

HGL WELL CONSTRUCTION DETAILS AND ABANDONMENT FORM

HydroGeologic, Inc.

FIELD REPRESENTATIVE: S. Holmes

TYPE OF FILTER PACK: Silica Sand

DRILLING CONTRACTOR: Frontz Drilling

GRADATION: #20-#40

AMOUNT OF FILTER PACK USED: 175 LB

DRILLING TECHNIQUE: Sonic

TYPE OF BENTONITE: 1/4" Pel - plus Coater Pellets

AUGER SIZE AND TYPE: 6 5/8"

AMOUNT BENTONITE USED: 50 LB

BOREHOLE IDENTIFICATION: PW-9

TYPE OF GROUT: High Solids Bentonite Grout

BOREHOLE DIAMETER: 6 5/8"

AMOUNT GROUT USED: 275 Gallons Grout / 550 LB Bentonite

WELL IDENTIFICATION: PW-9

GROUT MATERIALS USED: 200% By Weight

WELL CONSTRUCTION START DATE: 7/9/09

DIMENSIONS OF SECURITY CASING: _____

WELL CONSTRUCTION COMPLETE DATE: _____

SCREEN MATERIAL: Stainless Steel

TYPE OF WELL CAP: Screw on Cap

SCREEN DIAMETER: 2" O.D. 1" slot

TYPE OF END CAP: NA W/BLIND CLOSED BOTTOM

STRATUM-SCREENED INTERVAL (FT): _____

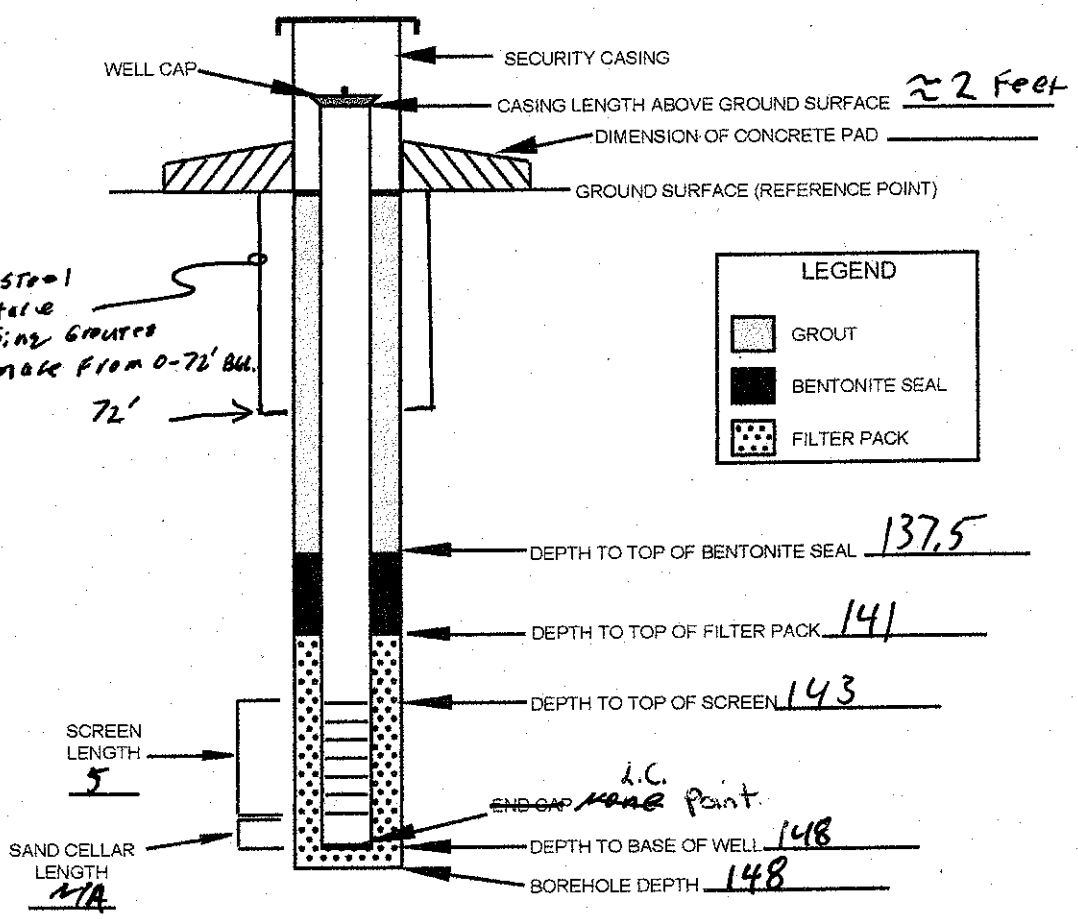
COMMENTS: on screen

CASING MATERIAL: Stainless Steel

CASING DIAMETER: 2 - Inch

SPECIAL CONDITIONS
(describe and draw)

8" steel
suitable
Casing Grout
in place from 0-72' BH.



NOT TO SCALE

INSTALLED BY: D. Schreckengost INSTALLATION OBSERVED BY: S. Holmes

DISCREPANCIES: Buffer Sand not installed per AFCEE Approval to allow setting of screen and filter pack below upper clay layer



BORING LOG

Borehole ID: PW-9
 Sheet 1 of 11

Project Name STANDARD CHLORINE			Project Number E100ZZ.03		LTCCODE (IRPIMS)		Location NEW CASTLE, DE	
Drilling Company FRONTZ			Driller D. SCHRENCENGOST		Ground Elevation		Site ID	
Drilling Equipment VERSA-SONIC			Drilling Method SONIC		Borehole Diameter 6 3/8"		Date/Time Drilling Started 6-25-09/1000	
Type of Sampling Device 5' x 10' RODS 4" DIAMETER			Water Level (bgs)		Date/Time Total Depth Reached 7-9-09 / 11:30		LPRCODE (IRPIMS)	
Sample Hammer Type NA Driving Wt. Drop			Hydrogeologist		First 52.73 @ 10:30		Final 54.79 @ 11:09 at 0745	
					Checked by/Date Lisa Carter CHAMHill 7/21/09			

Location Description (include sketch in field logbook)
LOCATED ON OXYCHEM PROPERTY IN OLD RECREATIONAL BASEBALL FIELD

Depth	Interval	Recovery	Blow Counts	Description <small>(include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)</small>	USCS Symbol	Lithology	Water Content	Remarks <small>(include all sample types & depth, odor, organic vapor measurements, etc.)</small>
1				CLAYEY SILT - YELLOWISH BROWN (10YR 8/6) & MOTTLED LIGHT YELLOWISH BROWN (10YR 6/3), LOW PLASTICITY, HARD, STIFF, DAMP TO DRY	ML	COLUMN FOLIATION	0.0	
2			5/5				0.0	
3							3.8	
4							0.0	
5							1.35	
6				0.0				
7				3.7				
8				SANDY SILT - YELLOWISH BROWN (10YR 8/6), FEW GRAVEL (1-1.5"), MOTTLED, NON PLAST., STIFF	ML		0.0	
9			5/5				0.0	

Project Name S.C.S			Project Number E10022-03		Location NEW CASTLE, DE			
Depth	Interval	Recovery	Blow Counts	Description <small>(Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)</small>	USCS Symbol	Lithology	Water Content	Remarks <small>(Include all sample types & depth, odor, organic vapor measurements, etc.)</small>
10				MEDIUM SAND - DARK YELLOWISH BROWN (10YR 4/6), LOOSE, FEW TRACE SP GRAVEL, MOIST			39.5	
11							0.1	
12				SILTY SAND - FINE GRIN, PALE YELLOW (2.5Y 7/3), MOIST, TRACE COARSE GRAIN	SM		6.5	
13							14.2	
14				- SILTY CLAY STRINGER FROM 13-14'			13.5	
15				CLAY SILT - DARK YELLOWISH BROWN (10YR 3/4), SOME SAND, MOIST, LOW PLASTICITY, STIFF	ML	COLUMN FORMATION	26.9	
16							69.9	
17				SILTY SAND, - PALE YELLOW (10YR 7/4), MOIST, FINE TO V. FINE, LOOSE			46.3	
18					SM		34.9	
19							28.6	
20						94.9		NO ODOOR
21				CLAY SILT - DARK YELLOWISH BROWN (10YR 3/4), SOME SAND, MOIST, NO PLAST	ML		117	
22				SILTY SAND - OLIVE YELLOW (2.5Y 6/6), MOIST, FINE TO VERY FINE, MOIST, MEDIUM DENSE			52.9	
23			6/10				32.5	
24				POCKETS w/ HIGH SILT CAUSING STRINGERS; TRACE GRAVE,	SM		18.6	



BORING LOG (cont'd)

Borehole ID: PW-9
 Sheet 4 of 11

Project Name		Project Number		Location					
S.C.S.		E10022-03		NEW CASTLE, DE					
Depth	Interval	Recovery	RECOVERY Blow-Counts	Description <small>(Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)</small>	USCS Symbol	Lithology	Water Content	Remarks <small>(Include all sample types & depth, odor, organic vapor measurements, etc.)</small>	
39				SAME AS ABOVE BECOMES WET @ APPROX. 39'	SM			5.1 SET 35-40' SCREEN	
40				MEDIUM SAND - YELLOWISH BROWN (10YR 8/6), SATURATED, BLACK IRON FLECKS?, SOME COARSE GRAIN	SP			1340 - UNABLE TO GET WATER TO SURFACE 5.7	
41								12.1	
42								49.7	
43				POORLY GRADED SAND - YELLOWISH BROWN (10YR 8/6), DENSE, SOME SILT, Fe STAINING, MED. TO FINE GRAIN, SATURATED	SP	COLUMN B FORMATION		30.0	
44									5.0
45			7/10	SILTY SAND - YELLOWISH BROWN (10YR 8/6), FINE TO V. FINE GRAIN, TRACE MEDIUM GRAIN	SM				21.6
46				SAND W/ SILT - YELLOWISH BROWN (10YR 8/6), SATURATED, MEDIUM GRAIN, POORLY GRADED, DENSE					6.6
47									3.2
48								18.1	
49				- GRADES TO COARSE GRAINS W/ SILT, GRAVEL - ROUNDED TO 0.5'	SM			0.2	
50								0.0	
51									
52									

SET TEST SCREEN
 FROM 45-50' TO COLLECT
 GW SAMPLE: MCO9-PW9-45.50
 PID ON PURGE = 0.0 @ 16.40



BORING LOG (cont'd)

Borehole ID: PW-9
 Sheet 5 of 11

Project Name		Project Number		Location				
S.C.S.		E10022.03		NEW CASTLE, DE				
Depth	Interval	Recovery	RECOVERY Blow-Counts	Description	USCS Symbol	Lithology	Water Content	Remarks
				(Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)				(Include all sample types & depth, odor, organic vapor measurements, etc.)
53				SAME AS ABOVE - INTERBEDDED MEDIUM GRAIN POORLY GRADED SAND AND FINE TO V. FINE SILTY SAND, SATURATED		COLUMBIA FORMATION	3.9	SET TEMP. SUREP'S FROM SS-60' TO COLLECT GW SAMPLE! MC97, PW97-SS-60
54			10/10				0.0	
55							4.3	
56							32.7	
57							4.7	
58							2.3	
59							17.7	
60							17.7	
61							BEGN DRILLING 6-26-09 @ 0740	
62			3/5				37.1	
63				30.2				
64				13.6				
65				25.1				
66				11.2				
				30.6				



BORING LOG (cont'd)

Borehole ID: PW-9
 Sheet 6 of

Project Name <u>S.C.S.</u>			Project Number <u>E10022.03</u>		Location <u>NEWCASTLE, DE</u>	
Depth	Interval	Recovery <u>5/5</u>	Description <small>(Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)</small>	USCS Symbol	Lithology Water Content	Remarks <small>(Include all sample types & depth, odor, organic vapor measurements, etc.)</small>
67		<u>5/5</u>	<u>SAME AS ABOVE</u>	<u>SM</u>	<u>COLUMBIA</u>	<u>60.1</u>
68						<u>21.2</u>
69			<u>SILTY SANDY GRAVEL - YELLOWISH BROWN (10YR 5/6), ANG. TO ROUND, SIZE TO 0.5", WET, DENSE</u>	<u>GM</u>		<u>8.8</u>
70			<u>CLAY - GREENISH BLACK (5GY 2.5/1), COHESIVE, MED. PLASTICITY, DRY TO DAMP, MICACEOUS, V. STIFF TO STIFF MG</u>	<u>CL</u>	<u>MERCANTONVILLE</u>	<u>3.2</u>
71		<u>5/5</u>				<u>15</u>
72		<u>5/5</u>	<u>CLAY-greenish black (5GY 2.5/1), cohesive, medium to high plasticity, dry to damp, micaceous, v. stiff to stiff.</u>	<u>CH</u>		<u>1.9</u>
73						<u>1.2</u>
74						<u>1.1</u>
75						<u>1.6</u>
76		<u>5/5</u>	<u>CLAYEY SILT - Gray (10YR 6/1), low plasticity, moist to wet, medium dense, trace fine sand.</u>	<u>ML</u>		<u>0.0</u>
77			<u>SILTY SAND, fine grained sand, Gray (10YR 6/1), with v pale brown mottling (10YR 7/3), dense, poorly graded, moist to wet.</u>	<u>SM</u>	<u>POTOMAC</u>	<u>0.1</u>
78						<u>0.0</u>
79						<u>0.0</u>
80			<u>CLAYEY SAND - fine, medium, coarse sand, dry to slightly moist, gray (10YR 6/1), dense, poorly graded.</u>	<u>SC</u>		<u>0.0</u>

SET TEMP. SCREENS FROM 65-70' BGS TO COLLECT GW SAMPLE: MCO9-PW9-65-70

END SONIC DRILLING - RETURN W/ MUD POT. TO SET SURFACE USING

7-7-09 Resume Sonic Drilling at 70-75 ft. 70-72 ft. interval is slough.

8" Iron Surface Casings Grouted In Place From 0-72' BGL.

SET TEMP SCREEN FROM 77-82' TO COLLECT GW SAMPLE MCO9-PW9-77-82 PID on purge > 6kgd.

Note: Interval is non-producing. Sampling is stopped per USCS approval.



BORING LOG (cont'd)

Borehole ID: PW-9
 Sheet 7 of

Project Name			Project Number			Location		
S.C.S.			E10022.03			New Castle, DE		
Depth	Interval	Recovery	Description <small>(Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)</small>	USCS Symbol	Lithology	Water Content	Remarks	
							<small>(Include all sample types & depth, odor, organic vapor measurements, etc.)</small>	
81		4.5	SILTY SAND, fine grained, trace medium and coarse sand, wet, poorly sorted, gray (10YR 6/1), coarse-grained sandstone concretion near bottom (well-cemented), grades into next interval, note: concretion is 0.3-foot diameter.	SM	POTOMAC	2.2	D-10 SAMPLE MCS-0101 77-88	
82		5.0				0.6		
83			CLAY, mottled with gray (10YR 6/1) with reddish brown (5YR 4/4) mottles, dry, very stiff to hard, high plasticity (density gets higher with depth), top 0.3 feet is sandy.	CH		0.4		
84						0.9		
85			CLAY, mottling: lt gray (10YR 7/1) with reddish brown (2.5YR 4/4) mottles, dry, very stiff, high plasticity			0.0		
86		5.0				0.0		
87			CLAYEY SAND, mottling: lt gray (10YR 7/1) with reddish brown (2.5YR 4/4) mottles, moist to wet, stiff, fine grained sand,	SC		0.0		
88						0.4		
89			SANDY CLAY, mottling: lt gray (10YR 7/1) with reddish brown (2.5YR 4/4) to high (4/4) medium plasticity, very stiff, fine grained sand, dry to moist.	CL		0.4		
90		5.0				1.8		
91		5.0	Same as 90-91?	SC		5.2		
92						5.6		
93								
94								

95

Project Name		Project Number		Location		Remarks	
S.C.S.		E10022.03		New Castle, DE		(Include all sample types & depth, odor, organic vapor measurements, etc.)	
Depth	Interval	Recovery	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Lithology	Water Content	
96		5.0/5.0	INTERBEDDED SANDY CLAY with CLAY trace SANDY CLAY has low plasticity, moist to wet, soft to v stiff CLAY has high plasticity, dry, trace fine sand, soft to M stiff, color is mottled: lt gray (10YR 7/1) with reddish brown (2.5YR 4/4) mottles.	CL/CH	POTOMAC	0.0 0.0 0.0 0.0	97-102: Attempt groundwater sample. Pump ends quickly as boring dries. Interval is considered a non-water bearing zone.
97						0.2	
98						0.14	
99			SAND, fine grained, poorly graded, (10YR 8/1) white, moist, dense, some silt.	SP		0.3	
100						0.0	
101						0.0	
102			INTERBEDDED CLAYEY SAND with CLAY: CLAY has high plasticity, trace fine sand, stiff to hard, dry to moist. CLAYEY SAND is non-plastic, moist to wet, medium dense to stiff. Mottled: lt gray (10YR 7/1) w reddish brn (2.5YR 4/4) mottles.	CH/SC		0.7	
103						0.0	
104		x	SAND, fine grained, poorly graded, trace silt, white (10YR 8/1) wet, soft.	SP		0.0	
105		5.0/5.0	SAND, fine grained, trace silt, poorly graded, mottling: light gray (10YR 7/2) with red (2.5YR 5/8) mottles, wet, becomes moist with depth, soft.	SP		0.0	
106						0.0	
107			CLAYEY SILT, med to high plasticity, trace fine sand, dry to moist, very stiff, mottling light gray (10YR 7/2) with red (2.5YR 5/8) mottles.	CH ML	(16)	0.0	
108			SAND, fine grained, trace silt, moist, soft, reddish yellow 5YR 6/6 at 107.7-109 feet, white (10YR 8/1) for 108-110 feet, poorly graded.	SP		0.0	
109						1.2	



BORING LOG (cont'd)

Borehole ID: PW-9
 Sheet 9 of

Project Name			Project Number			Location		
S.C.S.			E10022.03			New Castle, DE		
Depth	Interval	Recovery	Description	USCS Symbol	Lithology	Water Content	Remarks	
			(Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)				(Include all sample types & depth, odor, organic vapor measurements, etc.)	
111		5.0	SAND, fine grained, little silt, poorly graded, wet, very soft, light gray (10YR 7/2).	SP	POTOMAC	0.0		
112						2.0		
113						3.7		
114			SILTY CLAY, high plasticity, dry to moist, stiff, lt gray (10YR 7/2).	CH		7.5		
115			SAND, fine grained, little silt, moist to very moist, med dense, poorly graded, lt gray (10YR 7/2)	SP		8.2		
116		5.0	SAND, fine grained, trace silt, moist, medium dense, poorly graded, lt gray (10YR 7/2).	SP	105.2-5	46	Note: 119-120' interval fell out of barrel upon retrieval from boring. It was logged as cuttings.	
117					116.3-1	33.1	8.9	
118					116.9-7	33.1		
119						2.5		
120		3.7						07-08-09: 0750 Begin drilling activities from 120 feet.
121		5.0						1.8 Note: At 120-125 feet, bottom 1.3 feet of sample (123.7-125 ft) fell out of barrel. Appearance of material smeared on core no. 118 is of a wet fine sand with little silt. This zone is wetter than material above it.
122								3.8
123								6.2
124								3.6
125								4.2

115-120': Attempt groundwater sample. Purge was not producing any water at all. No water producing zone. Attempted on 7-8-09.

Set up screen at 120-125' to collect GW sample. MC09-PW-120-125. PID on purge. No odor.



BORING LOG (cont'd)

Borehole ID: DW-9
 Sheet 10 of

Project Name		Project Number		Location		
S.C.S.		E10022.03		New Castle, DE		
Depth	Interval	Recovery	Description	USCS Symbol	Lithology	Remarks
			(Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)		Winter Content	(Include all sample types & depth, odor, organic vapor measurements, etc.)
126		1.4/5.0	SAND, fine grained, white (10YR 8/1), wet, poorly graded. Note: material on outside of core from lost material is a SAND, medium grained, yellowish brown (10YR 5/4), poorly graded, well-rounded, wet.	SP		125-130: After recovery what is recovered was vibrated out of core barrel into plastic sieve.
127						
128						
129						
130		5.0/5.0	SAND, fine to medium grained, very pale brown (10YR 7/4), trace silt, wet, very loose material.			130-135: Core lost became cement in barrel. Sample was vibrated into bag.
131						68.0
132						17.0
133						25.0
134						5.6
135		5.0/5.0	SAND, fine to medium grained, very pale brown (10YR 7/3), trace coarse sand and silt, wet, very loose material, trace ang. gravel at 133-138.1 feet in darker bag; interval becomes coarser towards bottom (becomes medium grained, little fine, trace coarse).			34.9
136						5.2
137						19.7
138						5.9
139						8.0
140			CLAY, H gray 10YR 7/1, trace silt, v stiff, dry, high plasticity.	CH		

POTO MAC

Project Name		Project Number		Location			
S.C.S.		E10022.03		New Castle, DE			
Depth	Interval	Recovery	Description	USCS Symbol	Lithology	Water Content	Remarks
			(Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)				(Include all sample types & depth, odor, organic vapor measurements, etc.)
141		5.0 4.6 5.0	CLAY, gray (10YR 4/1), hard, high plasticity, silty, dry	CH			Pole: Odor and high PID results in mg sandy material at 141.6-145 feet.
142			SAND, pale brown (10YR 6/3), fine to medium grained, trace coarse sand, trace silt, wet, loose, definite obvious odor detected.	SP	POTOMAC		442 78 7-9-09: Begin drilling activities with G/W sample activities at 140-145 ft.
143							MG 425
144							MG 43-0698
145							MG 426
146							
147							
148							
149							
150							
151							
152							
153							
154							

Set temp screen at 140-145 feet to collect G/W sample: MCO9-PW9-140-145.