APPENDIX H
Vicinity Groundwater Quality Data from VDEQ

SOW 91-A

Form GW-2
1978-10,000

COMMONWEALTH OF VIRGINIA
WATER WELL COMPLETION REPORT

BWCM No. 234-136

(Certification of Completion/County Permit)

State Water Control Board
P. O. Box 11143
2111 North Hamilton St.
Richmond, Va. 23230

SWCB Permit _____
County Permit _____

Certification of inspecting official:
This well does _____ does not _____
meet code/low requirements.
S. _____
Date _____
For Office Use

County/City: Chesapeake
County/City Stamp

Virginia Plane Coordinates
_____ N
_____ E

Latitude & Longitude
36° 42' 27" N
76° 07' 49" W

Topo. Map No. _____
Elevation _____ ft.
Formation _____
Lithology _____
River Basin _____
Province _____
Type Logs _____
Cuttings ~~[illegible]~~
Water Analysis yes
Aquifer Test _____

Owner: SWCB
Well Designation or Number: 234-136
Address: SOW 91-A
Phone _____

Drilling Contractor: SWCB
Address: 2111 No Hamilton St. Richmond, Va.
Phone _____

Tax Map I.D. No. _____
Subdivision _____
Section _____
Block _____
Lot _____
Class Well I _____, IIA _____, IIB _____, IIIA _____, IIIB _____, IIIC _____, IIID _____, IIIE _____

WELL LOCATION: _____ (feet/miles _____ direction) of _____
and _____ feet/miles _____ (direction) of _____
(If possible please include map showing location marked)

Date started _____ Date completed _____ Type rig Failing CF 15

1. WELL DATA: New X Reworked _____ Deepened _____

Total depth _____ ft.
Depth to bedrock _____ ft.

Hole size (Also include reamed zones)
- 6.5 inches from 0 to ~~92~~ 400 ft.
- _____ inches from _____ to _____ ft.
- _____ inches from _____ to _____ ft.

Casing size (I.D.) and material
- 4 inches from 0 to 92 ft.
  Material _____
  Wt. per foot _____ or wall thickness _____ in.
- _____ inches from _____ to _____ ft.
  Material _____
  Wt. per foot _____ or wall thickness _____ in.
- _____ inches from _____ to _____ ft.
  Material _____
  Wt. per foot _____ or wall thickness _____ in.

Screen size and mesh for each zone (where applicable)
- 4 inches from 92 to 97 ft.
  Mesh size _____ Type _____
- _____ inches from _____ to _____ ft.
  Mesh size _____ Type _____
- _____ inches from _____ to _____ ft.
  Mesh size _____ Type _____
- _____ inches from _____ to _____ ft.
  Mesh size _____ Type _____

Gravel pack
- From _____ to _____ ft.
- From _____ to _____ ft.

Out
- From _____ to _____ ft., Type _____
- From _____ to _____ ft., Type _____

2. WATER DATA Water temperature _____ °F
Static water level (unpumped level-measured) _____ ft.
Stabilized measured pumping water level _____ ft.
Stabilized yield _____ gpm after _____ hours
Natural Flow: Yes _____ No _____, flow rate _____ gpm
Comment on quality _____

3. WATER ZONES: From _____ To _____
From _____ To _____, From _____ To _____
From _____ To _____, From _____ To _____

4. USE DATA:
Type of use: Drinking _____, Livestock Watering _____, Irrigation _____, Food processing _____, Household _____, Manufacturing _____, Fire safety _____, Cleaning _____, Recreation _____, Aesthetic _____, Cooling or heating _____, Injection _____, Other observation
Type of facility: Domestic _____, Public water supply _____, Public institution _____, Farm _____, Industry _____, Commercial _____, Other _____

5. PUMP DATA: Type _____ Rated H.P. _____
Intake depth _____ Capacity _____ at _____ head

6. WELLHEAD: Type well seal _____
Pressure tank _____ gal., Loc. _____
Sample tap _____, Measurement port _____
Well vent _____, Pressure relief valve _____
Gate valve _____, Check valve (when required) _____
Electrical disconnect switch on power supply _____

7. DISINFECTION: Well disinfected _____ yes _____ no
Date _____, Disinfectant used _____
Amount _____, Hours used _____

8. ABANDONMENT (where applicable) yes _____ no _____
Casing pulled yes _____ no _____ not applicable _____
Plugging grout From _____ to _____ material _____

OVER

Groundwater Research Station
77-9 (78-3)
Fentress

Total Depth:400'

U.S.G.A. 7.5 Quad Fentress Lat: 36°42' 27"

Long: 76° 07'49"

Depth	Geology	Hydraulic Conductivity
o-10'	Poorly sorted, Sub-Angular, Silt(80%) and Very Fine Sand(20%) to Medium Quartz Sand. Trace Hornblende	20 GPD/FT.^{2}
10-20'	Well sorted, Sub-Angular, Fine to Medium Quartz Sand. Trace Hornblende, Hematite, Mica	400 GPD/FT.^{2}
20-30'	Bimodally sorted, Sub-Anagular, Silt(30%) and Fine and Medium Quartz sand.(70%) Trace Limonite, Magnetite, Chlorite.	150 GPD/FT.^{2}
30-40'	Poorly sorted, Sub-Angular, Silt(20%) to Coarse (10%) Quartz Sand(40% Medium Sand). Trace Glauconite, Magnetite, Mica, Chlorite.	100 GPD/FT.^{2}
40-50'	Poorly sorted, Sub-Angular, Silt(60%) to Very Fine to Coarse (20%) Quartz Sand. (Medium Sand 20%)) Glauconite, Iron Stains, Hematite, (Sand washed out).	200 GPD/FT.^{2}
50-60'	Poorly sorted, Sub-Angular, Very Fine to Coarse Quartz Sand. Glauconite, Chlorite.	600 GPD/FT.^{2}
60-70'	Poorly sorted, Sub-Angular, Silt (20%)to Well Rounded Very Coarse (20%) Quartz Sand.(Medium sand is 30%) Hornblende, Glauconite, Feldspar.	300 GPD/FT.^{2}
70-80'	Poorly sorted, Sub-Angular, Silt(20%) to Very Coarse (20%) Quartz Sand. (Medium Sand is 20%) Limey. Shell Fragments, Glauconite, Magnetite.	450 GPD/FT.^{2}
80-90	Poorly sorted, Sub-Angular, Silt(10%) to Very Coarse Quartz Sand. (Coarse 30%)(Limey) Shell Fragments, Plagioclase Grains, Glauconite, Hornblende.	400 GPD/FT.^{2}

90-100	Poorly sorted, Sub-Angular, Clay and Silt (30%) to Very Fine (30%) to Coarse Quartz Sand. (Limey) Ilmenite, Shell Fragments, Glauconite, Asbestos (Serpenite)	100 GPD/FT.^{2}
100-110	Poorly sorted, Sub-Angular, Silt (50%)(Fine to Medium Sand)30%) (Very Limey) Echinoid Spines, Glauconite, Shell FRagments (20%), Fish bone, Gypsum.	20 GPD/FT.^{2}
110-120	(Same) Coquina (Very Limey) Kyanite Trace	20 GPD/FT.^{2}
120-130	(Same)	20 GPD/FT.^{2}
130-140	Poorly sorted, Sub-Angular, Silt(30%) Very Fine Sand (40%) to Coarse Quartz Sand. (Very Limey) Shell Fragments(20%), Fish bone, Echinoid Spines, Magnetite, Silt and Clay Washed Out.	30 GPD/FT.^{2}
140-150	Poorly sorted, Sub-Angular, Clay(20%) and Silt(70%) Coarse sand(5%)(Very Limey) Shell Fragments, (5%), Limonite.	10 GPD/FT.^{2}
150-160	(Same)	10 GPD/FT.^{2}
160-170	(Same) More Clay(30%)(No Coarses)	1 GPD/FT.^{2}
170-180	(Same)	1 GPD/FT.^{2}
180-190	(Same) Glauconite (5%)	1 GPD/FT.^{2}
190-200	(Same)	1 GPD/FT.^{2}
200-210	(Same) Glauconite (10%)	1 GPD/FT.^{2}
210-220	(Same) Glauconite 20%	1 GPD/FT.^{2}
220-230	(Same)	1 GPD/FT.^{2}
230-240	(Same) More Clay	.8 GPD/FT.^{2}
240-250	(Same)	.8 GPD/FT.^{2}
250-260	(Same) More Clay	.5 GPD/FT.^{2}
260-270	(Same)	.5 GPD/FT.^{2}
270-280	(Same)	.5 GPD/FT.^{2}
280-290	Poorly sorted, Sub-Angular, Tan(Iron Oxide) Fine to Medium (30%) Quartz Sand and (Clay and Silt)(70%)(Limey) Glauconite$<$1%	1.5 GPD/FT.^{2}
290-300	Clay (30%) and Silt (60%)(Limonite Nodules 2%) (Limey) 5% Shell and Pebbles.	1.o GPD/FT.^{2}
300-310	(Same) No Limonite(Very Slightly Limey)	1.0 GPD/FT.^{2}
310-320	(Same) Large Well Rounded Pebbles	1.0 GPD/FT.^{2}

320-330	(Same)	1.0 GPD/FT.^{2}
330-340	(Same)	.8 GPD/FT.^{2}
340-400	(SAme)Gradually Increasing in Clay Content (Very Slightly Limey)	.7 GPD/FT.^{2}

TOTAL DEPTH: 400'

Sample Datetime	Time datum	Time datum reliability code	Sample Medium Code	Agency Collecting Sample, Code	Analysis Source	Hydro-logic Event	Hydro-logic Condition	Sample type
1989-03-	EST	T	WG	USGS-WRD	9	9	A	9
2003-08-	EDT	K	WG	USGS-WRD	9	9	A	9

USGS 364227076074701 61B 2 SOW 091A

Chesapeake City, Virginia
Hydrologic Unit Code 03010205
Latitude 36°42'27", Longitude 76°07'47" NAD27
Land-surface elevation 15.00 feet above sea level NGVD29
The depth of the well is 97.0 feet below land surface.
The depth of the hole is 400 feet below land surface.
This well is completed in the UPPER CHESAPEAKE GROUP (121CSPKU) local aquifer.

Water Quality Remark Code	Description
<	Less than.
M	Presence verified but not quantified.

Value Qualifier Code	Description

d	Diluted sample: method hi range exceeded

Project Code	Labor-atory sample comment	Sam-pling depth, feet (00003)	Temper-ature, water, deg C (00010)	Agency ana-lyzing sample, code (00028)	Flow rate, instan-taneous gal/min (00059)	Color, water, fltrd, Pt-Co units (00080)	Specif-ic conduc-tance, wat unf uS/cm 25 degC (00095)	Hydro-gen ion, water, unfltrd calcd, mg/L (00191)
445108900	RR:CA-58,MG=27,NA=206		16.8	80020		15	1650	0.00010
24829RCX6		50.0	18.2	80020	4.1		1690	0.00004

Dis-solved oxygen, mg/L (00300)	Dis-solved oxygen, percent of sat-uration (00301)	pH, water, unfltrd field, std units (00400)	pH, water, unfltrd lab, std units (00403)	Carbon dioxide water, unfltrd mg/L (00405)	ANC, wat unf fixed end pt, field, mg/L as CaCO3 (00410)	Carbon-ate, wat flt infl pt titr., field, mg/L (00452)	Bicar-bonate, wat flt infl pt titr., field, mg/L (00453)	Ammonia water, fltrd, mg/L as N (00608)
		7.0	7.4	57	294			1.20
2.1	23	7.4	7.5			0.0	331	

Ammonia + org-N, water, unfltrd mg/L as N (00625)	Nitrate + nitrite water fltrd, mg/L as N (00631)	Phos-phorus, water, unfltrd mg/L as P (00665)	Organic carbon, water, unfltrd mg/L (00680)	Hard-ness, water, mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes-ium, water, fltrd, mg/L (00925)	Sodium, water, fltrd, mg/L (00930)	Sodium adsorp-tion ratio (00931)
1.2	< 0.100	0.25	5.6	270	59.0	29.0	240	6.4
				250	57.4	26.3	210	5.8

hard

Sodium frac-tion of cations percent (00932)	Potas-sium, water, fltrd, mg/L (00935)	Chlor-ide, water, fltrd, mg/L (00940)	Sulfate water, fltrd, mg/L (00945)	Fluor-ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L as SiO2 (00955)	Boron, water, fltrd, ug/L (01020)	Iron, water, unfltrd recover-able, ug/L (01045)	Iron, water, fltrd, ug/L (01046)
64	18.0	420	27.0	0.30	37.0	470	5000	440
62	22.8	358 d	14.1	0.20	42.4			599

500
WHO

300
2°

Mangan-ese, water, unfltrd recover-able, ug/L (01055)	Mangan-ese, water, fltrd, ug/L (01056)	Zinc, water, fltrd, ug/L (01090)	Alum-inum, water, fltrd, ug/L (01106)	Alka-linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Depth to water level below LSD, meters (30210)	Alka-linity, wat flt inf tit field, mg/L as CaCO3 (39086)	Residue on evap. at 180deg C wat flt mg/L (70300)	Residue water, fltrd, sum of consti-tuents mg/L (70301)
50	15.0	8	20		2.31		1070	1010
	14.0			276	2.62	271	930	896

50
2c

Residue water, fltrd, tons/ acre-ft (70303)	Ammonia water, fltrd, mg/L (71846)	Bromide water, fltrd, mg/L (71870)	Sample purpose code (71999)	Pump or flow period prior to sampling, minutes (72004)	Sampling condition, code (72006)	Depth to top sample intrval feet below LSD (72015)	Depth to bot sample intrval feet below LSD (72016)	Depth to water level, feet below LSD (72019)
1.46	1.55					92.00	97.00	7.58
1.26		1.14 d	10.00	45	0.10	97.00	92.00	8.60

Sam-pling method, code (82398)	Specif. conduc-tance, wat unf lab, uS/cm 25 degC (90095)	ANC, wat unf fixed end pt, lab, mg/L as CaCO3 (90410)	Sulfide water, unfltrd field, mg/L (99119)
	1710	288	
4040	1620		M

Scw 91-B

Form GW-2
1978-10,000

COMMONWEALTH OF VIRGINIA
WATER WELL COMPLETION REPORT

• BWCM No. 234-65

(Certification of Completion/County Permit)

State Water Control Board
P. O. Box 11143
2111 North Hamilton St.
Richmond, Va. 23230

SWCB Permit _____
County Permit _____

Certification of inspecting official:
This well does _____ does not _____
meet code/low requirements.
S. _____
Date _____
For Office Use

County/City Chesapeake
County/City Stamp

• Virginia Plane Coordinates
_____ N
_____ E
Latitude & Longitude
36° 42' 27" N
76° 07' 49" W
• Topo. Map No. _____
• Elevation _____ ft.
• Formation _____
• Lithology _____
• River Basin _____
• Province _____
• Type Logs _____
• Cuttings 10 ft. Intervals
• Water Analysis yes
• Aquifer Test _____

• Owner SWCB
• Well Designation or Number _____
Address _____
Phone _____
• Drilling Contractor SWCB
Address 2111 N. Hamilton St
Richmond, Va.
Phone _____

Tax Map I.D. No. _____
Subdivision _____
Section _____
Block _____
Lot _____
Class Well: I _____, IIA _____,
IIB _____, IIIA _____, IIIB _____
IIIC _____ IIID _____ IIIE _____

WELL LOCATION: _____ (feet/miles _____ direction) of _____
and _____ feet/miles _____ (direction) of _____
(If possible please include map showing location marked)

Date started 5-6-79 • Date completed _____ Type rig Mud Rotary Failing CF-15

1. WELL DATA: New X Reworked _____ Deepened _____
• Total depth 1060 ft.
• Depth to bedrock _____ ft.
• Hole size (Also include reamed zones)
• 6.5 inches from 0 to 1060 ft.
• _____ inches from _____ to _____ ft.
• _____ inches from _____ to _____ ft.
• Casing size (I.D.) and material
• 4 inches from 0 to 1040 ft.
Material Steel
Wt. per foot _____ or wall thickness _____ in.
• _____ inches from _____ to _____ ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
• _____ inches from _____ to _____ ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
• Screen size and mesh for each zone (where applicable)
• 4 inches from 1040 to 1060 ft.
• Mesh size _____ Type _____
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• _____ inches from _____ to _____ ft.
• Mesh size _____ Type _____
• Gravel pack
• From _____ to _____ ft.
• From _____ to _____ ft
• Grout
• From _____ to _____ ft., Type _____
• From _____ to _____ ft., Type _____

2. WATER DATA • Water temperature _____ °F
• Static water level (unpumped level-measured) _____
• Stabilized measured pumping water level _____
• Stabilized yield _____ gpm after _____ hours
Natural Flow: Yes _____ No _____, flow rate _____ gpm
Comment on quality _____

3. WATER ZONES: From _____ To _____
From _____ To _____. From _____ To _____
From _____ To _____. From _____ To _____

4. USE DATA:
Type of use: Drinking _____, Livestock Watering _____,
Irrigation _____ Food processing _____, Household _____,
Manufacturing _____, Fire safety _____, Cleaning _____,
Recreation _____, Aesthetic _____, Cooling or heating _____,
Injection _____, Other observation
• Type of facility: Domestic _____, Public water supply _____,
Public institution _____, Farm _____, Industry _____,
Commercial _____, Other _____

5. PUMP DATA: Type _____ • Rated H.P. _____,
• Intake depth _____ • Capacity _____ at _____ head

6. WELLHEAD: Type well seal _____
Pressure tank _____ gal., Loc. _____
Sample tap _____, Measurement port _____
Well vent _____, Pressure relief valve _____
Gate valve _____, Check valve (when required) _____
Electrical disconnect switch on power supply _____

7. DISINFECTION: Well disinfected _____ yes _____ no
Date _____, Disinfectant used _____
Amount _____, Hours used _____

8. ABANDONMENT (where applicable) • yes _____ no _____
Casing pulled yes _____ no _____ not applicable _____
Plugging grout From _____ to _____ material _____

OVER

79-4(A)
Fentress

Depth/Time(min)	Description
0-10/1.0	Brown to Gray Clay w/Trace med sand
10-110/20.0	Gray Med To Coarse Sand w/Trace Br. Clay
110-160/13.0	Med To Very Coarse Sand, Trace Shell frag. & Glauconit
160-180/6.0	Fine to Coarse Sand, Shell, Glauconite w/Trace Clay
180-230/15.0	Med To Coarse Sand, shell frag, w/ Abundant Glauconite
230-260/10.0	VCS, Shell frag Glauconite
260-280/30.0	Hard Limey Cemented Glauconite with shell & med To Coarse Sand
280-300/5.0	Fine Sandy clay w/ Glauconite & shell frag.
300-330/9.0	Gray Clay Trace fine sand, shell frag, Glauconite.
330-600/115.0	Gray Clay
600-700/58.0	Green Clay w/Some Sand & Black sand.
700-750/?	Pebbles, shell frag, Gray Clay w/ med To fine sand.
750-800/?	Fine to Coarse Sand w/few Pebbles, shells
800-880/?	Clayey Fine To VCS w/few Pebbles Trace shell frag
880-910/?	Micaceous Silty Fine to VCS occasional Pebble
[illegible] 1000/?	Micaceous Silty Clay w/Trace Coarse Sand.
1000-1050/?	Gray VCS w/ Pebbles.

Sample Datetime	Time datum	Time datum reliability code	Sample Medium Code	Agency Collecting Sample, Code	Analysis Source	Hydro-logic Event	Hydro-logic Condition	Geo-logic unit
1989-03-	EST	T	WG	USGS-WRD	9	9	A	
2001-03-	EST	T	WG	USGS-WRD	9	X	X	211CRCSU
2008-06-	EDT	K	WG	USGS-WRD	9	X	X	211CRCSU

USGS 364227076074702 61B 5 SOW 091B

Chesapeake City, Virginia
Hydrologic Unit Code 03010205
Latitude 36°42'27", Longitude 76°07'47" NAD27
Land-surface elevation 15.00 feet above sea level NGVD29
The depth of the well is 1,060 feet below land surface.
The depth of the hole is 1,200 feet below land surface.
This well is completed in the Northern Atlantic Coastal Plain aquifer system (S100NATLCP)
This well is completed in the UPPER CRETACEOUS SERIES (211CRCSU) local aquifer.

Water Quality Remark Code	Description
<	Less than.
E	Estimated.
M	Presence verified but not quantified.

Value Qualifier Code	Description
@	Holding time exceeded
c	See laboratory comment
d	Diluted sample: method hi range exceeded

Sample type	Project Code	Laboratory sample comment	Temperature, water, deg C (00010)	Temperature, air, deg C (00020)	Barometric pressure, mm Hg (00025)	Agency analyzing sample, code (00028)	Flow rate, instantaneous gal/min (00059)	Color, water, fltrd, Pt-Co units (00080)
9	445108900	CL-RR	18.5			80020		4
9	445110600		20.0	15.7	753	80020	4.0	
9	24829RC20		21.3		757		6.8	

) national aquifer.

Specif-ic conduc-tance, wat unf uS/cm 25 degC (00095)	Hydro-gen ion, water, unfltrd calcd, mg/L (00191)	Dis-solved oxygen, mg/L (00300)	Dis-solved oxygen, percent of sat-uration (00301)	pH, water, unfltrd field, std units (00400)	pH, water, unfltrd lab, std units (00403)	Carbon dioxide water, unfltrd mg/L (00405)	ANC, wat unf fixed end pt, field, mg/L as CaCO3 (00410)	Carbon-ate, wat flt infl pt titr., field, mg/L (00452)
6000	0.00001			8.0	7.9	8.7	453	
5780	0.00001	0.0	0.0	7.9	8.0			< 1
5880		0.1		7.9	8.1			E 2

Bicar-bonate, wat flt infl pt titr., field, mg/L (00453)	Ammonia water, fltrd, mg/L as N (00608)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Nitrate + nitrite water fltrd, mg/L as N (00631)	Phos-phorus, water, unfltrd mg/L as P (00665)	Organic carbon, water, unfltrd mg/L (00680)	Hard-ness, water, mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes-ium, water, fltrd, mg/L (00925)
	2.20	2.0	< 0.100	0.03	0.5	87	15.0	12.0
554						87	16.6	11.0
E 547							15.8 d	10.9 dc

Sodium, water, fltrd, mg/L (00930)	Sodium adsorp-tion ratio (00931)	Sodium frac-tion of cations percent (00932)	Potas-sium, water, fltrd, mg/L (00935)	Chlor-ide, water, fltrd, mg/L (00940)	Sulfate water, fltrd, mg/L (00945)	Fluor-ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L as SiO2 (00955)	Boron, water, fltrd, ug/L (01020)
1100	51	95	25.0	1500	120	1.30	13.0	3600
1180	55	95	27.3	1540	109	1.49	11.8	
1200 d			26.8 dc	1590 d	117 d	1.43	10.5 dc	

Iron, water, unfltrd recover -able, ug/L (01045)	Iron, water, fltrd, ug/L (01046)	Mangan-ese, water, unfltrd recover -able, ug/L (01055)	Mangan-ese, water, fltrd, ug/L (01056)	Zinc, water, fltrd, ug/L (01090)	Alum-inum, water, fltrd, ug/L (01106)	Alka-linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Depth to water level below LSD, meters (30210)	Alka-linity, wat flt inf tit field, mg/L as CaCO3 (39086)
760	110	20	20	20	20		14.7	
	478		18.9			462	20.8	455
	425 dc		11.4 dc			454 @c		452

Residue on evap. at 180deg C wat flt mg/L (70300)	Residue water, fltrd, sum of consti-tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Ammonia water, fltrd, mg/L (71846)	Bromide water, fltrd, mg/L (71870)	Alti-tude of land surface feet (72000)	Pump or flow period prior to sam-pling, minutes (72004)	Sam-pling condi-tion, code (72006)	Depth to top sample intrval feet below LSD (72015)
3050	3060	4.15	2.83					1040.00
2940	3170	3.99		6.12	15.0	495	8.00	1040.00
3260				5.92 d	15.0	403	8.00	1040.00

Depth to bot sample intrval feet below LSD (72016)	Depth to water level, feet below LSD (72019)	Sampler type, code (84164)	Specif. conduc-tance, wat unf lab, uS/cm 25 degC (90095)	ANC, wat unf fixed end pt, lab, mg/L as CaCO3 (90410)	Sulfide water, unfltrd field, mg/L (99119)
1060.00	48.21		5740	463	
1060.00	68.30	4040	5720		
1060.00	77.60	4040	5840		M

Form GW-2
1978-10,000

COMMONWEALTH OF VIRGINIA
WATER WELL COMPLETION REPORT

SW 91-C

BWCM No. 234-66

(Certification of Completion/County Permit)

State Water Control Board
Box 11143
North Hamilton St.
Richmond, Va. 23230

SWCB Permit _____
County Permit _____

Certification of inspecting official:
This well does _____ does not _____
meet code/low requirements.
S. _____
Date _____
For Office Use

County/City Chesapeake

County/City Stamp

Virginia Plane Coordinates
_____ N
_____ E

Latitude & Longitude
36 42 28 N
76 07 49 W

Topo. Map No. _____
Elevation _____ ft.
Formation _____
Lithology _____
River Basin _____
Province _____
Type Logs D
Cuttings no
Water Analysis _____
Aquifer Test _____

Owner Fentress obs. 91C
Well Designation or Number _____
Address _____
Phone _____

Drilling Contractor SWCB
Address _____
Phone _____

Tax Map I.D. No. _____
Subdivision _____
Section _____
Block _____
Lot _____
Class Well: I _____, IIA _____, IIB _____, IIIA _____, IIIB _____, IIIC _____, IIID _____, IIIE _____

WELL LOCATION: _____ (feet/miles _____ direction) of _____
and _____ feet/miles _____ (direction) of _____
(If possible please include map showing location marked)

Date started 5/23/79 Date completed 5/24/79 Type rig rot

1. WELL DATA: New ✓ Reworked _____ Deepened _____

Total depth 800 ft.
Depth to bedrock _____ ft.

Hole size (Also include reamed zones)
7 inches from 0 to 800 ft.
_____ inches from _____ to _____ ft.
_____ inches from _____ to _____ ft.

Casing size (I.D.) and material
4 inches from 0 to 760 ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
_____ inches from _____ to _____ ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
_____ inches from _____ to _____ ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.

Screen size and mesh for each zone (where applicable)
3 inches from 760 to 780 ft.
Mesh size _____ Type _____
_____ inches from _____ to _____ ft.
Mesh size _____ Type _____
_____ inches from _____ to _____ ft.
Mesh size _____ Type _____
_____ inches from _____ to _____ ft.
Mesh size _____ Type _____

Gravel pack
From _____ to _____ ft.
From _____ to _____ ft.

Grout
From _____ to _____ ft., Type _____
From _____ to _____ ft., Type _____

2. WATER DATA Water temperature _____ °F
Static water level (unpumped level-measured) _____ ft.
Stabilized measured pumping water level _____ ft.
Stabilized yield _____ gpm after _____ hours
Natural Flow: Yes ✓ No _____, flow rate _____ gpm
Comment on quality tastes salty

3. WATER ZONES: From _____ To _____
From _____ To _____, From _____ To _____
From _____ To _____, From _____ To _____

4. USE DATA:
Type of use: Drinking _____, Livestock Watering _____,
Irrigation _____, Food processing _____, Household _____,
Manufacturing _____, Fire safety _____, Cleaning _____,
Recreation _____, Aesthetic _____, Cooling or heating _____,
Injection _____, Other research
Type of facility: Domestic _____, Public water supply _____,
Public institution _____, Farm _____, Industry _____,
Commercial _____, Other _____

5. PUMP DATA: Type _____ Rated H.P. _____,
Intake depth _____ Capacity _____ at _____ head

6. WELLHEAD: Type well seal _____
Pressure tank _____ gal., Loc. _____
Sample tap _____, Measurement port _____
Well vent _____, Pressure relief valve _____
Gate valve _____, Check valve (when required) _____
Electrical disconnect switch on power supply _____

7. DISINFECTION: Well disinfected _____ yes _____ no
Date _____, Disinfectant used _____
Amount _____, Hours used _____

8. ABANDONMENT (where applicable) yes _____ no _____
Casing pulled yes _____ no _____ not applicable _____
Plugging grout From _____ to _____ material _____

OVER

Sample Datetime	Time datum	Time datum reliability code	Sample Medium Code	Agency Collecting Sample, Code	Analysis Source	Hydro-logic Event	Hydro-logic Condition	Geo-logic unit
1989-03-	EST	T	WG	USGS-WRD	9	9	A	
1993-07-	EDT	T	WG	USGS-WRD	9	9	A	
1996-07-	EDT	T	WG	USGS-WRD	9	9	A	000SAND
1998-04-	EDT	T	WG	USGS-WRD	9	9	A	000SAND
2006-06-	EDT	K	WG	USGS-WRD	9	9	A	211CRAQU

USGS 364227076074703 61B 6 SOW 091C

Chesapeake City, Virginia
Hydrologic Unit Code 03010205
Latitude 36°42'27", Longitude 76°07'47" NAD27
Land-surface elevation 15.00 feet above sea level NGVD29
The depth of the well is 780 feet below land surface.
The depth of the hole is 800 feet below land surface.
This well is completed in the Northern Atlantic Coastal Plain aquifer system (S100NATLCP)
This well is completed in the UPPER CRETACEOUS AQUIFER SYSTEM (211CRAQU) local aq

PEE DEE Aquifer

Water Quality Remark Code	Description
<	Less than.
M	Presence verified but not quantified.

Value Qualifier Code	Description
@	Holding time exceeded
c	See laboratory comment
d	Diluted sample: method hi range exceeded

Sample type	Project Code	Temperature, water, deg C (00010)	Temperature, air, deg C (00020)	Barometric pressure, mm Hg (00025)	Agency analyzing sample, code (00028)	Flow rate, instantaneous gal/min (00059)	Color, water, fltrd, Pt-Co units (00080)	Specific conductance, wat unf uS/cm 25 degC (00095)
9	445108900	18.0			80020		4	80000
9	445108910	19.8	34.0	766	80020			9400
9	44511060	20.0	25.5	755	80020	3.0		9500
9	4451106000	20.0	14.0	764	80020			9480
9	24829RC20	19.8	23.5	751	80020	8.5		8780

) national aquifer.
uifer.

Hydro-gen ion, water, unfltrd calcd, mg/L (00191)	Dis-solved oxygen, mg/L (00300)	Dis-solved oxygen, percent of sat-uration (00301)	pH, water, unfltrd field, std units (00400)	pH, water, unfltrd lab, std units (00403)	Carbon dioxide water, unfltrd mg/L (00405)	ANC, wat unf fixed end pt, field, mg/L as CaCO3 (00410)	Carbon-ate, wat flt infl pt titr., field, mg/L (00452)	Bicar-bonate, wat flt infl pt titr., field, mg/L (00453)
0.00003			7.6	7.6	30	617		
0.00002	0.1	0.0	7.7	7.7	29		0.0	914
0.00003	0.2	2	7.5	7.6	45			828
0.00003	0.0	0.0	7.5	7.6	45		0.0	749
0.00003	M	0.0	7.5	7.8			3	888

Organic nitro-gen, water, unfltrd mg/L (00605)	Ammonia water, fltrd, mg/L as N (00608)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Nitrate + nitrite water fltrd, mg/L as N (00631)	Phos-phorus, water, unfltrd mg/L as P (00665)	Organic carbon, water, unfltrd mg/L (00680)	Hard-ness, water, mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes-ium, water, fltrd, mg/L (00925)
0.50	5.90	6.4	< 0.100	0.11	5.1	200	25.0	33.0
						190	25.0	32.0
						180	24.0	30.0
						210	28.6	34.0
						190	25.9 dc	30.9 dc

Sodium, water, fltrd, mg/L (00930)	Sodium adsorp-tion ratio (00931)	Sodium frac-tion of cations percent (00932)	Potas-sium, water, fltrd, mg/L (00935)	Chlor-ide, water, fltrd, mg/L (00940)	Sulfate water, fltrd, mg/L (00945)	Fluor-ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L as SiO2 (00955)	Boron, water, fltrd, ug/L (01020)
1900	59	94	55.0	2600	160	1.30	16.0	6500
1900	59	94	52.0	2500	170	1.6	14.0	
1800	58	94	57.0	2600	170	1.40	16.0	
1980	59	94	54.5	2520	167	1.21	16.8	
1850 dc	58	94	54.4 dc	2570 d	160 d	1.32	15.7 dc	

Iron, water, unfltrd recover -able, ug/L (01045)	Iron, water, fltrd, ug/L (01046)	Mangan-ese, water, unfltrd recover -able, ug/L (01055)	Mangan-ese, water, fltrd, ug/L (01056)	Zinc, water, fltrd, ug/L (01090)	Alum-inum, water, fltrd, ug/L (01106)	Alka-linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Depth to water level below LSD, meters (30210)	Alka-linity, wat flt fxd end field, mg/L as CaCO3 (39036)
8200	280	40	10	< 10	20		1.67	
	130		< 10					
	300		< 10.0					
	278		< 40.0				0.055	610
	207 dc		5.4 dc			725 @c	2.18	

Alka-linity, wat flt inf tit field, mg/L as CaCO3 (39086)	Residue on evap. at 180deg C wat flt mg/L (70300)	Residue water, fltrd, sum of consti-tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Ammonia water, fltrd, mg/L (71846)	Bromide water, fltrd, mg/L (71870)	Alti-tude of land surface feet (72000)	Pump or flow period prior to sam-pling, minutes (72004)	Sam-pling condi-tion, code (72006)
	5050	5170	6.87	7.60				
749	5480	5150	7.45		3.90			
679	5230	5120	7.11		9.90	15.0	265	8.00
614	5110	5180	6.95		9.29			8.00
733	5320	5160	7.23		9.69 d	15.0	215	8.00

Depth to top sample intrval feet below LSD (72015)	Depth to bot sample intrval feet below LSD (72016)	Depth to water level, feet below LSD (72019)	Sam-pling method, code (82398)	Sampler type, code (84164)	Specif. conduc-tance, wat unf lab, uS/cm 25 degC (90095)	ANC, wat unf fixed end pt, lab, mg/L as CaCO3 (90410)	Sulfide water, unfltrd field, mg/L (99119)
760.00	780.00	5.48			9100	727	
			8010	4040	9170	724	
760.00	780.00			4040	9230	729	
760.00	780.00	0.18		4040	9060	729	
760.00	780.00	7.15		4040	9250		M

SOW 91-D

Form GW-2
1978-10,000

COMMONWEALTH OF VIRGINIA
WATER WELL COMPLETION REPORT

BWCM No. 234-67

(Certification of Completion/County Permit)

State Water Control Board
P. O. Box 11143
2111 North Hamilton St.
Richmond, Va. 23230

SWCB Permit _____
County Permit _____
Certification of inspecting official:
This well does _____ does not _____
meet code/low requirements.
S. _____
Date _____
For Office Use

County/City: Chesapeake

County/City Stamp

Virginia Plane Coordinates
_____ N
_____ E
Latitude & Longitude
36° 42' 27" N
76° 07' 49" W
Topo. Map No. _____
Elevation _____ ft.
Formation _____
Lithology _____
River Basin _____
Province _____
Type Logs _____
Cuttings _____
Water Analysis _____
Aquifer Test _____

Owner: SWCB
Well Designation or Number: SOW 91-D
Address _____
Phone _____
Drilling Contractor: SWCB
Address: 2111 N. Hamilton St.
Richmond, Va.
Phone _____

Tax Map I.D. No. _____
Subdivision _____
Section _____
Block _____
Lot _____
Class Well I _____, IIA _____, IIB _____, IIIA _____, IIIB _____, IIIC _____, IIID _____, IIIE _____

WELL LOCATION: _____ (feet/miles _____ direction) of _____
and _____ feet/miles _____ (direction) of _____
(If possible please include map showing location marked)

Date started _____ Date completed _____ Type rig Failing F-15

1. WELL DATA: New X Reworked _____ Deepened _____
Total depth 22 ft.
Depth to bedrock _____ ft.
Hole size (Also include reamed zones)
4 inches from 0 to 22 ft.
_____ inches from _____ to _____ ft.
_____ inches from _____ to _____ ft.
Casing size (I.D.) and material
4 inches from 0 to 17 ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
_____ inches from _____ to _____ ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
_____ inches from _____ to _____ ft.
Material _____
Wt. per foot _____ or wall thickness _____ in.
Screen size and mesh for each zone (where applicable)
4 inches from 17 to 22 ft.
Mesh size _____ Type _____
_____ inches from _____ to _____ ft.
Mesh size _____ Type _____
_____ inches from _____ to _____ ft.
Mesh size _____ Type _____
_____ inches from _____ to _____ ft.
Mesh size _____ Type _____
Gravel pack
From _____ to _____ ft.
From _____ to _____ ft
Grout
From _____ to _____ ft., Type _____
From _____ to _____ ft., Type _____

2. WATER DATA Water temperature _____ °F
Static water level (unpumped level-measured) _____ ft
Stabilized measured pumping water level _____ ft.
Stabilized yield _____ gpm after _____ hours
Natural Flow: Yes _____ No _____, flow rate _____ gpm
Comment on quality _____

3. WATER ZONES: From _____ To _____
From _____ To _____, From _____ To _____
From _____ To _____, From _____ To _____

4. USE DATA:
Type of use: Drinking _____, Livestock Watering _____,
Irrigation _____, Food processing _____, Household _____,
Manufacturing _____, Fire safety _____, Cleaning _____,
Recreation _____, Aesthetic _____, Cooling or heating _____,
Injection _____, Other Observation
Type of facility: Domestic _____, Public water supply _____,
Public institution _____, Farm _____, Industry _____,
Commercial _____, Other _____

5. PUMP DATA: Type _____ Rated H.P. _____,
Intake depth _____ Capacity _____ at _____ head

6. WELLHEAD: Type well seal _____
Pressure tank _____ gal., Loc. _____
Sample tap _____, Measurement port _____
Well vent _____, Pressure relief valve _____
Gate valve _____, Check valve (when required) _____
Electrical disconnect switch on power supply _____

7. DISINFECTION: Well disinfected _____ yes _____ no
Date _____, Disinfectant used _____
Amount _____, Hours used _____

8. ABANDONMENT (where applicable) yes _____ no _____
Casing pulled yes _____ no _____ not applicable _____
Plugging grout From _____ to _____ material _____

OVER

Sample Datetime	Time datum	Time datum reliability code	Sample Medium Code	Agency Collecting Sample, Code	Analysis Source	Hydro-logic Event	Hydro-logic Condition	Sample type
1989-03-	EST	T	WG	USGS-WRD	9	9	A	9
2003-08-	EDT	K	WG	USGS-WRD	9	9	A	9

USGS 364227076074704 61B 7 SOW 091D

Chesapeake City, Virginia
Hydrologic Unit Code 03010205
Latitude 36°42'27", Longitude 76°07'47" NAD27
Land-surface elevation 15.00 feet above sea level NGVD29
The depth of the well is 22.0 feet below land surface.
The depth of the hole is 22.0 feet below land surface.
This well is completed in the QUATERNARY SYSTEM (110QRNR) local aquifer.

Water Quality Remark Code	Description
<	Less than.
M	Presence verified but not quantified.

Value Qualifier Code	Description

d	Diluted sample: method hi range exceeded

Project Code	Labor-atory sample comment	Sam-pling depth, feet (00003)	Temper-ature, water, deg C (00010)	Agency ana-lyzing sample, code (00028)	Flow rate, instan-taneous gal/min (00059)	Color, water, fltrd, Pt-Co units (00080)	Specif-ic conduc-tance, wat unf uS/cm 25 degC (00095)	Hydro-gen ion, water, unfltrd calcd, mg/L (00191)
445108900	RR:ALK DROPPED,CL=24,SO4=25		15.0	80020		13	200	0.00253
24829RCX6		19.0	18.7	80020	2.7		325	0.00139

Dis-solved oxygen, mg/L (00300)	Dis-solved oxygen, percent of sat-uration (00301)	pH, water, unfltrd field, std units (00400)	pH, water, unfltrd lab, std units (00403)	Carbon dioxide water, unfltrd mg/L (00405)	ANC, wat unf fixed end pt, field, mg/L as CaCO3 (00410)	Carbon-ate, wat flt infl pt titr., field, mg/L (00452)	Bicar-bonate, wat flt infl pt titr., field, mg/L (00453)	Organic nitro-gen, water, unfltrd mg/L (00605)
		5.6	6.0	311	64			0.18
0.5	5	5.9	5.7			0.0	90	

Ammonia water, fltrd, mg/L as N (00608)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Nitrate + nitrite water fltrd, mg/L as N (00631)	Phos-phorus, water, unfltrd mg/L as P (00665)	Organic carbon, water, unfltrd mg/L (00680)	Hard-ness, water, mg/L as CaCO3 (00900)	Noncarb hard-ness, wat flt lab, mg/L as CaCO3 (00905)	Calcium water, fltrd, mg/L (00915)	Magnes-ium, water, fltrd, mg/L (00925)
0.120	0.30	< 0.100	0.06	3.0	40		6.80	5.60
					72	48	11.5	10.4

Sodium, water, fltrd, mg/L (00930)	Sodium adsorp-tion ratio (00931)	Sodium frac-tion of cations percent (00932)	Potas-sium, water, fltrd, mg/L (00935)	Chlor-ide, water, fltrd, mg/L (00940)	Sulfate water, fltrd, mg/L (00945)	Fluor-ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L as SiO2 (00955)	Boron, water, fltrd, ug/L (01020)
14.0	1.0	42	1.10	24.0	12.0	0.10	20.0	40
17.9	0.9	35	1.38	8.08	63.4	< 0.17	17.4	

500
WHO

Iron, water, unfltrd recover -able, ug/L (01045)	Iron, water, fltrd, ug/L (01046)	Mangan-ese, water, unfltrd recover -able, ug/L (01055)	Mangan-ese, water, fltrd, ug/L (01056)	Zinc, water, fltrd, ug/L (01090)	Alum-inum, water, fltrd, ug/L (01106)	Alka-linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Depth to water level below LSD, meters (30210)	Alka-linity, wat flt inf tit field, mg/L as CaCO3 (39086)
mg/L 12000	15000	240	280	36	20		0.323	
	29500 d		388			24	0.829	74

300 50

Residue on evap. at 180deg C wat flt mg/L (70300)	Residue water, fltrd, sum of consti-tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Ammonia water, fltrd, mg/L (71846)	Bromide water, fltrd, mg/L (71870)	Sample purpose code (71999)	Pump or flow period prior to sam-pling, minutes (72004)	Sam-pling condi-tion, code (72006)	Depth to top sample intrval feet below LSD (72015)
159	137	0.22	0.15					17.00
201	204	0.27		0.15 d	10.00	40	0.10	22.00

Depth to bot sample intrval feet below LSD (72016)	Depth to water level, feet below LSD (72019)	Sam-pling method, code (82398)	Specif. conduc-tance, wat unf lab, uS/cm 25 degC (90095)	ANC, wat unf fixed end pt, lab, mg/L as CaCO3 (90410)	Sulfide water, unfltrd field, mg/L (99119)
22.00	1.06		195	62	
17.00	2.72	4040	215		M

Form GW-2
1978-10,000

COMMONWEALTH OF VIRGINIA
WATER WELL COMPLETION REPORT

BWCM No. 234-191

(Certification of Completion/County Permit)

te Water Control Board
O. Box 11143
11 North Hamilton St.
Richmond, Va. 23230

SWCB Permit
County Permit
Certification of inspecting official:
This well does ____ does not ____
meet code/low requirements.
S.
Date
For Office Use

County/City Chesapeake

County/City Stamp

Virginia Plane Coordinates
N
E

Latitude & Longitude
36 42' 27" N
76 07' 47" W

Topo. Map No. 2B
Elevation 15 ft.
Formation KLP
Lithology SD
River Basin 5
Province 1
Type Logs E
Cuttings No
Water Analysis Yes
Aquifer Test No

Owner Observation Well # 91-E
Well Designation or Number Fentress
Address
Phone

Drilling Contractor SWCB - Creason
Address
Phone

Tax Map I.D. No.
Subdivision
Section
Block
Lot
Class Well I ____, IIA ____, IIB ____, IIIA ____, IIIB ____, IIIC ____, IIID ____, IIIE ____

WELL LOCATION: Fentress [Observation Well # 91-E] ____ (feet/miles ____ direction) of ____
and ____ feet/miles ____ (direction) of ____
(If possible please include map showing location marked)

Date started 9-29-88 Date completed 11-30-88 Type rig Mud Rotary

1. WELL DATA: New X Reworked ____ Deepened ____

Total depth 1831' ft.
Depth to bedrock ____ ft.
ole size (Also include reamed zones)
12 inches from 0 to 82' ft.
7 inches from 83 to 1697' ft
3.5 inches from 1698' to 1873' ft.

Casing size (I.D.) and material
4 inches from 0 to 1697' ft.
Material Black Steel
Wt. per foot ____ or wall thickness ____ in.
2 inches from 1626' to 1821' ft.
Material Black Steel
Wt. per foot ____ or wall thickness ____ in.
____ inches from ____ to ____ ft.
Material ____
Wt. per foot ____ or wall thickness ____ in.

Screen size and mesh for each zone (where applicable)
2 inches from 1821' to 1831' ft.
Mesh size .020 Type SS Pipe Base
____ inches from ____ to ____ ft.
Mesh size ____ Type ____
____ inches from ____ to ____ ft.
Mesh size ____ Type ____
____ inches from ____ to ____ ft
Mesh size ____ Type ____

Gravel pack
From ____ to ____ ft.
From ____ to ____ ft

Grout
From 0 to 1697' ft., Type Aqua-Gel Goldseal
From ____ to ____ ft., Type ____

2. WATER DATA Water temperature 60.8 °F
Static water level (unpumped level-measured) 39.68 TOC ft
Stabilized measured pumping water level 85.0 TOC ft
Stabilized yield 7.9 gpm after 7.5 hours
Natural Flow: Yes ____ No X, flow rate ____ gpm
Comment on quality Salty

3. WATER ZONES: From ____ To ____
From ____ To ____ From ____ To ____
From ____ To ____ From ____ To ____

4. USE DATA:
Type of use: Drinking ____, Livestock Watering ____,
Irrigation ____, Food processing ____, Household ____,
Manufacturing ____, Fire safety ____, Cleaning ____,
Recreation ____, Aesthetic ____, Cooling or heating ____,
Injection ____, Other Observation
Type of facility: Domestic ____, Public water supply ____,
Public institution ____, Farm ____, Industry ____,
Commercial ____, Other Observation

5. PUMP DATA: Type ____ Rated H.P. ____
Intake depth ____ Capacity ____ at ____ head

6. WELLHEAD: Type well seal ____
Pressure tank ____ gal., Loc. ____
Sample tap ____, Measurement port ____
Well vent ____, Pressure relief valve ____
Gate valve ____, Check valve (when required) ____
Electrical disconnect switch on power supply ____

7. DISINFECTION: Well disinfected ____ yes ____ no
Date ____, Disinfectant used ____
Amount ____, Hours used ____

8. ABANDONMENT (where applicable) yes ____ no ____
Casing pulled: yes ____ no ____ not applicable ____
Plugging grout From ____ to ____ material ____

OVER

Sample Datetime	Time datum	Time datum reliability code	Sample Medium Code	Agency Collecting Sample, Code	Analysis Source	Hydro-logic Event	Hydro-logic Condition	Geo-logic unit
1989-03-	EST	T	WG	USGS-WRD	9	9	A	
1993-07-	EDT	T	WG	USGS-WRD	9	9	A	
1998-04-	EDT	T	WG	USGS-WRD	9	9	A	217PTXN
2006-06-	EDT	K	WG	USGS-WRD	9	9	A	217PTXN

USGS 364227076074706 61B 12 SOW 091E

Chesapeake City, Virginia
Hydrologic Unit Code 03010205
Latitude 36°42'27", Longitude 76°07'47" NAD27
Land-surface elevation 15.00 feet above sea level NGVD29
The depth of the well is 1,831.00 feet below land surface.
The depth of the hole is 1,873.00 feet below land surface.
This well is completed in the Northern Atlantic Coastal Plain aquifer system (S100NATLCP)
This well is completed in the PATUXENT FORMATION (217PTXN) local aquifer.

Water Quality Remark Code	Description
<	Less than.
>	Greater than.

E	Estimated.

Value Qualifier Code	Description
@	Holding time exceeded
c	See laboratory comment
d	Diluted sample: method hi range exceeded
n	Below the LRL and above the LT-MDL

Sample type	Project Code	Laboratory sample comment	Temperature, water, deg C -10	Temperature, air, deg C -20	Barometric pressure, mm Hg -25	Agency analyzing sample, code -28	Flow rate, instantaneous gal/min -59	Color, water, fltrd, Pt-Co units -80
9	445108900	NH4 & NH4+ORG-RR	16.0			80020		4
9	445108910	CATIONS DUP'ED	21.2	35.0	761	80020		
7	445110600		21.0	15.0	768	80020		
9	24829RC20	A-1860004 High chloride expected	21.6	29.6	751	80020	3.8	

) national aquifer.

Specif-ic conduc-tance, wat unf uS/cm 25 degC -95	Hydro-gen ion, water, unfltrd calcd, mg/L -191	Dis-solved oxygen, mg/L -300	Dis-solved oxygen, percent of sat-uration -301	pH, water, unfltrd field, std units -400	pH, water, unfltrd lab, std units -403	Carbon dioxide water, unfltrd mg/L -405	ANC, wat unf fixed end pt, field, mg/L as CaCO3 -410	Carbon-ate, wat flt infl pt titr., field, mg/L -452
> 8000	0.00016			6.8	6.7	35	113	
46600	0.00004	0.1	1	7.4	7.0	6.4		0.0
47600	0.00008	0.1	1	7.1	6.6	12		0.0
44000	0.00005	0.1	2	7.3	6.7			0.0

Bicar-bonate, wat flt infl pt titr., field, mg/L -453	Organic nitro-gen, water, unfltrd mg/L -605	Ammonia water, fltrd, mg/L as N -608	Ammonia + org-N, water, unfltrd mg/L as N -625	Nitrate + nitrite water fltrd, mg/L as N -631	Phos-phorus, water, unfltrd mg/L as P -665	Organic carbon, water, unfltrd mg/L -680	Hard-ness, water, mg/L as CaCO3 -900	Noncarb hard-ness, wat flt field, mg/L as CaCO3 -904
	5.4	3.50	8.9	< 0.100	0.02	0.7	3300	
142							3900	3800
116							4600	4500
E 109							4400	E 4300

Noncarb hard-ness, wat flt lab, mg/L as CaCO3 -905	Calcium water, fltrd, mg/L -915	Magnes-ium, water, fltrd, mg/L -925	Sodium, water, fltrd, mg/L -930	Sodium adsorp-tion ratio -931	Sodium frac-tion of cations percent -932	Potas-sium, water, fltrd, mg/L -935	Chlor-ide, water, fltrd, mg/L -940	Sulfate water, fltrd, mg/L -945
	960	230	8100	61	84	94.0	17000	580
	1000	350	2400	17	56	100	15000	630
	1080	470	9530	61	81	118	17200	586
4300	1010 d	448 d	8970 d	59	81	107 d	17600 d	578 d

Fluor-ide, water, fltrd, mg/L -950	Silica, water, fltrd, mg/L as SiO2 -955	Boron, water, fltrd, ug/L -1020	Iron, water, unfltrd recover-able, ug/L (01045)	Iron, water, fltrd, ug/L (01046)	Mangan-ese, water, unfltrd recover-able, ug/L (01055)	Mangan-ese, water, fltrd, ug/L (01056)	Zinc, water, fltrd, ug/L (01090)	Alum-inum, water, fltrd, ug/L (01106)
0.10	16.0	5200	15000	16000	3300	3400	420	< 50
1.7	14.0			17000		3300		
< 0.10	18.5			19000		3580		
E 0.07 n	19.3 d			18000 d		3050 d		

Alka-linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Depth to water level below LSD, meters (30210)	Alka-linity, wat flt fxd end field, mg/L as CaCO3 (39036)	Alka-linity, wat flt inf tit field, mg/L as CaCO3 (39086)	Residue on evap. at 180deg C wat flt mg/L (70300)	Residue water, fltrd, sum of consti-tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Ammonia water, fltrd, mg/L (71846)	Bromide water, fltrd, mg/L (71870)
	11.4			28600	27100	38.9	4.51	
			116	32100	19600	43.7		3.50
	24.5	91	95	30500	29100	41.5		62.2
76 @c	27.1		90	30900	E 28900	42.0		67.3 d

Altitude of land surface feet (72000)	Pump or flow period prior to sampling minutes (72004)	Sampling condition, code (72006)	Depth to top sample intrval feet below LSD (72015)	Depth to bot sample intrval feet below LSD (72016)	Depth to water level, feet below LSD (72019)	Sampling method, code (82398)	Sampler type, code (84164)	Specif. conductance, wat unf lab, uS/cm 25 degC (90095)
			1821.00	1831.00	37.28			40700
						8010	4040	43900
		8.00	1820.00	1830.00	80.42		4040	41900
15.0	816	8.00	1820.00	1830.00	88.90		4040	E 46900

ANC, wat unf fixed end pt, lab, mg/L as CaCO3 (90410)
88
83
78

Form GW-2
1978-10,000

COMMONWEALTH OF VIRGINIA
WATER WELL COMPLETION REPORT

• BWCM No. 234-192

(Certification of Completion/County Permit)

State Water Control Board
P. O. Box 11143
2111 North Hamilton St.
Richmond, Va. 23230

SWCB Permit
County Permit
Certification of inspecting official:
This well does ____ does not ____
meet code/low requirements.
S.
Date
For Office Use

County/City Chesapeake

County/City Stamp

• Virginia Plane Coordinates
N
E
Latitude & Longitude
36° 42' 27" N
76° 07' 47" W
• Topo. Map No. 2B
• Elevation 15 ft.
• Formation KMP
• Lithology SD
• River Basin 5
• Province 1
• Type Logs E
• Cuttings No
• Water Analysis Yes
• Aquifer Test NO

• Owner Observation Well # 91-F
• Well Designation or Number
Address
Phone
• Drilling Contractor SWCB - Creason
Address
Phone

Tax Map I.D. No.
Subdivision
Section
Block
Lot
Class Well I ____, IIA ____, IIB ____, IIIA ____, IIIB ____, IIIC ____, IIID ____, IIIE ____

Fentress [Observation Well # 91-F]
WELL LOCATION: ____ (feet/miles ____ direction) of ____
and ____ feet/miles ____ (direction) of ____
(If possible please include map showing location marked)

Date started 5-23-88 • Date completed 7-26-88 Type rig Mud Rotary

1. WELL DATA: New X Reworked ____ Deepened ____
• Total depth 1390' ft.
• Depth to bedrock ____ ft.
• Hole size (Also include reamed zones)
• 3.5 inches from 0 to 1124' ft.
• 7.25 inches from 0 to 1290' ft.
• 3.5 inches from 1290' to 1390' ft.
• Casing size (I.D.) and material
• 4 inches from 0 to 1290' ft.
Material Black Steel
Wt. per foot ____ or wall thickness .237 in.
• 2 inches from 1274' to 1370' ft
Material Black Steel
Wt. per foot ____ or wall thickness ____ in.
• 2 inches from 1380' to 1390' ft.
Material ____
Wt. per foot ____ or wall thickness ____ in
• Screen size and mesh for each zone (where applicable)
• 2 inches from 1370' to 1380' ft.
• Mesh size ____ Type ____
• ____ inches from ____ to ____ ft.
• Mesh size ____ Type ____
• ____ inches from ____ to ____ ft.
• Mesh size ____ Type ____
• ____ inches from ____ to ____ ft.
• Mesh size ____ Type ____
• Gravel pack
• From ____ to ____ ft.
• From ____ to ____ ft.
• Grout
• From 0 to 1290' ft., Type Benseal/EZ Mud
• From ____ to ____ ft., Type ____

2. WATER DATA • Water temperature 60.8 °F
• Static water level (Unpumped level measured) 56.72 TOC ft
• Stabilized measured pumping water level Approx. 100 ft
• Stabilized yield 9.4 gpm after 4.5 hours
Natural Flow: Yes ____ No X, flow rate ____ gpm
Comment on quality Salty Hydrogen Sulfide Odor

3. WATER ZONES: From ____ To ____
From ____ To ____ From ____ To ____
From ____ To ____ From ____ To ____

4. USE DATA:
Type of use: Drinking ____, Livestock Watering ____,
Irrigation ____, Food processing ____, Household ____
Manufacturing ____, Fire safety ____, Cleaning ____,
Recreation ____, Aesthetic ____, Cooling or heating ____,
Injection ____, Other Observation
• Type of facility: Domestic ____, Public water supply ____
Public institution ____, Farm ____, Industry ____
Commercial ____, Other Observation

5. PUMP DATA: Type ____ • Rated H.P ____
• Intake depth ____ • Capacity ____ at ____ head

6. WELLHEAD: Type well seal ____
Pressure tank ____ gal., Loc. ____
Sample tap ____, Measurement port ____
Well vent ____, Pressure relief valve ____
Gate valve ____, Check valve (when required) ____
Electrical disconnect switch on power supply ____

7. DISINFECTION: Well disinfected ____ yes ____ no
Date ____, Disinfectant used ____
Amount ____, Hours used ____

8. ABANDONMENT (where applicable) • yes ____ no ____
Casing pulled yes ____ no ____ not applicable ____
Plugging grout From ____ to ____ material ____

OVER

Sample Datetime	Time datum	Time datum reliability code	Sample Medium Code	Agency Collecting Sample, Code	Analysis Source	Hydro-logic Event	Hydro-logic Condition	Geo-logic unit
1989-03-	EST	T	WG	USGS-WRD	9	9	A	
1993-07-	EDT	T	WG	USGS-WRD	9	9	A	
1997-04-	EDT	T	WG	USGS-WRD	9	9	A	217PPSC
2006-06-	EDT	K	WG	USGS-WRD	9	9	A	217PPSC

USGS 364227076074707 61B 13 SOW 091F

Chesapeake City, Virginia
Hydrologic Unit Code 03010205
Latitude 36°42'27", Longitude 76°07'47" NAD27
Land-surface elevation 15.00 feet above sea level NGVD29
The depth of the well is 1,390.00 feet below land surface.
The depth of the hole is 1,390.00 feet below land surface.
This well is completed in the Northern Atlantic Coastal Plain aquifer system (S100NATLCP)
This well is completed in the PATAPSCO FORMATION (217PPSC) local aquifer.

Water Quality Remark Code	Description
<	Less than.
E	Estimated.

M	Presence verified but not quantified.

Value Qualifier Code	Description
@	Holding time exceeded
c	See laboratory comment
d	Diluted sample: method hi range exceeded

Sample type	Project Code	Laboratory sample comment	Temperature, water, deg C -10	Temperature, air, deg C -20	Barometric pressure, mm Hg -25	Agency analyzing sample, code -28	Flow rate, instantaneous gal/min -59	Color, water, fltrd, Pt-Co units -80
9	445108900	NH4 & NH4+ORG-RR	16.0			80020		10
9	445108910		21.0	33.0	765	80020		
9	445110600		20.0	12.0		80020		
9	24829RC20		21.0	30.0	765	80020	2.9	

) national aquifer.

Specif-ic conduc-tance, wat unf uS/cm 25 degC -95	Hydro-gen ion, water, unfltrd calcd, mg/L -191	Dis-solved oxygen, mg/L -300	Dis-solved oxygen, percent of sat-uration -301	pH, water, unfltrd field, std units -400	pH, water, unfltrd lab, std units -403	Carbon dioxide water, unfltrd mg/L -405	ANC, wat unf fixed end pt, field, mg/L as CaCO3 -410	Carbon-ate, wat flt infl pt titr., field, mg/L -452
9000	0.00006			7.2	7.4	30	242	
15500	0.00003	0.1	1	7.6	7.5	13		0.0
15500	0.00005	0.7		7.3	7.6	24		0.0
14200	0.00002	0.1	0.0	7.6	7.7			E 0.0

Bicar-bonate, wat flt infl pt titr., field, mg/L -453	Organic nitro-gen, water, unfltrd mg/L -605	Ammonia water, fltrd, mg/L as N -608	Ammonia + org-N, water, unfltrd mg/L as N -625	Nitrate + nitrite water fltrd, mg/L as N -631	Phos-phorus, water, unfltrd mg/L as P -665	Organic carbon, water, unfltrd mg/L -680	Hard-ness, water, mg/L as CaCO3 -900	Noncarb hard-ness, wat flt field, mg/L as CaCO3 -904
	0.10	5.00	5.1	< 0.100	0.02	0.3	570	
313							560	300
351							560	270
E 293							520	E 280

Noncarb hard-ness, wat flt lab, mg/L as CaCO3 -905	Calcium water, fltrd, mg/L -915	Magnes-ium, water, fltrd, mg/L -925	Sodium, water, fltrd, mg/L -930	Sodium adsorp-tion ratio -931	Sodium frac-tion of cations percent -932	Potas-sium, water, fltrd, mg/L -935	Chlor-ide, water, fltrd, mg/L -940	Sulfate water, fltrd, mg/L -945
	120	65.0	3000	55	91	43.0	5000	280
	120	63.0	3000	55	91	44.0	4600	290
	122	61.2	3110	57	92	54.4	5060	279
280	113 d	58.6 d	2740 d	52	91	48.6 d	4850 d	263 d

Fluor-ide, water, fltrd, mg/L -950	Silica, water, fltrd, mg/L as SiO2 -955	Boron, water, fltrd, ug/L -1020	Iron, water, unfltrd recover-able, ug/L (01045)	Iron, water, fltrd, ug/L (01046)	Mangan-ese, water, unfltrd recover-able, ug/L (01055)	Mangan-ese, water, fltrd, ug/L (01056)	Zinc, water, fltrd, ug/L (01090)	Alum-inum, water, fltrd, ug/L (01106)
0.40	13.0	5200	3900	3800	280	220	20	< 20
0.9	12.0			3200		200		
0.45	13.7			3870		240		
0.43	13.1 d			4070 d		244 d		

Alka-linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Depth to water level below LSD, meters (30210)	Alka-linity, wat flt fxd end field, mg/L as CaCO3 (39036)	Alka-linity, wat flt inf tit field, mg/L as CaCO3 (39086)	Residue on evap. at 180deg C wat flt mg/L (70300)	Residue water, fltrd, sum of consti-tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Ammonia water, fltrd, mg/L (71846)	Bromide water, fltrd, mg/L (71870)
	17.0			8900	8680	12.1	6.44	
			256	9090	8290	12.4		3.70
		280	282	8720	8900	11.9		18.3
249 @c	23.7		241	8830	E 8260	12.0		18.9 d

Altitude of land surface feet (72000)	Pump or flow period prior to sampling, minutes (72004)	Sampling condition, code (72006)	Depth to top sample intrval feet below LSD (72015)	Depth to bot sample intrval feet below LSD (72016)	Depth to water level, feet below LSD (72019)	Sampling method, code (82398)	Sampler type, code (84164)	Specif. conductance, wat unf lab, uS/cm 25 degC (90095)
			1370.00	1380.00	55.62			14800
						8010	4040	15000
			1370.00	1380.00			4040	15200
15.0	475	8.00	1370.00	1380.00	77.88		4040	E 10600

ANC, wat unf fixed end pt, lab, mg/L as CaCO3 (90410)	Sulfide water, unfltrd field, mg/L (99119)
246	
247	
250	
	M

Form GW-2
1978-10,000

COMMONWEALTH OF VIRGINIA
WATER WELL COMPLETION REPORT

• BWCM No. 234-193

(Certification of Completion/County Permit)

State Water Control Board
P.O. Box 11143
2111 North Hamilton St.
Richmond, Va. 23230

SWCB Permit
County Permit
Certification of inspecting official:
This well does ____ does not ____
meet code/low requirements.
S.
Date
For Office Use

County/City Chesapeake

County/City Stamp

• Virginia Plane Coordinates
N
E
Latitude & Longitude
36° 42' 27" N
76° 07' 47" W
• Topo. Map No. 2B
• Elevation 15 ft.
• Formation KUP
• Lithology SD
• River Basin 5
• Province 1
• Type Logs E
• Cuttings No
• Water Analysis Yes
• Aquifer Test No

• Owner Observation Well # 91-G
• Well Designation or Number Fentress
Address
Phone
• Drilling Contractor SWCB - Creason
Address
Phone

Tax Map I.D. No.
Subdivision
Section
Block
Lot
Class Well I ____, IIA ____, IIB ____, IIIA ____, IIIB ____, IIIC ____, IIID ____, IIIE ____

Fentress [Observation Well # 91-G]
WELL LOCATION: ____ (feet/miles ____ direction) of ____
and ____ feet/miles ____ (direction) of ____
(If possible please include map showing location marked)

Date started 7-28-88 • Date completed 8-15-88 Type rig Mud Rotary

1. WELL DATA: New X Reworked ____ Deepened ____
• Total depth 1113' ft.
• Depth to bedrock ____ ft.
Hole size (Also include reamed zones)
• 12 inches from 0 to 25' ft.
• 6.75 inches from 0 to 1000' ft.
• 3.5 inches from 1000' to 1113' ft.
• Casing size (I.D.) and material
• 4 inches from 0 to 1000' ft.
Material Black Steel
Wt. per foot ____ or wall thickness .237 in.
• 2 inches from 987' to 1093' ft
Material Black Steel
Wt. per foot ____ or wall thickness ____ in.
• 2 inches from 1103' to 1113' ft.
Material Black Steel
Wt. per foot ____ or wall thickness ____ in.
• Screen size and mesh for each zone (where applicable)
• 2 inches from 1093' to 1103' ft.
• Mesh size .020 Type SS Pipe Base
• ____ inches from ____ to ____ ft.
• Mesh size ____ Type ____
• ____ inches from ____ to ____ ft.
• Mesh size ____ Type ____
• ____ inches from ____ to ____ ft.
• Mesh size ____ Type ____
• Gravel pack
• From ____ to ____ ft.
• From ____ to ____ ft
• Grout
• From 0 to 1000' ft., Type Aqua-Gel Goldseal
• From ____ to ____ ft., Type ____

2. WATER DATA • Water temperature 64.4 °F
• Static water level (unpumped level measured) 52.22 TOC ft
• Stabilized measured pumping water level Approx. 100' ft
• Stabilized yield 10 gpm after 3.5 hours
Natural Flow: Yes ____ No X, flow rate ____ gpm
Comment on quality Salty Hydrogen Sulfide Odor

3. WATER ZONES: From ____ To ____
From ____ To ____ From ____ To ____
From ____ To ____ From ____ To ____

4. USE DATA:
Type of use Drinking ____, Livestock Watering ____,
Irrigation ____, Food processing ____, Household ____
Manufacturing ____, Fire safety ____, Cleaning ____,
Recreation ____, Aesthetic ____ Cooling or heating ____,
Injection ____, Other Observation
• Type of facility Domestic ____, Public water supply ____,
Public institution ____, Farm ____, Industry ____,
Commercial ____, Other Observation

5. PUMP DATA: Type ____ • Rated H.P. ____
• Intake depth ____ • Capacity ____ at ____ head

6. WELLHEAD: Type well seal ____
Pressure tank ____ gal., Loc. ____
Sample tap ____, Measurement port ____
Well vent ____, Pressure relief valve ____
Gate valve ____, Check valve (when required) ____
Electrical disconnect switch on power supply ____

7. DISINFECTION: Well disinfected ____ yes ____ no
Date ____, Disinfectant used ____
Amount ____, Hours used ____

8. ABANDONMENT (where applicable) • yes ____ no ____
Casing pulled yes ____ no ____ not applicable ____
Plugging grout From ____ to ____ material ____

OVER

Sample Datetime	Time datum	Time datum reliability code	Sample Medium Code	Agency Collecting Sample, Code	Analysis Source	Hydro-logic Event	Hydro-logic Condition	Geo-logic unit
1989-03-	EST	T	WG	USGS-WRD	9	9	A	
1993-07-	EDT	T	WG	USGS-WRD	9	9	A	
1997-04-	EDT	T	WG	USGS-WRD	9	9	A	211CRCSU
2006-06-	EDT	K	WG	USGS-WRD	9	9	A	211CRCSU

USGS 364227076074708 61B 14 SOW 091G

Chesapeake City, Virginia
Hydrologic Unit Code 03010205
Latitude 36°42'27", Longitude 76°07'47" NAD27
Land-surface elevation 15.00 feet above sea level NGVD29
The depth of the well is 1,113.00 feet below land surface.
The depth of the hole is 1,113.00 feet below land surface.
This well is completed in the Northern Atlantic Coastal Plain aquifer system (S100NATLCP)
This well is completed in the UPPER CRETACEOUS SERIES (211CRCSU) local aquifer.

Water Quality Remark Code	Description
<	Less than.
E	Estimated.

M	Presence verified but not quantified.

Value Qualifier Code	Description
@	Holding time exceeded
c	See laboratory comment
d	Diluted sample: method hi range exceeded

Sample type	Project Code	Laboratory sample comment	Temperature, water, deg C (00010)	Temperature, air, deg C (00020)	Barometric pressure, mm Hg (00025)	Agency analyzing sample, code (00028)	Flow rate, instantaneous gal/min (00059)	Color, water, fltrd, Pt-Co units (00080)
9	445108900	NH4 & NH4+ORG-RR	18.0			80020		22
9	445108910	BOTTLES OK	20.4	32.0	765	80020		
7	445110600		19.9	12.0	757	80020		
9	24829RC20		20.6	32.0	763	80020	3.0	

) national aquifer.

Specif-ic conduc-tance, wat unf uS/cm 25 degC (00095)	Hydro-gen ion, water, unfltrd calcd, mg/L (00191)	Dis-solved oxygen, mg/L (00300)	Dis-solved oxygen, percent of sat-uration (00301)	pH, water, unfltrd field, std units (00400)	pH, water, unfltrd lab, std units (00403)	Carbon dioxide water, unfltrd mg/L (00405)	ANC, wat unf fixed end pt, field, mg/L as CaCO3 (00410)	Carbon-ate, wat flt infl pt titr., field, mg/L (00452)
6000	0.00002			7.7	7.9	17	429	
6010	0.00001	0.1	1	8.0	8.0	8.5		0.0
6080	0.00001			8.1	8.0	6.8		0.0
5140	0.00001	0.1	0.0	8.0	8.1			E 2

Bicar-bonate, wat flt infl pt titr., field, mg/L (00453)	Ammonia water, fltrd, mg/L as N (00608)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Nitrate + nitrite water fltrd, mg/L as N (00631)	Phos-phorus, water, unfltrd mg/L as P (00665)	Organic carbon, water, unfltrd mg/L (00680)	Hard-ness, water, mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes-ium, water, fltrd, mg/L (00925)
	2.80	2.8	< 0.100	0.03	0.1	110	21.0	13.0
547						73	14.0	9.20
582						89	17.7	10.9
E 536						85	16.8 d	10.3 d

Sodium, water, fltrd, mg/L (00930)	Sodium adsorp-tion ratio (00931)	Sodium frac-tion of cations percent (00932)	Potas-sium, water, fltrd, mg/L (00935)	Chlor-ide, water, fltrd, mg/L (00940)	Sulfate water, fltrd, mg/L (00945)	Fluor-ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L as SiO2 (00955)	Boron, water, fltrd, ug/L (01020)
1200	51	95	23.0	1600	130	1.40	13.0	3500
1100	56	96	27.0	1400	120	1.5	10.0	
1210	56	96	25.2	1640	122	1.42	12.6	
1160 d	55	96	25.3 d	1370 d	99.4 d	1.30	11.7 d	

Iron, water, unfltrd recover -able, ug/L (01045)	Iron, water, fltrd, ug/L (01046)	Mangan-ese, water, unfltrd recover -able, ug/L (01055)	Mangan-ese, water, fltrd, ug/L (01056)	Zinc, water, fltrd, ug/L (01090)	Alum-inum, water, fltrd, ug/L (01106)	Alka-linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Depth to water level below LSD, meters (30210)	Alka-linity, wat flt fxd end field, mg/L as CaCO3 (39036)
800	650	40	40	< 10	< 10		15.6	
	410		35.0					
	658		51.8					480
	922 d		66.7 d			378 @c	22.4	

Alka-linity, wat flt inf tit field, mg/L as CaCO3 (39086)	Residue on evap. at 180deg C wat flt mg/L (70300)	Residue water, fltrd, sum of consti-tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Ammonia water, fltrd, mg/L (71846)	Bromide water, fltrd, mg/L (71870)	Alti-tude of land surface feet (72000)	Pump or flow period prior to sam-pling, minutes (72004)	Sam-pling condi-tion, code (72006)
	3310	3270	4.50	3.61				
448	3340	2950	4.54		2.30			
477	3260	3330	4.43		6.01			
443	2870	E 2960	3.90		5.18 d	15.0	640	8.00

Depth to top sample intrval feet below LSD (72015)	Depth to bot sample intrval feet below LSD (72016)	Depth to water level, feet below LSD (72019)	Sam-pling method, code (82398)	Sampler type, code (84164)	Specif. conduc-tance, wat unf lab, uS/cm 25 degC (90095)	ANC, wat unf fixed end pt, lab, mg/L as CaCO3 (90410)	Sulfide water, unfltrd field, mg/L (99119)
1093.00	1103.00	51.32			5880	442	
			8010	4040	5890	442	
1090.00	1100.00			4040	5980	444	
1090.00	1100.00	73.42		4040	5260		M

Form GW-2
1978-10,000

COMMONWEALTH OF VIRGINIA
WATER WELL COMPLETION REPORT

BWCM No. 234-194

(Certification of Completion/County Permit)

State Water Control Board
P. O. Box 11143
701 North Hamilton St.
Richmond, Va. 23230

SWCB Permit
County Permit
Certification of inspecting official:
This well does ____ does not ____
meet code/low requirements.
S. ____
Date ____
For Office Use

County/City Chesapeake

County/City Stamp

Virginia Plane Coordinates
N
E
Latitude & Longitude
36° 42' 27" N
76° 07' 47" W
Topo Map No. 2B
Elevation 15 ft.
Formation KVB
Lithology SD
River Basin 5
Province 1
Type Logs E
Cuttings No
Water Analysis Yes
Aquifer Test No

Owner Observation Well # 91-H
Well Designation or Number Fentress
Address
Phone
Drilling Contractor SWCB - Creason
Address
Phone
Fentress [Observation Well # 91-H]
WELL LOCATION: ____ (feet/miles ____ direction) of ____
and ____ feet/miles ____ (direction) of ____
(If possible please include map showing location marked)

Tax Map I.D. No.
Subdivision
Section
Block
Lot
Class Well I ____, IIA ____, IIB ____, IIIA ____, IIIB ____, IIIC ____, IIID ____, IIIE ____

Date started 8-21-88 Date completed 8-25-88 Type rig Mud Rotary

1. WELL DATA: New X Reworked ____ Deepened ____
Total depth 790' ft.
Depth to bedrock ____ ft.
Hole size (Also include reamed zones)
12 inches from 0 to 25' ft.
6.75 inches from 25' to 700' ft.
3.5 inches from 700' to 790' ft.
Casing size (I.D.) and material
4 inches from 0 to 700' ft.
Material Black Steel
Wt. per foot ____ or wall thickness .237 in.
2 inches from 674' to 759' ft
Material Black Steel
Wt. per foot ____ or wall thickness ____ in.
2 inches from 769' to 790' ft.
Material ____
Wt. per foot ____ or wall thickness ____ in.
Screen size and mesh for each zone (where applicable)
2 inches from 759' to 769' ft.
Mesh size .020 Type SS Wire Wrapped
____ inches from ____ to ____ ft.
Mesh size ____ Type ____
____ inches from ____ to ____ ft
Mesh size ____ Type ____
____ inches from ____ to ____ ft
Mesh size ____ Type ____
Gravel pack
From ____ to ____ ft.
From ____ to ____ ft.
Grout
From 0 to 700 ft., Type Aqua-Gel Goldseal
From ____ to ____ ft., Type ____

2. WATER DATA Water temperature 61.7 °F
Static water level (unpumped level measured) Flowing ft
Stabilized measured pumping water level Approx. 160 ft
Stabilized yield 7.5 gpm after 3.5 hours
Natural Flow: Yes X No ____, flow rate Less Than 1 gpm
Comment on quality Salty Hydrogen Sulfide Odor

3. WATER ZONES: From ____ To ____
From ____ To ____ From ____ To ____
From ____ To ____ From ____ To ____

4. USE DATA:
Type of use Drinking ____, Livestock Watering ____,
Irrigation ____, Food processing ____, Household ____,
Manufacturing ____, Fire safety ____, Cleaning ____,
Recreation ____, Aesthetic ____, Cooling or heating ____,
Injection ____, Other Observation
Type of facility Domestic ____, Public water supply ____,
Public institution ____, Farm ____, Industry ____,
Commercial ____, Other Observation

5. PUMP DATA: Type ____ Rated H.P. ____
Intake depth ____ Capacity ____ at ____ head

6. WELLHEAD: Type well seal ____
Pressure tank ____ gal., Loc. ____
Sample tap ____, Measurement port ____
Well vent ____, Pressure relief valve ____
Gate valve ____, Check valve (when required) ____
Electrical disconnect switch on power supply ____

7. DISINFECTION: Well disinfected ____ yes ____ no
Date ____, Disinfectant used ____
Amount ____, Hours used ____

8. ABANDONMENT (where applicable) yes ____ no ____
Casing pulled yes ____ no ____ not applicable ____
Plugging grout From ____ to ____ material ____

OVER

Sample Datetime	Time datum	Time datum reliability code	Sample Medium Code	Agency Collecting Sample, Code	Analysis Source	Hydro-logic Event	Hydro-logic Condition	Geo-logic unit
1989-03-	EST	T	WG	USGS-WRD	9	9	A	
2001-03-	EST	T	WG	USGS-WRD	9	X	X	211CRAQU
2006-06-	EDT	K	WG	USGS-WRD	9	9	A	211CRAQU

USGS 364227076074709 61B 15 SOW 091H

Chesapeake City, Virginia
Hydrologic Unit Code 03010205
Latitude 36°42'27", Longitude 76°07'47" NAD27
Land-surface elevation 15.00 feet above sea level NGVD29
The depth of the well is 790.00 feet below land surface. PEE DEE Aquifer
The depth of the hole is 790.00 feet below land surface.
This well is completed in the Northern Atlantic Coastal Plain aquifer system (S100NATLCP
This well is completed in the UPPER CRETACEOUS AQUIFER SYSTEM (211CRAQU) local aq

Water Quality Remark Code	Description
<	Less than.
M	Presence verified but not quantified.

Value Qualifier Code	Description
@	Holding time exceeded
c	See laboratory comment
d	Diluted sample: method hi range exceeded

Sample type	Project Code	Laboratory sample comment	Temperature, water, deg C (00010)	Temperature, air, deg C (00020)	Barometric pressure, mm Hg (00025)	Agency analyzing sample, code (00028)	Flow rate, instantaneous gal/min (00059)	Color, water, fltrd, Pt-Co units (00080)
9	445108900	NH4 & NH4+ORG-RR	16.5			80020		25
9	445110600		20.8	23.4	744	80020	6.7	
9	24829RC20		18.9	23.1	751	80020	3.0	

) national aquifer.
uifer.

Specif-ic conduc-tance, wat unf uS/cm 25 degC (00095)	Hydro-gen ion, water, unfltrd calcd, mg/L (00191)	Dis-solved oxygen, mg/L (00300)	Dis-solved oxygen, percent of sat-uration (00301)	pH, water, unfltrd field, std units (00400)	pH, water, unfltrd lab, std units (00403)	Carbon dioxide water, unfltrd mg/L (00405)	ANC, wat unf fixed end pt, field, mg/L as CaCO3 (00410)	Carbon-ate, wat flt infl pt titr., field, mg/L (00452)
7000	0.00001			8.1	7.8	10	630	
7800	0.00002	0.0	0.0	7.8	7.9			< 1
7570	0.00001	0.1	0.0	7.9	8.0			4

Bicar-bonate, wat flt infl pt titr., field, mg/L (00453)	Ammonia water, fltrd, mg/L as N (00608)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Nitrate + nitrite water fltrd, mg/L as N (00631)	Phos-phorus, water, unfltrd mg/L as P (00665)	Organic carbon, water, unfltrd mg/L (00680)	Hard-ness, water, mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes-ium, water, fltrd, mg/L (00925)
	4.40	4.3	< 0.100	0.19	0.9	140	20.0	22.0
775						130	19.8	20.4
778						130	18.7 dc	20.2 dc

$$TDS = Ca^{2+} + Mg^{2+} + Na^{+} + K^{+} + Cl^{-} + SO_4^{2-}$$

$$= 18.7 + 20.2 + 1550 + 42.9 + 2140 + 159$$

$$= 3930.8 \text{ mg/L}$$

Sodium, water, fltrd, mg/L (00930)	Sodium adsorp-tion ratio (00931)	Sodium frac-tion of cations percent (00932)	Potas-sium, water, fltrd, mg/L (00935)	Chlor-ide, water, fltrd, mg/L (00940)	Sulfate water, fltrd, mg/L (00945)	Fluor-ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L as SiO2 (00955)	Boron, water, fltrd, ug/L (01020)
1700	62	95	39.0	2100	180	1.30	11.0	6100
1600	60	95	44.0	2150	156	1.47	9.94	
1550 dc	59	95	42.9 dc	2140 d	159 d	1.38	9.91 dc	

Iron, water, unfltrd recover -able, ug/L (01045)	Iron, water, fltrd, ug/L (01046)	Mangan-ese, water, unfltrd recover -able, ug/L (01055)	Mangan-ese, water, fltrd, ug/L (01056)	Zinc, water, fltrd, ug/L (01090)	Alum-inum, water, fltrd, ug/L (01106)	Alka-linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Depth to water level below LSD, meters (30210)	Alka-linity, wat flt inf tit field, mg/L as CaCO3 (39086)
4500	790	50	10	< 10	30			
	296		24.3			642	0.241	636
	547 dc		33.9 dc			638 @c	1.01	646

Residue on evap. at 180deg C wat flt mg/L (70300)	Residue water, fltrd, sum of consti-tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Ammonia water, fltrd, mg/L (71846)	Bromide water, fltrd, mg/L (71870)	Alti-tude of land surface feet (72000)	Pump or flow period prior to sam-pling, minutes (72004)	Sam-pling condi-tion, code (72006)	Depth to top sample intrval feet below LSD (72015)
4390	4460	5.97	5.67					759.00
4580	4390	6.23		7.82	15.0	200	8.00	759.00
4540	4340	6.18		8.01 d	15.0	499	8.00	759.00

Depth to bot sample intrval feet below LSD (72016)	Depth to water level, feet below LSD (72019)	Sampler type, code (84164)	Specif. conduc-tance, wat unf lab, uS/cm 25 degC (90095)	ANC, wat unf fixed end pt, lab, mg/L as CaCO3 (90410)	Sulfide water, unfltrd field, mg/L (99119)
769.00			7810	633	
769.00	0.79	4040	7760		
769.00	3.30	4040	7910		M

Form GW-2
1978-10,000

COMMONWEALTH OF VIRGINIA
WATER WELL COMPLETION REPORT

BWCM No. 234-195

(Certification of Completion/County Permit)

State Water Control Board
P.O. Box 11143
11 North Hamilton St.
Richmond, Va. 23230

SWCB Permit
County Permit
Certification of inspecting official:
This well does ____ does not ____
meet code/low requirements.
S.
Date
For Office Use

County/City Chesapeake

County/City Stamp

Virginia Plane Coordinates
N
E
Latitude & Longitude
36° 42' 27" N
76° 07' 47" W
Topo. Map No. 2B
Elevation 15 ft.
Formation TA
Lithology SD
River Basin 5
Province 1
Type Logs E
Cuttings No
Water Analysis Yes
Aquifer Test No

Owner Observation Well # 91-J
Well Designation or Number Fentress
Address
Phone
Drilling Contractor SWCB - Creason
Address
Phone

Tax Map I D No
Subdivision
Section
Block
Lot
Class Well I , IIA
IIB , IIIA , IIIB
IIIC , IIID , IIIE

Fentress [Observation Well # 91-J]
WELL LOCATION: ____ (feet/miles ____ direction) of ____
and ____ feet/miles ____ (direction) of ____
(If possible please include map showing location marked)

Date started 9-1-88 Date completed 9-14-88 Type rig Mud Rotary

1. WELL DATA: New X Reworked ____ Deepened ____
Total depth 690' ft.
Depth to bedrock ft
Hole size (Also include reamed zones)
7.25 inches from 0 to 602' ft.
3.5 inches from 602' to 690' ft.
inches from to ft
Casing size (I.D.) and material
4.5 inches from 0 to 602' ft.
Material PVC
Wt per foot or wall thickness in.
2 inches from 586' to 670' ft
Material Black Steel
Wt. per foot or wall thickness in.
2 inches from 680' to 690' ft
Material Black Steel
Wt. per foot or wall thickness in.
Screen size and mesh for each zone (where applicable)
2 inches from 670' to 680' ft.
Mesh size .010 Type SS Wire Wrapped
inches from to ft.
Mesh size Type
inches from to ft.
Mesh size Type
inches from to ft
Mesh size Type
Gravel pack
From to ft.
From to ft
Grout
From 0 to 602' ft., Type Aqua-Gel Goldseal
From to ft., Type

2. WATER DATA Water temperature 62.6 °F
Static water level (unpumped level measured) Flowing ft
Stabilized measured pumping water level 22.52 ft.
Stabilized yield 10 gpm after 2.5 hours
Natural Flow: Yes X No , flow rate Less Than 1 gpm
Comment on quality Salty, Hydrogen sulfide odor

3. WATER ZONES: From To
From To From To
From To From To

4. USE DATA:
Type of use Drinking , Livestock Watering
Irrigation , Food processing , Household
Manufacturing , Fire safety , Cleaning
Recreation , Aesthetic , Cooling or heating
Injection , Other Observation
Type of facility Domestic , Public water supply
Public institution , Farm , Industry
Commercial , Other Observation

5. PUMP DATA: Type Rated H.P.
Intake depth Capacity , at head

6. WELLHEAD: Type well seal
Pressure tank gal , Loc.
Sample tap , Measurement port
Well vent , Pressure relief valve
Gate valve , Check valve (when required)
Electrical disconnect switch on power supply

7. DISINFECTION: Well disinfected yes no
Date , Disinfectant used
Amount , Hours used

8. ABANDONMENT (where applicable) yes no
Casing pulled yes no not applicable
Plugging grout From to material

OVER

Sample Datetime	Time datum	Time datum reliability code	Sample Medium Code	Agency Collecting Sample, Code	Analysis Source	Hydro-logic Event	Hydro-logic Condition	Geo-logic unit
1989-03-	EST	T	WG	USGS-WRD	9	9	A	
1993-07-	EDT	T	WG	USGS-WRD	9	9	A	
1996-07-	EDT	T	WG	USGS-WRD	9	9	A	124EOCN
1998-04-	EDT	T	WG	USGS-WRD	9	9	A	124EOCN
2006-06-	EDT	K	WG	USGS-WRD	9	9	A	124EOCN

USGS 364227076074710 61B 16 SOW 091J

Chesapeake City, Virginia
Hydrologic Unit Code 03010205
Latitude 36°42'27", Longitude 76°07'47" NAD27
Land-surface elevation 15.00 feet above sea level NGVD29
The depth of the well is 690.00 feet below land surface.
The depth of the hole is 690.00 feet below land surface.
This well is completed in the Northern Atlantic Coastal Plain aquifer system (S100NATLCP)
This well is completed in the EOCENE SERIES (124EOCN) local aquifer.

Water Quality Remark Code	Description
<	Less than.
E	Estimated.

M	Presence verified but not quantified.

Value Qualifier Code	Description
@	Holding time exceeded
c	See laboratory comment
d	Diluted sample: method hi range exceeded

Sample type	Project Code	Laboratory sample comment	Temperature, water, deg C (00010)	Temperature, air, deg C (00020)	Barometric pressure, mm Hg (00025)	Agency analyzing sample, code (00028)	Flow rate, instantaneous gal/min (00059)	Color, water, fltrd, Pt-Co units (00080)
9	445108900	NH4 & NH4+ORG-RR	17.0			80020		7
9	445108910		20.6	30.0	762	80020		
9	445110600		21.0	35.0	761	80020	3.2	
9	445110600		21.0	21.0	765	80020		
9	24829RC20		20.9	25.5	751	80020	4.7	

) national aquifer.

Specif-ic conduc-tance, wat unf uS/cm 25 degC (00095)	Hydro-gen ion, water, unfltrd calcd, mg/L (00191)	Dis-solved oxygen, mg/L (00300)	Dis-solved oxygen, percent of sat-uration (00301)	pH, water, unfltrd field, std units (00400)	pH, water, unfltrd lab, std units (00403)	Carbon dioxide water, unfltrd mg/L (00405)	ANC, wat unf fixed end pt, field, mg/L as CaCO3 (00410)	Carbon-ate, wat flt infl pt titr., field, mg/L (00452)
8000	0.00004			7.4	7.6	55	716	
9700	0.00002	0.1	1	7.7	7.9	30		0.0
9620	0.00003	0.2	2	7.5	7.7	44		
9530	0.00003	0.0	0.0	7.5	7.6			0.0
8570	0.00003	M	0.0	7.5	7.8			E 2

Bicar-bonate, wat flt infl pt titr., field, mg/L (00453)	Organic nitro-gen, water, unfltrd mg/L (00605)	Ammonia water, fltrd, mg/L as N (00608)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Nitrate + nitrite water fltrd, mg/L as N (00631)	Phos-phorus, water, unfltrd mg/L as P (00665)	Organic carbon, water, unfltrd mg/L (00680)	Hard-ness, water, mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)
	0.20	5.00	5.2	< 0.100	0.02	1.5	210	31.0
890							190	19.0
653							200	24.0
787							210	28.4
E 865 @							170	21.6 d

Magnes-ium, water, fltrd, mg/L (00925)	Sodium, water, fltrd, mg/L (00930)	Sodium adsorp-tion ratio (00931)	Sodium frac-tion of cations percent (00932)	Potas-sium, water, fltrd, mg/L (00935)	Chlor-ide, water, fltrd, mg/L (00940)	Sulfate water, fltrd, mg/L (00945)	Fluor-ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L as SiO2 (00955)
33.0	1900	57	95	4.80	2600	180	1.30	18.0
34.0	2200	70	96	11.0	2700	21.0	1.3	17.0
34.0	1900	58	94	55.0	2700	160	1.40	19.0
33.8	1980	60	94	56.0	2500	157	1.17	16.9
29.2 d	1840 d	61	94	49.8 d	2590 d	149 d	1.34	17.0 d

$$TDS = Na^+ + K^+ + Ca^{2+} + Mg^{2+} + Cl^- + SO_4^{2-}$$

$$= 1840 + 49.8 + 21.6 + 29.2 + 2570 + 149$$

$$= 4679.6 \text{ mg/L}$$

Boron, water, fltrd, ug/L (01020)	Iron, water, unfltrd recover -able, ug/L (01045)	Iron, water, fltrd, ug/L (01046)	Mangan-ese, water, unfltrd recover -able, ug/L (01055)	Mangan-ese, water, fltrd, ug/L (01056)	Zinc, water, fltrd, ug/L (01090)	Alum-inum, water, fltrd, ug/L (01106)	Alka-linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Depth to water level below LSD, meters (30210)
6000	740	430	10	< 10	10	< 10		
		100		10				
		210		8.0				
		278		43.7				0.000
		307 d		5.6 d			712 @c	1.10

500
WHO

Alka-linity, wat flt fxd end field, mg/L as CaCO3 (39036)	Alka-linity, wat flt inf tit field, mg/L as CaCO3 (39086)	Residue on evap. at 180deg C wat flt mg/L (70300)	Residue water, fltrd, sum of consti-tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Ammonia water, fltrd, mg/L (71846)	Bromide water, fltrd, mg/L (71870)	Alti-tude of land surface feet (72000)	Pump or flow period prior to sam-pling, minutes (72004)
		5160	5210	7.02	6.44			
	729	5350	5450	7.28		5.20		
	535	5300	5220	7.21		9.70	15.0	
640	643	5010	5180	6.81		9.37		
	713	5350	E 5140	7.28		9.71 d	15.0	308

Sam-pling condi-tion, code (72006)	Depth to top sample intrval feet below LSD (72015)	Depth to bot sample intrval feet below LSD (72016)	Depth to water level, feet below LSD (72019)	Sam-pling method, code (82398)	Sampler type, code (84164)	Specif. conduc-tance, wat unf lab, uS/cm 25 degC (90095)	ANC, wat unf fixed end pt, lab, mg/L as CaCO3 (90410)	Sulfide water, unfltrd field, mg/L (99119)
	670.00	680.00				9190	727	
				8010	4040	9460	719	
	670.00	680.00			4040	9300	725	
8.00	670.00	680.00	0.00		4040	9190		
8.00	670.00	680.00	3.60		4040	9300		M

Form GW-2
1978-10,000

COMMONWEALTH OF VIRGINIA
WATER WELL COMPLETION REPORT

BWCM No. 234-196

(Certification of Completion/County Permit)

State Water Control Board
P.O. Box 11143
811 North Hamilton St.
Richmond, Va. 23230

SWCB Permit
County Permit
Certification of inspecting official:
This well does ____ does not ____
meet code/low requirements.
S.
Date
For Office Use

County/City Chesapeake

County/City Stamp

Virginia Plane Coordinates
N
E
Latitude & Longitude
36° 42' 27" N
76° 07' 47" W
Topo. Map No. 2B
Elevation 15 ft.
Formation TY
Lithology SD
River Basin 5
Province 1
Type Logs E
Cuttings No
Water Analysis Yes
Aquifer Test No

Owner Observation Well # 91-K
Well Designation or Number Fentress
Address
Phone
Drilling Contractor SWCB - Creason
Address
Phone

Tax Map I.D. No.
Subdivision
Section
Block
Lot
Class Well I , IIA
IIB , IIIA , IIIB
IIIC , IIID , IIIE

Fentress [Observation Well # 91-K]
WELL LOCATION: ____ (feet/miles ____ direction) of ____
and ____ feet/miles ____ (direction) of ____
(If possible please include map showing location marked)

Date started 9-15-88 Date completed 9-19-88 Type rig Mud Rotary

1. WELL DATA: New X Reworked ____ Deepened ____
Total depth 108' ft.
Depth to bedrock ____ ft.
Hole size (Also include reamed zones)
7.25 inches from 0 to 80' ft.
3.5 inches from 80' to 108' ft.
____ inches from ____ to ____ ft.
Casing size (I.D.) and material
4.5 inches from 0 to 80' ft.
Material PVC
Wt. per foot ____ or wall thickness ____ in.
2 inches from 78' to 88' ft.
Material Black Steel
Wt. per foot ____ or wall thickness ____ in.
2 inches from 98' to 108' ft.
Material Black Steel
Wt. per foot ____ or wall thickness ____ in.
Screen size and mesh for each zone (where applicable)
2 inches from 88' to 98' ft
Mesh size .010 Type PVC
____ inches from ____ to ____ ft.
Mesh size ____ Type ____
____ inches from ____ to ____ ft.
Mesh size ____ Type ____
____ inches from ____ to ____ ft
Mesh size ____ Type ____
Gravel pack
From ____ to ____ ft.
From ____ to ____ ft
Grout
From 0 to 80' ft., Type Aqua-Gel Goldseal
From ____ to ____ ft., Type ____

2. WATER DATA Water temperature 59.9 °F
Static water level (unpumped level measured) 7.22 TOC ft
Stabilized measured pumping water level 32.15 TOC ft
Stabilized yield 10 gpm after 1 hours
Natural Flow. Yes ____ No X , flow rate ____ gpm
Comment on quality Hydrogen Sulfide Odor

3. WATER ZONES: From ____ To ____
From ____ To ____ From ____ To ____
From ____ To ____ From ____ To ____

4. USE DATA:
Type of use. Drinking ____ , Livestock Watering ____ ,
Irrigation ____ Food processing ____ , Household ____
Manufacturing ____ , Fire safety ____ , Cleaning ____ ,
Recreation ____ , Aesthetic ____ , Cooling or heating ____ ,
Injection ____ , Other Observation
Type of facility: Domestic ____ , Public water supply ____ ,
Public institution ____ , Farm ____ , Industry ____ ,
Commercial ____ , Other Observation

5. PUMP DATA: Type ____ Rated H.P. ____ ,
Intake depth ____ Capacity ____ at ____ head

6. WELLHEAD: Type well seal ____
Pressure tank ____ gal. Loc. ____
Sample tap ____ , Measurement port ____
Well vent ____ , Pressure relief valve ____
Gate valve ____ , Check valve (when required) ____
Electrical disconnect switch on power supply ____

7. DISINFECTION: Well disinfected ____ yes ____ no
Date ____ , Disinfectant used ____
Amount ____ , Hours used ____

8. ABANDONMENT (where applicable) yes ____ no ____
Casing pulled yes ____ no ____ not applicable ____
Plugging grout From ____ to ____ material ____

OVER

Sample Datetime	Time datum	Time datum reliability code	Sample Medium Code	Agency Collecting Sample, Code	Analysis Source	Hydro-logic Event	Hydro-logic Condition	Sample type
1989-03-	EST	T	WG	USGS-WRD	9	9	A	9

USGS 364227076074711 61B 17 SOW 091K

Chesapeake City, Virginia
Hydrologic Unit Code 03010205
Latitude 36°42'27", Longitude 76°07'47" NAD27
Land-surface elevation 15.00 feet above sea level NGVD29
The depth of the well is 108.00 feet below land surface.
The depth of the hole is 108.00 feet below land surface.
This well is completed in the Northern Atlantic Coastal Plain aquifer system (S100NATLCP
This well is completed in the UPPER CHESAPEAKE GROUP (121CSPKU) local aquifer.

Water Quality Remark Code	Description
<	Less than.

Project Code	Temperature, water, deg C (00010)	Agency analyzing sample, code (00028)	Color, water, fltrd, Pt-Co units (00080)	Specific conductance, wat unf uS/cm 25 degC (00095)	Hydrogen ion, water, unfltrd calcd, mg/L (00191)	pH, water, unfltrd field, std units (00400)	pH, water, unfltrd lab, std units (00403)	Carbon dioxide water, unfltrd mg/L (00405)
445108900	15.5	80020	17	1500	0.00005	7.3	7.7	27

) national aquifer.

ANC, wat unf fixed end pt, field, mg/L as CaCO3 (00410)	Organic nitro-gen, water, unfltrd mg/L (00605)	Ammonia water, fltrd, mg/L as N (00608)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Nitrate + nitrite water fltrd, mg/L as N (00631)	Phos-phorus, water, unfltrd mg/L as P (00665)	Organic carbon, water, unfltrd mg/L (00680)	Hard-ness, water, mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)
276	0.30	1.10	1.4	< 0.100	0.16	4.9	240	54.0

hard

$TDS = Ca^{2+} + Mg^{2+} + Na^{+} + K^{+} + Cl^{-} + SO_4^{2-}$

$TDS = 54 + 26 + 240 + 21 + 340 + 20$

$TDS = 701 \frac{mg}{L}$

Magnes-ium, water, fltrd, mg/L (00925)	Sodium, water, fltrd, mg/L (00930)	Sodium adsorp-tion ratio (00931)	Sodium frac-tion of cations percent (00932)	Potas-sium, water, fltrd, mg/L (00935)	Chlor-ide, water, fltrd, mg/L (00940)	Sulfate water, fltrd, mg/L (00945)	Fluor-ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L as SiO2 (00955)
26.0	240	6.7	66	21.0	340	20.0	0.20	36.0

250

20

Boron, water, fltrd, ug/L (01020)	Iron, water, unfltrd recover-able, ug/L (01045)	Iron, water, fltrd, ug/L (01046)	Mangan-ese, water, unfltrd recover-able, ug/L (01055)	Mangan-ese, water, fltrd, ug/L (01056)	Zinc, water, fltrd, ug/L (01090)	Alum-inum, water, fltrd, ug/L (01106)	Depth to water level below LSD, meters (30210)	Residue on evap. at 180deg C wat flt mg/L (70300)
320	1000	470	20	12.0	6	< 10	1.80	897

500
WHO

300
20

Residue water, fltrd, sum of consti-tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Ammonia water, fltrd, mg/L (71846)	Depth to top sample intrval feet below LSD (72015)	Depth to bot sample intrval feet below LSD (72016)	Depth to water level, feet below LSD (72019)	Specif. conduc-tance, wat unf lab, uS/cm 25 degC (90095)	ANC, wat unf fixed end pt, lab, mg/L as CaCO3 (90410)
905	1.22	1.42	88.00	98.00	5.92	1620	282

1620 μmho/cm

$$\Lambda_0 = \lambda_0^+ + \lambda_0^- = 50.1 + 76.3 = 126.4 \text{ mho-cm}^2/\text{eq.}$$

$$N \cong \frac{1000K}{\Lambda_0} = \frac{1000(1620 \times 10^{-6})}{126.4} = 1.28 \times 10^{-2} \text{ eq/L}$$

$$\text{NaCl concentration} = \left(1.28 \times 10^{-2} \frac{\text{eq.}}{\text{L}}\right)\left(58.5 \times 10^{3}\right) = 750 \frac{\text{mg}}{\text{L}}$$

$500 \frac{\text{mg}}{\text{L}}$

2^0

Form GW-2
1978-10,000

COMMONWEALTH OF VIRGINIA
WATER WELL COMPLETION REPORT

BWCM No. 234-197

(Certification of Completion/County Permit)

State Water Control Board
P. O. Box 11143
2111 North Hamilton St.
Richmond, Va. 23230

SWCB Permit
County Permit
Certification of inspecting official:
This well does ____ does not ____ meet code/low requirements.
S.
Date
For Office Use

County/City Chesapeake

County/City Stamp

Virginia Plane Coordinates
N
E
Latitude & Longitude
36° 42' 27" N
76° 07' 47" W
Topo. Map No. 2B
Elevation 15 ft.
Formation TY
Lithology SD
River Basin 5
Province 1
Type Logs E
Cuttings No
Water Analysis Yes
Aquifer Test No

Owner Observation Well # 91-L
Well Designation or Number Fentress
Address
Phone
Drilling Contractor SWCB - Creason
Address
Phone

Tax Map I.D. No.
Subdivision
Section
Block
Lot
Class Well I ____, IIA ____, IIB ____, IIIA ____, IIIB ____, IIIC ____, IIID ____, IIIE ____

Fentress [Observation Well # 91-L]

WELL LOCATION: ____ (feet/miles ____ direction) of ____
and ____ feet/miles ____ (direction) of ____
(If possible please include map showing location marked)

Date started 9-20-88 Date completed 9-20-88 Type rig Mud Rotary

1. WELL DATA: New X Reworked ____ Deepened ____

Total depth 67' ft.
Depth to bedrock ____ ft.
Hole size (Also include reamed zones)
7.25 inches from 0 to 40' ft.
3.5 inches from 40' to 67' ft.
____ inches from ____ to ____ ft.

Casing size (I.D.) and material
4.5 inches from 0 to 40' ft
Material PVC
Wt. per foot ____ or wall thickness ____ in.
2 inches from 37' to 57' ft.
Material PVC
Wt. per foot ____ or wall thickness ____ in.
____ inches from ____ to ____ ft.
Material ____
Wt. per foot ____ or wall thickness ____ in

Screen size and mesh for each zone (where applicable)
2 inches from 57' to 67' ft.
Mesh size ____ Type ____
____ inches from ____ to ____ ft
Mesh size ____ Type ____
____ inches from ____ to ____ ft
Mesh size ____ Type ____
____ inches from ____ to ____ ft
Mesh size ____ Type ____

Gravel pack
From ____ to ____ ft.
From ____ to ____ ft

Grout
From 0 to 40' ft., Type Benseal/EZ Mud
From ____ to ____ ft., Type ____

2. WATER DATA Water temperature 60.8 °F
Static water level (unpumped level-measured) 8.75 TOC ft
Stabilized measured pumping water level 9.33 TOC ft.
Stabilized yield 10 gpm after 0.5 hour
Natural Flow: Yes ____ No X, flow rate ____ gpm
Comment on quality Hydrogen Sulfide Odor

3. WATER ZONES: From ____ To ____
From ____ To ____ From ____ To ____
From ____ To ____ From ____ To ____

4. USE DATA:
Type of use: Drinking ____, Livestock Watering ____,
Irrigation ____, Food processing ____, Household ____,
Manufacturing ____, Fire safety ____, Cleaning ____,
Recreation ____, Aesthetic ____, Cooling or heating ____,
Injection ____, Other Observation
Type of facility Domestic ____, Public water supply ____,
Public institution ____, Farm ____, Industry ____,
Commercial ____, Other Observaton

5. PUMP DATA: Type ____ Rated H.P. ____
Intake depth ____ Capacity ____ at ____ head

6. WELLHEAD: Type well seal ____
Pressure tank ____ gal., Loc. ____
Sample tap ____, Measurement port ____
Well vent ____, Pressure relief valve ____
Gate valve ____, Check valve (when required) ____
Electrical disconnect switch on power supply ____

7. DISINFECTION: Well disinfected ____ yes ____ no
Date ____, Disinfectant used ____
Amount ____, Hours used ____

8. ABANDONMENT (where applicable) yes ____ no ____
Casing pulled yes ____ no ____ not applicable ____
Plugging grout From ____ to ____ material ____

OVER

Sample Datetime	Time datum	Time datum reliability code	Sample Medium Code	Agency Collecting Sample, Code	Analysis Source	Hydro-logic Event	Hydro-logic Condition	Sample type
1989-03-	EST	T	WG	USGS-WRD	9	9	A	9

USGS 364227076074712 61B 18 SOW 091L

Chesapeake City, Virginia
Hydrologic Unit Code 03010205
Latitude 36°42'27", Longitude 76°07'47" NAD27
Land-surface elevation 15.00 feet above sea level NGVD29
The depth of the well is 67.00 feet below land surface.
The depth of the hole is 67.00 feet below land surface.
This well is completed in the QUATERNARY SYSTEM (110QRNR) local aquifer.

Water Quality Remark Code	Description
<	Less than.

Project Code	Temper-ature, water, deg C -10	Agency ana-lyzing sample, code -28	Color, water, fltrd, Pt-Co units -80	Specif-ic conduc-tance, wat unf uS/cm 25 degC -95	Hydro-gen ion, water, unfltrd calcd, mg/L -191	pH, water, unfltrd field, std units -400	pH, water, unfltrd lab, std units -403	Carbon dioxide water, unfltrd mg/L -405
445108900	16.0	80020	95	300	0.00032	6.5	6.9	71

ANC, wat unf fixed end pt, field, mg/L as CaCO3 -410	Ammonia water, fltrd, mg/L as N -608	Ammonia + org-N, water, unfltrd mg/L as N -625	Nitrate + nitrite water fltrd, mg/L as N -631	Phos-phorus, water, unfltrd mg/L as P -665	Organic carbon, water, unfltrd mg/L -680	Hard-ness, water, mg/L as CaCO3 -900	Calcium water, fltrd, mg/L -915	Magnes-ium, water, fltrd, mg/L -925
116	0.320	0.20	< 0.100	0.68	1.8	87	27.0	4.80

Sodium, water, fltrd, mg/L -930	Sodium adsorp-tion ratio -931	Sodium frac-tion of cations percent -932	Potas-sium, water, fltrd, mg/L -935	Chlor-ide, water, fltrd, mg/L -940	Sulfate water, fltrd, mg/L -945	Fluor-ide, water, fltrd, mg/L -950	Silica, water, fltrd, mg/L as SiO2 -955	Boron, water, fltrd, ug/L -1020
21.0	1.0	33	3.30	18.0	11.0	0.20	44.0	50

Iron, water, unfltrd recover -able, ug/L (01045)	Iron, water, fltrd, ug/L (01046)	Mangan-ese, water, unfltrd recover -able, ug/L (01055)	Mangan-ese, water, fltrd, ug/L (01056)	Zinc, water, fltrd, ug/L (01090)	Alum-inum, water, fltrd, ug/L (01106)	Depth to water level below LSD, meters (30210)	Residue on evap. at 180deg C wat flt mg/L (70300)	Residue water, fltrd, sum of consti-tuents mg/L (70301)
5000	5940	140	152	92	20	2.04	191	206

Residue water, fltrd, tons/ acre-ft (70303)	Ammonia water, fltrd, mg/L (71846)	Depth to top sample intrval feet below LSD (72015)	Depth to bot sample intrval feet below LSD (72016)	Depth to water level, feet below LSD (72019)	Specif. conduc-tance, wat unf lab, uS/cm 25 degC (90095)	ANC, wat unf fixed end pt, lab, mg/L as CaCO3 (90410)
0.26	0.41	57.00	67.00	6.70	278	112

Form GW-2
1978-10,000

COMMONWEALTH OF VIRGINIA
WATER WELL COMPLETION REPORT

BWCM No 234-198

(Certification of Completion/County Permit)

State Water Control Board
O. Box 11143
11 North Hamilton St.
Richmond, Va. 23230

SWCB Permit
County Permit
Certification of inspecting official:
This well does ____ does not ____
meet code/low requirements.
S.
Date
For Office Use

County/City Chesapeake

County/City Stamp

Virginia Plane Coordinates
N
E
Latitude & Longitude
36° 42' 27" N
76° 07' 47" W
Topo. Map No. 2B
Elevation 15 ft.
Formation OPC
Lithology SD
River Basin 5
Province 1
Type Logs E
Cuttings NO
Water Analysis Yes
Aquifer Test NO

Owner Observation Well # 91-M
Well Designation or Number Fentress
Address
Phone
Drilling Contractor SWCB - Creason
Address
Phone
Fentress [Observation Well # 91 M]

Tax Map I.D. No.
Subdivision
Section
Block
Lot
Class Well I ____, IIA ____
IIB ____ IIIA ____, IIIB ____
IIIC ____ IIID ____ IIIE ____

WELL LOCATION: ____ (feet/miles ____ direction) of ____
and ____ feet/miles ____ (direction) of ____
(If possible please include map showing location marked)

Date started 9-21-88 Date completed 9-21-88 Type rig Mud Rotary

1. WELL DATA: New X Reworked ____ Deepened ____
Total depth 20' ft
Depth to bedrock ____ ft
Hole size (Also include reamed zones)
7.25 inches from 0 to 20' ft.
____ inches from ____ to ____ ft.
____ inches from ____ to ____ ft.
Casing size (I.D.) and material
4.5 inches from 0 to 10' ft.
Material PVC
Wt. per foot ____ or wall thickness ____ in.
____ inches from ____ to ____ ft
Material ____
Wt. per foot ____ or wall thickness ____ in.
____ inches from ____ to ____ ft
Material ____
Wt. per foot ____ or wall thickness ____ in
Screen size and mesh for each zone (where applicable)
4 inches from 10 to 20' ft.
Mesh size .010 Type Galv. Wire Wrapped
____ inches from ____ to ____ ft.
Mesh size ____ Type ____
____ inches from ____ to ____ ft.
Mesh size ____ Type ____
____ inches from ____ to ____ ft
Mesh size ____ Type ____
Gravel pack
From 0 to 20' ft.
From ____ to ____ ft
Grout
From 0 to 10' ft., Type Benseal/EZ Mud
From ____ to ____ ft., Type ____

2. WATER DATA Water temperature 57.2 °F
Static water level (unpumped level measured) 2.48 TOC ft
Stabilized measured pumping water level 8.0 TOC ft.
Stabilized yield 10 gpm after 1 hours
Natural Flow: Yes ____ No X, flow rate ____ gpm
Comment on quality Hydrogen Sulfide Odor

3. WATER ZONES: From ____ To ____
From ____ To ____ From ____ To ____
From ____ To ____ From ____ To ____

4. USE DATA:
Type of use: Drinking ____, Livestock Watering ____,
Irrigation ____, Food processing ____, Household ____
Manufacturing ____, Fire safety ____, Cleaning ____,
Recreation ____, Aesthetic ____, Cooling or heating ____,
Injection ____, Other Observation
Type of facility Domestic ____, Public water supply ____,
Public institution ____, Farm ____, Industry ____,
Commercial ____, Other Observation

5. PUMP DATA: Type ____ Rated H.P. ____
Intake depth ____ Capacity ____ at ____ head

6. WELLHEAD: Type well seal ____
Pressure tank ____ gal Loc. ____
Sample tap ____, Measurement port ____
Well vent ____, Pressure relief valve ____
Gate valve ____, Check valve (when required) ____
Electrical disconnect switch on power supply ____

7. DISINFECTION: Well disinfected ____ yes ____ no
Date ____, Disinfectant used ____
Amount ____, Hours used ____

8. ABANDONMENT (where applicable) yes ____ no ____
Casing pulled yes ____ no ____ not applicable ____
Plugging grout From ____ to ____ material ____

OVER

Fentress

RECORD NUMBER: 99403567 STATION NUMBER: 364227076074713 COLLECTED: 08-20-1994 AT: 1
STATION NAME: 61B 19 SOW 91-M COUNTY: 550
MEDIUM: 6 STATUS: 9 SOURCE: 9 HYD. CONDITION: 9 SAMPLE TYPE: 9 HYD.

	CODE	PARAMETER NAME	UNITS	VALUE	R	Q	M	P
	00010	WATER TEMPERATURE	(DEGREES)	19.5		I		3
	00020	AIR TEMPERATURE	DEGREES	28.0		I		3
	00025	AIR PRESSURE	(MM OF HG)	763		I		3
	00027	COLLECTING AGENCY	(CODE NUMBER)	1028		I		5
	00028	ANALYZING AGENCY	(CODE NUMBER)	80020		H		5
	00059	FLOW RATE INS. (G/M)	(GALLONS/MINUTE)	1.5		I		3
	00095	SPECIFIC CONDUCTANCE	US/CM @ 25C	326		I		3
	00300	OXYGEN DISSOLVED	(MG/L)	0.5		I		3
	00301	OXYGEN DIS. PERCENT	% OF SATURATION	5		I		3
	00400	PH, WH, FIELD	(STANDARD UNITS)	6.0		I		3
	00403	PH, WH, LABORATORY	(STANDARD UNITS)	6.7		H	A	2
	00419	ALKALINITY,WH,IT,F	(MG/L AS CACO3)	95		I		3
	00447	CARBONATE,WH,IT,F	(MG/L AS CO3)	0		I		3
	00450	BICARBONATE,WH,IT,F	(MG/L AS HCO3)	116		I		3
	00608	NITROGEN AMMONIA D.	(MG/L AS N)	0.130		H	B	3
	00613	NITROGEN,NITRITE D.	MG/L AS N	0.010	1	H	B	3
	00623	NITRO AMN & ORG DIS	(MG/L AS N)	0.20	1	H	C	2
	00631	NO2 + NO3 DISSOLVED	(MG/L AS N)	0.061		H	B	3
	00666	PHOSPHORUS DISS.	(MG/L AS P)	0.010		H	C	3
	00671	PHOSPHORUS ORTHO D.	(MG/L AS P)	0.010	1	H	B	3
	00681	CARBON ORGANIC DIS.	(MG/L AS C)	3.5		H	A	2
COMPUTED	00900	HARDNESS TOTAL	(MG/L AS CAO3)	43				
	00915	CALCIUM DISSOLVED	(MG/L AS CA)	7.0		H	D	2
	00925	MAGNESIUM DISSOLVED	(MG/L AS MG)	6.2		H	C	2
	00930	SODIUM DISSOLVED	(MG/L AS NA)	27		H	C	2
COMPUTED	00931	SODIUM ADSORPTION R.	(RATIO)	2				
COMPUTED	00932	SODIUM, PERCENT	PERCENT	57				
	00935	POTASSIUM DISSOLVED	(MG/L AS K)	1.4		H	B	2
	00940	CHLORIDE DISSOLVED	(MG/L AS CL)	24		H	J	2
	00945	SULFATE DISSOLVED	(MG/L AS SO4)	33		H	G	2
	00950	FLUORIDE DISSOLVED	(MG/L AS F)	0.10	1	H	B	2
	00955	SILICA DISSOLVED	(MG/L AS SIO2)	18		H	D	2
	01000	ARSENIC DISSOLVED	(UG/L AS AS)	8		H	B	1
	01005	BARIUM DISSOLVED	(UG/L AS BA)	71		H	G	2
	01010	BERYLLIUM DISSOLVED	(UG/L AS BE)	1	1	H	G	1
	01025	CADMIUM DISSOLVED	(UG/L AS CD)	1.0	1	H	G	2
	01030	CHROMIUM DISSOLVED	(UG/L AS CR)	6		H	G	1
	01035	COBALT DISSOLVED	(UG/L AS CO)	2		H	G	1
	01040	COPPER DISSOLVED	(UG/L AS CU)	1	1	H	G	1
	01046	IRON DISSOLVED	(UG/L AS FE)	30000		H	D	2

RECORD NUMBER: 99403567 -- CONTINUED

CODE	PARAMETER NAME	UNITS	VALUE	R	Q	M	P
01049	LEAD DISSOLVED	(UG/L AS PB)	1	1	H	G	1
01056	MANGANESE DISSOLVED	(UG/L AS MN)	440		H	G	2
01060	MOLYBDENUM DISSOLVED	(UG/L AS MO)	1	1	H	G	1
01065	NICKEL DISSOLVED	(UG/L AS NI)	1	1	H	G	1
01075	SILVER DISSOLVED	(UG/L AS AG)	1.0	1	H	G	2
01090	ZINC DISSOLVED	(UG/L AS ZN)	22		H	G	2
01095	ANTIMONY DISSOLVED	(UG/L AS SB)	1	1	H	G	1

01106	ALUMINUM DISSOLVED	(UG/L AS AL)	10		H	G	1
01145	SELENIUM DISSOLVED	(UG/L AS SE)	1	1	H	A	1
04024	PROPACHLOR DISS REC	(UG/L)	0.01	1	H	D	2
04028	BUTYLATE DISS REC	(UG/L)	0	1	H	D	3
04035	SIMAZINE DISS REC	(UG/L)	0	1	H	D	3
04037	PROMETON DISS REC	(UG/L)	0	1	H	D	3
04040	DEETHYL ATRAZINE D	(UG/L)	0	1	H	D	3
04041	CYANAZINE DISS REC	(UG/L)	0.01	1	H	D	2
04095	FONOFOX DISS REC	(UG/L)	0	1	H	D	3
22703	URANIUM,NATURAL,DIS	UG/L AS U	0.40	1	H	C	2
30217	DIBROMOMETHANE,W.W.R	UG/L	0.2	1	H	C	1
32101	DICHLOROBROMOMETHANE	UG/L	0.2	1	H	C	1
32102	CARBONTETRACHLORIDE	UG/L	0.2	1	H	C	1
32103	1,2-DICHLOROETHANE	UG/L	0.2	1	H	C	1
32104	BROMOFORM TOTAL	UG/L	0.2	1	H	C	1
32105	CHLORODIBROMOMETHANE	UG/L	0.2	1	H	C	1
32106	CHLOROFORM TOTAL	UG/L	0.2	1	H	C	1
34010	TOLUENE, TOTAL	UG/L	0.2	1	H	C	1
34030	BENZENE, TOTAL	UG/L	0.2	1	H	C	1
34253	ALPHA BHC	UG/L	0	1	H	D	3
34301	CHLOROBENZENE	(UG/L)	0.20	1	H	C	2
34311	CHLOROETHANE	UG/L	0.2	1	H	C	1
34371	ETHYLBENZENE TOTAL	(UG/L)	0.2	1	H	C	1
34413	METHYLBROMIDE TOTAL	(UG/L)	0.2	1	H	C	1
34418	METHYLCHLORIDE,TOT.	(UG/L)	0.4		H	C	1
34423	METHYLENECHLORIDE	(UG/L)	0.2	1	H	C	1
34475	TETRACHLOROETHYLENE	(UG/L)	3.2		H	C	2
34488	TRICH.FLUOR.METHANE	(UG/L)	0.2	1	H	C	1
34496	DICHLOROETHANE 1,1 T	(UG/L)	0.2	1	H	C	1
34501	DICHLOROETHYLENE T.	(UG/L)	0.2	1	H	C	1
34506	TRICHLOROETHANE T.	(UG/L)	0.2	1	H	C	1
34511	TRICHLOROETHANE T.	(UG/L)	0.2	1	H	C	1
34516	1122TETRACHLORO ETH	(UG/L)	0.2	1	H	C	1
34536	O-CHLORO-BENZENE U	(UG/L)	0.20	1	H	D	2

1

RECORD NUMBER: 99403567 -- CONTINUED

CODE	PARAMETER NAME	UNITS	VALUE	R	Q	M	P
34541	DICHLOROPROPANE TOT.	(UG/L)	0.2	1	H	C	1
34546	TRANSDICH.ETHENE T.	(UG/L)	0.2	1	H	C	1
34551	124TRICHLORO-BENZEN	(UG/L)	0.20	1	H	D	2
34566	13DICHLORO-BENZENE	(UG/L)	0.20	1	H	D	2
34571	14DICHLORO-BENZENE	(UG/L)	0.20	1	H	D	2
34653	P,P' DDE DISSOLVED	(UG/L)	0.01	1	H	D	2
34668	DICHL.DIFL.METHANE T	(UG/L)	0.2	1	H	C	1
34696	NAPHTHALENE TOTAL	(UG/L)	0.2	1	H	D	1
34699	TR1,3-DICHL.PROPENE	UG/L	0.2	1	H	C	1
34704	CIS1,3-DICHL.PROPENE	UG/L	0.2	1	H	C	1
38933	CHLORPYRIFOS, DISS	UG/L	0	1	H	D	3
39175	VINYLCHLORIDE	UG/L	0.2	1	H	C	1
39180	TRICHLOROETHYLENE	UG/L	0.2	1	H	C	1
39341	LINDANE DISSOLVED	UG/L	0.01	1	H	D	2
39381	DIELDRIN DISSOLVED	UG/L	0	1	H	D	3
39415	METOLACHLOR,WAT.DIS.	UG/L	0	1	H	D	3
39532	MALATHION DISSOLVED	UG/L	0.01	1	H	D	2
39542	PARATHION DISSOLVED	UG/L	0.02	1	H	D	2
39572	DIAZINON DISSOLVED	UG/L	0	1	H	D	3
39632	ATRAZINE, DISS, REC	UG/L	0.02	1	H	D	2
39702	HEXACHLOROBUTADIENE	UG/L	0.2	1	H	D	1
46342	ALACHLOR, DISS, REC.	UG/L	0	1	H	D	3
70300	RESIDUE DIS 180C	MG/L	163		H	A	3
COMPUTED 70301	DISSOLVED SOLIDS SUM	MG/L	205				

71870	BROMIDE DISSOLVED	MG/L AS BR	0.30		H	E	2
71999	SAMPLE PURPOSE	PURPOSE CODE	15.0		I		3
72000	ELEV.LSD(FT.AB.NGVD)	FT (NGVD)	15.0		I		3
72004	PUMP PERIOD (MIN))	MIN	24		I		3
72006	SAMPLING CONDITION	CODE NUMBER	8.00		I		3
72015	DEPTH TOP OF SAM.FT.	FT	10		I		3
72016	DPTH BOT. OF SAM.FT.	FT	20		I		3
72019	DEPTH BELOW LAND S.	FT	5.56		I		3
75990	URANIUM NAT PE DISS	UG/L	0		H	C	3
76000	RADIUM-228 PE DISS	PCI/L	0.4		H	C	1
77093	CIS1,2DICHL.ETHENE,T	UG/L	0.2	1	H	C	1
77128	STYRENE, TOTAL	UG/L	0.2	1	H	C	1
77168	1,1-DICHLOROPROPENE	UG/L	0.2	1	H	C	1
77170	2,2-DICHLOROPROPANE	UG/L	0.2	1	H	C	1
77173	1,3DICHLPROPANE W W	UG/L	0.2	1	H	C	1
77222	PSEUDOCUMENE UNF RE	(UG/L)	0.20	1	H	C	2
77223	ISOPROPYL-BENZENE W	(UG/L)	0.20	1	H	C	2

1

RECORD NUMBER: 99403567 -- CONTINUED

CODE	PARAMETER NAME	UNITS	VALUE	R	Q	M	P
77224	N-PROPYL-BENZENE U	(UG/L)	0.20	1	H	C	2
77226	MESITYLENE UNF REC	(UG/L)	0.20	1	H	C	2
77275	O-CHLOROTOLUENE T.	UG/L	0.2	1	H	C	1
77277	P-CHLORO-TOLUENE U	(UG/L)	0.20	1	H	C	2
77297	METHANE BROMOCHLORO	(UG/L)	0.20	1	H	C	2
77342	N-BUTYL-BENZENE U R	(UG/L)	0.20	1	H	C	2
77350	SEC-BUTYL-BENZENE U	(UG/L)	0.20	1	H	C	2
77353	TERT-BUTYL-BENZENE	(UG/L)	0.20	1	H	C	2
77356	P-ISOPROPYLTOLUENE	(UG/L)	0.20	1	H	C	2
77443	123TRICHLPROPANE,TO	UG/L	0.2	1	H	C	1
77562	1112TETRACHLORO-ETH	(UG/L)	0.2	1	H	C	1
77613	1,2,3-TRICHLORO BEN	(UG/L)	0.20	1	H	C	2
77651	1,2DIBROMOETHANE,TOT	UG/L	0.2	1	H	E	1
77652	FREON 113 UNF REC	(UG/L)	0.2	1	H	C	1
78032	TERTBUTYL METH ETHE	(UG/L)	0.2	1	H	C	1
81366	RA228 DISS	PCI/L	1.0	1	H	C	2
81551	XYLENE UNF REC	(UG/L)	0.20	1	H	C	2
81555	BROMOBENZENE WAT.WH.	UG/L	0.2	1	H	C	1
82625	DIBROMOCHLOROPROPAN	UG/L	1.0	1	H	C	2
82630	METRIBUZIN,WAT.DIS.	UG/L	0.01	1	H	D	2
82660	26DIETHYLANILINE FL	(UG/L)	0	1	H	D	3
82661	TRIFLURALIN FIL 0.7	(UG/L)	0.01	1	H	D	2
82662	DIMETHOATE FIL 0.7	(UG/L)	0.02	1	H	D	2
82663	ETHALFLURALIN FIL .	(UG/L)	0.01	1	H	D	2
82664	PHORATE FIL 0.7 REC	(UG/L)	0.01	1	H	D	2
82665	TERBACIL FIL 0.7 RE	(UG/L)	0.03	1	H	D	2
82666	LINURON FIL 0.7 REC	(UG/L)	0.04	1	H	D	2
82667	METHYL PARATHION F.	(UG/L)	0.03	1	H	D	2
82668	EPTC FIL 0.7 REC	(UG/L)	0	1	H	D	3
82669	PEBULATE FIL 0.7 RE	(UG/L)	0	1	H	D	3
82670	TEBUTHIURON FIL .7	(UG/L)	0.01	1	H	D	2
82671	MOLINATE FIL 0.7 RE	(UG/L)	0	1	H	D	3
82672	ETHOPROP FIL 0.7 RE	(UG/L)	0.01	1	H	D	2
82673	BENFLURALIN FIL .7	(UG/L)	0.01	1	H	D	2
82674	CARBOFURAN FIL .7 R	(UG/L)	0.01	1	H	D	2
82675	TERBUFOS FIL 0.7 RE	(UG/L)	0.01	1	H	D	2
82676	PRONAMIDE FIL .7 RE	(UG/L)	0	1	H	D	3
82677	DISULFOTON FIL .7 R	(UG/L)	0.06	1	H	D	2
82678	TRIALLATE FIL .7 RE	(UG/L)	0	1	H	D	3
82679	PROPANIL FIL 0.7 RE	(UG/L)	0.02	1	H	D	2
82680	CARBARYL FIL 0.7 RE	(UG/L)	0.05	1	H	D	2

1

RECORD NUMBER: 99403567 -- CONTINUED

CODE	PARAMETER NAME	UNITS	VALUE	R	Q	M	P
82681	THIOBENCARB FIL .7	(UG/L)	0	1	H	D	3
82682	DCPA FIL 0.7 REC	(UG/L)	0	1	H	D	3
82683	PENDIMETHALIN F.7 R	(UG/L)	0.02	1	H	D	2
82684	NAPROPAMIDE FIL .7	(UG/L)	0.01	1	H	D	2
82685	PROPARGITE FIL .7 R	(UG/L)	0	1	H	D	3
82686	METHYL AZINPHOS F.7	(UG/L)	0.05	1	H	D	2
82687	PERMETHRIN FIL .7 R	(UG/L)	0.02	1	H	D	2
84164	SAMPLER TYPE CODE	CODE	4040		I		3
90095	SPECIFIC CONDUCTANCE	MICROSIEMENS/CM	330		H	A	3
90410	ALKALINITY	MG/L AS CACO3	36		H	A	2
91063	DIAZINON SURROGATE	(PERCENT)	110		H	D	2
91064	TERBUTHYLAZINE SURR	(PERCENT)	120		H	D	2
91065	ALPHA D6 HCH SURROG	(PERCENT)	97		H	D	2
99856	SAMP VOL SCHED 2001	(ML)	968		H	D	3
99900	DISTRICT SPEC 99900	99900	0.10	1	A		2
99902	DISTRICT SPEC 99902	99902	0.10	1	A		2
99903	DISTRICT SPEC 99903	99903	0.10		A		2
99904	DISTRICT SPEC 99904	99904	0.10		A		2
99905	DISTRICT SPEC 99905	99905	1.00		A		3

CATION/CONDUCTANCE RATIO OUTSIDE LIMITS .92 TO 1.24

RESIDUE AT 180 C/SPECIFIC CONDUCTANCE RATIO OUTSIDE LIMITS .55 TO .81

DISSOLVED SOLIDS/CALCULATED SOLIDS RATIO OUTSIDE LIMITS .9 TO 1.12

1

RECORD NUMBER: 99403567

STATION ID: USGS 364227076074713

STATION NAME: 61B 19

COLLECTION DATE: 08-20-1994 1030 - -

CATIONS	(MG/L)	(MEQ/L)	ANIONS	(MG/L)	(MEQ/L)
CALCIUM, DISS. MG/L	7.000	0.350	CHLORIDE, DISS. MG/L	24.000	0.678
MAGNESIUM, DISS. MG/L	6.200	0.511	SULFATE, DISS. MG/L	33.000	0.688
SODIUM, DISS. MG/L	27.000	1.175	BICARB., WHL, IT, FLD	116.001	1.902
POTASSIUM, DISS. MG/L	1.401	0.036	CARB., WHL, IT, FLD	0.000	0.001

IRON,	DISS. UG/L	30000.000	1.612	NO2 + NO3, DISS. AS N	0.061	0.005
MANGANESE,	DISS. UG/L	438.000	0.016			
		TOTAL	3.698		TOTAL	3.270

PERCENT DIFFERENCE = 6.14

1

RECORD NUMBER: 99404224 STATION NUMBER: 363738076053101 COLLECTED: 08-20-1994 AT: 153
STATION NAME: 62A 17 COUNTY: 550
MEDIUM: 6 STATUS: 9 SOURCE: 9 HYD. CONDITION: 9 SAMPLE TYPE: 9 HYD.

	CODE	PARAMETER NAME	UNITS	VALUE	R	Q	M	P
	00010	WATER TEMPERATURE	(DEGREES)	26.0		I		3
	00020	AIR TEMPERATURE	DEGREES	30.0		I		3
	00025	AIR PRESSURE	(MM OF HG)	762		I		3
	00027	COLLECTING AGENCY	(CODE NUMBER)	1028		I		5
	00028	ANALYZING AGENCY	(CODE NUMBER)	80020		H		5
	00059	FLOW RATE INS. (G/M)	(GALLONS/MINUTE)	1.0		I		3
	00095	SPECIFIC CONDUCTANCE	US/CM @ 25C	381		I		3
	00300	OXYGEN DISSOLVED	(MG/L)	0.2		I		3
	00301	OXYGEN DIS. PERCENT	% OF SATURATION	3		I		3
	00400	PH, WH, FIELD	(STANDARD UNITS)	5.8		I		3
	00403	PH, WH, LABORATORY	(STANDARD UNITS)	5.7		H	A	2
	00419	ALKALINITY,WH,IT,F	(MG/L AS CACO3)	43		I		3
	00450	BICARBONATE,WH,IT,F	(MG/L AS HCO3)	52		I		3
	00608	NITROGEN AMMONIA D.	(MG/L AS N)	0.030		H	B	3
	00613	NITROGEN,NITRITE D.	MG/L AS N	0.010	1	H	B	3
	00623	NITRO AMN & ORG DIS	(MG/L AS N)	0.20		H	C	2
	00631	NO2 + NO3 DISSOLVED	(MG/L AS N)	8.00		H	B	3
	00666	PHOSPHORUS DISS.	(MG/L AS P)	0.010	1	H	C	3
	00671	PHOSPHORUS ORTHO D.	(MG/L AS P)	0.010	1	H	B	3
	00681	CARBON ORGANIC DIS.	(MG/L AS C)	1.8		H	A	2
COMPUTED	00900	HARDNESS TOTAL	(MG/L AS CAO3)	72				
	00915	CALCIUM DISSOLVED	(MG/L AS CA)	20		H	D	2
	00925	MAGNESIUM DISSOLVED	(MG/L AS MG)	5.4		H	C	2
	00930	SODIUM DISSOLVED	(MG/L AS NA)	41		H	C	2
COMPUTED	00931	SODIUM ADSORPTION R.	(RATIO)	2				
COMPUTED	00932	SODIUM, PERCENT	PERCENT	55				
	00935	POTASSIUM DISSOLVED	(MG/L AS K)	2.6		H	B	2
	00940	CHLORIDE DISSOLVED	(MG/L AS CL)	53		H	J	2
	00945	SULFATE DISSOLVED	(MG/L AS SO4)	26		H	G	2
	00950	FLUORIDE DISSOLVED	(MG/L AS F)	0.10	1	H	B	2
	00955	SILICA DISSOLVED	(MG/L AS SIO2)	6.0		H	D	2

Sample Datetime	Time datum	Time datum reliability code	Sample Medium Code	Agency Collecting Sample, Code	Analysis Source	Hydro-logic Event	Hydro-logic Condition	Sample type
1989-03-	EST	T	WG	USGS-WRD	9	9	A	9

USGS 364227076074713 61B 19 SOW 091M

Chesapeake City, Virginia
Hydrologic Unit Code 03010205
Latitude 36°42'27", Longitude 76°07'47" NAD27
Land-surface elevation 15.00 feet above sea level NGVD29
The depth of the well is 20.00 feet below land surface.
The depth of the hole is 20.00 feet below land surface.
This well is completed in the Northern Atlantic Coastal Plain aquifer system (S100NATLCP)
This well is completed in the QUATERNARY SYSTEM (110QRNR) local aquifer.

Water Quality Remark Code	Description
<	Less than.

Project Code	Temper-ature, water, deg C (00010)	Agency ana-lyzing sample, code (00028)	Color, water, fltrd, Pt-Co units (00080)	Specif-ic conduc-tance, wat unf uS/cm 25 degC (00095)	Hydro-gen ion, water, unfltrd calcd, mg/L (00191)	pH, water, unfltrd field, std units (00400)	pH, water, unfltrd lab, std units (00403)	Carbon dioxide water, unfltrd mg/L (00405)
445108900	14.0	80020	15	220	0.00201	5.7	6.1	238

) national aquifer.

ANC, wat unf fixed end pt, field, mg/L as CaCO3 (00410)	Ammonia water, fltrd, mg/L as N (00608)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Nitrate + nitrite water fltrd, mg/L as N (00631)	Phos-phorus, water, unfltrd mg/L as P (00665)	Organic carbon, water, unfltrd mg/L (00680)	Hard-ness, water, mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes-ium, water, fltrd, mg/L (00925)
62	0.080	< 0.20	< 0.100	0.05	2.4	38	6.20	5.40

Sodium, water, fltrd, mg/L (00930)	Sodium adsorp-tion ratio (00931)	Sodium frac-tion of cations percent (00932)	Potas-sium, water, fltrd, mg/L (00935)	Chlor-ide, water, fltrd, mg/L (00940)	Sulfate water, fltrd, mg/L (00945)	Fluor-ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L as SiO2 (00955)	Boron, water, fltrd, ug/L (01020)
17.0	1.2	49	1.10	17.0	15.0	0.10	19.0	20

Iron, water, unfltrd recover -able, ug/L (01045)	Iron, water, fltrd, ug/L (01046)	Mangan-ese, water, unfltrd recover -able, ug/L (01055)	Mangan-ese, water, fltrd, ug/L (01056)	Zinc, water, fltrd, ug/L (01090)	Alum-inum, water, fltrd, ug/L (01106)	Depth to water level below LSD, meters (30210)	Residue on evap. at 180deg C wat flt mg/L (70300)	Residue water, fltrd, sum of consti-tuents mg/L (70301)
13000	14000	240	270	2000	20	0.884	130	134

Residue water, fltrd, tons/ acre-ft (70303)	Ammonia water, fltrd, mg/L (71846)	Depth to top sample intrval feet below LSD (72015)	Depth to bot sample intrval feet below LSD (72016)	Depth to water level, feet below LSD (72019)	Specif. conduc-tance, wat unf lab, uS/cm 25 degC (90095)	ANC, wat unf fixed end pt, lab, mg/L as CaCO3 (90410)
0.18	0.10	10.00	20.00	2.90	208	60