

OWNER: Commonwealth of Virginia
(Division of Mineral Resources)
DRILLER: Douglas and Dickinson, Inc.
COUNTY: Westmoreland (Montross)

VDMR: 1914
WWCR: 159
TOTAL DEPTH: 641'

GEOLOGIC LOG

Depth in
feet

COLUMBIA GROUP (0-30')

- 0-10 Clay - orange, mottled white, sandy, ferricrete crusts; fine- to coarse, poorly sorted and poorly rounded quartz, with considerable amount of white, weathered feldspar; small amounts of blue quartz and magnetite
- 10-21 " moderately sandy
- 21-31 Sand - light-brown clay matrix, 5 percent quartzo-feldspathic granule gravel, ferricrete crusts; fine to coarse, poorly sorted, clear, angular quartz; coarse clasts of feldspar common

YORKTOWN FORMATION (30-166') Top of formation defined on basis of other information.

- 31-42 Sand - abundant dark gray clay matrix, locally limonitic, ferri-manganic crusts and geodes common; fine- to very fine-grained, well-sorted, angular; clear quartz, with minor feldspar and muscovite; traces of glauconite, magnetite and brown epidote
- 42-52 Sand - abundant dark-gray clay matrix; very fine-grained, very well-sorted, angular; clear to greenish quartz; traces of muscovite and glauconite
- 52-63 " "
- 63-73 " with calcareous laminae
- 73-84 Clay - medium-greenish-gray with trace of silt-sand, locally olive-green with abundant fine- to very fine-grained sand; traces of feldspar, glauconite, muscovite, and fragments of carbono-phosphate in sand fraction
- 84-94 Clay - dark gray, very sandy; sand is fine-grained; fairly well-sorted, angular, clear to greenish quartz; minor magnetite, carbono-phosphate (bone and shell fragments), and feldspar; trace of glauconite
- 94-105 " "

- 105-115 Clay - light gray, locally limonitic and sandy; sand is fine, fairly well-sorted, angular; clear quartz with minor muscovite and carbonophosphate; very slightly diatomaceous
- 115-126 Sand - abundant greenish-gray clay matrix; fine- to very fine-grained, well-sorted, angular clear quartz; minor fine-grained carbonophosphate; trace of glauconite; trace of shell fragments; a few foraminifers
- 126-136 Clay - light-greenish-gray, with abundant fine-grained, well-sorted, angular quartz sand; foraminifers common; a few ostracods, shell and plant fragments, and small chips of phosphatic bone and shell; moderately diatomaceous
- 136-147 " diatomaceous
- 147-157 Clay - light-gray, pure; traces of shell and bone fragments; moderately diatomaceous
- 157-168 Clay - greenish gray, moderately sandy; sand is fine- to very fine-grained, well-sorted, angular, clear to greenish quartz; minor carbonophosphate and muscovite; a few foraminifers; diatomaceous to very diatomaceous
- CALVERT FORMATION (166-263') Top of formation defined on basis of other information.
- 168-178 Silt - dark greenish-brown, clayey; very well-sorted, angular, coarse silt to very fine-grained sand; quartz, with minor carbonophosphate and muscovite; foraminifers common, including Siphogenerina; traces of plant and shell fragments
- 178-189 Clay - light greenish-gray, moderately silty, trace of sand; minor muscovite and carbonophosphate; a few coarse grains of glauconite; trace of shell fragments; foraminifers moderately abundant; diatomaceous to very diatomaceous
- 189-199 " "
- 199-210 " "
- 210-220 Clay - light-greenish-gray, moderate amount of well-sorted, angular coarse silt to fine-grained sand; about 10 percent of non-clay fraction is medium- to coarse-grained glauconite; shell fragments, echinoid spines, bone fragments, and fish scales common; foraminifers common; extremely diatomaceous
- 213 Sand and Shell - moderately-abundant matrix of light-gray calcareous clay, a very few small, rounded pebbles and phosphate nodules; 50 percent coarse pelecypod shell fragments with associated carbonate cementation of quartzo-glauconitic sand (limestone); sand (50 percent) consists of fine- to coarse, poorly-sorted fresh glauconite (65 percent) and angular to subangular, clear to greenish quartz; foraminifers common; a few ostracods, bryozoans, and echinoid spines

- 220-231 Clay - greenish brown, sandy; sand is fine-grained, very well-sorted, angular; clear to greenish quartz (85 percent) and 15 percent very fine- to medium-grained brown phosphorite in form of bone and shell fragments; traces of glauconite and muscovite; foraminifers and echinoid spines common but not abundant; a few ostracods; diatomaceous
- 231-241 Clay- greenish-brown, sandy; non-clay fraction consists of fine- to very coarse-grained, poorly sorted, angular to sub-angular; sand 70-75 percent clear quartz, and 15-20 percent brown phosphorite in form of bone and shell fragments; traces of garnet and feldspar; 10 percent calcareous shell fragments; foraminifers moderately abundant (mostly Nonion); diatomaceous
- 241-252 Sand - moderately abundant matrix of greenish-brown, moderately-diatomaceous clay; a few phosphate nodules, rounded quartz pebbles, and angular fragments of arenaceous limestones; fine to coarse, poorly sorted, angular quartz, with about 5 percent fragmental brown phosphorite; some quartz is iron-oxide stained; traces of muscovite, glauconite, garnet and feldspar; a few pelecypod shell fragments, echinoid spines, and foraminifers
- 252-262 Clay - greenish-brown, diatomaceous, very sandy; sand is fine to coarse, poorly sorted; clear angular quartz, slightly glauconitic; small amounts fragmental phosphorite, feldspar; trace of muscovite; shell fragments with associated glauconitic limestone common; foraminifers common
- NANJEMOY FORMATION (263-423) Top of formation defined on basis of other information.
- 262-273 Sand and Shell - greenish-gray matrix, a few phosphate nodules and quartz pebbles; 50 percent coarse pelecypod shell debris with associated carbonate cementation of quartzo-glauconitic sand (arenaceous limestone); 50 percent fine to coarse, poorly sorted sand consisting of subequal amounts of greenish-black glauconite and angular, clear to greenish quartz; traces of garnet and phosphorite; foraminifers common, but not abundant
- 273-283 " 65 percent sand, 35 percent shell and limestone
- 283-294 Clay - light gray, calcareous, moderately sandy; sand is fine to medium-grained, moderately sorted; 45 percent clear to greenish, angular quartz, 40 percent greenish-black glauconite, 15 percent foraminifers; echinoid spines abundant; fragments of pelecypod shell and arenaceous limestone (cream color to blue gray) common; a few ostracods and encrusting bryozoans

- 294-305 Sand - dark-gray clay matrix; fine- to very fine-grained, well-sorted; 65 percent angular, clear to greenish quartz, and 35 percent greenish black glauconite; moderately micaceous; traces of garnet and phosphorite; a few shell fragments; foraminifers and ostracods moderately abundant
- 305-315 " "
- 315-325 " 5 percent shell fragments
- 325-336 Sand - dark gray clay matrix; fine-grained, well-sorted; 65 percent greenish-black to green glauconite, and 35 percent clear to greenish, angular quartz; minor muscovite; a few shell fragments and foraminifers
- 336-346 Sand - moderately abundant matrix of dark gray clay; medium to coarse, moderately sorted, subequal amounts of subrounded quartz and greenish black glauconite; a few shell fragments and microfossils; traces of pyrite, muscovite and phosphorite
- 346-357 " 60 percent medium-grained glauconite, and 40 percent fine-grained, angular quartz and coarse to very coarse-grained, rounded quartz
- 357-367 " "
- 367-378 " "
- 378-388 " "
- 388-399 Sand - dark-gray, silty clay matrix; coarse-grained black glauconite, with 25 percent coarse-grained, clear quartz; traces of pyrite bone and shell
- 399-409 " 60 percent glauconite, 40 percent quartz
- 409-420 Clay - pinkish-orange, with laminae and lenses of light-gray, sand-free or dark-gray, sandy clay; sand is fine- to coarse-grained, poorly sorted, very glauconitic; traces of garnet, muscovite and phosphorite; a few foraminifers
- 420-430 " "
- MATTAPONI FORMATION (423-588') Top of formation defined on basis of other information.
- 430-441 Clay - dark-gray, sandy, with laminae and lenses of pink and light-gray relatively sand-free clay; sand is fine- to coarse-grained, moderately sorted; subequal amounts greenish-black to light-green and brown glauconite, and clear- to yellow and greenish quartz; small amounts of muscovite and bone phosphorite; a very few foraminifers, including Nodosaria

441-451	As 430-441	"
451-462	"	"
462-472	"	"
472-483	Sand - gray, slightly clayey (dark-gray clay matrix); medium grained, fairly well-sorted; 50 percent quartz, 50 percent glauconite; small amounts of shell and weathered feldspar; foraminifers common, but not abundant (<u>Dentalina</u> present); a few fragments of phosphorite	
483-493	"	"
493-504	Sand - sparse matrix of dark-gray clay; medium- to coarse-grained, fairly well-sorted; 60 percent clear, yellow, green, and brown quartz; 40 percent greenish-black to brown glauconite; shell fragments, and fragments of weakly cemented calcitic sandstone common; foraminifers common (including <u>Robulus</u> and <u>Dentalina</u>); a few bryozoans and echinoid spines	
504-514	Sand and Clay - 60 percent sand in medium-gray clay matrix, with laminae and lenses of pink, sand free clay (40 percent); sand is medium, moderately sorted; clear angular quartz and greenish black to green glauconite in subequal amounts; coarser fraction (0.5-2.0 mm) contains abundant decomposed glauconite and deeply stained quartz; minor feldspar; plant fragments common; small foraminifers very abundant; a few large foraminifers (<u>Nodosaria</u>), bone fragments, and fish scales	
514-525	Sand and Clay - 90 percent sand in medium-gray clay matrix, with laminae and lenses of pink, sand free clay (10 percent); 20 percent of sand fraction consists of foraminifers; sand is medium, moderately sorted; clear angular quartz and greenish-black to green glauconite in subequal amounts; coarser fraction (0.5-2.0 mm) contains abundant decomposed glauconite and deeply stained quartz; minor feldspar; plant fragments common; small foraminifers very abundant; a few large foraminifers (<u>Nodosaria</u>), bone fragments, and fish scales	
525-535	Sand - abundant matrix of medium-gray clay, with a small amount of pure pink clay, 10 percent very fine-grained gravel consisting of greenish quartz, blue quartz, and a very few phosphate nodules; fine- to coarse-grained, poorly sorted; quartz 65 percent and glauconite 35 percent, 10 percent foraminifers; minor feldspar and garnet; a few shell fragments, echinoid spines, ostracods, bone fragments, plant fragments, and fish scales	
535-546	"	"
546-556	"	skewed coarse; about 5 percent foraminifers

556-567 Clay and Sand - 60-70 percent pink, sand-free clay, with laminae of sand in brown clay matrix; sand is poorly sorted, poorly rounded, quartz and glauconite; abundant small foraminifers a few phosphate nodules

567-577 " "

577-588 " "

TRANSITIONAL BEDS (588-609')

588 Clay - brightly mottled, sandy, a few very small pebbles, sand is fine to coarse, very poorly sorted; poorly rounded; 15 percent feldspar, 15 percent glauconite; earthy hematite common; a few bone fragments, fish scales, and plant fragments; foraminifers common, but not abundant

588-598 " "

598-609 " mottled clay matrix, with greenish aspect; slightly feldspathic; plant fragments abundant

PATUXENT FORMATION (609-641')

609-619 Sand - light-brownish-gray, slightly clayey, small amount of granule gravel; medium- to very coarse-grained, rather poorly sorted, angular to subrounded; 5 percent fresh glauconite; feldspathic - abundant fresh to moderately decomposed potassic feldspar; minor blue quartz, earthy hematite, brown epidote, garnet, and muscovite; a few fragments of limestone and bone fragments common; a few foraminifers

619-630 " "

630-637 " fine to coarse, poorly sorted, moderately feldspathic

637-641 Clay - mottled, brown aspect, moderately sandy; sand is poorly sorted, poorly rounded; slightly glauconitic and feldspathic; abundant earthy hematite and plant fragments; a few foraminifers

GEOLOGIC SUMMARY

	<u>Rock Unit</u>	<u>Age</u>
0-30	Columbia Group	post-Miocene
30-166	Yorktown Formation	Miocene
166-263	Calvert Formation	Miocene
263-423	Nanjemoy Formation	Eocene
423-588	Mattaponi Formation	Paleocene - Late Cretaceous
588-609	Transitional Beds	Late Cretaceous
609-641	Patuxent Formation	Early Cretaceous

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