

Drilled 11/66

VC-T-10

Conoco

COL-P

L/E/G

CONFIDENTIAL

Geologic Log
Strip Log

INTERVAL SHEET

ELEV. : 10'

Page 1 of 1

VDMR Well No: **WELL NO. 2102**

Date rec'd: 7/18/67

Sample Interval: from 0 to 370

PROP:

0.5 Miles N.E.
Visitor's Center of
Yamestown Fort,
E. side Colonial
Parkway.

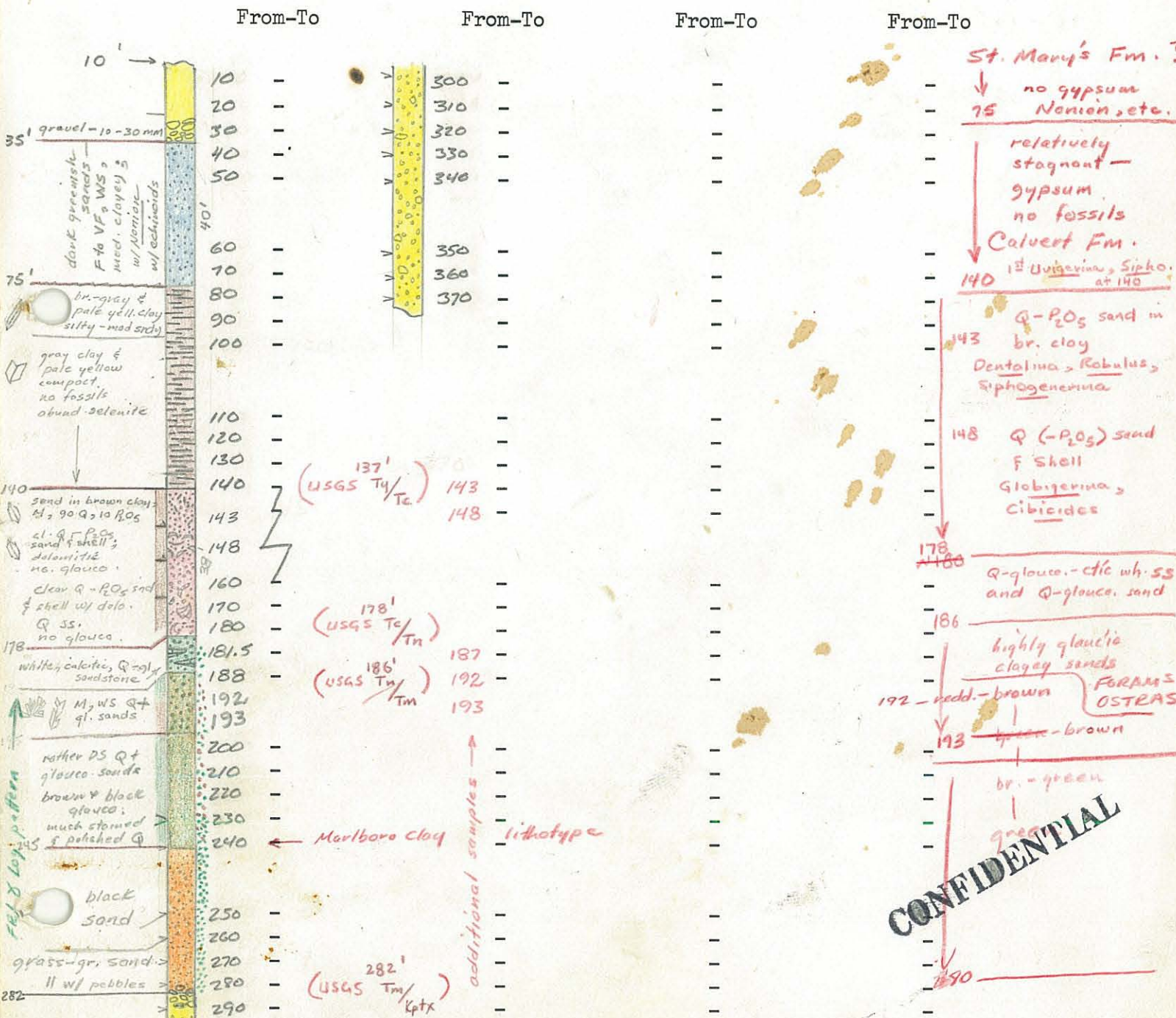
Number of samples: ~~37~~ 42

COMP:

Total Depth: 370'

COUNTY: Jones City (SUERY SHEET)

Oil or Gas: Water: Exploratory: ✓



pronounced variations in gypsum habit w/ depth.

CONFIDENTIAL

INTERVAL SHEET

Page 1 of 1

VDMR Well No: 2102

Date rec'd: 2-5-68

Sample Interval: from 10 to: 370

PROP: JC-T-10

Number of samples: 37

COMP:

Total Depth: 370

COUNTY: James City

Oil or Gas: Water: Exploratory: X

From-To	From-To	From-To	From-To
10 -	300 -	-	-
20 -	310 -	-	-
30 -	320 -	-	-
40 -	330 -	-	-
50 -	340 -	-	-
60 -	350 -	-	-
70 -	360 -	-	-
80 -	370 -	-	-
90 -	-	-	-
100 -	-	-	-
110 -	-	-	-
120 -	-	-	-
130 -	-	-	-
140 -	-	-	-
-	-	-	-
160 -	-	-	-
170 -	-	-	-
180 -	-	-	-
181.5	-	-	-
188 -	-	-	-
200 -	-	-	-
210 -	-	-	-
220 -	-	-	-
230 -	-	-	-
240 -	-	-	-
250 -	-	-	-
260 -	-	-	-
270 -	-	-	-
280 -	-	-	-
290 -	-	-	-

All intervals have both washed and unwashed samples

VDMR Well No. 2102
County: James City

Well: JC-T-10
Property: Jamestown Fort
Driller: Norfolk and Western Railway
Location: 0.5 miles NE of Visitors' Center of Jamestown Fort, on E side
of Colonial Parkway: 76° 45' 30" W, 37° 13' 30" N
Elevation: 10 feet
Total Depth: 370 feet
Started drilling: November, 1966 Completed drilling: November, 1966
Sample description by: R.H. Teifke, Virginia Division of Mineral
Resources, October, 1968

GEOLOGIC LOG*

Depth in
feet

✓
COLUMBIA GROUP (0-^{40'}~~30'~~)

10 Clay -- orange-brown, sandy; sand is fine- to medium-
grained, well-sorted, angular; clear and ironoxide-
stained (orange) quartz; slightly feldspathic and
micaceous; traces of magnetite, epidote, and
weathered glauconite

20 " brown; with 10% fine-grained (2-10 mm)
quartzo-feldspathic gravel

30 Gravel -- orange-brown; rounded pebbles (5-30 mm) of
quartz, quartzite, and chert

30-40 No Sample

YORKTOWN
~~ST. MARYS~~ FORMATION (40-^{83'}~~70'~~)

40 Sand -- dark brownish-gray, locally yellow and reddish-
brown, moderately clayey; fine- to very fine-
grained, very well-sorted, angular; clear quartz,
with accessory glauconite, gypsum, magnetite,
and muscovite; echinoid spines abundant; a very
few foraminifers

- 50 Sand -- dark greenish-gray, moderately clayey; 15% coarse pelecypod shell fragments; fine- to very fine-grained, well-sorted, angular; clear quartz with a trace of glauconite; echinoid spines common; a very few foraminifers, mostly Nonion (also Lagena, Textularia, Cibicides)
- 60 " trace of shell
- 70 " trace of shell
- 70-80 No Sample
(83-182')
- CALVERT FORMATION (80-140')
- 80 Clay -- greenish-brown, locally pale-yellow, very silty, moderately sandy; sand is fine-grained, well-sorted, angular, quartzose, with yellow cast; abundant slender crystals of selenite
- 90 "
- 100 Clay -- gray, locally orange-brown, compact; small amount of fine, well-sorted quartz sand; very abundant stubby crystals of selenite
- 110 " locally pale-yellow
- 120 " locally pale-yellow; slightly sandy
- 130 " locally pale-yellow; slightly sandy
- 140 " locally pale-yellow; slightly to moderately sandy; a few Uvigerina, Nonion and Siphogenerina
- 140-143 No Sample
- ~~CHICKAHOMINY FORMATION (143-180')~~
- 143 Sand -- abundant matrix of brown clay, a few shell fragments; fine- to medium-grained, fairly well-sorted; clear, angular to subangular quartz, with 10% small fragments of bone phosphorite, and 2-3% lignite; abundant anhydrite pseudomorphs after gypsum; foraminifers abundant (Siphogenerina, Robulus and Dentalina dominant)

148 Shell and sand — binder of drab-brown clay, dolomitic (encrusting, cavernous), abundant anhydrite pseudomorphs after gypsum (as attached crystals and as dendrites on shell fragments); 60% shell and 25% fine- to medium-grained, fairly well-sorted, angular to subangular sand; sand is 90% clear quartz, 10% fragmental phosphorite; foraminifers abundant (globigerinids and Cibicides); a few ostracods

160 Sand — abundant matrix of greenish-gray clay, 10% fine, rounded quartz gravel, a few shell fragments; medium- to very coarse-grained, rather poorly sorted, angular to subrounded; clear quartz, with 5% fragmental phosphorite; pyrite nodules and gypsum crystals common; a few foraminifers

170 " with 20% shell fragments and fragments of dolomitic quartz sandstone

180 " with 20% shell fragments and a few fragments of dolomitic quartz sandstone; 1-2% phosphorite

180-181.5 No Sample

NANJEMOY FORMATION (182-250')
(181.5-240')

181.5 Sand and sandstone — light-gray, moderately clayey; 80% fine- to coarse-grained, moderately-sorted sand, of which 70% is clear and pale-green quartz, and 30% is dark-green glauconite; small amounts phosphorite and gypsum; 15% white, calcitic sandstone, with quartz and black glauconite; small foraminifers common

187 Sand — matrix of brown gypsiferous clay; medium-grained, fairly well-sorted; 55% greenish quartz, 20% dark- to light-green glauconite, 5% gypsum and anhydrite pseudomorphs after gypsum

188 Sand — abundant matrix of gray clay; medium-grained, moderately sorted; 60% clear and greenish quartz, 20% brown, light-green, and dark-green glauconite; gypsum common; foraminifers and ostracods common

- 192 Sand -- matrix of brownish-black clay; medium- to coarse-grained, predominantly reddish-brown glauconite, with 10% stained, rounded quartz
- 193 " with matrix of brown and yellow clays; 15-20% stained and rounded quartz
- 200 Sand -- matrix of brownish-gray clay, a few shell fragments and small pebbles; medium- to very coarse-grained, moderately sorted; 40% clear and iron-stained, subangular to rounded quartz, 40% fresh and weathered glauconite; traces of gypsum, pyrite, phosphorite; a few foraminifers and ostracods
- 210 " 60% glauconite, 25% quartz
- 220 " 65% glauconite, 15% quartz
- 230 Sand -- abundant matrix of drab gray clay, 5% pelecypod shell fragments and a few fragments of phosphate rock, bedded (?) pyrite, and sandstone; fine- to medium-grained, fairly well-sorted; 25% clear, angular quartz, 55% dark-green glauconite; trace of gypsum; a very few foraminifers
- 240 Clay -- laminated orange-pink, light-gray, and yellow, essentially sand-free clays (80%), and blackish-green lenses of clayey, glauconitic sand (20%); clay laminae contain fresh, authogenic glauconite and selenite

240-250 No Sample

MATTAPONI FORMATION (250-^{285'}~~280'~~)

- 250 Sand -- black, slightly to moderately clayey; medium-grained, well-sorted; fresh black glauconite with 5-10% clear, angular quartz; trace of selenite
- 260 " with a few fragments of calcitic, glauconite-bearing sandstone

- 270 Sand and sandstone -- abundant matrix of grass-green clay; 15-20% calcitic, white, glauconite-bearing sandstone; 70-75% fine- to medium-grained, well-sorted, dull, dark- and light-green glauconite, with 10% quartz; a few shell fragments
- 280 " with 40% fine (10-20 mm), rounded, stained-quartz gravel
- 280-290 No Sample
- PATUXENT FORMATION (²⁸⁵~~290~~-370')
- 290 Gravel and sand -- binder of green clay, a few shell fragments; 60% fine (2-20 mm), moderately sorted, rounded gravel comprised of quartz and a few pebbles of chert, quartzite and phosphorite; 30% coarse- to very coarse-grained, subangular to subrounded feldspathic sand; trace of garnet
- 300 " 50% gravel, 40% sand
- 310 " 50% gravel, 40% sand
- 320 Sand and gravel -- yellowish-gray, slightly clayey; 30% fine, quartzo-feldspathic gravel; 65% medium- to very coarse-grained; rather poorly sorted, angular to subangular feldspathic sand; trace of garnet
- 330 "
- 340 " 80% sand, 15% gravel
- 350 " 85% sand, 10% gravel
- 360 Sand -- brownish-gray, clayey, 5% fine gravel; fine-grained, well-sorted, angular; moderately feldspathic; slightly glauconitic and micaceous; trace of garnet
- 370 "

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

GEOLOGIC SUMMARY

	<u>Rock Unit</u>	<u>Age</u>
0-30+40	Columbia Group	Pleistocene
30-40	No Sample	
40-70' 83	St. Mary's Formation Yorktown Formation	Late Miocene
70-80	No Sample	
83 80-140' 182	Calvert Formation	Middle Miocene
140-143	No Sample	
143-180	Chickahominy Formation	Late Eocene
180-181.5	No Sample	
182 181.5-240' 250	Nanjemoy Formation	Middle Eocene
240-250	No Sample	
250-280' 285	Mattaponi Formation	Paleocene-Late Cretaceous
280-290	No Sample	
285-290-370'	Patuxent Formation	Early Cretaceous

R. H. Taylor
3/7/72

50 Sand -- dark greenish-gray, moderately clayey; 15% coarse pelecypod shell fragments; fine- to very fine-grained, well-sorted, angular; clear quartz with a trace of glauconite; echinoid spines common; a very few foraminifers, mostly Nonion (also Lagena, Textularia, Cibicides)

60 " trace of shell

70 " trace of shell

70-80 No Sample *some, as 70-foot interval*
 80-83 *83-180'*
 CALVERT FORMATION (~~80-140'~~)
 ^

83 Clay -- greenish-brown, locally pale-yellow, very silty, moderately sandy; sand is fine-grained, well-sorted, angular, quartzose, with yellow cast; abundant slender crystals of selenite

90 "

100 Clay -- gray, locally orange-brown, compact; small amount of fine, well-sorted quartz sand; very abundant stubby crystals of selenite

110 " locally pale-yellow

120 " locally pale-yellow; slightly sandy

130 " locally pale-yellow; slightly sandy

140 " locally pale-yellow; slightly to moderately sandy; a few Uvigerina, Nonion and Siphogenerina

140-143 No Sample

[CHICKAHOMINY FORMATION (143-180')]

143 Sand -- abundant matrix of brown clay, a few shell fragments; fine- to medium-grained, fairly well-sorted; clear, angular to subangular quartz, with 10% small fragments of bone phosphorite, and 2-3% lignite; abundant anhydrite pseudomorphs after gypsum; foraminifers abundant (Siphogenerina, Robulus and Dentalina dominant)

*TCB
 abund bone strands
 ← preserves large
 bones & br. P₂O₅
 clam shells common*

- 148 Shell and sand — binder of drab-brown clay, dolomitic (encrusting, cavernous), abundant anhydrite pseudomorphs after gypsum (as attached crystals and as dendrites on shell fragments); 60% shell and 25% fine- to medium-grained, fairly well-sorted, angular to subangular sand; sand is 90% clear quartz, 10% fragmental phosphorite; foraminifers abundant (globigerinids and Cibicides); a few ostracods
- 160 Sand — abundant matrix of greenish-gray clay, 10% fine, rounded quartz gravel, a few shell fragments; medium- to very coarse-grained, rather poorly sorted, angular to subrounded; clear quartz, with 5% fragmental phosphorite; pyrite nodules and gypsum crystals common; a few foraminifers
- 170 " with 20% shell fragments and fragments of dolomitic quartz sandstone
- 180 " with 20% shell fragments and a few fragments of dolomitic quartz sandstone; 1-2% phosphorite
- 180-181.5 No Sample
- NANJEMOY FORMATION (181.5-240')
- 181.5 Sand and sandstone — light-gray, moderately clayey; 80% fine- to coarse-grained, moderately-sorted sand, of which 70% is clear and pale-green quartz, and 30% is dark-green glauconite; small amounts phosphorite and gypsum; 15% white, calcitic sandstone, with quartz and black glauconite; small foraminifers common
- 187 Sand — matrix of brown gypsiferous clay; medium-grained, fairly well-sorted; 55% greenish quartz, 20% dark- to light-green glauconite, 5% gypsum and anhydrite pseudomorphs after gypsum
- 188 Sand — abundant matrix of ^{brown}gray clay; medium-grained, moderately sorted; 60% clear and greenish quartz, 20% brown, light-green, and dark-green glauconite; gypsum common; foraminifers and ostracods common

- 192 Sand — matrix of brownish-black clay; medium- to coarse-grained, predominantly reddish-brown glauconite, with 10% stained, rounded quartz
- 193 " with matrix of brown and yellow clays; 15-20% stained and rounded quartz
- 200 Sand — matrix of brownish-gray clay, a few shell fragments and small pebbles; medium- to very coarse-grained, moderately sorted; 40% clear and iron-stained, subangular to rounded quartz, 40% fresh and weathered glauconite; traces of gypsum, pyrite, phosphorite; a few foraminifers and ostracods
- 210 " 60% glauconite, 25% quartz
- 220 " 65% glauconite, 15% quartz
- 230 Sand — abundant matrix of drab gray clay, 5% pelecypod shell fragments and a few fragments of phosphate rock, bedded (?) pyrite, and sandstone; fine- to medium-grained, fairly well-sorted; 25% clear, angular quartz, 55% dark-green glauconite; trace of gypsum; a very few foraminifers
- 240 Clay — laminated orange-pink, light-gray, and yellow, essentially sand-free clays (80%), and blackish-green lenses of clayey, glauconitic sand (20%); clay laminae contain fresh, authogenic glauconite and selenite
- 240-250 No Sample

MATTAPONI FORMATION (250-280')

- 250 Sand — black, slightly to moderately clayey; medium-grained, well-sorted; fresh black glauconite with 5-10% clear, angular quartz; trace of selenite
- 260 " with a few fragments of calcitic, glauconite-bearing sandstone

- 270 Sand and sandstone — abundant matrix of grass-green clay; 15-20% calcitic, white, glauconite-bearing sandstone; 70-75% fine- to medium-grained, well-sorted, dull, dark- and light-green glauconite, with 10% quartz; a few shell fragments
- 280 " with 40% fine (10-20 mm), rounded, stained-quartz gravel
- 280-290 No Sample

PATUXENT FORMATION (290-370')

- 290 Gravel and sand — binder of green clay, a few shell fragments; 60% fine (2-20 mm), moderately sorted, rounded gravel comprised of quartz and a few pebbles of chert, quartzite and phosphorite; 30% coarse- to very coarse-grained, subangular to subrounded feldspathic sand; trace of garnet
- 300 " 50% gravel, 40% sand
- 310 " 50% gravel, 40% sand
- 320 Sand and gravel — yellowish-gray, slightly clayey; 30% fine, quartzo-feldspathic gravel; 65% medium- to very coarse-grained, rather poorly sorted, angular to subangular feldspathic sand; trace of garnet
- 330 "
- 340 " 80% sand, 15% gravel
- 350 " 85% sand, 10% gravel
- 360 Sand — brownish-gray, clayey, 5% fine gravel; fine-grained, well-sorted, angular; moderately feldspathic; slightly glauconitic and micaceous; trace of garnet
- 370 "

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

GEOLOGIC SUMMARY

	<u>Rock Unit</u>	<u>Age</u>
0-30'	Columbia Group	Pleistocene
30-40'	No Sample	
40-70' & 3'	^{York} St. Mary's Formation	Late Miocene
70-80'	No Sample	
83 80-140' 180'	Calvert Formation	Middle Miocene
140-143'	No Sample	
143-180'	Ghickahominy Formation	Late Eocene
180-181.5'	No Sample	
181.5-240'	Nanjemoy Formation	Middle Eocene
240-250'	No Sample	
250-280'	Mattaponi Formation	Paleocene
280-290'	No Sample	
290-370'	Patuxent Formation	Early Cretaceous

Virginia D of 211 R
 Robert H. Teitke, Geologist
 October 1968
 Revised March 1972

VDMR Well No. 2102
County: James City

Well: JC-T-10
Property: Jamestown Fort
Driller: Norfolk and Western Railway
Location: 0.5 miles NE of Visitors' Center of Jamestown Fort, on E side
of Colonial Parkway: $76^{\circ} 45' 30''$ W, $37^{\circ} 13' 30''$ N
Elevation: 10 feet
Total Depth: 370 feet
Started drilling: November, 1966 Completed drilling: November, 1966

GEOLOGIC LOG*

Depth in
feet

COLUMBIA GROUP (0-30')

- 10 Clay -- orange-brown, sandy; sand is fine- to medium-
grained, well-sorted, angular; clear and ironoxide-
stained (orange) quartz; slightly feldspathic and
micaceous; traces of magnetite, epidote, and
weathered glauconite
- 20 " brown; with 10% fine-grained (2-10 mm)
quartzo-feldspathic gravel
- 30 Gravel -- orange-brown; rounded pebbles (5-30 mm) of quartz,
quartzite, and chert
- 30-40 No Sample

YORKTOWN FORMATION (40-83')

- 40 Sand -- dark brownish-gray, locally yellow and reddish-brown,
moderately clayey; fine- to very fine-grained, very
well-sorted, angular; clear quartz, with accessory
glauconite, gypsum, magnetite, and muscovite; echinoid
spines abundant; a very few foraminifers
- 50 Sand -- dark greenish-gray, moderately clayey; 15% coarse
pelecypod shell fragments; fine- to very fine-grained,
well-sorted, angular; clear quartz with a trace of
glauconite; echinoid spines common; a very few fora-
minifers, mostly Nonion (also Lagena, Textularia, Cibicides)

- 60 Sand -- dark greenish-gray, moderately clayey; trace of coarse pelecypod shell fragments; fine-to very fine-grained, well-sorted, angular; clear quartz with trace of glauconite; echinoid spines common; a very few foraminifers, mostly Nonion (also Lagena, Textularia, Cibicides)
- 70 "
- 70-80 No Sample
- 80-83 Same as 70-foot interval

CALVERT FORMATION (83-180')

- 83 Clay -- greenish-brown, locally pale-yellow, very silty, moderately sandy; sand is fine-grained, well-sorted, angular, quartzose, with yellow cast; abundant slender crystals of selenite
- 90 "
- 100 Clay -- gray, locally orange-brown, compact; small amount of fine, well-sorted quartz sand; very abundant stubby crystals of selenite
- 110 " locally pale-yellow
- 120 " locally pale-yellow; slightly sandy
- 130 " locally pale-yellow; slightly sandy
- 140 " locally pale-yellow; slightly to moderately sandy; a few Uvigerina, Nonion and Siphogenerina
- 143 Sand -- abundant matrix of brown clay, a few shell fragments; fine- to medium-grained, fairly well-sorted; clear, angular to subangular quartz, with 10% small fragments of bone phosphorite, and 2-3% lignite; abundant anhydrite pseudomorphs after gypsum; foraminifers abundant (Siphogenerina, Robulus and Dentalina dominant)
- 148 Shell and sand -- binder of drab-brown clay, dolomitic (encrusting, cavernous), abundant anhydrite pseudomorphs after gypsum (as attached crystals and as dendrites on shell fragments); 60% shell and 25% fine- to medium-grained, fairly well-sorted, angular to subangular sand; sand is 90% clear quartz, 10% fragmental phosphorite; foraminifers abundant (globigerinids and Cibicides); a few ostracods

- 160 Sand -- abundant matrix of greenish-gray clay, 10% fine, rounded quartz gravel, a few shell fragments; medium- to very coarse-grained, rather poorly sorted, angular to subrounded; clear quartz, with 5% fragmental phosphorite; pyrite nodules and gypsum crystals common; a few foraminifers
- 170 " with 20% shell fragments and fragments of dolomitic quartz sandstone
- 180 " with 20% shell fragments and a few fragments of dolomitic quartz sandstone; 1-2% phosphorite

180-181.5 No Sample

NANJEMOY FORMATION (181.5-240')

- 181.5 Sand and sandstone -- light-gray, moderately clayey; 80% fine- to coarse-grained, moderately-sorted sand, of which 70% is clear and pale-green quartz, and 30% is dark-green glauconite; small amounts phosphorite and gypsum; 15% white, calcitic sandstone, with quartz and black glauconite; small foraminifers common
- 187 Sand --- matrix of brown gypsiferous clay; medium-grained, fairly well-sorted; 55% greenish quartz, 20% dark- to light-green glauconite, 5% gypsum and anhydrite pseudomorphs after gypsum
- 188 Sand -- abundant matrix of brown clay; medium-grained, moderately sorted; 60% clear and greenish quartz, 20% brown, light-green, and dark-green glauconite; gypsum common; foraminifers and ostracods common
- 192 Sand -- matrix of brownish-black clay; medium- to coarse-grained, predominantly reddish-brown glauconite, with 10% stained, rounded quartz
- 193 " with matrix of brown and yellow clays; 15-20% stained and rounded quartz
- 200 Sand -- matrix of brownish-gray clay, a few shell fragments and small pebbles; medium- to very coarse-grained, moderately sorted; 40% clear and iron-stained, sub-angular to rounded quartz, 40% fresh and weathered glauconite; traces of gypsum, pyrite, phosphorite; a few foraminifers and ostracods
- 210 " 60% glauconite, 25% quartz
- 220 " 65% glauconite, 15% quartz

VDMR Well No. 2102

- 230 Sand -- abundant matrix of drab gray clay, 5% pelecypod shell fragments and a few fragments of phosphate rock, bedded (?) pyrite, and sandstone; fine- to medium-grained, fairly well-sorted; 25% clear, angular quartz, 55% dark-green glauconite; trace of gypsum; a very few foraminifers
- 240 Clay -- laminated orange-pink, light-gray, and yellow, essentially sand-free clays (80%), and blackish-green lenses of clayey, glauconitic sand (20%); clay laminae contain fresh, authogenic glauconite and selenite
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MATTAPONI FORMATION (250-280')

- 250 Sand -- black, slightly to moderately clayey; medium-grained, well-sorted; fresh black glauconite with 5-10% clear, angular quartz; trace of selenite
- 260 " with a few fragments of calcitic, glauconite-bearing sandstone
- 270 Sand and sandstone -- abundant matrix of grass-green clay; 15-20% calcitic, white, glauconite-bearing sandstone; 70-75% fine- to medium-grained, well-sorted, dull, dark- and light-green glauconite, with 10% quartz; a few shell fragments
- 280 " with 40% fine (10-20 mm), rounded, stained-quartz gravel
- 280-290 No Sample

PATUXENT FORMATION (290-370')

- 290 Gravel and sand -- binder of green clay, a few shell fragments; 60% fine (2-20 mm), moderately sorted, rounded gravel comprised of quartz and a few pebbles of chert, quartzite and phosphorite; 30% coarse- to very coarse-grained, subangular to subrounded feldspathic sand; trace of garnet
- 330 "
- 340 " 80% sand, 15% gravel
- 350 " 85% sand, 10% gravel

360 Sand — brownish-gray, clayey, 5% fine gravel; fine-grained, well sorted, angular; moderately feldspathic; slightly glauconitic and micaceous; trace of garnet

370 "

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

GEOLOGIC SUMMARY

	<u>Rock Unit</u>	<u>Age</u>
0-30'	Columbia Group	Pleistocene
30-40'	No Sample	
40-83'	Yorktown Formation	Late Miocene
83-180'	Calvert Formation	Middle Miocene
180-181.5'	No Sample	
181.5-240'	Nanjemoy Formation	Middle Eocene
240-250'	No Sample	
250-280'	Mattaponi Formation	Paleocene
280-290'	No Sample	
290-370'	Patuxent Formation	Early Cretaceous

Virginia Division of Mineral Resources
 Robert H. Teifke, Geologist
 October 1968
 Revised March, 1972

INTERVAL SHEET

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VDMR Well No: 2102

Date rec'd: 2-5-68

Sample Interval: from 10 to 370

PROP: JC-T-10

Number of samples: 37

COMP:

Total Depth: 370

COUNTY: James City

Oil or Gas: Water: Exploratory: X

From-To	From-To	From-To	From-To
10 -	300 -	-	-
20 -	310 -	-	-
30 -	320 -	-	-
40 -	330 -	-	-
50 -	340 -	-	-
60 -	350 -	-	-
70 -	360 -	-	-
80 -	370 -	-	-
90 -	-	-	-
100 -	-	-	-
110 -	-	-	-
120 -	-	-	-
130 -	-	-	-
140 -	-	-	-
-	-	-	-
160 -	-	-	-
170 -	-	-	-
180 -	-	-	-
181-5	-	-	-
188 -	-	-	-
200 -	-	-	-
210 -	-	-	-
220 -	-	-	-
230 -	-	-	-
240 -	-	-	-
250 -	-	-	-
260 -	-	-	-
270 -	-	-	-
280 -	-	-	-
290 -	-	-	-

All intervals have both washed and unwashed samples

0-35 orange sand w/ 30 mm & gravel at base
(USGS : 38')

35-75' greenish clayey silt-fine sand w/ Donia ;
NO GYPSUM
(USGS : Late Miocene)

75-135' clay w/ abundant gypsum
NO BUGS, NO DIATOMS
(USGS : Late Miocene)

VDMR Well No. 2102
County: James City

Well: JC-T-10
Property: Jamestown Fort
Driller: Norfolk and Western Railway
Location: 0.5 miles NE of Visitors' Center of Jamestown Fort, on E side
of Colonial Parkway: 76° 45' 30" W, 37° 13' 30" N
Elevation: 10 feet
Total Depth: 370 feet
Started drilling: November, 1966 Completed drilling: November, 1966

GEOLOGIC LOG*

Depth in
feet

COLUMBIA GROUP (0-30')

10	Clay --	orange-brown, sandy; sand is fine- to medium-grained, well-sorted, angular; clear and ironoxide-stained (orange) quartz; slightly feldspathic and micaceous; traces of magnetite, epidote, and weathered glauconite
20	"	brown; with 10% fine-grained (2-10 mm) quartzo-feldspathic gravel
30	Gravel --	orange-brown; rounded pebbles (5-30 mm) of quartz, quartzite, and chert
30-40	No Sample	

YORKTOWN FORMATION (40-83')

40	Sand --	dark brownish-gray, locally yellow and reddish-brown, moderately clayey; fine- to very fine-grained, very well-sorted, angular; clear quartz, with accessory glauconite, gypsum, magnetite, and muscovite; echinoid spines abundant; a very few foraminifers
50	Sand --	dark greenish-gray, moderately clayey; 15% coarse pelecypod shell fragments; fine- to very fine-grained, well-sorted, angular; clear quartz with a trace of glauconite; echinoid spines common; a very few foraminifers, mostly <u>Nonion</u> (also <u>Lagena</u> , <u>Textularia</u> , <u>Cibicides</u>)

- 60 Sand -- dark greenish-gray, moderately clayey; trace of coarse pelecypod shell fragments; fine-to very fine-grained, well-sorted, angular; clear quartz with trace of glauconite; echinoid spines common; a very few foraminifers, mostly Nonion (also Lagena, Textularia, Cibicides)
- 70 "
- 70-80 No Sample
- 80-83 Same as 70-foot interval

CALVERT FORMATION (83-180')

- 83 Clay -- greenish-brown, locally pale-yellow, very silty, moderately sandy; sand is fine-grained, well-sorted, angular, quartzose, with yellow cast; abundant slender crystals of selenite
- 90 "
- 100 Clay -- gray, locally orange-brown, compact; small amount of fine, well-sorted quartz sand; very abundant stubby crystals of selenite
- 110 " locally pale-yellow
- 120 " locally pale-yellow; slightly sandy
- 130 " locally pale-yellow; slightly sandy
- 140 " locally pale-yellow; slightly to moderately sandy; a few Uvigerina, Nonion and Siphogenerina
- 143 Sand -- abundant matrix of brown clay, a few shell fragments; fine- to medium-grained, fairly well-sorted; clear, angular to subangular quartz, with 10% small fragments of bone phosphorite, and 2-3% lignite; abundant anhydrite pseudomorphs after gypsum; foraminifers abundant (Siphogenerina, Robulus and Dentalina dominant)
- 148 Shell and sand -- binder of drab-brown clay, dolomitic (encrusting, cavernous), abundant anhydrite pseudomorphs after gypsum (as attached crystals and as dendrites on shall fragments); 60% shell and 25% fine- to medium-grained, fairly well-sorted, angular to subangular sand; sand is 90% clear quartz, 10% fragmental phosphorite; foraminifers abundant (globigerinids and Cibicides); a few ostracods

- 160 Sand -- abundant matrix of greenish-gray clay, 10% fine, rounded quartz gravel, a few shell fragments; medium- to very coarse-grained, rather poorly sorted, angular to subrounded; clear quartz, with 5% fragmental phosphorite; pyrite nodules and gypsum crystals common; a few foraminifers
- 170 " with 20% shell fragments and fragments of dolomitic quartz sandstone
- 180 " with 20% shell fragments and a few fragments of dolomitic quartz sandstone; 1-2% phosphorite
- 180-181.5 No Sample

NANJEMOY FORMATION (181.5-240')

- 181.5 Sand and sandstone -- light-gray, moderately clayey; 80% fine- to coarse-grained, moderately-sorted sand, of which 70% is clear and pale-green quartz, and 30% is dark-green glauconite; small amounts phosphorite and gypsum; 15% white, calcitic sandstone, with quartz and black glauconite; small foraminifers common
- 187 Sand -- matrix of brown gypsiferous clay; medium-grained, fairly well-sorted; 55% greenish quartz, 20% dark- to light-green glauconite, 5% gypsum and anhydrite pseudomorphs after gypsum
- 188 Sand -- abundant matrix of brown clay; medium-grained, moderately sorted; 60% clear and greenish quartz, 20% brown, light-green, and dark-green glauconite; gypsum common; foraminifers and ostracods common
- 192 Sand -- matrix of brownish-black clay; medium- to coarse-grained, predominantly reddish-brown glauconite, with 10% stained, rounded quartz
- 193 " with matrix of brown and yellow clays; 15-20% stained and rounded quartz
- 200 Sand -- matrix of brownish-gray clay, a few shell fragments and small pebbles; medium- to very coarse-grained, moderately sorted; 40% clear and iron-stained, sub-angular to rounded quartz, 40% fresh and weathered glauconite; traces of gypsum, pyrite, phosphorite; a few foraminifers and ostracods
- 210 " 60% glauconite, 25% quartz
- 220 " 65% glauconite, 15% quartz

VDMR Well No. 2102

- 230 Sand -- abundant matrix of drab gray clay, 5% pelecypod shell fragments and a few fragments of phosphate rock, bedded (?) pyrite, and sandstone; fine- to medium-grained, fairly well-sorted; 25% clear, angular quartz, 55% dark-green glauconite; trace of gypsum; a very few foraminifers
- 240 Clay -- laminated orange-pink, light-gray, and yellow, essentially sand-free clays (80%), and blackish-green lenses of clayey, glauconitic sand (20%); clay laminae contain fresh, authogenic glauconite and selenite
- 240-250 No Sample

MATTAPONI FORMATION (250-280')

- 250 Sand -- black, slightly to moderately clayey; medium-grained, well-sorted; fresh black glauconite with 5-10% clear, angular quartz; trace of selenite
- 260 " with a few fragments of calcitic, glauconite-bearing sandstone
- 270 Sand and sandstone -- abundant matrix of grass-green clay; 15-20% calcitic, white, glauconite-bearing sandstone; 70-75% fine- to medium-grained, well-sorted, dull, dark- and light-green glauconite, with 10% quartz; a few shell fragments
- 280 " with 40% fine (10-20 mm), rounded, stained-quartz gravel
- 280-290 No Sample

PATUXENT FORMATION (290-370')

- 290 Gravel and sand -- binder of green clay, a few shell fragments; 60% fine (2-20 mm), moderately sorted, rounded gravel comprised of quartz and a few pebbles of chert, quartzite and phosphorite; 30% coarse- to very coarse-grained, subangular to subrounded feldspathic sand; trace of garnet
- 330 "
- 340 " 80% sand, 15% gravel
- 350 " 85% sand, 10% gravel

VDMR Well No. 2102

360 Sand — brownish-gray, clayey, 5% fine gravel; fine-grained,
well sorted, angular; moderately feldspathic;
slightly glauconitic and micaceous; trace of garnet

370 "

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

GEOLOGIC SUMMARY

	<u>Rock Unit</u>	<u>Age</u>
0-30'	Columbia Group	Pleistocene
30-40'	No Sample	
40-83'	Yorktown Formation	Late Miocene
83-180'	Calvert Formation	Middle Miocene
180-181.5'	No Sample	
181.5-240'	Nanjemoy Formation	Middle Eocene
240-250'	No Sample	
250-280'	Mattaponi Formation	Paleocene
280-290'	No Sample	
290-370'	Patuxent Formation	Early Cretaceous

Virginia Division of Mineral Resources
Robert H. Teifke, Geologist
October 1968
Revised March, 1972

VDMR Well No. 2102
County: James City

Well: JC-T-10
Property: Jamestown Fort
Driller: Norfolk and Western Railway
Location: 0.5 miles NE of Visitors' Center of Jamestown Fort, on E side
of Colonial Parkway: 76° 45' 30" W, 37° 13' 30" N
Elevation: 10 feet
Total Depth: 370 feet
Started drilling: November, 1966 Completed drilling: November, 1966
Sample description by: R.H. Teifke, Virginia Division of Mineral
Resources, October, 1968

GEOLOGIC LOG*

Depth in
feet

COLUMBIA GROUP (0-30')

10	Clay -- orange-brown, sandy; sand is fine- to medium-grained, well-sorted, angular; clear and ironoxide-stained (orange) quartz; slightly feldspathic and micaceous; traces of magnetite, epidote, and weathered glauconite
20	" brown; with 10% fine-grained (2-10 mm) quartzo-feldspathic gravel
30	Gravel -- orange-brown; rounded pebbles (5-30 mm) of quartz, quartzite, and chert
30-40	No Sample

ST. MARYS FORMATION (40-70')

40	Sand -- dark brownish-gray, locally yellow and reddish-brown, moderately clayey; fine- to very fine-grained, very well-sorted, angular; clear quartz, with accessory glauconite, gypsum, magnetite, and muscovite; echinoid spines abundant; a very few foraminifers
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- 50 Sand — dark greenish-gray, moderately clayey; 15% coarse pelecypod shell fragments; fine- to very fine-grained, well-sorted, angular; clear quartz with a trace of glauconite; echinoid spines common; a very few foraminifers, mostly Nonion (also Lagena, Textularia, Cibicides)
- 60 " trace of shell
- 70 " trace of shell
- 70-80 No Sample
- CALVERT FORMATION (80-140')
- 80 Clay — greenish-brown, locally pale-yellow, very silty, moderately sandy; sand is fine-grained, well-sorted, angular, quartzose, with yellow cast; abundant slender crystals of selenite
- 90 "
- 100 Clay — gray, locally orange-brown, compact; small amount of fine, well-sorted quartz sand; very abundant stubby crystals of selenite
- 110 " locally pale-yellow
- 120 " locally pale-yellow; slightly sandy
- 130 " locally pale-yellow; slightly sandy
- 140 " locally pale-yellow; slightly to moderately sandy; a few Uvigerina, Nonion and Siphogenerina
- 140-143 No Sample
- CHICKAHOMINY FORMATION (143-180')
- 143 Sand — abundant matrix of brown clay, a few shell fragments; fine- to medium-grained, fairly well-sorted; clear, angular to subangular quartz, with 10% small fragments of bone phosphorite, and 2-3% lignite; abundant anhydrite pseudomorphs after gypsum; foraminifers abundant (Siphogenerina, Robulus and Dentalina dominant)

- 148 Shell and sand — binder of drab-brown clay, dolomitic (encrusting, cavernous), abundant anhydrite pseudomorphs after gypsum (as attached crystals and as dendrites on shell fragments); 60% shell and 25% fine- to medium-grained, fairly well-sorted, angular to subangular sand; sand is 90% clear quartz, 10% fragmental phosphorite; foraminifers abundant (globigerinids and Cibicides); a few ostracods
- 160 Sand — abundant matrix of greenish-gray clay, 10% fine, rounded quartz gravel, a few shell fragments; medium- to very coarse-grained, rather poorly sorted, angular to subrounded; clear quartz, with 5% fragmental phosphorite; pyrite nodules and gypsum crystals common; a few foraminifers
- 170 " with 20% shell fragments and fragments of dolomitic quartz sandstone
- 180 " with 20% shell fragments and a few fragments of dolomitic quartz sandstone; 1-2% phosphorite
- 180-181.5 No Sample
- NANJEMOY FORMATION (181.5-240')
- 181.5 Sand and sandstone — light-gray, moderately clayey; 80% fine- to coarse-grained, moderately-sorted sand, of which 70% is clear and pale-green quartz, and 30% is dark-green glauconite; small amounts phosphorite and gypsum; 15% white, calcitic sandstone, with quartz and black glauconite; small foraminifers common
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- 188 Sand — abundant matrix of gray clay; medium-grained, moderately sorted; 60% clear and greenish quartz, 20% brown, light-green, and dark-green glauconite; gypsum common; foraminifers and ostracods common

- 192 Sand — matrix of brownish-black clay; medium- to coarse-grained, predominantly reddish-brown glauconite, with 10% stained, rounded quartz
- 193 " with matrix of brown and yellow clays; 15-20% stained and rounded quartz
- 200 Sand — matrix of brownish-gray clay, a few shell fragments and small pebbles; medium- to very coarse-grained, moderately sorted; 40% clear and iron-stained, subangular to rounded quartz, 40% fresh and weathered glauconite; traces of gypsum, pyrite, phosphorite; a few foraminifers and ostracods
- 210 " 60% glauconite, 25% quartz
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MATTAPONI FORMATION (250-280')

- 250 Sand — black, slightly to moderately clayey; medium-grained, well-sorted; fresh black glauconite with 5-10% clear, angular quartz; trace of selenite
- 260 " with a few fragments of calcitic, glauconite-bearing sandstone

- 270 Sand and sandstone — abundant matrix of grass-green clay; 15-20% calcitic, white, glauconite-bearing sandstone; 70-75% fine- to medium-grained, well-sorted, dull, dark- and light-green glauconite, with 10% quartz; a few shell fragments
- 280 " with 40% fine (10-20 mm), rounded, stained-quartz gravel
- 280-290 No Sample

PATUXENT FORMATION (290-370')

- 290 Gravel and sand — binder of green clay, a few shell fragments; 60% fine (2-20 mm), moderately sorted, rounded gravel comprised of quartz and a few pebbles of chert, quartzite and phosphorite; 30% coarse- to very coarse-grained, subangular to subrounded feldspathic sand; trace of garnet
- 300 " 50% gravel, 40% sand
- 310 " 50% gravel, 40% sand
- 320 Sand and gravel — yellowish-gray, slightly clayey; 30% fine, quartzo-feldspathic gravel; 65% medium- to very coarse-grained, rather poorly sorted, angular to subangular feldspathic sand; trace of garnet
- 330 "
- 340 " 80% sand, 15% gravel
- 350 " 85% sand, 10% gravel
- 360 Sand — brownish-gray, clayey, 5% fine gravel; fine-grained, well-sorted, angular; moderately feldspathic; slightly glauconitic and micaceous; trace of garnet
- 370 "

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

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143-180'	Chickahominy Formation	Late Eocene
180-181.5'	No Sample	
181.5-240'	Nanjemoy Formation	Middle Eocene
240-250'	No Sample	
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280-290'	No Sample	
290-370'	Patuxent Formation	Early Cretaceous