INTERVAL SHEET

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Date rec'd: 2-7-68

PROP: GLO -P-1

COMP: Fletterhoff

COUNTY: Gloucester Co. (Clay Bank)
VDMR Well No. W-2103

VDMR Well No: 2103

Sample Interval: from 0 to: 424

Number of samples: 38

Total Depth: 424

Oil or Gas: Water: Exploratory: X

From-To	From-To	From-To	From-To
0 - 25	351 - 361	-	-
25 - 45	361 - 371	-	-
345 - 66	371 - 381	-	-
66 - 83	381 - 392	-	-
83 - 95	392 - 402	-	-
95 - 105	402 -	-	-
105 - 125	402 - 412	-	-
125 - 135	412 - 420	-	-
135 - 145	424 -	-	-
138 - 148	-	-	-
145 - 155	-	-	-
148 - 158	-	-	-
155 - 165	-	-	-
165 - 180	-	-	-
180 - 187	-	-	-
187 197	-	-	-
197 - 207	-	-	-
207 - 217	-	-	-
217 - 228	-	-	-
228 - 238	-	-	-
258 - 269	-	-	-
269 - 279	-	-	-
279 - 289	-	-	-
289 - 300	-	-	-
-	-	-	-
300 - 310	-	-	-
310 - 320	-	-	-
320 - 330	-	-	-
330 - 341	-	-	-
341 - 351	-	-	-

All intervals have both washed and unwashed samples

OWNER: Clay Bank
DRILLER: Fetterhoff Bros.
COUNTY: Gloucester
LOCATION: at Clay Bank

REPOSITORY NUMBER: 2103
ELEVATION: 7
TOTAL DEPTH: 424

VDMR Well No. 2103
County: Gloucester

Well: GLO-P-1
Property: Clay Bank
Driller: Fetterhoff Bros.
Location: Clay Bank, Va.
Elevation: 7 feet
Total Depth: 424 feet
Started drilling: May, 1967 Completed drilling: May, 1967
Sample description by: R. H. Teifke, Division of Mineral Resources, October, 1968

GEOLOGIC LOG*

Depth in feet		
COLUMBIA GROUP (0-25')		
0-25	Sand --	tan, slightly clayey, trace of granule gravel; fine to coarse, poorly sorted; encrustation of goethite common; small amount of light-green glauconite; some blue quartz and decomposed feldspar in gravel portion fraction.
YORKTOWN FORMATION (25-83')		
25-45	Sand --	greenish-gray, slightly clayey, 10% shell fragments; fine to medium; 2-3% light-green glauconite; traces of muscovite and magnetite; 10 percent shell fragments.
45-66	Sand --	greenish-gray, slightly clayey, 15% gastrodpod-pelecypod shells (biocoenotic); fine to coarse, rather poorly sorted, angular to rounded; 5-10% medium-grained glauconite; a few fragments of black shell and phosphorite; aragonite needles common; black vivianite common; Textularia present. 15 percent in-place gastropod and pelecypod shells, a few fragments of black shell and phosphorite; Textularia present.

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66-83 Sand — dark-gray, slightly clayey, ~~25% gastropod-pelecypod shells (biocoenotic)~~; fine to coarse; rather poorly sorted, angular to well-rounded; 5% ~~of sand is~~ glauconite; aragonite needles common; brown vivianite common; 25 percent in-place gastropod and pelecypod shells.

~~ST. MARY'S FORMATION (83-105')~~

83-95 Sand — greenish-gray, moderately clayey, 3-5% small shell fragments; fine, well-sorted, angular; minor glauconite, trace of muscovite; a few ostracods, foraminifers, echinoid spines, and bone fragments.

95-105 "

~~CALVERT FORMATION (105-279')~~

105-125 Clay — light-gray, compact, sand-free; subordinate laminae of greenish-gray, moderately clayey, fine, well-sorted sand; Nonion common; a few bone and shell fragments; minor nodular pyrite

125-135 " except: Nonion and Bolivina common; nodular pyrite common.

135-145 " except: greenish-gray; Nonion common, a few Textularia; nodular pyrite common

138-148 Sand — greenish-gray, clayey, fine to medium, fairly well-sorted; ~~80%~~ clear subangular quartz, ~~5%~~ fragmented phosphorite; Siphogenerina, Uvigerina, Nonion abundant; a few Robulus and Dentalina.

145-155 Clay — greenish-gray, ~~5% shell fragments~~, trace of fine quartz sand; a few foraminifers (Nonion, Bolivina) and ostracods

148-158 Sand and shell — greenish-gray, slightly clayey; ~~40%~~ pelecypod shell fragments; ~~80%~~ medium to coarse, moderately sorted, subangular to subrounded clear quartz sand; phosphorite fragments ~~are~~ common; a few fragments of dolomitic sandstone; a very few foraminifers.

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155-165	Clay — greenish-gray, silty.
165-180	" except: with fine-grained trace of fine, green-tinted quartz sand; a few foraminifers.
180-187	" except: with fine-grained traces of fine, green-tinted quartz sand, and fine-to coarse-grained clear quartz sand with minor fragmented phosphorite; foraminifers (Nonion, Bolivina, Textularia) common, but not abundant.
187-197	Sand and shell — greenish-gray, slightly clayey; ~~20% pelecypod shell fragments~~; ~~80%~~ medium-grained, moderately sorted, clear quartz sand; fragmented phosphorite is common. pelecypod shell fragments (20 per
CALVERT FORMATION (197-279')	
197-207	Clay — buff, pulverulent, diatomaceous; foraminifers common (Nonion, Uvigerina)
207-217	" except: foraminifers abundant (Nonion, Robulus, Uvigerina, Bolivina).
217-228	" "
228-238	Clay — buff, pulverulent, diatomaceous; foraminifers, abundant (Siphogenerina dominant).
238-258	No Sample
258-269	Sand — brownish-gray, slightly clayey, ~~a few shell fragments~~; medium-grained to coarse, moderately sorted, subangular to subrounded; clear quartz with 2-3% fragmented phosphorite, a few small shell fragments and foraminifers
269-279	Sand — greenish-gray, moderately clayey, a very few shell fragments; fine-to very coarse-grained, poorly sorted, angular to rounded; clear quartz, with 2-3% fragmented phosphorite; foraminifers moderately abundant; a very few foraminifers

VDMR Well No. 2103

NANJEMOY FORMATION (279-361')

~~CHICKAHOMINY FORMATION (279-351')~~

279-289	Clay —	dark-gray with purple cast; sandy; sand is fine- to coarse-grained, poorly sorted; clear quartz, with subordinate light- and dark-green glauconite, and minor amount of fragmented phosphorite; a few shell fragments; abundant foraminifers (Dentalina bevani dominant);
289-300	"	except: sand consists of 60 percent quartz, 40 percent glauconite.
300-310	"	except: sand consists of 60 percent medium-to very coarse-grained quartz, 40 percent medium-grained glauconite; abundant pyrite.
310-320	"	except: moderately sandy; sand consists of ~~40%~~ medium-to very coarse-grained (40 percent) quartz, ~~60%~~ and fine-to medium-grained, light- and dark-green glauconite (60 percent); minor pyrite.
320-330	"	except: sandy; sand consists of ~~50%~~ medium-to very coarse-grained quartz (50 percent), fine-to medium-grained (50 percent), dark- and light-green glauconite; minor pyrite; shell fragments common.
330-341	"	except: silty and very sandy; sand is fine-to medium-grained, moderately sorted, ~~40%~~ quartz (40 percent), ~~40%~~ dark- and light-green glauconite (40 percent), ~~20%~~ foraminifers, ostracods, and small shell fragments (20 percent); pyrite moderately abundant; phosphorite common.
341-351	"	

~~NANJEMOY FORMATION (351-361')~~

351-361	Sand —	brownish-gray, slightly to moderately clayey, coarse-to very coarse-grained, fairly well-sorted; ~~40%~~ clear quartz (45 percent), ~~40%~~ bioclasts, ~~10%~~ dark-green glauconite (10 percent); foraminifers common, but not abundant (10 percent); minor phosphorite and pyrite.

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MATTAPONI FORMATION (361-402')

361-371	Sand — black, very slightly clayey; medium, well-sorted; ~~90%~~ blackish-green glauconite; ~~5%~~ quartz (5 percent).
371-381	" except: ~~75%~~ glauconite, ~~5%~~ quartz, ~~5%~~ fragments of phosphatic, glauconite-bearing sandstone (~~10~~ percent).
381-392	Sand — gray, slightly clayey; ~~80%~~ medium, well-sorted, dark-green glauconite; ~~10%~~ medium- to coarse-grained quartz (15 percent)
392-402	" except: 55% fine to medium, fairly well-sorted, dark-green glauconite; ~~40%~~ fine to medium-grained, angular quartz (40 percent) (85 percent) (60 percent)

PATUXENT FORMATION (402-424')

402	Gravel and sand — gray, slightly clayey; very coarse sand (50%) and granule gravel; ~~subrounded~~, very feldspathic; abundant garnet; minor tourmaline.
402-412	Sand — brownish-gray, slightly clayey, ~~5% fine feldspathic gravel~~; fine to very coarse, poorly sorted; very feldspathic; 5% weathered glauconite; minor garnet and muscovite.
412-420	Sand — gray, clean; medium to very coarse, poorly sorted; very feldspathic; minor garnet; trace of glauconite.
424	" except coarse to very coarse, moderately sorted.

~~*The use of the lithologic term, "clay" includes all size ranges of particles less than 1/16 mm.~~

VDMR Well No. 2103

GEOLOGIC SUMMARY

	Rock Unit	Age
0-25'	Columbia Group	~~Pleistocene~~ post-Miocene
25-~~83~~ 197	Yorktown Formation	Late Miocene
~~83-105'~~	~~St. Mary's Formation~~	~~Late Miocene~~
197 ~~105~~-279'	Calvert Formation	Middle Miocene
~~279-351'~~	~~Chickahominy Formation~~	~~Late Eocene~~
279 ~~351~~-361'	Nanjemoy Formation	Middle Eocene
361-402'	Mattaponi Formation	Paleocene - Late Cretaceous
402-424'	Patuxtent Formation	Early Cretaceous

Interval 135-145' is overlapped by interval 138-148'
Interval 145-155' is overlapped by interval 148-158'

0-25 — Columbia Group — Pleistocene
25-197 — Yorktown Formation — Miocene
197-279 — Calvert Formation — Miocene
279-361 — Nanjemoy Formation — Eocene
361-402 — Mattaponi Formation — Paleocene-late Cretaceous
402-424 — Patuxtent Formation — Early Cretaceous

R. H. Teifke
3/7/72

VDMR Well No. 2103
County: Gloucester

Well: GLO-P-1
Property: Clay Bank
Driller: Fetterhoff Bros.
Location: Clay Bank, Va.
Elevation: 7 feet
Total Depth: 424 feet
Started drilling: May, 1967 Completed drilling: May, 1967
Sample description by: R. H. Teifke, Division of Mineral Resources, October, 1968

GEOLOGIC LOG*

Depth in feet		
COLUMBIA GROUP (0-25')		
0-25	Sand --	tan, slightly clayey, trace of granule gravel; fine to coarse, poorly sorted; encrustation of goethite common; small amount of light-green glauconite; some blue quartz and decomposed feldspar in gravel portion
YORKTOWN FORMATION (25-83')		
25-45	Sand --	greenish-gray, slightly clayey, 10% shell fragments; fine to medium; 2-3% light-green glauconite; traces of muscovite and magnetite
45-66	Sand --	greenish-gray, slightly clayey, 15% gastrodpod-pelecypod shells (biocoenotic); fine to coarse, rather poorly sorted, angular to rounded, 5-10% medium glauconite; a few fragments of black shell and phosphorite; aragonite needles common; black vivianite common; Textularia present

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66-83 Sand — dark-gray, slightly clayey, 25% gastropod-pelecypod shells (biocoenotic); fine to coarse, rather poorly sorted, angular to well-rounded; 5% of sand is glauconite; aragonite needles common; brown vivianite common

ST. MARY'S FORMATION (83-105')

83-95 Sand — greenish-gray, moderately clayey, 3-5% small shell fragments; fine, well-sorted, angular; minor glauconite, trace of muscovite; a few ostracods, foraminifers, echinoid spines, and bone fragments

95-105 "

CALVERT FORMATION (105-279')

105-125 Clay — light-gray, compact, sand-free; subordinate laminae of greenish-gray, moderately clayey, fine, well-sorted sand; Nonion common; a few bone and shell fragments; minor nodular pyrite

125-135 " Nonion and Bolivina common; nodular pyrite common

135-145 " greenish-gray; Nonion common, a few Textularia; nodular pyrite common

138-148 Sand — greenish-gray, clayey; fine to medium, fairly well-sorted; 80% clear subangular quartz, 15% fragmented phosphorite; Siphogenerina, Uvigerina, Nonion abundant; a few Robulus and Dentalina

145-155 Clay — greenish-gray, 5% shell fragments, trace of fine quartz sand; a few foraminifers (Nonion, Bolivina) and ostracods

148-158 Sand and shell — greenish-gray, slightly clayey; 20% pelecypod shell fragments; 80% medium to coarse, moderately sorted, subangular to subrounded clear quartz sand; phosphorite fragments are common; a few fragments of dolomitic sandstone; a very few foraminifers

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155-165	Clay — greenish-gray, silty
165-180	" trace of fine, green-tinted quartz sand; a few foraminifers
180-187	" traces of fine, green-tinted quartz sand, and fine to coarse, clear quartz sand with minor fragmented phosphorite; foraminifers (Nonion, Bolivina, Textularia) common, but not abundant
187-197	Sand and shell — greenish-gray, slightly clayey; 20% pelecypod shell fragments; 70% medium, moderately sorted clear quartz sand; fragmented phosphorite is common
197-207	Clay — buff, pulverulent, diatomaceous; foraminifers common (Nonion, Uvigerina)
207-217	" foraminifers abundant (Nonion, Robulus, Uvigerina, Bolivina)
217-228	" "
228-238	Clay — buff, pulverulent, diatomaceous; foraminifers, abundant (Siphogenerina dominant)
238-258	No Sample
258-269	Sand — brownish-gray, slightly clayey, a few shell fragments; medium to coarse, moderately sorted, subangular to subrounded; clear quartz with 2-3% fragmented phosphorite, a few small foraminifers
269-279	Sand — greenish-gray, moderately clayey, a very few shell fragments; fine to very coarse, poorly sorted, angular to rounded; clear quartz, with 2-3% fragmented phosphorite; foraminifers moderately abundant

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CHICKAHOMINY FORMATION (279-351')

279-289	Clay — dark-gray with purple cast; sandy; sand is fine to coarse, poorly sorted; clear quartz, with subordinate light- and dark-green glauconite, and minor amount of fragmented phosphorite; a few shell fragments; abundant foraminifers (Dentalina bevani dominant)
289-300	" sand consists of 60% quartz, 40% glauconite
300-310	" sand consists of 60% medium to very coarse quartz, 40% medium glauconite; abundant pyrite
310-320	" moderately sandy; sand consists of 40% medium to very coarse quartz, 60% fine to medium, light- and dark-green glauconite; minor pyrite
320-330	" sandy; sand consists of 50% medium to very coarse quartz, 50% fine to medium, dark- and light-green glauconite; minor pyrite; shell fragments common
330-341	" silty and very sandy; sand is fine to medium moderately sorted, 40% quartz, 40% dark- and light-green glauconite, 20% foraminifers, ostracods, and small shell fragments; pyrite moderately abundant, phosphorite common
341-351	"

NANJEMOY FORMATION (351-361')

351-361	Sand — brownish-gray, slightly to moderately clayey, coarse to very coarse, fairly well-sorted; 40% clear quartz, 40% bioclasts, 10% dark-green glauconite; foraminifers common, but not abundant; minor phosphorite and pyrite

VDMR Well No. 2103

MATTAPONI FORMATION (361-402')

361-371	Sand — black, very slightly clayey; medium; well-sorted; 90% blackish-green glauconite; 5% quartz
371-381	" 75% glauconite, 15% quartz, 5% fragments of phosphatic, glauconite-bearing sandstone
381-392	Sand — gray, slightly clayey; 80% medium, well-sorted, dark-green glauconite; 10% medium to coarse quartz
392-402	" 55% fine to medium, fairly well-sorted, dark-green glauconite; 40% fine to medium, angular quartz

PATUXENT FORMATION (402-424')

402	Gravel and sand — gray, slightly clayey; very coarse sand (50%) and granule gravel; subrounded, very feldspathic; abundant garnet; minor tourmaline
402-412	Sand — brownish-gray, slightly clayey, 5% fine, feldspathic gravel; fine to very coarse, poorly sorted; very feldspathic, 5% weathered glauconite; minor garnet and muscovite
412-420	Sand — gray, clear; medium to very coarse, poorly sorted; very feldspathic, minor garnet; trace of glauconite
424	" coarse to very coarse, moderately sorted

*The use of the lithologic term, "clay" includes all size ranges of particles less than 1/16 mm.

VDMR Well No. 2103

GEOLOGIC SUMMARY

	Rock Unit	Age
0-25'	Columbia Group	Pleistocene
25-83'	Yorktown Formation	Late Miocene
83-105'	St. Mary's Formation	Late Miocene
105-279'	Calvert Formation	Middle Miocene
279-351'	Chickahominy Formation	Late Eocene
351-361'	Nanjemoy Formation	Middle Eocene
361-402'	Mattaponi Formation	Paleocene
402-424'	Patuxtent Formation	Early Cretaceous

Interval 135-145' is overlapped by interval 138-148'
Interval 145-155' is overlapped by interval 148-158'

INTERVAL SHEET

Page 1 of 1

VDMR Well No: 2103

Date rec'd: 2-7-68

Sample Interval: from 0 to: 424

PROP: GLO -P-1

Number of samples: 38

COMP: Fletterhoff

Total Depth: 424

COUNTY: Gloucester Co. (Clay Bank)
VDMR Well No. W-2103

Oil or Gas: Water: Exploratory: X

From-To	From-To	From-To	From-To
0 - 25	351 - 361	-	-
25 - 45	361 - 371	-	-
45 - 66	371 - 381	-	-
66 - 83	381 - 392	-	-
83 - 95	392 - 402	-	-
95 - 105	402 -	-	-
105 - 125	402 - 412	-	-
125 - 135	412 - 420	-	-
135 - 145	424 -	-	-
138 - 148	-	-	-
145 - 155	-	-	-
148 - 158	-	-	-
155 - 165	-	-	-
165 - 180	-	-	-
180 - 187	-	-	-
187 197	-	-	-
197 - 207	-	-	-
207 - 217	-	-	-
217 - 228	-	-	-
228 - 238	-	-	-
258 - 269	-	-	-
269 - 279	-	-	-
279 - 289	-	-	-
289 - 300	-	-	-
-	-	-	-
300 - 310	-	-	-
310 - 320	-	-	-
320 - 330	-	-	-
330 - 341	-	-	-
341 - 351	-	-	-

All intervals have both washed and unwashed samples

Drilled 5/22/67
Fetterhoff
E/9

GLO-P-1

INTERVAL SHEET

Page 1 of 1

VDMR Well No: **WELL NO. 2103**

Date rec'd: 7/18/67

Sample Interval: from 0 to 424

PROP:

Clay Bank
(CLAY BANK SHEET)

Number of samples: 38

COMP:

Total Depth: 424

COUNTY: Gloucester (Clay Bank)

Oil or Gas: Water: ✓ Exploratory:

W (sand floated)

From-To	From-To	From-To	From-To	
0 - 25	341 - 351	0 - 25	351 - 361	
25 - 45	351 - 361	25 - 45	361 - 371	
45 - 66	361 - 371	45 - 66	371 - 381	
66 - 83	371 - 381	66 - 83	371 - 381	
83 - 95	381 - 392	83 - 95	381 - 392	
St. Mary's Fm.				
95 - 105	392 - 402	95 - 105	392 - 402	
105 - 125	402 -	105 - 125	402 -	
125 - 135	402 - 412	125 - 135	402 - 412	
135 - 145	412 - 420	135 - 145	412 - 420	
138 - 148	424 -	138 - 148	424 -	
145 - 155	-	145 - 155	-	D. bevoni (v. abund.)
148 - 158	-	148 - 158	-	
155 - 165	-	155 - 165	-	Robulus
165 - 180	-	165 - 180	-	
180 - 187	-	180 - 187	-	cibicides
187 - 197	-	187 - 197	-	
197 - 207	-	197 - 207	-	
207 - 217	-	207 - 217	-	
217 - 228	-	217 - 228	-	
228 - 238	-	228 - 238	-	Corotobuliminia
← P_2O_5 zone (8)				
	-		-	D. intermedia (few)
	-		-	D. cooperensis
258 - 269	-	258 - 269	-	
269 - 279	-	269 - 279	-	
279 - 289	-	279 - 289	-	
289 - 300	-	289 - 300	-	Gyroidina orbicularis
300 - 310	-	300 - 310	-	
310 - 320	-	310 - 320	-	
320 - 330	-	320 - 330	-	
330 - 341	-	330 - 341	-	Gaudryina jacksonensis