



WATER-RIGHT DOCKET

Fredericksburg and Spotsylvania NMP

Docket No: 2

WELL, JACKSON SHRINE WATER SYSTEM

Supporting Hydro Data

00-00-0000: contents of soil by depth of spotsylvania co. battlefield

OWNER:	Fredericksburg - Spotsylvania Co. Battlefield	VDMR # 765
DRILLER:	Sydner Pump and Well Co., Inc.	WVCR # 19
COUNTY:	Caroline (Guinea)	TOTAL DEPTH : 180

SAMPLE EXAMINATION (Unwashed Samples)

COLUMBIA GROUP (0-10)

0-5	Sand - tan, medium to fine grained, angular, abundant silt and clay, small amounts of gravel
5-10	Gravel - tan, angular, 1/16 to 1/4 inch diameter, abundant coarse sand, small amounts of silt.

CALVERT FORMATION (10-80)

10-15	Clay - gray, small amounts of gravel and very fine grained sand, a few diatoms (<u>Coscinodiscus</u>).
15-20	Clay - gray, small amounts of very fine grained sand, and a few diatoms (<u>Coscinodiscus</u>).
20-25	Clay - gray, small amounts of gravel and very fine grained sand, a few diatoms (<u>Coscinodiscus</u>)
25-30	As above
30-35	Clay - gray, small amounts of coarse to fine grained sand, a few diatoms (<u>Coscinodiscus</u>)
35-40	As above
40-45	As above
45-50	As above
50-55	As above
55-60	As above
60-65	As above
65-70	As above
70-75	As above
75-80	As above

OWNER: Fredericksburg - Spotsylvania Co. Battlefield (continued)

PAMUNKEY GROUP (80-155)

80-85	Limestone - gray, small amounts of coarse to fine grained sand, glauconite, shell fragments, and a few shark and ray teeth
85-90	Shell fragments - white to gray, abundant arenaceous and glauconitic limestone fragments, small amounts of coarse to fine grained sand, a few shark teeth
90-95	As above
95-100	Sand - gray, very fine grained, angular, abundant shell fragments, small amounts of glauconite and clay
100-105	As above
105-110	As above
110-115	Sand - gray, very fine grained, angular, abundant clay, small amounts of shell fragments and glauconite
115-120	As above
120-125	As above
125-130	Sand - gray, coarse to fine grained, angular, abundant clay, small amounts of glauconite and shell fragments
130-135	As above
135-140	As above
140-145	As above
145-150	As above
150-155	As above

PATUXENT FORMATION (155-180)

155-160	Sand - white to gray, medium to coarse grained, angular, 20% feldspar, small amounts of gravel
160-165	As above
165-170	As above
170-175	No sample
175-180	Sand - white to gray, medium to coarse grained, angular, 20% feldspar

OWNER: Fredericksburg - Spotsylvania Co. Battlefield (continued)

GEOLOGIC SUMMARY

	<u>AGE</u>	<u>ROCK UNIT</u>
0-10	Pleistocene	Columbia group
10-80	Miocene	Calvert formation
80-155	Eocene	Pamunkey group
155-180	Lower Cretaceous	Patuxent formation

Virginia Division of Mineral Resources
James L. Ruhle - Geologist
January 8, 1963

Log of well (over)

LOG

FURNISHED BY: SYDNOR PUMP & WELL COMPANY, INC.

DATE: January 9, 1963

DEPTH (feet)		TYPE OF SOIL OR ROCK PENETRATED (gravel, clay, etc., hardness, color, etc)	REMARKS (water, caving, shot, screen, sample, etc)
FROM	TO		
0	8	Red sandy clay and gravel	
8	17	Gravel	
17	78	Very tough blue clay	
78	97	Shells and blue clay	
97	109	Dark green silty clay and some shells	
109	120	White sandy clay	
120	125	Blue and white sandy clay	
125	129	Gray sand	
129	142	Gray sand clay	
142	149	Streaked sand and clay	
149	155	Tough cemented sand	
155	173	Coarse sand and gravel, gray	
173	178	White sand clay	

**FROEHLING & ROBERTSON, INC.**

INSPECTION ENGINEERS • CHEMISTS • BACTERIOLOGISTS

CABLE ADDRESS—"FROEHLING"

MAIN OFFICE AND LABORATORIES
814 WEST CARY STREET
RICHMOND, VIRGINIA
PHONE 844-3085BRANCH LABORATORIES
NORFOLK; CHARLOTTE; RALEIGH
WASHINGTON; BALTIMORE
GREENVILLE; ROANOKE; WILMINGTON**CHEMICAL ANALYSIS OF WATER****RICHMOND, VA.
DECEMBER 31, 196**NO. **K-522-12-B**MADE FOR: **NATIONAL PARK SERVICE, SOUTHEAST REGIONAL OFFICE, 400 N. 8th S
P. O. BOX 10008, RICHMOND 40, VA. ATTENTION: MR. VICK**MARKED: **SAMPLE FROM 178' DEEP WELL, JACKSON SHRINE, GUINEA, VA.
FREDERICKSBURG & SPOTSYLVANIA COUNTY BATTLEFIELDS NATIONAL
MILITARY PARK AND CEMETARY.****P.O. NO. 31-1932, DATED 12/20/62**

pH VALUE (ELECTROMETRIC)

7.6**PARTS PER MILLION**

~~DISSOLVED~~ —TOTAL SOLIDS AT 103°C.	183.2
LOSS ON IGNITION (ORGANIC AND VOLATILE MATTER)	43.6
MINERAL RESIDUE (NON-VOLATILE MATTER)	139.6
SUSPENDED (INSOLUBLE) MATTER	-
FREE CARBON DIOXIDE (CO ₂)	6.0
PHENOLPHTHALEIN (CARBONATE) ALKALINITY as CaCO ₃	0.0
METHYL ORANGE (BICARBONATE) ALKALINITY as CaCO ₃	114.0
TOTAL HARDNESS (BY CALCULATION) as CaCO ₃	72.3
SOAP HARDNESS as CaCO ₃	80.0

ANALYSIS OF MINERAL RESIDUE:

SILICA (SiO ₂) AND INSOLUBLE MATTER	17.6
IRON (Fe)	0.2
ALUMINUM (Al)	2.0
CALCIUM (Ca)	14.8
MAGNESIUM (Mg)	8.6
SODIUM AND POTASSIUM as SODIUM (Na)	23.8
BICARBONATE (HCO ₃) (BY CALC. FROM ALKALINITY)	139.1
CARBONATE (CO ₃) (BY CALC. FROM ALKALINITY)	0.0
CHLORIDE (Cl)	4.0
SULFATE (SO ₄)	15.2
NITRATE (NO ₃)	0.3
PHOSPHATE (PO ₄)	-
COPPER (Cu)	-
FLUORIDE (F)	TRACE

REMARKS:**4cc NATIONAL PARK SERVICE**

ad Form CW-1-A

RESPECTFULLY,

FROEHLING & ROBERTSON, INC.

MAIN OFFICE AND LABORATORIES
814 WEST CARY STREET
RICHMOND, VIRGINIA
PHONE 644-3025



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CABLE ADDRESS—"FROEHLING"

BRANCH LABORATORIES
NORFOLK, CHARLOTTE, KILLICK
WASHINGTON, BALTIMORE
GREENVILLE, KANSAS, WASHINGTON

RICHMOND, VA. 23261
MAY 31, 1974

NO. B-660-5-A

ANALYSES OF 7 SAMPLES OF WATER

MADE FOR: FREDERICKSBURG NATIONAL MILITARY PARK, P. O. BOX 679, FREDERICKSBURG, VA. 22401
ATTENTION: MR. JOSEPH F. VAUGHN

MARKED: (1) QUARTERS 7 (5) QUARTERS 9
(2) QUARTERS 8 (6) QUARTERS 10
(3) SPOTSYLVANIA SHELTER (7) QUARTERS 11
(4) JACKSON SHED

P. NO. PX 4370-4-0259

0-0-0

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
pH VALUE (ELECTROMETRIC)	6.88	6.90	6.92	7.52	6.68	6.72	6.98

PARTS PER MILLION

TOTAL SOLIDS @ 103°C.	80.0	78.0	80.0	194.0	44.0	34.0	148.0
LOSS ON IGNITION (ORGANIC & VOLATILE MATTER)	38.0	36.0	30.0	48.0	30.0	24.0	60.0
MINERAL RESIDUE (NON-VOLATILE MATTER)	42.0	42.0	50.0	146.0	14.0	10.0	88.0
FREE CARBON DIOXIDE (CO ₂)	20.0	10.0	8.0	2.0	16.0	10.0	12.0
PHENOLPHTHALEIN (CARBONATE) ALKALINITY as CaCO ₃	0.0	0.0	0.0	0.0	0.0	0.0	0.0
METHYL ORANGE (BICARBONATE) ALKALINITY as CaCO ₃	50.0	62.0	64.0	126.0	28.0	16.0	110.0
TOTAL HARDNESS (BY CALCULATION) as CaCO ₃	58.9	46.9	44.6	56.1	15.1	11.3	86.1
ANALYSIS OF MINERAL RESIDUE:							
SILICA (SiO ₂) AND INSOLUBLE MATTER	15.89	9.09	9.45	37.11	3.79	3.79	27.25
IRON (Fe)	0.13	0.01	0.09	0.88	0.29	0.14	0.03
MANGANESE (Mn)	NIL	NIL	NIL	0.07	0.04	NIL	NIL
CALCIUM (Ca)	11.97	14.17	15.22	13.86	4.87	3.25	25.02
MAGNESIUM (Mg)	7.04	2.79	1.60	5.24	0.73	0.77	5.75
SODIUM & POTASSIUM as SODIUM (Na)	0.3	9.3	11.2	38.1	8.0	4.4	17.4
BICARBONATE (HCO ₃) (BY CALC. FROM ALKALINITY)	61.0	75.6	76.1	153.7	34.2	19.5	134.2
CARBONATE (CO ₃) (BY CALC. FROM ALKALINITY)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CHLORIDE (Cl)	6.0	3.0	3.0	4.0	3.0	3.0	5.0
SULFATE (SO ₄)	1.2	0.8	0.8	8.6	0.8	0.8	6.6
NITRATE (NO ₃)	5.05	NIL	NIL	NIL	0.71	1.42	1.33
FLUORIDE (F)	NIL	NIL	NIL	NIL	NIL	NIL	NIL

5cc
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RESPECTFULLY,
FROEHLING & ROBERTSON, INC.

MEMBER: American Society for Testing Materials • American Concrete Institute • American Council of Independent Laboratories • Virginia Academy of Science • Association of Science & Industry • Society for Nondestructive Testing • Virginia State Chamber of Commerce
REPRESENTED IN: American Wood Preservers Association • Association of Asphalt Paving Technologists • American Water Works Association • American Chemical Society • American Public Health Association • Technical Association Pulp & Paper Industry • Virginia Public Health Association

Other Supporting Information



IN REPLY REFER TO:

LS4

UNITED STATES
DEPARTMENT OF THE INTERIOR

NATIONAL PARK SERVICE
Southeast Region
Richmond 40, Virginia
JAN 4 1963 9 29 AM '63

WRcopy

D. B. Lee
JAN 15/15
ENR 1/15/63

WR
P. Miller

Memorandum

To: Superintendent, Fredericksburg

From: Acting Assistant Regional Director, Resource Planning,
Southeast Region

Subject: A completion report on deep well at Jackson Shrine,
Fredericksburg and Spotsylvania County Battlefields
National Military Park and Cemetery

A deep well was drilled, developed and pump tested by the Sydnor Pump and Well Company, Richmond, Virginia, during the period December 6 through December 19, 1962.

The water well was drilled 9 5/8 inches in diameter by a hydraulic-rotary drilling unit to a depth of 178 feet below land surface. Soil samples were collected at regular intervals by the driller. These samples were sent to the State Geologist, Division of Mineral Resources, Charlottesville, Virginia, for a determination as to sample identification. Enclosed is a copy of the driller's log. The well was constructed by installing 10 feet of 6-inch I. D. black steel casing and 150 feet of 4-inch I.D. black steel casing with one stainless steel screen, (#20 slot), 10 feet in length in the drilled hole. The contractor placed a wash valve assembly and a tail pipe section located below the bottom of the screen, 5 feet 3 inches in length. Before the surging operation of the well was started, No. 2 graded gravel was filled around the screen perimeter. The final pump test was started at 12 noon on Monday, December 17, 1962 and the results of the tests are shown on enclosed Tables 1 and 2.

Not clear
under screen
was set
ENR

The well was pumped at 25 gallons per minute, the maximum capacity of the pump, with a drawdown of approximately 68 feet. The static water was measured at 31 feet from the top of well casing. At the end of the pump test, a water sample was collected for chemical analysis. The Froehling and Robertson Laboratories, Richmond, Virginia, will furnish this office a report of their findings within a few days.

FRSP

After it was determined that the test well had sufficient quantity to meet the needs of the Park, the contractor placed impervious material around the casing from the water bearing zone to 50 feet below land surface. Above this level neat cement grout was placed around the casing to land surface to prevent undesirable waters from entering the well.

Engineer Everhardt is making the necessary arrangements for the installation of a submersible pump and connection of the well to the existing water system.

(Signed)

Thomas W. Morse

Enclosures 3

cc:
~~Director w/enc.~~
Chief, EODC w/enc. (2)

DRILLER'S LOG

**Jackson Shrine
Fredericksburg National Military Park**

0-8	Red sandy clay and gravel
8-17	Gravel
17-78	Tough blue clay
78-79	Gravel
79-97	Shells and blue clay
97-109	Dark green silty clay and some shell
109-120	White clay and sand
120-125	Blue and white sand clay
125-129	Gray sand
129-142	Gray sand clay
142-149	Streaks sand and clay
149-155	Tough cemented sand
155-173	Course sand and gravel

Table 1.

Pump Test Conducted at Jackson Shrine, Frederickshurg and
Spotsylvania County Battlefields National Memorial Park and
Cemetery, on December 17, 1962.

Water standing at 31'.

Pump set at 148'.

Pumping Level 72'.

Started Pumping at 12:00 Noon.

12:15 pm	25 gpm at 72'
12:45 pm	25 gpm at 80'6"
1:50 pm	25 gpm at 90'
2:05 pm	25 gpm at 93'
2:20 pm	25 gpm at 95'
2:35 pm	25 gpm at 96'
3:00 pm	25 gpm at 97'
3:15 pm	25 gpm at 98'
3:30 pm	25 gpm at 98'6"
3:45 pm	25 gpm at 98'6"
4:00 pm	25 gpm at 99'
4:15 pm	25 gpm at 99'
4:30 pm	25 gpm at 99'
4:45 pm	25 gpm at 99'
5:00 pm	25 gpm at 99'
5:15 pm	25 gpm at 99'

39
31
68
0.26
1.50
2.04
4.60
Hm/ft

Note: The test pump was cut off at 11:00 pm after a short developed
in the electric wiring of the pump. The discharge was 25 gallons per
minute and the water level was 99 feet.

Table 2.

**Pump Test Conducted at Jackson Shrine, Fredericksburg and
Spotsylvania County Battlefields National Memorial Park and
Cemetery, on December 18.**

Static Level 31'	Pump Set 105'
1:45 pm	25 gpm at 81'
2:00 pm	25 gpm at 81'
2:15 pm	25 gpm at 81'
2:30 pm	25 gpm at 83'6"
2:45 pm	25 gpm at 83'6"
3:00 pm	25 gpm at 85'
3:15 pm	25 gpm at 86'6"
3:30 pm	25 gpm at 88'
3:45 pm	25 gpm at 89'
4:00 pm	25 gpm at 89'6"
4:25 pm	25 gpm at 90'
4:45 pm	25 gpm at 90'6"
5:00 pm	25 gpm at 90'6"
5:15 pm	25 gpm at 90'6"

RECEIVED
NATIONAL PARK SERVICE
WASHINGTON OFFICE

Dec 31 8 46 AM '62 Southeast Region
Richmond 40, Virginia

LS4

DEC 28 1962

Dr. James L. Calver
State Geologist
Department of Conservation and Economic Development
Division of Mineral Resources
Natural Resources Building
Box 3667
Charlottesville, Virginia

Dear Dr. Calver:

Engineer Vick has shipped soil samples to you, by parcel post, which were taken from two deep water wells drilled at Fort Harrison, Richmond National Battlefield Park, Henrico County, Virginia, on November 8, and at Jackson Shrine, Guinea, Virginia, Fredericksburg and Spotsylvania County Battlefields National Military Park and Cemetery, on December 10.

We would appreciate notification of the material type of the soil samples after your staff have completed the laboratory analyses.

The Fort Harrison test well was drilled by the Sydnor Pump and Well Company, Richmond, Virginia, to a depth of 80' and the maximum yield was only 2½ gallons per minute and the static water level was 26'. After drilling the hole, a stainless steel screen 10' in length was placed in the hole at 61 to 71' below land surface and when this water bearing zone failed to produce the desired quantity and quality of water after 8 hours of pump testing, the screen and casing were pulled up and reset at 45 to 55'. This water bearing zone was pump tested and found to produce only 2 gallons per minute of cloudy water. With these results, the hole was abandoned on November 12.

D. E. Lee
Sam 1/4
Quinn 1/14
W. H. 1/15/63
P. Miller

RICH

The deep well at Jackson Shrine was also drilled by Sydnor Pump and Well Company, using the hydraulic-rotary method, to a depth of 178' and pump tested at 25 gallons per minute. The static water level was 31'. A stainless steel screen 10' in length was set in the water bearing zone at 160 to 170'. This well will be used as the main water supply for the Jackson Shrine area.

We will forward the copy of the chemical analysis report for the Jackson Shrine well as soon as Froehling and Robertson Testing Laboratories have completed the work.

Your cooperation and interest in the water development of this well is greatly appreciated.

Sincerely yours,

E. M. Lisle
Acting Regional Director

cc:
Director
Supt., RICH
Supt., FRED
Chief, RDC

Docket Information

Number of Documents in Docket 14

Documents Dated from 12/21/1962 to 1/9/1963

Docket Compiled: 3/22/2011