

VDMR Well No. 2093  
County: Nansemond

Well: C-172  
Property: Atlantic Coast Line Railroad  
Driller: Norfolk and Western Railway  
Location: At intersection of Rte. 337 and ACL Railroad;  
76° 32' 30" w, 36° 45' 30" N  
Elevation: 23 feet  
Total Depth: 375 feet  
Started drilling: June, 1966      Completed drilling: June, 1966  
Sample description by: R. H. Teifke, Virginia Division of Mineral  
Resources, March, 1968

GEOLOGIC LOG \*

Depth in  
feet

✓ COLUMBIA GROUP ( 0-30')

- 0-10 Sand — brown, clayey; fine--to coarse-grained, rather poorly sorted, variably rounded; coarse grade is slightly feldspathic; minor glauconite and magnetite; accessory garnet and epidote
- 10-20 Sand and gravel— sparse matrix of brown clay; 30% granule gravel; 70% fine--to medium-grained, moderately sorted, poorly rounded sand; both fractions are slightly to moderately feldspathic
- 20-30 Sand and gravel — brown, clean, 50% granule gravel, 50% medium--to very coarse-grained, fairly well-sorted sand; minor allochthonous glauconite; both fractions feldspathic

YORKTOWN FORMATION ( 30-290')

- 30-40 Sand - 70% very coarse-grained, well-sorted, subangular to subrounded, slightly to moderately feldspathic sand; matrix (30%) fine-grained, well-sorted, angular quartz sand with subordinate amounts of shell fragments, echinoid spines, and foraminifers; binder of greenish-gray clay; traces of glauconite, epidote, and garnet
- 40-50 Gravel and sand - 80% well-sorted; subangular to subrounded, slightly feldspathic and lithic granule gravel; 20% greenish-gray, fine-grained, well-sorted sand composed of quartz, bioclasts, and abundant foraminifers; minor amount of anhydrite pseudomorphs after gypsum
- 50-60 "
- 60-70 " gravel fraction is coarser (2-8 mm) and contains numerous shell fragments
- 70-80 " "
- 80-90 " "
- 90-100 Silt and sand - grayish-green; very clayey; coarse-grained silt to very fine-grained sand, well-sorted, angular, slightly glauconitic and micaceous; foraminifers and echinoid spines abundant; gypsum and anhydrite pseudomorphs after gypsum are common
- 100-110 "
- 110-120 Clay - gray and grayish-brown, compact, slightly to moderately sandy, shell fragments common; sand is greenish, very fine-to medium-grained, fairly well-sorted; gypsiferous; very slightly glauconitic; echinoid spines common
- 120-130 " moderately sandy
- 130-140 " slightly sandy

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140-150	Sand - abundant matrix of gray-green clay, 30% shell fragments, fine- to medium-grained, well-sorted, angular; clear and greenish quartz, with minor glauconite and gypsum, traces of muscovite and phosphorite; a few foraminifers
150-160	"
160-170	Sand and clay - 5% shell fragments; 45% gray-green clay; 50% fine- to medium-grained, well-sorted, angular sand; clear and greenish quartz; slightly gypsiferous and glauconitic; a few foraminifers
170-180	Clay - greenish-gray, moderately sandy; 5% shell fragments; sand is fine- to medium-grained, well-sorted, angular; slightly glauconitic; gypsiferous
180-190	"
190-200	"
200-210	Sand - moderately abundant matrix of greenish-gray clay, 5% shell fragments; very fine- to medium-grained, well-sorted, angular; very slightly glauconitic; traces of phosphorite and gypsum
210-220	"
220-230	Clay - greenish-brown, silty and sandy; coarse-grained, silt to very fine-grained sand, well-sorted, angular; traces of glauconite and phosphorite; gypsum common
230-240	"
240-250	Clay - gray, spotted pale-yellow, slightly sandy; sand is fine, well-sorted, angular; abundant gypsum; trace of glauconite
250-260	" very slightly sandy
260-270	" trace of sand

270-280 " "

280-290 " "

CALVERT FORMATION ( 290-320')

290-300 Clay - greenish-brown, moderately sandy; sand is fine-  
to coarse-grained, moderately sorted, subangular;  
clear quartz, with 10% phosphorite and a trace  
of glauconite; a few foraminifers, including  
Siphogenerina, Uvigerina, and Nonion

300-310 Sand - moderately abundant matrix of greenish-brown  
clay, a few shell fragments; fine- to very coarse-  
grained, poorly sorted, angular to rounded;  
clear quartz with 10% bone, pelleted, and nodular  
phosphorite; foraminifers common

310-320 "

MATTAPONI FORMATION ( 320-<sup>355'</sup>375')

320-330 Sand - moderately abundant matrix of greenish-gray clay;  
a few fragments of shell, and of glauconitic  
limestone; fine- to coarse-grained, moderately  
sorted; 50% poorly rounded quartz, 50% variably  
weathered (Brown, greens, black) glauconite;  
gypsum common; small amount of bone and nodular  
phosphorite; a few foraminifers

330-340 Sand - sparse matrix of brown clay; trace of shell; medium-  
to coarse-grained black, antochthonous glauconite  
with 5% quartz; a few foraminifers

<sup>355</sup>  
340-350 "

TRANSITIONAL BEDS (355 - 375')

350-360 " with abundant laminae of silt and  
355 gypsiferous variegated clay

- 360-370 Sand -- abundant matrix of multi-colored clay; 20% shell fragments and a few quartz granules and limestone fragments; fine--to coarse-grained, rather poorly sorted; sand consists of 45% clear to green-stained, angular quartz; 45% glauconite, 5% green-stained feldspar, and 5% bone nodular, and rock phosphorite; minor gypsum and pyrite; a few foraminifers
- 370-375 " 60% quartz, 30% glauconite

GEOLOGIC SUMMARY

	<u>Rock Unit</u>	<u>Age</u>
0-30	Columbia Group	Pleistocene
30-290	Yorktown Formation	<del>Late</del> Miocene
290-320	Calvert Formation	<del>Middle</del> Miocene
320-375 355	Mattaponi Formation	Paleocene-Late Cretaceous
355-375	<i>Transitional beds</i>	<i>Late Cretaceous</i>

\* The use of the lithologic term, "clay" includes all size ranges of particles less than 1/32 mm.

*R. H. Teufel  
3/9/72*

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30-40	Sand - 70% very coarse-grained, well-sorted, subangular to subrounded, slightly to moderately feldspathic sand; matrix (30%) fine-grained, well-sorted, angular quartz sand with subordinate amounts of shell fragments, echinoid spines, and foraminifers; binder of greenish-gray clay; traces of glauconite, epidote, and garnet
40-50	Gravel and sand - 80% well-sorted; subangular to subrounded, slightly feldspathic and lithic granule gravel; 20% greenish-gray, fine-grained, well-sorted sand composed of quartz, bioclasts, and abundant foraminifers; minor amount of anhydrite pseudomorphs after gypsum
50-60	"
60-70	" gravel fraction is coarser (2-8 mm) and contains numerous shell fragments
70-80	" "
80-90	" "
90-100	Silt and sand - grayish-green; very clayey; coarse-grained silt to very fine-grained sand, well-sorted, angular, slightly glauconitic and micaceous; foraminifers and echinoid spines abundant; gypsum and anhydrite pseudomorphs after gypsum are common
100-110	"
110-120	Clay - gray and grayish-brown, compact, slightly to moderately sandy, shell fragments common; sand is greenish, very fine-to medium-grained, fairly well-sorted; gypsiferous; very slightly glauconitic; echinoid spines common
120-130	" moderately sandy
130-140	" slightly sandy

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140-150	Sand - abundant matrix of gray-green clay, 30% shell fragments, fine- to medium-grained, well-sorted, angular; clear and greenish quartz, with minor glauconite and gypsum, traces of muscovite and phosphorite; a few foraminifers
150-160	"
160-170	Sand and clay - 5% shell fragments; 45% gray-green clay; 50% fine- to medium-grained, well-sorted, angular sand; clear and greenish quartz; slightly gypsiferous and glauconitic; a few foraminifers
170-180	Clay - greenish-gray, moderately sandy; 5% shell fragments; sand is fine- to medium-grained, well-sorted, angular; slightly glauconitic; gypsiferous
180-190	"
190-200	"
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210-220	"
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230-240	"
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270-280 " "

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CALVERT FORMATION ( 290-320')

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to coarse-grained, moderately sorted, subangular;  
clear quartz, with 10% phosphorite and a trace  
of glauconite; a few foraminifers, including  
Siphogenerina, Uvigerina, and Nonion

300-310 Sand - moderately abundant matrix of greenish-brown  
clay, a few shell fragments; fine- to very coarse-  
grained, poorly sorted, angular to rounded;  
clear quartz with 10% bone, pelleted, and nodular  
phosphorite; foraminifers common

310-320 "

MATTAPONI FORMATION ( 320-375')

320-330 Sand - moderately abundant matrix of greenish-gray clay;  
a few fragments of shell, and of glauconitic  
limestone; fine- to coarse-grained, moderately  
sorted; 50% poorly rounded quartz, 50% variably  
weathered (brown, greens, black) glauconite;  
gypsum common; small amount of bone and nodular  
phosphorite; a few foraminifers

330-340 Sand - sparse matrix of brown clay; trace of shell; medium-  
to coarse-grained black, antochthonous glauconite  
with 5% quartz; a few foraminifers

340-350 "

350-360 " with abundant laminae of silt and  
gypsiferous variegated clay

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- 360-370 Sand - abundant matrix of multi-colored clay; 20% shell fragments and a few quartz granules and limestone fragments; fine--to coarse-grained, rather poorly sorted; sand consists of 45% clear to green-stained, angular quartz; 45% glauconite, 5% green-stained feldspar, and 5% bone nodular, and rock phosphorite; minor gypsum and pyrite; a few foraminifers
- 370-375 " 60% quartz, 30% glauconite

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320-375	Mattaponi Formation	Paleocene

\* The use of the lithologic term, "clay" includes all size ranges of particles less than 1/32 mm.

INTERVAL SHEET

Page 1 of 1

VDMR Well No: 2093

Date rec'd: 1-22-68

Sample Interval: from 0 to: 375

PROP: C-172

Number of samples: 38

COMP:

Total Depth: 375

COUNTY: Nansemond

Oil or Gas: Water: Exploratory: X

From-To	From-To	From-To	From-To
0 - 10	300 - 310	-	-
10 - 20	310 - 320	-	-
20 - 30	320 - 330	-	-
30 - 40	330 - 340	-	-
40 - 50	340 - 350	-	-
50 - 60	350 - 360	-	-
60 - 70	360 - 370	-	-
70 - 80	375 -	-	-
80 - 90	-	-	-
90 - 100	-	-	-
100 - 110	-	-	-
110 - 120	-	-	-
120 - 130	-	-	-
130 - 140	-	-	-
140 - 150	-	-	-
150 - 160	-	-	-
160 - 170	-	-	-
170 - 180	-	-	-
180 - 190	-	-	-
190 - 200	-	-	-
200 - 210	-	-	-
210 - 220	-	-	-
220 - 230	-	-	-
230 - 240	-	-	-
240 - 250	-	-	-
250 - 260	-	-	-
260 - 270	-	-	-
270 - 280	-	-	-
280 - 290	-	-	-
290 - 300	-	-	-

All intervals have both washed and unwashed samples

Drilled 6/66

NAN-T-19

Continental  
ELEV. : 231

# CONFIDENTIAL

C-172

Geologic Log ✓  
Strip Log ✓

## INTERVAL SHEET

*Handwritten notes:*  
Washed  
over

Page 1 of 1

VDMR Well No: **WELL NO. 2093**

Date rec'd: 7/19/67

Sample Interval: from 0 to 375

PROP: 

0.5 Miles N.  
of Rte. 13 on  
Rte. 337.  
ACL RR

Number of samples: 38

COMP:

Total Depth: 375'

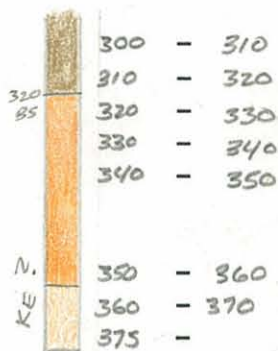
COUNTY: Naussemond  
(CHUCKATUCK SHEET)

Oil or Gas: Water: Exploratory: ✓

UNW  
From-To                      From-To                      From-To                      From-To



0	-	10
10	-	20
20	-	30
30	-	40
40	-	50
50	-	60
60	-	70
70	-	80
80	-	90
90	-	100
100	-	110
110	-	120
120	-	130
130	-	140
140	-	150
150	-	160
160	-	170
170	-	180
180	-	190
190	-	200
200	-	210
210	-	220
220	-	230
230	-	240
240	-	250
250	-	260
260	-	270
270	-	280
280	-	290
290	-	300



300	-	310
310	-	320
320	-	330
330	-	340
340	-	350
350	-	360
360	-	370
375	-	

**CONFIDENTIAL**

VA-NAN-T-19

C-172

see - W-02093

W-06016

LAT: 3645.30

LONG: 7632.06

Depth: 375'

Elev: 20'

Located on 7.5 min Quad.

Chuckatuck Quad.

Logger KF 4/28/80

- 0-10 Sand, silty, light brownish gray (2.5Y 6/2)  
Fine to medium grained, poorly sorted  
sub-angular. Composition: Quartz, with  
feldspar (<5%), glauconite (1-3%), with limonite.  
glauconite is reworked.
- 10-20 Sand, with pea sized pebbles, grayish brown (10YR 5/2)  
medium to very coarse, subangular, mod. sorted.  
Comp: Quartz, feldspar (5-10%), Rock fragments (1%)  
Trace of chert.
- 20-30 Same as above, with trace of shell hash, glauconite.
- 30-40 Sand, very silty; SAND/SILT = 1, olive gray (5Y 5/2)  
Lithologically same as above. Chert, shell more common.  
No. glauconite
- 40-50 Same as above
- 50-60 Sand, silty, gray (5Y 6/1), very coarse, sub-angular  
poorly sorted. Comp: Quartz, shell hash (35%), feldspar (5-10%),  
chert (1%). Shell hash is well sorted, mostly gray and  
dolomitized

00-70 Gravel, sandy, <sup>SILTY</sup> gray (5Y6/1), Sand Fraction: Fine to very coarse; gravel - well sorted, 3-4mm diam, sub-angular. Composition: Quartz, dolomitized gray shell hash and white calcareous shell hash (30%), feldspar, chert (10%), SILTY interstitially

70-80 sand, gravelly, silty, Like above.

80-90 Like 2 Above, Trace of glauconites

90-100 SILT, sandy, gravelly; lithologically like 3 above.

100-110 SILT, sandy, olive gray (5Y5/2)  
Predom. fine grained, but numerous coarse chunks of quartz and shell hash up to 1cm diam. Poorly sorted, sub-angular, Comp: Quartz, shell hash (30%), glauconite (1-5%) feldspar (<5%). Shell hash partially dolomitized  
Numerous echinoid spines.

110-120 SILT, sandy, clayey, same as above. glauconite = 5%  
Feldspar → zero.

120-130 same as above with whole Venericardia valves,  
Turritella

130-140 same as 2 above with Pecten fragments  
Trace of angular chert.

140-150 same as 3 above.

150-160 SILT, sandy, olive gray (5Y5/2). Fine grained, well sorted, sub-angular. Comp: Quartz, shell hash (15%), glauconite (5%) of sand fraction. Shell hash partly dolomitized

160-170 Same as above, with secondary gypsum and sulfur.

170-180 Same as above but slightly clayey. Shell hash fine and fragile. The gray heavy dolomitized fragments only form a Trace of the total shell hash.

180-190 Sand, silty, olive gray (5Y5/2) Fine grained, well sorted, sub-angular. Comp: Quartz, glauconite (5%), shell hash (10%) Overall greenish color on washed sample glauconite probably reworked.

190-200 Sand, silty, same as above with secondary gypsum.

200-210 Same as above

210-220 same as above

220-230 Same as above

230-240 SILT, sandy, same as above

240-250 Same as above, secondary gypsum & sulfur very common.

250-260 SILT, sandy, clayey, same as above.

260-270 Same as above.

270-280 Clay, silty, sandy same as above.

280-290 Same as above only 10% glauconite

290-300 Same as above

300-310 Same as above

0-300

sand, clayey, olive gray (5Y 5/2)

Fine-med, well sorted, sub angular to well rounded  
Comp: quartz, shell hash (5%), brown rounded  
pellets of glauconite or phosphate or opaques (10%),  
With trace of glauconite. Numerous Globigerinas

300-310

sand, clayey, olive gray (5Y 5/2),

same as above but contains 10% shell hash and  
brown angular fragments of limy dolomite (5%)  
With foram Robulus (broken)

310-320

Sand, silty, olive gray (5Y 5/2)

med grained, moderately sorted, sub rounded

Comp: Quartz, glauconite (30%),  
angular fragments of sandy limy dolomite (10%)  
shell hash (5%).

320-330

Same as above, but much of the glauconite has been  
oxidized (to limonite) and sample is 60% glauconite

330-340

Sand, silty interstitially, dark gray (5Y 4/1)  
coarse, well sorted, 75% glauconite  
with minor shell hash, quartz, dolomite.

340-350

Same as above w/ a few fragments of sandy limestone

350-360

Same as above but silty sand ~ 20% silt



360-370

sand, silty, olive gray (5Y5/2), medium, well sorted rounded except for angular chunks of shell, limestone, limy dolomite up to 1cm diam.

Comp: glauconite (50%), shell & limestone fragments (30%), sandy dolomite (25%), secondary sulfur, gypsum, quartz. with garnet, Foram Rebulus.

375

sand, silty, olive gray (5Y5/2), Fine, mod. sorted, sub-angular. comp: Quartz, glauconite (40%), shell hash and sandy limestone (10%), limy dolomite