and medium dark gray (N4) sand.
- 580-590 same sand. Less extras (shale, limonitic)
- 590-600 same Sand average 1/2mm, very well sorted.
- 600-610 little change
Clean, clear well sorted, fine-medium grained (1/8-1/2mm), average 1/2mm, vitreous, angular quartz sand. Little extras. A bit of mica, limonite, lignite and medium dark gray (N4) shale.
- 610-620 Megascopic color (N7)
Clean, clear, angular, vitreous, fine-coarse (1/8-1mm) average 1/2 quartz sand. Accessories (1%), limonitic, micaceous, medium dark gray (N4) shale.
- 620-630 Clean, clear, vitreous, angular, fine-coarse grained, (1/8-1mm), average 1mm, well sorted sand (95%), accessories (5%), lignitic; (N4) shale; limonitic, micaceous.
- 630-640 same
- 640-650 Clean, clear, vitreous, angular, fine-medium grained (1/8-1/2mm), average 1/2mm, well sorted, sand. accessories: (2%), micaceous, lignitic, shale.
- 650-660 Clean, clear, vitreous, angular, fine-medium grained (1/8-1/2mm), average 1/3mm, well sorted quartz sand. Few accessories.
- 660-670 Clean, clear, angular, vitreous, fine-coarse grained (1/8-1mm), average 1/2mm, well sorted. Accessories (2%), glauconitic-rounded, shiny, grayish olive green (5GY3/2); limonitic, lignitic, shale, N4, 10YR5/4.
- 670-680 same
- 680-690 Clean, clear, vitreous, angular, fine-coarse grained (1/8-1mm), average 1/4mm, well sorted. Accessories: (3%) glauconitic, limonitic, lignitic, shale, micaceous.
- 690-700 no change
- 700-710 Megascopic color: yellowish gray 5Y7/2, clean, clear, some limonitic coated, micaceous, phosphatic, limonitic, glauconitic (some altering to limonite) 1 lignitic, vitreous, angular, fine-coarse grained (1/8-1mm) average 1/4mm, well sorted, slightly shaly (1%), sand.

Red/lim

- 710-720 Clean, clear (or colorless), micaceous, slightly glauconitic, slightly limonitic, lignitic (2%), fine-medium grained (1/8-1/2mm average 1/4mm, well sorted, angular, vitreous, clayey (4%), small, moderate reddish brown 10R4/6 like before) shaly (6%) sand. Some pieces of what sure looks like molybdenite (MoS_2), soft, flaky, greasy, metallic. Must be graphite.
- 720-730* same. Microfossil slide made.
- 730-740* Microfossil slide made. Clean, clear and cloudy white, micaceous, very lignitic (4%), fine-medium grained (1/8-1/2mm), average 1/4mm, vitreous, angular, well sorted, clayey (3%) shaly (6%) sand. Still a bit of molybdenite.
- 740-750 Sand is the same. More lignite (5%), shale (7%), both types 10YR6/2 and N4. Also limonite, mica, moderately reddish brown 10R4/6 claystone. The amount of caved material is unknown. The 10YR6/2 shale has been present from the first sample on and off. Also, whether the lignite is interbedded or represents cave from the original bed is unknown.
- 750-760 Clean, clear, some cloudy white, lignitic (4%), limonitic, micaceous, slightly glauconitic, vitreous, subangular, fine-medium grained (1/8-1/2mm), average 1/4mm, well sorted, clayey (2%), shaly (8%) sand.
- 760-770 little change
- 770-780 Dominantly milky white, very micaceous, slightly glauconitic, fine-medium grained (1/8-1/2mm), average 1/4mm, well sorted, shaly (10%) sand.
- 780-790 same
- 790-800 Milky white, dull and clear, vitreous; very micaceous (2%), limonitic, lignitic, slightly glauconitic, fine-medium grained (1/8-1/2mm), average 1/4mm, well sorted, subangular, shaly (15%), clayey (3%) sand
- 800-310* Microfossil slide made. with possible molybdenite
Cloudy white and gray to clear, very micaceous, limonitic, lignitic, slightly glauconitic, fine-coarse (1/8-1mm), average 1/4mm, medium sorted, angular, dull to vitreous, shaly (10%) sand. The shale has a silvery sheen to its medium dark gray (N4) color. graphite
- 810-820 Clear, cloudy white and gray, micaceous, limonitic, lignitic, glauconitic, slightly pyritic, some moderately reddish brown 10R4/6 coating on grains, fine-coarse grained 1/8-1mm, average 1/5mm, well sorted, clayey (2%) shaly (3%) sand.
- 820-830 Clear, milky white and gray, and pale yellowish orange (10YR8/6),

very micaceous, glauconitic, lignitic, limonitic, slightly pyritic, fine-coarse grained (1/8-1mm), average 1/4mm, well sorted, angular, vitreous, clayey (2%), shaly (15%) sand and sandstone (3%).

The shale is medium dark gray (N4), slightly glauconitic, fissile and slightly iridescent.

- 830-840* Microfossil slide made. Clear, cloudy white and gray, and transparent pale yellowish orange (10YR8/6), micaceous, glauconitic, limonitic, phosphatic, slightly pyritic, lignitic, fine-coarse grained (1/8-1mm), average 1mm, angular, vitreous, slightly clayey (2%), slightly limy (3%), (white, chalky limestone; some fossils; a bit of white prismatic aragonite which indicates pelecypod shells) shaly (10%) sand and sandstone.
- 840-850 Clear, cloudy white and gray, yellowish tinted, micaceous, glauconitic, limonitic, lignitic, pyritic, slightly phosphatic, fine-coarse grained 1/8-1mm, (average 1/2mm), medium sorted, more coarse grained sand, angular, vitreous, slightly limy, shaly (10%), sand with sandstone some limestone cement.
- 850-860 small sample
cloudy white and gray, clear, micaceous, lignitic, limonitic, pyritic, range is fine-coarse grained (1/8mm-1mm) but few fine grained sand, most is 1mm, subangular, vitreous, well sorted, clayey (2%), shaly (15%), sand.
- 860-870 little change. More fine grained sand.
- 870-880* Microfossil slide made.
Milky white, clear, pyritic, phosphatic, limonitic, lignitic, micaceous (green tinted, chloritized?), glauconitic, fine-coarse grained (1/8-1mm), average 1/4mm, well sorted, clayey (2%- moderate reddish orange 10R6/6), limy (5%- chalky white; and fine sandy, clayey, glauconitic limestone), shaly (10) sand.
- 880-890* Microfossil slide made. Ostracods, pelecypods. Little change.
- 890-900* Microfossil slide made. Microfossils, ostracods, bryozoa.
Clear and milky white, also yellowish tinted, lignitic, limonitic, micaceous, glauconitic, phosphatic, pyritic, fine-coarse grained (1/8mm-1mm), average 1/4mm, well sorted, clayey (3%), limy (10%), shaly (10%) sand.
- 900-910 little change
- 910-920 small amount of sample
Sand is same as above, as well as accessories.
The amount of shale is up (30%). Limestone (10%).
- 920-930 No change
- 930-940 Fresh, brittle, fissile, speckled, olive gray (5Y4/1)-medium dark gray (N5), micaceous, pyritic, glauconitic, limonitic, flaky, earthy-waxy, limy (5%), sandy (10%) shale.

- 940-950 Very little sample
Cloudy white and clear, pyritic, glauconitic, micaceous, phosphatic, limonitic, lignitic fine-coarse grained (1/8-1mm), average .75mm, medium sorted, slightly clayey, shaly (20%) sand.
- 950-960 Clear, cloudy white, glauconitic, micaceous, very lignitic, fine-coarse grained (1/8-1mm), average 1/2mm, subangular, vitreous, shaly (12%) sand. Average medium grained.
- 960-970 Clear and cloudy white, pyritic, very lignitic, slightly glauconitic, micaceous, medium-very coarse grained (1/4-2mm), average (.3mm), medium sorted, subangular, vitreous, slightly clayey, slightly limy, shaly (20%) sand.
- 970-980 Megascopic color: yellowish gray 5Y7/2, cloudy white-clear, micaceous, very lignitic, slightly glauconitic, fine-coarse grained (1/8-1mm), average 1/4mm, well sorted, slightly limy, shaly (10%-olive gray 5Y4/1) sand.
- 980-990 Same as above.
- 990-1000 No change.
- 1000-1010 Very little sample, maybe not representative.
Clear-cloudy white, micaceous, glauconitic, lignitic, pyritic, shaly (20%) sand, medium-coarse grained 1/4-1mm, average 1/2mm, well sorted.
- 1010-1020 Micaceous, lignitic, limonitic, phosphatic, medium-very coarse grained (1/4-2mm), average 1/2mm, well sorted, subrounded, vitreous, slightly limy, shaly (10%) sand.
- 1020-1030 Fresh, brittle, fissile, speckled, micaceous, very lignitic, phosphatic, limonitic, flaky, waxy, sandy (20% fine-very coarse, average 1mm), limy 10% (clayey, fine grained sandy) shale.
- 1030-1040 Micaceous, phosphatic, limonitic, pyritic, lignitic, fine-very coarse grained (1/3-2mm), average 1mm, medium sorted, subangular-subrounded, shaly (30%) sand.
- 1040-1050 Small sample- same as above.
- 1050-1060 Cloudy white and clear, and also yellow tinted, micaceous, phosphatic, limonitic, lignitic, pyritic, slightly glauconitic, fine-coarse grained (1/8-1mm), dominantly 1mm, medium sorted, subangular, vitreous, limy (5% finely sandy, clayey, glauconitic limestone and some fossil fragments), shaly (15%) sand.
- 1060-1070 Very lignitic, micaceous, pyritic, phosphatic, limonitic, medium-coarse grained 1/4-1mm, dominantly 1mm, medium sorted, limy (3%), shaly (40%- olive gray 5Y4/1-medium gray N5) sand.
- 1070-1080 Fresh, brittle, fissile, olive gray 5Y4/1, micaceous, limonitic, lignitic, phosphatic, fossiliferous (macrofossils-pelecypods), waxy, limy (5%) sandy (35%) shale.
- 1080-1090 Cloudy white-gray and clear, very lignitic, micaceous, slightly limonitic, phosphatic, slightly glauconitic, fine-coarse grained

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 (1/8-1mm), average (.75mm), medium sorted, subangular, vitreous, slightly limy, shaly (15%) sand.
- 1090-1100 Little change. Less shale (5%).
- 1100-1110 Cloudy white-gray, clear, yellowish orange tinted, lignitic, micaceous, limonitic, phosphatic, slightly glauconitic, pyritiferous, fine-very coarse grained (1/8-2mm), 2 main size categories, 1mm and 1/4mm, medium sorted, subrounded-subangular, vitreous, slightly limy, shaly (15%) sand.
- 1110-1120 Cloudy white-gray, clear, slightly micaceous, slightly pyritic, fine-coarse (1/8-1mm), most 1mm, well sorted, subrounded-subangular, shaly (1%) sand (99%).
- 1120-1130 Missing
- 1130-1140* Microfossil slide made.
 Brittle, fissile, speckled, micaceous, pyritic, limonitic, lignitic, flaky, fossiliferous (megafossils), earthy-waxy, limy (2%), sandy (25%- dominantly 1.5mm, subrounded) shale.
- 1140-1150* Microfossil slide made. No change. Slightly glauconitic.
- 1150-1160 Cloudy white-gray, clear, yellow tinted, lignitic, phosphatic, slightly glauconitic, slightly micaceous, limonitic, fine-very coarse grained, (1/8-2mm), most about 1mm, subangular, slightly limy (1%), shaly (45%) sand.
- 1160-1170 Sand finer grained (about 1/2mm) medium sorted, less shale 15%.
- 1170-1180 Milky white-gray, clear, yellow and orange tinted, phosphatic, glauconitic, pyritiferous, slightly micaceous, limonitic, fine-very coarse grained (1/8-2mm), most (1/2mm), medium sorted, limy (5%- microfossils; chalky, white limestone and clayey, fine grained sandy, glauconitic limestone) shaly 10% sand.
- 1180-1190 Brittle, fissile, olive gray (5Y4/1)- medium gray (n5), limonitic, phosphatic, micaceous, glauconitic, lignitic, pyritic, slightly fossiliferous, waxy, limy (8%), sandy (30%) shale.
- 1190-1200 Cloudy white-gray, clear, yellow-orange tinted, limonitic, phosphatic, glauconitic, micaceous, pyritic, lignitic, fine-very coarse grained (1/3-2mm), average 1/2mm, medium sorted, limy (5%), shaly (35%) sand.
 Like above but with an influx of finer sand.
- 1200-1210 Same as above.
- 1210-1220 Little change.
- 1220-1230 Milky white, clear, limonitic, lignitic, phosphatic, micaceous, slightly glauconitic, pyritic, fine-very coarse grained (1/8-

- 2mm), average (.75mm), well sorted, angular, vitreous, limy (5% - dominantly sandy, dirty limestone), shaly [(35% - light olive gray (5Y6/1) - olive gray (5Y4/1) - medium gray N5), varying amounts of included mica and brownish organic material (?) sand.
- 1230-1240* Megafossil slide made.
Little change - a few microfossils. Shale portion about 45%.
- 1240-1250 Brittle, fissile, olive gray (5Y4/1) - medium gray (N5) - medium dark gray (N4), micaceous, pyritic, glauconitic, limonitic, flaky, earthy-waxy, limy (5%), sandy (15%), shale.
- 1250-1260 Brittle, fissile, olive gray (5Y4/1) - medium dark gray (N4), lignitic, micaceous, phosphatic, slightly glauconitic, pyritic, flaky, waxy-earthly, limy (5%), sandy (10%) shale.
- 1260-1270 Shale is as above. Limestone is as microfossils, sandy, white limestone and relatively pure white and cream limestone.
- 1270-1280 Shale as above with phosphatic, micaceous, lignitic, glauconitic, pyritic, (5%) limestone as microfossil fragments, prismatic aragonite, sandy limestone and dense 100% limestone. (30%) sand, clear, vitreous, angular, well sorted, average 1/2 mm
- 1280-1290 Little change.
- 1290-1300 Milky white, pyritic, very phosphatic, lignitic, dull-vitreous, well sorted, subrounded, medium-very coarse grained (1/4-2mm), average 2mm, limy (3%), shaly (40%) sand.
- 1300-1310* Microfossil slide made. Ostracods, pelecypods.
Brittle, fissile, light olive gray (5Y6/1) - olive gray (5Y4/1), very phosphatic, lignitic, pyritic, slightly limonitic, slightly fossiliferous (pelecypods, ostracods), earthy-waxy, limy (8%) sandy (30%) well sorted, average 1/2mm, shale.
- 1310-1320 Limy (10%), sandy (35%) shale as above.
- 1320-1330 Clear, cloudy white-gray, and yellow tinted, pyritic, phosphatic, lignitic, slightly limonitic, fine-coarse grained (1/8-1mm), average 1/4mm, well sorted, vitreous, angular, limy (6%), shaly (25%) sand.
- 1330-1340 Mesoscopic color: yellowish gray (5Y8/1)
Individual grains: clear, cloudy white, yellow tinted, pyritic, phosphatic, fine-very coarse grained (1/8-2mm), average 1/2mm, medium sorted, subangular-subrounded, slightly shaly (2%) sand (98%).
- 1340-1350* Microfossil slide made.
Micaceous, pyritic, phosphatic, slightly glauconitic, fine-coarse grained (1/8-1mm), average 1/4mm, well sorted, vitreous, angular, limy (8%), shaly (40%) sand.

- 1350-1360 Cloudy white-clear, micaceous, phosphatic, fine-very coarse grained, (1/8-2mm), average 1mm, subangular, vitreous-dull, medium sorted, limy (5%), shaly (15%) sand.
- 1360-1370 Cloudy white, clear, phosphatic, pyritic, fine-coarse grained (1/8-1mm), average 1/2mm, medium sorted, subangular-subrounded, vitreous-dull, limy (2%) shaly (10%) sand.
- 1370-1380 Same sand, 5% shale, lignitic
- 1380-1390 Cloudy white-gray, clear, yellow tint, lignitic, phosphatic, fine-very coarse grained (1/8-2mm), average 1mm, (some 3mm), medium sorted, subrounded-subangular, dull-vitreous, limy (2%) shaly (5%) sand.
- 1390-1400 No change
- 1400-1410* Micafossil slide made.
Dominantly coarse grained sand with 1% limestone, 5% shale. As above.
- 1410-1420 Cloudy white-gray, clear, slightly lignitic, fine-very coarse grained (1/8-2mm), also some granules >3mm, average 1mm, medium sorted, angular-subrounded, vitreous, these larger grain sizes are the more rounded and less clear (as is usually the case) shaly (5%) light olive gray (5Y6/1)-olive gray (5Y4/1), sand.
- 1420-1430 Dominantly coarse-very coarse sand with (15%) shale, as above.
- 1430-1440 Brittle, fissile, olive gray (5Y4/1), micaceous, slightly phosphatic, flaky, very slightly fossiliferous (a few megafossil fragments), waxy-earthy, sandy (20%-fine-coarse grained, average 1/2mm), clayey (20%-light olive gray (5Y6/1), slightly sandy, waxy claystone), shale (60%).
- 1440-1450 Same as above.
- 1450-1460 Little change
Shale, as above, 49%
Claystone-30% ('non fissile shale', lighter than above shale)
Sand-20% Limestone-1%
- 1460-1470* Slide made.
Fresh, soft, light olive gray (5Y6/1), micaceous, pyritic, waxy, slightly limy, sandy (30%) claystone.
- 1480-1490 Cloudy white, clear, yellow-orange tinted, dull-vitreous, medium sorted, subangular-subrounded, fine-very coarse grained (1/8-2mm), average 1mm, very slightly limy, clayey (5%), shaly (8%) sand.
- 1490-1500 Sand size range is the same, the average, however, is 1/2mm. Clay and shale the same.
- 1470-1480* Slide. Fresh, soft, light olive gray 5Y6/1, micaceous, pyritic, waxy, slightly limy, sandy (30%) shaly (30%) claystone.

- 1500-1510 Cloudy white-clear, more yellow, orange red iron stain, micaceous, feldspathic? (bright white, crystalline, rectangular), dull-vitreous, poorly sorted, subrounded-subangular), fine-coarse grained (1/8-1mm), average 1/2mm, slightly limy, shaly (15%) sand.
- 1510-1520 Clear, cloudy white, also iron stain, phosphatic, micaceous, vitreous-dull, poorly sorted, angular-subangular, fine-very coarse grained, (1/8-2mm), average 1/2mm, slightly limy, (a few microfossil fragments), shaly (30%) sand.
- 1520-1530 Brittle, fissile, medium gray (N5)-medium light gray (N6), feldspathic, micaceous, phosphatic, pyritic, slightly glauconitic, flaky, waxy, slightly limy, sandy (25%) clayey (35%-5YB/1 claystone) shale.
- 1530-1540 Cloudy white, clear, iron stain, some pink, micaceous, slightly pyritic, feldspathic, slightly glauconitic, medium sorted, subangular, fine-very coarse grained (1/8-2mm), average 1mm, clayey (30%), shaly (30%) sand.
- 1540-1550 Sand as above, dominantly coarse, grained-very coarse grained, much iron stain, less claystone (15%), shale (20%).
- 1550-1560 Clear, cloudy white, less iron stained than above, feldspathic, micaceous, pyritic, fine-very coarse grained, (1/8-2mm), average 1mm, medium sorted, angular-subrounded, vitreous-dull, slightly clayey (2%), shaly (5%) sand.
- 1560-1570 Milky white, pink, red, yellow, orange, clear, feldspathic, coarse-very coarse grained, and granules (1-4mm), average 2mm, fine grained portion missing in this sample. (artificial?) subangular-subrounded, dull-vitreous, slightly clayey, shaly (3%) sand.
- 1570-1580 Milky white, with yellow, pink, orange tint, also red stain, feldspathic (bright white, crystalline), pyritized, lignite, medium-very coarse grained (1/2-3mm), average 1.5mm, medium sorted, dull-vitreous, shaly (7%) sand.
- 1580-1590* Microfossil slide made.
Cloudy white, clear, (orange, yellow, red tint), slightly micaceous, feldspathic, slightly pyritic, fine-coarse grained (1/8-1mm), average 1/2mm, well sorted, angular, vitreous, shaly (15%) sand.
- 1590-1600 Same as above.
- 1600-1610 Clear, cloudy white-with orange, yellow, red or orange tinting, slightly micaceous, feldspathic, fine-coarse grained, (1/8-1mm), average 1/2mm, angular-subangular, vitreous, medium sorted, clayey (5% light olive gray claystone as above), shaly (7%) sand.

*Same as above
@ 1530
-935*

cut

77

- 1610-1620 20% new dark gray (N3) metamorphic chips. Quartzose and mafic felia are evident. No alteration is evident in the sands above and below. Since no metamorphic activity is indicated, the gneiss may be the result of a ground up pebble. Little change from above is seen in the sand.
- 1620-1630 Clear, cloudy white, iron stained, feldspathic, fine-coarse grained, (1/8-1mm), average 3/4mm, medium sorted, angular-subangular, vitreous, slightly clayey, slightly shaly, sand. No schist in sample.
- 1630-1640 No change.
- 1640-1650 Little change, 5% shale. Clear, cloudy white (red, orange, yellow tint and stain), fine-coarse grained (1/8-1mm), average 3/4mm, medium sorted, angular-subangular, vitreous, sand.
- 1650-1660 Cloudy white, clear, with yellow, orange, red tinting (inside), megascopic color: grayish orange (10YR7/4), feldspathic, fine-coarse grained, 1/8-1mm, average .75mm, medium sorted, angular, vitreous, slightly shaly, sand.
- 1660-1670 Same as above.
- 1670-1680 No change.
- 1680-1690 Feldspathic (2%), slightly shaly (4%) sand as above.
- 1100 1690-1700 No change.
- 1700-1710 Still relatively pure, some iron stain, feldspathic, slightly micaceous, slightly shaly sand.
- 1710-1720 Clear, cloudy white with iron tinting and staining, feldspathic (3%), micaceous, fine-very coarse grained, 1/8-2mm, average 1mm, medium sorted, angular-subangular, vitreous, shaly (4%) sand.
- 1720-1730 Cloudy white, clear-yellow, orange, red tint and stain, feldspathic, medium-very coarse grained (1/4-2mm), most grains are coarse-very coarse, average 1mm, well sorted, angular, vitreous, sand.
- 1730-1740 Same as above.
- 1740-1750 Sand colors are the same. The range: fine-coarse grained, 1/8-1mm, average .4mm, medium sorted, vitreous, angular.
- 1750-1760 Megascopic color: light brown 5YR6/4-moderate orange
Individual grain colors: cloudy white, clear and much pale orange, also red stain. Feldspathic, slightly micaceous, fine-coarse (1/8-1mm), average .75mm, medium sorted, angular, vitreous, very slightly shaly (cave ?) sand.
- 1760-1770 Sand as above with 5% shale-with some claystone.
- 1770-1780 Cloudy white, clear, yellow, orange and red, feldspathic, micaceous, fine-coarse grained, (1/8-1mm), average 1/2mm, vitreous, medium sorted, angular sand.

1780-1790

No change

(m t w s c 1790-1800

Clear, pale orange, cloudy white with some yellow and red, feldspathic, micaceous, fine-coarse grained, 1/8-1mm, average 1/2mm, better sorted than above but not quite well sorted, vitreous, angular, slightly shaly (1%) (cave. ?), sand.

@ - 1190

1800-1810

Clear, cloudy white, yellow, orange, and red, limonitic, micaceous, feldspathic, slightly pyritic, fine-very coarse grained (1/8-2mm), average 1/2mm, poorly sorted, vitreous, angular, slightly shaly (2%) sand.

1810-1820

Same as above

1820-1830*

Microfossil slide mate.

Clear, cloudy white, yellow, orange and red, feldspathic, micaceous, limonitic, fine-coarse grained, average 1/4mm, poorly sorted, angular, vitreous, sand. slightly shaly (7%).

1790-1840

1830-1840

Grain colors as above. Size range: fine-very coarse grained and granules 1/8-3mm, dominant size 1/4mm, average size 1/2mm, poorly sorted, vitreous, angular, slightly shaly (2%-cave. ?) sand.

1840-1850

Cloudy white, yellow, clear dominantly grained colors. Also orange and red, feldspathic, micaceous, fine-coarse grained (1/8-1mm), average 1mm, well sorted, vitreous, angular, clayey (2%), shaly (2%) sand.

1850-1860

Same as above with average size .75 mm.

1860-1870

Grain colors as above. Size range: fine-very coarse grained and granules 1/8-3mm, dominant size: 2mm, average size 1mm, large grain sizes are very unabraded, i.e. angular and unfrosted. Clayey (2%) shaly (3%).

1870-1880

Same size range, more 1/4mm portion though, so average is .75mm. Colors are same.

1880-1890

Containing lessening of very coarse grained portion, average 1/2mm, poorly sorted.

1890-1900

Cloudy white, pale orange, clear, feldspathic, micaceous, fine-coarse grained (1/8-1mm) average 1/4mm, medium sorted, angular, vitreous, sand.: Some red stained also.

1900-1910

Cloudy white, clear, less iron tinting and staining (yellow, orange, red), fine-very coarse grained and granules, 1/8-3mm, many 2mm grains, average of total: 1mm, unabraded: angular, unfrosted, sand.

1910-1920

Little change, slightly micaceous, 2% claystone with various iron stain colors-red, orange, pink, yellow.

-1790

- 1930-1930 Milky white, clear, yellow, feldspathic, micaceous, fine-very coarse grained, 1/8-2mm, less very coarse grained portion, average grain size: 1mm, medium sorted, vitreous, angular, sand. 3% extras: claystone, shade as above. Claystone is iron stained, varicolored.
- 1930-1940 No change
- 1940-1950 No change
- 1950-1960 Same colors as above. Size range: fine-very coarse - 1/8-2mm, most is coarse grained, average 1/2 mm, medium sorted, angular, vitreous. Also 3% micaceous, claystone with various iron stain colors (red, orange, yellow, purple). "without stain color: yellowish gray 5Y3/1. Also bit of micaceous, medium gray (N5) shale.
- 1960-1970 Milky white, clear or yellow, orange. Feldspathic, micaceous, fine-very coarse grained, 1/8-2mm, average 1mm, well sorted angular, vitreous. A very pure, uniform sample.
- 1970-1980 Same with less very coarse grained portion, average size is still 1mm.
- 1980-1990 Little change, more very coarse grained. range: fine-very coarse, average 1.25mm.
- 1990-2000 Same. Milky white, clear-yellowish orange, fine-very coarse grained, average 1mm, micaceous, feldspathic, angular, vitreous, medium sorted, rather pure sand.
- 2000-2010 Cloudy white, clear, yellow-orange, micaceous, feldspathic, fine-very coarse grained and granules, 1/8-3mm, average .75mm, medium sorted, angular vitreous sand. The usual.
- 2010-2020 Same, sand
- 2020-2030 Same
- 2030-2040 Sand same, fine-very coarse grained, some granules, 1/8-3mm, medium sorted, average .75 mm, slightly micaceous, feldspathic, vitreous, angular. The grain size seems not to affect angularity. The larger grain sizes are just as angular as those smaller. Before (not in this section starting about 1500) larger grain sizes are more abraded...One piece of very poorly sorted, iron cemented sandstone.
- 2040-2050 Still no change
- 2050-2060 Fine-very coarse grains and granules, 1/8-4mm, average 1mm, poorly sorted, vitreous, subangular, sand. Varicolored (iron), slightly sandy, micaceous, claystone (2%).

Handwritten notes:
 2040-2050
 2050-2060
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- 2060-2070 Same. another chunk of iron cement, very poorly sorted sandstone.
- 2070-2080 Same
- 2080-2090 Grains are mostly milky white or clear, less yellow or orange tinted. Fine-very coarse grains and granules, 1/8-3mm, average about 1mm, vitreous, subangular. Still varicolored, slightly sandy, micaceous claystone. Bits of shale, limonitic.
- 2090-2100 Same as above
- 2100-2110 Same. Larger grain sizes are more abraded than those smaller. (starting 2090'). Larger sizes (>1mm) are subangular and frosted.
- 2110-2120 No change
- 2120-2130 Cloudy white, clear. some yellow, orange and pink tinted, feldspathic (4%), slightly micaceous, medium-very coarse grained, a few granules, (1/4-3mm), average 2mm, medium sorted, almost well sorted. angular-subangular, vitreous-dull, more frosted grains than before. 1% claystone/shale.
- 2130-2140 Same but fine grained portion back. → average 1mm.
- 2140-2150 No change
- 2150-2160 Grain size range: 1/8-4mm, very little fine grains, average size 2mm, medium sorted, vitreous-dull, angular-subangular, feldspathic, slightly micaceous, sand.
- 2160-2170 Milky white, clear, some pale yellow, slightly micaceous, feldspathic (3%), fine-very coarse grained, 1/8-2mm, very small fine grained portion, average 1.5mm, well sorted, dull-vitreous, subangular-angular, slightly shaly (2%), sand.
- 2170-2180 No change
- 2180-2190 Fine-very coarse, more fine grained portion, average 1mm, medium sorted, dull-vitreous, subangular-angular, sand.
- 2190-2200 Clear, cloudy white, some pale yellow, orange, micaceous, feldspathic, fine-very coarse grained 1/8-2mm, average .75mm, medium sorted, more vitreous than above, more angular than above
- 2200-2210 Little change, little mica
- 2210-2220 Same
- 2220-2230 Milky white, clear, some pale yellow and orange, feldspathic, micaceous, fine-very coarse grained, 1/8-2mm, average 1mm, medium sorted, subangular-angular, dull-vitreous, sand. 1 piece poorly sorted, iron cemented sandstone.
- 2230-2240 Little change-a chunk of rutillated quartz seen. Slightly clayey (5%), varicolored.

- 2240-2250 Same
- 2250-2260 Fine to very coarse grained, poorly sorted, average .75 mm, clayey (5%), varicolored quartz sand
- 2260-2270 Same
- 2270-2280 Feldspathic (5%), claystone (8%), fine to very coarse grained sand.

- 2250-2290 Same
- 2290-2300 Still about the same fine-very coarse grained, poorly sorted
- 2300-2310 Clean, clear, cloudy white and yellow or orange, micaceous, feldspathic (less than above), fine-very coarse grained, $1/8$ - 2 mm, average 2 mm, well sorted angular, vitreous, pure sand (100%).
- 2310-2320 Not pure like 2300-2310. Cloudy white, clear, and the usual iron tint colors, slightly micaceous, feldspathic, fine-very coarse grained, $1/8$ - 2 mm, average about 1 mm, medium sorted, clayey (4%), subangular, dull.
- 2320-2350 Fine-coarse grained $1/8$ - 1 mm, average $1/2$ mm, angular-subangular, dull-vitreous, feldspathic, sand. Claystone 6%.
- 2330-2340 same as above
- 2340-2350 little change
- 2350-2360 Like 2300-2310.
Clean, clear, well sorted, average 2 mm, vitreous, angular, pure sand.
- 2360-2370 Milky white, clear-pink, red, orange, yellow; limonitic, feldspathic, fine-very coarse grained, $1/8$ - 2 mm, average about 1 mm, medium sorted, angular, vitreous, very slightly limy (2 pelecypod fragments), clayey ((10%) varicolored: brownish red, red, yellow, orange.) sand Also pieces of iron cemented sandstone.
- 2370-2380 little change. Very feldspathic (5%).
- 2380-2390 same
- 2390-2400 little change. still lots of iron coloration, slightly pyritic
- 2400-2410 same
- 2410-2420 New arkose. Milky white, clear, and iron tint colors, feldspathic, fine-very coarse grained and granules, $1/8$ - 5 mm, average 2 mm, medium sorted, many large grains, angular, vitreous, sand. Clayey-shale(8%). Also iron cemented, limonitic, sandstone. A new poorly sorted, grayish red 10R4/2-brownish red arkosic sandstone. Dense, with a microcrystalline, white, tight non carbonate cement, probable clay from weathered feldspar. Does lithified rock indicate Triassic?
- 2420-2430 No change
- 2430-2440 Milky white-clear; yellow, orange, pink, red; feldspathic, slightly limonitic, fine-very coarse grained and granules, ($1/8$ - 3 mm), average .75 mm, poorly sorted, vitreous-dull, angular-subangular sand. Also some iron cemented, very coarse grained sandstone, poorly sorted. 10%-new, grayish red-brownish red, dense, angular, poorly sorted sandstone (arkosic).

- 2440-2450* Same as above. Microfossil slide made.
- 2450-2460 No change.
- 2460-2470 Same colors, feldspathic, slightly limonitic, (as quartz coating and cement), fine-very coarse grains and granules, (1/8-4mm), average 1mm, medium sorted; larger grains dull, subrounded; those smaller: vitreous, angular sand; 20% reddish-brown, sandstone.
- 2470-2480 60% Cloudy white, clear some yellow, red, feldspathic, slightly glauconitic, fine-very coarse grained, 1/8-2mm, average 1/2, most is fine grained, vitreous, angular sand.
40% leached, hard, stained, banded, moderately reddish brown (10R4/6)-grayish red 5R4/2, feldspathic, slightly apatitic(?), vitreous, poorly sorted, clay (white-from feldspar) cement, nonporous, dense, angular, fine-very coarse grained, (1/8-2mm), arkosic sandstone.
- 2480-2490 Sand is more coarse grained, up to 3mm, sandstone is 30%, same as above.
- 2490-2500 Sand is the same... as well as the sandstone but the amount is down to 20%.
- 2500-2510 No sample.
- 2510-2520 65% sand. Milky white, clear, some iron stain, feldspathic, slightly glauconitic, fine-very coarse grained, 1/8-2mm, most fine grained, average of total: 1/2mm, medium sorted, larger sizes dull and subrounded; smaller are vitreous and angular. 35% pale red 5R6/2-grayish red 5R4/2, arkosic, clayey, very angular, medium sorted sandstone.
- 2520-2530 More coarse grained sand. 15% arkosic sandstone.
- 2530-2540 70% quartz sand. Fine-very coarse grained, average 1/4mm, most is fine grained medium sorted, slightly micaceous, slightly pyritic, feldspathic.
30% dense, hard, tightly cemented, angular, poorly sorted, fine-very coarse grained, grayish red, arkosic, clayey cemented sandstone.
- 2540-2550 30% quartz sand. Less fine grained sand, average now 1mm
20% tightly cemented arkosic sandstone. Looks almost like granite.
- 2550-2560 60% quartz sand, fine-very coarse grained, average 1/2, feldspathic, micaceous, lignitic, some white-transparent prismatic aragonite.
35% arkosic sandstone
5% Medium light gray (N6)-medium gray (N5) shale- probably core.
- 2560-2570 Same as above

- 2570-2580 70% Hard, stained, banded, brick red-grayish red, feldspathic, minutely quartz veined, vitreous (quartz), poorly sorted, clay cemented, nonporous, dense, angular, medium-very coarse grained, 1/4-2mm, arkosic, tightly cemented sandstone.
25% sand - cloudy white, clear, iron tint colors, feldspathic, micaceous, fine-coarse grained, angular-subangular, vitreous-dull.
5% shale
- 2580-2590 70% sand as above
30% arkosic sandstone
- 2590-2595 Cloudy white, clear, yellow-orange, feldspathic, micaceous, slightly fine to very coarse grains and granules, 1/8-3mm, average 2 mm, dull, angular, arkosic (39%) sand.
- 2595-2600 Same as above
- 2600-2610 Sand as above with more fine grained portion. Average now 1mm.
Also 20% arkose.
- 2610-2620 60% sand, 40% arkose.
- 2620-2630 55% sand, fine-very coarse (1/8-2mm), average 1/2mm, angular, medium sorted.
45% arkose. as above
- 2630-2640 60% well sorted, average 1/2mm, angular, vitreous, sand
40% arkose
- 2640-2650 sand and arkose
- 2650-2660 65% sand. Cloudy white, clear, yellowish with some red stain, feldspathic, slightly micaceous, fine-very coarse, (1/8-2mm), average 1mm, medium sorted, angular-subrounded, vitreous-dull
35% arkosic sandstone. as above
- 2660-2670 little change 3% shale with a bit of shell fragments.
- The varying amounts of arkosic sandstone in sample may indicate interbedding (Due to weathering changes?). The sand portion looks much like that encountered in the section above (about 1500-2400')
- 2670-2680 Clear, cloudy white, and the usual iron tint colors, feldspathic, slightly pyritic, slightly glauconitic, slightly micaceous, fine-very coarse grained, (1/8-2mm), average .75mm, poorly sorted, fossiliferous (5% pelecypod fragments), mostly vitreous, angular, shaly (10%), arkosic (10%) sand.
- 2680-2690 little change, but more arkose (35%)
- 2690-2700 Slightly phosphatic, slightly glauconitic, micaceous, slightly pyritic, feldspathic, shaly (15%), arkosic (45%) sand.

START OF 5' INTERVALS

- 2700-2705 Clear, cloudy white, slightly pyritic, slightly glauconitic, (from shale), micaceous (individual and in shale), feldspathic, slightly fossiliferous, fine-very coarse grained and granules (1/8-3mm), subangular, clayey (5%-brick red claystone), shaly (15%), arkosic (40%) sand.
- 2705-2710 little change
- 2710-2715 20% shale, 50% arkose, 30% sand.
- 2715-2720 Clear-yellow-orange, feldspathic, fine-coarse grained (1/8-1mm), average 1/2mm, medium sorted, vitreous, angular, slightly shaly, arkosic (15%) sand. Relatively clean, clear, pure sand.
- 2720-2725 Sand with more arkose (35%) and shale (5%)
Also a few shell fragments, some showing pearly layers.
- 2725-2730 Dominantly arkose (65%) with sand
This is a tightly cemented arkose, with little interstitial space. What space there is is tightly packed with clay (kaolin?) cement. Occasional black or green crystalline unknown minerals are consolidated. The color, quartz angularity and density sure give a granitic appearance.
- 2730-2735 little change
- 2735-2740 Small sample, arkose and well sorted, average 1/4mm, angular, vitreous, sand.
- 2740-2745 Milky white, clear-yellow and other iron related colors, fine-very coarse grained, average 1/2mm, well sorted, little coarse-very coarse portion, vitreous, angular, arkosic (45%) sand. Two tourmaline crystal fragments. Also pieces of white clay (kaolin?) that may be well weathered feldspar.
- 2745-2750 little change
- 2750-2755* Microfossil slide made.
Clear, milky white, pink, orange, yellow, micaceous, slightly pyritic, limonitic, phosphatic, feldspathic, fine-very coarse grained, 1/8-2mm, average 1/2mm, poorly sorted, fossiliferous, angular-subangular, vitreous-dull, clayey 3% (kaolin), shaly (5%), arkosic (35%) sand.
- 2755-2760 little change
- 2760-2765* Microfossil slide made, foraminifera.
same
- 2765-2770 Some pyritized shell fragments, megafossils, fine-very coarse grains and granules, (1/8-3mm), average .75mm, poorly sorted, limonitic, feldspathic, kaolin, micaceous, clayey (5%) both kaolin and iron stained, micaceous claystone; shaly (2%) as above; arkosic (30%), sand.
- 2770-2775 Same
- 2775-2780* Microfossil slide made. Sand size average 1mm, poorly sorted.

- 2780-2785 Clear-yellowish, feldspathic, fine-very coarse grained, (1/8-2mm), average about 1mm, medium sorted, angular, vitreous, arkosic (10%) sand. A rather clear, clean, pure angular sand.
- 2785-2790 Back to arkosic (40%) coarse grained sand... Cloudy white, clear, micaceous feldspathic lam, fine-very coarse grains and granules, (1/8-4mm) average 2mm, medium sorted, dull, subangular, clayey (4%) (brick red claystone and kaolinite); arkosic (40%) sand.
- 2790-2795 little change
- 2795-2800 60% arkose, some iron cemented sandstone.
- 2800-2805 Sand with arkosic sandstone.
- 2805-2810 Same old stuff. Sand with individual feldspathic with a majority about 60% of arkosic (with feldspar included) sandstone.
- 2805-2810 same as above
- 2810-2815 Cloudy white, clear, feldspathic, micaceous, fine-very coarse grained and some granules (1/8-4mm), average 2mm, poorly sorted, dull, subangular, clayey (5%-kaolin and brick red clay stone), arkosic (50%), sand. The arkose is as dense, tightly cemented (kaolin?) rock in angular, sharp, fragments. While with the exception of occasional lichenite cemented sandstone, the sand is subangular, unconsolidated. The varying % of arkose would seem to indicate interbedding but whether consolidated arkose interbedded with unconsolidated sand is possible or likely is unknown.
- 2815-2820 Little change with the exception of the lowering of the average sand size to 1mm, medium sorted.
- 2820-2825 No change
- 2825-2830 No sample
- 2830-2835* Microfossil slide made.
Cloudy white-clear, fine-very coarse, (1/8-2mm), average 1/2mm, well sorted, very feldspathic (3%) individual, angular-subangular, vitreous-dull, clayey (3%), shaly (3%), arkosic (50%) sand.
- 2835-2840 Arkosic (40%) sand.
- 2840-2845 Arkosic (30%) sand, with brick red claystone. Well sorted sand average 1mm.
- 2845-2850* Microfossil slide made.
Little change. Angular, arkosic sandstone rock chips (30%), brick red claystone in cloudy white-clear, subangular, fine-very coarse grained, average 1mm, medium sorted, sand.

- 2850-2855 Same
- 2855-2860* Microfossil slide made.
Cloudy white, clear, micaceous, feldspathic, fine-very coarse grained, 1/8-2mm, average .75mm, medium sorted, subangular, dull, clayey (5%) arkose (30%) sand.
- 2860-2865 No change
- 2865-2870 Clean, clear, cloudy white, pale yellow, fine-very coarse grained, average 1/2mm, most is 1/4mm, sand. With 2% claystone, 3% shale, 15% arkosic sandstone.
- 2870-2875 Little change. More very coarse grained, average now 1 mm, medium sorted sand with others as above.
- 2875-2880 Same
- 2880-2885 Fine-very coarse grained (1/8-3mm), average about 1mm, medium sorted, clayey (8%-brick red claystone), arkosic (20%), shaly (4%) sand.
- 2885-2890 Same.
- 2890-2895 Limonitic, coating on some quartz sand and claystone particles
25%- brick red claystone is almost purple approximately grayish red (5R4/2)
10%- arkosic sandstone
65%- sand. Fine-very coarse grained, average approximately 1mm, medium sorted, angular.
- 2895-2900 A piece of subangular gypsum
75% arkose
5% claystone
20% sand
- 2900-2905 50% quartz sand. Cloudy white-clear, red, orange, yellow, fine-very coarse, 1/8-3mm, average 1mm, well sorted, vitreous, angular → dull, subangular, feldspathic, slightly hematitic
10% clayey brick red-grayish red, micaceous, claystone. Also powdery, white kaolin
40% arkosic sandstone angular chips, though some slightly rounded (during trip up through drilling mud?). The usual angular, clear or white, quartz with stained (red) feldspar in tight, dense clay cement.
- 2905-2910 Same as above.
- 2910-2915 Little change but most quartz is iron stained. Moderate red (5R5/4). Arkose chunks are more rounded. Megascopic sample color: grayish red (5R4/2).
- 2915-2920 No change
- 2920-2925 40% arkosic sandstone. A lot seems to have disconsolidated.
55% sand. Fine-very coarse, average 1/2mm.
5% clay- bits as reddish brown claystone; also kaolin.

- 2925-2930 Same Less quartz celeration.
- 2930-2935 60% quartz sand. Fine-very coarse grained, 1/8-2mm, average 1mm, medium sorted, cloudy white, clear, yellow, red orange. Some with limonitic coating. Also a greenish tinted mineral, apatite? Some clear prismatic aragonite.
35% arkose; as above
5% clay; claystone and kaolin.
- 2935-2940 Same.
- 2940-2945 Same. Sand, arkose and clay.
- 2945-2950 No change.
- 2950-2955 50% arkose. Angular to subangular, poorly sorted, medium-very coarse grained, clear to reddish quartz, with reddish-white feldspar in a dense, tightly clay cemented rock, less angular than above. These fragments that are angular may be broken pebbles.
45% quartz sand. Medium-very coarse grained, 1/4-2mm, average 1mm, poorly sorted, clear-cloudy white, also iron tinted.
5% claystone, kaolin.
- 2955-2960 Same.
- 2960-2965 Clean, clear to yellow, well sorted, angular, coarse to very coarse grains and granules of rather pure sand.
- 2965-2970 Sand as above, with arkose portion back. Limonite chunks and coating on grains.
- 2970-2975 60% quartz sand. Fine-very coarse grains and granules 1/8-4mm, average .75 mm, poorly sorted, angular-subrounded, vitreous-mull, cloudy white-clear, yellow, red, orange, limonitic coated.
35% arkose; as above
5% clay; iron stained, micaceous claystone and kaolin.
- 2975-2980 No change.
- 2980-2985 50% sand, 45% arkose, 5% clay
- 2985-2990 Same.
- 2990-2995 Same.
- 2995-3000 Still same.
- 3000-3005 One clear, rectangular, striated piece of gypsum.
65% arkose. as above. Most in 4mm chunks.
30% quartz sand.
5% clay. One large gray shell fragment.
- 3005-3010 As above.

- 3010-3015 No sample
- 3015-3020 Coarse grained sample, few grains or rock pieces smaller than 1mm. 65% dense, tightly cemented arkose like above. 30% quartz sand, most 1-4mm, dull, rounded, 5% claystone. Varicolored (light olive gray underneath iron stain), micaceous claystone, some large shale chunks, also the kaolin.
- 3020-3025 Same as above
- 3025-3030 No change
- 3030-3035 60% arkose, 35% sand. 5% clays.
- 3035-3040 Once again a clean, clear, milky white to yellow-orange, angular, medium-very coarse grains and granules (1/4-3mm), average 2mm, well sorted, vitreous, rather pure sand. (Like 2960-2965, 2780-2785, 2715-2720). A similar looking, occasionally reoccurring bed.
- 3040-3045 Angular sand as above with lower average size (1mm), medium sorted, 7% various claystones. Some sandy, micaceous.
- 3045-3050 Arkose back (25%), sand (70%), some limonitic cemented sandstone, 5% claystones
- 3050-3055 70% quartz sand. medium-very coarse grains and granules, 1/4-5mm, dull, subrounded, cloudy white-yellow
25% arkose 5% claystone-grayish red 5Y4/2
- 3055-3060 80% quartz sand. Coarse-very coarse grains and granules (1/2-4mm), average 1mm, subrounded, dull, cloudy white, some limonite coating.
15% arkose
5% claystones and kaolin.
- 3060-3065 No change.
- 3065-3070 Same.
- 3070-3075 Little change Subrounded-subangular quartz sand.
- 3075-3080 63% quartz sand. Clear-cloudy white, fine-very coarse grains and granules, 1/8-4mm, dominantly vitreous, angular, medium sorted.
30% arkose
7% claystone, kaolin bits of shale.
- 3080-3085 Little change
- 3085-3090 Same ole stuff
- 3090-3095 50% quartz sand. Fine-very coarse, granules 1/8-4mm, 40% arkose. as above, also a new type: well sorted, medium-coarse grained with pink feldspar. Looks like granite.
10% clays- brick red-grayish red claystones, large (1.5mm long) shale pieces and kaolin.
- 3095-3100 Same

- 5100-3105 Sand, arkose and claystone with some shale
- 3105-3110 Cloudy white, clear-yellow, fine-very coarse grained, (1/8-3mm), poorly sorted, average .75mm, slightly fossiliferous (a few pelecypod fragments), subangular, dull, 25% arkosic, 7% clayey (claystones and kaolin), 5% (N6 shale-large fragments, micaceous// shell fragments), sand.
- 3110-3115 Back to a rather pure sand. Clear, cloudy white to yellow, fine-very coarse grained, average 1mm, feldspathic, well sorted, vitreous, angular, (10% shale, claystone, arkose). Like 3035-3040.
- 3115-3120 A less pure, coarser grained sand. Cloudy white-yellow, limonite coating, feldspathic, coarse-very coarse grained and granules, 1/2-4mm, average 2mm, well sorted, dull, subangular, (15% others as above).
- 3120-3125 Back to the regular stuff. Cloudy white-yellow-orange, medium-very coarse grained (1/4-3mm), average 1mm, medium sorted, dull, subangular, slightly fossiliferous (pelecypod fragments), 7% clayey (grayish red (10R4/2) waxy type; greenish gray (5GY6/1)); Orange red, iron stained type; white, platy, powdery kaolin) 3% shale, 30% arkose, 60% sand.
- 3125-3130 Same
- 3130-3135 Little change
- 3135-3140 Same
- 3140-3145 Same
- 3145-3150 A diverse, multicolored, messy sample, as above. Leached, cloudy white-pale yellow, orange to clear, fine-very coarse grained, (1/8-4mm), average 1mm, poorly sorted, dull, subangular, slightly fossiliferous (pelecypod), limonitic, feldspathic, (individual and/arkosic (30%)), clayey (8% varicolored claystone and kaolin), shale (29%), sand, some 1mm cemented sandstone (poorly sorted).
- 3150-3155 Leached, cloudy white, clear and iron colors: pink, yellow, orange, feldspathic, fine-very coarse grained, (1/8-3mm), average 1mm, medium sorted, angular-subangular, dull, 15% claystone (dominantly grayish red, waxy), 10% arkose, sand.
- 3155-3160 5% arkose, 20% claystone, 75% sand
- 3160-3165 Same
- 3165-3170 Cloudy white-pale yellow, feldspathic, fine-very coarse grained, (1/8-3mm), average 1mm, medium sorted, angular-subangular, vitreous-dull, (15%) arkosic, (15%) clayey, sand
- 3170-3175 No sample

- 3175-3180 No change
- 3180-3185 Same With 5% shale
- 3185-3190 Little change. But 30% arkose, 20% clay, 5% shale, 45% sand.
- 3190-3195 A clean, clear, rather pure sand. Clear, cloudy white, yellow, fine-very coarse grained (1/3-2mm), average 1mm, well sorted, vitreous, angular.
- 3195-3200 Same as above, well sorted, angular, vitreous sand.
- 3200-3205 Clean, clear, cloudy white to pale yellow, some limonite coating, feldspathic, angular, vitreous, average 2mm, medium sorted, arkosic (3%), clayey (8%) sand.
- 3205-3210 80% quartz sand; angular, vitreous, dominantly very coarse grained as above
3% arkose; 17% claystone, mostly grayish red, waxy; and kaolin.
- 3210-3215 Little change
- 3215-3220 Sand, claystone and arkose (10%)
- 3220-3225 Back to varicolored mess. Like 3145-3150.

After consultation at this point, it was decided that the first instance of lithified rock i.e. the arkose at 2410' probably represents the Cretaceous-Triassic boundary, although such a great unconformity is not evidenced.