C 1 | 8583 | SEQUENCE NO. (MDE USE ONLY)

1 2 3 6 (THIS NUMBER IS TO BE PUNCHED IN COLS. 3-6 ON ALL CARDS)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED WITHIN 45 DAYS AFTER WELL IS COMPLETED.

COUNTY NUMBER 13

ST/CO USE ONLY DATE Received MM DD YY (8–13)

DATE WELL COMPLETED MM 04 DD 08 YY 10 (15–20)

Depth of Well 22 220 26 (TO NEAREST FOOT)

OK 4/30/15 SC

PERMIT NO. FROM "PERMIT TO DRILL WELL" HO-95-1844 (28–37)

OWNER Spittler last name Philip first name

STREET OR RFD 3745 Chatham Rd TOWN Ellicott City

SUBDIVISION _____ SECTION _____ LOT 12

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
Top Soil	0	1	
Brown Clay	1	60	
Sandstone	60	220	✓

NUMBER OF UNSUCCESSFUL WELLS: 0

WELL HYDROFRACTURED yes [Y] no [N]

CIRCLE APPROPRIATE LETTER
- A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
- E ELECTRIC LOG OBTAINED
- P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO.: M S D 150

Curtis Winslow
DRILLERS SIGNATURE (MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO.: __ __ D __ __ __

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes [Y] (44) no [N] (44)

TYPE OF GROUTING MATERIAL (Circle one)

CEMENT [C M] (45 46) BENTONITE CLAY [B C] (45 46)

NO. OF BAGS 6 NO. OF POUNDS 300

GALLONS OF WATER 150

DEPTH OF GROUT SEAL (to nearest foot)

from 0 (48 TOP 52) ft. to 220 (54 BOTTOM 58) ft.

(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

[S T] STEEL [C O] CONCRETE [P L] PLASTIC [O T] OTHER

MAIN CASING TYPE (60 61)	Nominal diameter top (main) casing (nearest inch)! (63 64)	Total depth of main casing (nearest foot) (66–70)
PL	1	220

OTHER CASING (if used)
EACH CASING

diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole — insert appropriate code below

[S T] STEEL [B R] BRASS BRONZE [H O] OPEN HOLE [P L] PLASTIC [O T] OTHER

C 2 (1 2)

DEPTH (nearest ft.)

EACH SCREEN

1	(8 9)	(11–15)	(17–21)		
2	(23 24)	(26–30)	(32–36)		
3	(38 39)	(41–45)	(47–51)		

SLOT SIZE 1 _____ 2 _____ 3 _____

DIAMETER OF SCREEN _____ (56–60) (NEAREST INCH)

from	to

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 (68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)

T (70) (E.R.O.S.) (72) W Q (74 75 76)

TELESCOPE CASING — LOG INDICATOR — OTHER DATA

C 3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour) _____ (6 9)

PUMPING RATE (gal. per min.) _____ (11–15)

METHOD USED TO MEASURE PUMPING RATE _____

WATER LEVEL (distance from land surface)

BEFORE PUMPING _____ (17–20) ft.

WHEN PUMPING _____ (22–25) ft.

TYPE OF PUMP USED (for test)

[A] air (27) [P] piston (27) [T] turbine (27)

[C] centrifugal (27) [R] rotary (27) [O] other (describe below) (27)

[J] jet (27) [S] submersible (27)

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO) YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. (29)

CAPACITY: GALLONS PER MINUTE (to nearest gallon) _____ (31–35)

PUMP HORSE POWER _____ (37–41)

PUMP COLUMN LENGTH (nearest ft.) _____ (43–47)

CASING HEIGHT (circle appropriate box and enter casing height)

[+] above (49) / [–] below (49) LAND SURFACE

4 (nearest) foot (50 51)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURE SUCH AS BUILDING, SEPTIC TANKS, AND /OR LANDMARKS AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)

N

* Please See Attached *

DENV-CR00

COUNTY

EMERGENCY/TEMP NO. IF ANY

B 1 5018 — SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND
APPLICATION FOR PERMIT TO DRILL WELL

W532579 please type

STATE PERMIT NUMBER: HO-95-1894

fill in this form completely

Date Received (APA) ____

OWNER INFORMATION

Spittler — Owner Last Name
Philip — First Name
3745 Chatham Rd. — Street or RFD
Ellicott City — Town
MD — State
21042 — Zip

DRILLER INFORMATION

Curtis Winslow — Driller's Name
M S D 150 — License No.
Winslow Pump and Well, Inc. — Firm Name
P.O. Box 521 Hollywood, MD 20636 — Address
Curtis Winslow — Signature
3.25.10 — Date

B 2 WELL INFORMATION

APPROX. PUMPING RATE (GAL. PER MIN.): 0
AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY): 0

USE FOR WATER (CIRCLE APPROPRIATE BOX)

- [D] DOMESTIC POTABLE SUPPLY & RESIDENTIAL IRRIGATION
- [F] FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION
- [I] INDUSTRIAL, COMMERICIAL, DEWATERING
- [P] PUBLIC WATER SUPPLY WELL
- [T] TEST, OBSERVATION, MONITORING
- [G] GEO-THERMAL 3

APPROXIMATE DEPTH OF WELL: 250 FEET

APPROXIMATE DIAMETER OF WELL: _____ NEAREST INCH

METHOD OF DRILLING (circle one)

BORED (or Augered) — JETTED — Jetted & DRIVEN
AIR-ROTary — AIR-PERcussion — ROTARY (Hydraulic Rotary)
CABLE — REVerse-ROTary — DRive-POINT
other _____

REPLACEMENT OR DEEPENED WELLS
(CIRCLE APPROPRIATE BOX)

- [N] THIS WELL WILL NOT REPLACE AN EXISTING WELL
- [Y] THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- [S] THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY-CONTACT LOCAL APPROVING AUTHORITY FOR POLICY ON STANDBY WELLS
- [D] THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE) ____ - ____ - ____

Not to be filled in by driller (MDE OR COUNTY USE ONLY)

APPROP. PERMIT NUMBER ____ G ____

PERMIT No. HO 95-1894

B 3 LOCATION OF WELL

Howard — COUNTY
Macalpine — SUBDIVISION
SECTION 2 — LOT 12
Ellicott City — NEAREST TOWN
MILES FROM TOWN (enter 0 if in town): 0 M

B 4

DIRECTION OF WELL FROM TOWN (CIRCLE BOX): N, NE 8-9, E 8, SE 8-9, S 8, SW 8-9, W 8, NW 8-9, TOWN

3745 Chatham Rd. — NEAR WHAT ROAD

ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX): NORTH, WEST, EAST, SOUTH

ADC 4815 G8

DISTANCE FROM ROAD: 30 Ft (ENTER FT OR MI)

TAX MAP: 24 BLK: 16 PARCEL 168

NOT TO BE FILLED IN BY DRILLER
HEALTH DEPARTMENT APPROVAL

Howard (13) Public — COUNTY NAME / COUNTY NO.
STATE SIGNATURE _____ INSERT S →
DATE ISSUED 4/28/2010 Brian Baker 4/28/2011 — CO SIGNATURE — EXP. DATE
NORTH GRID 522 000
EAST GRID 847 000

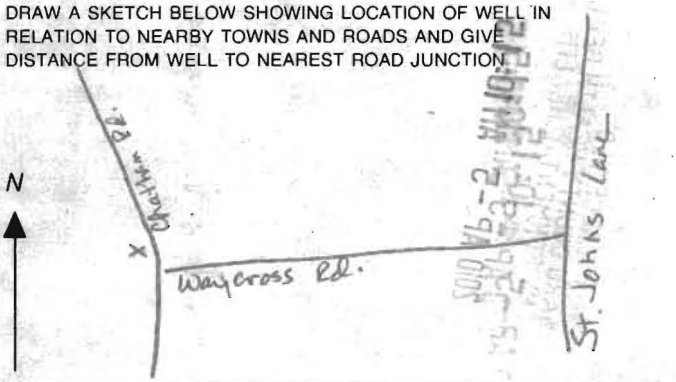
SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X

SOURCES OF DRILLING WATER
1. Deep Drilled Well
2.
3.

WRITE THE BOX NUMBER FROM THE MAP HERE
E 847
N 522

000
000

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION.

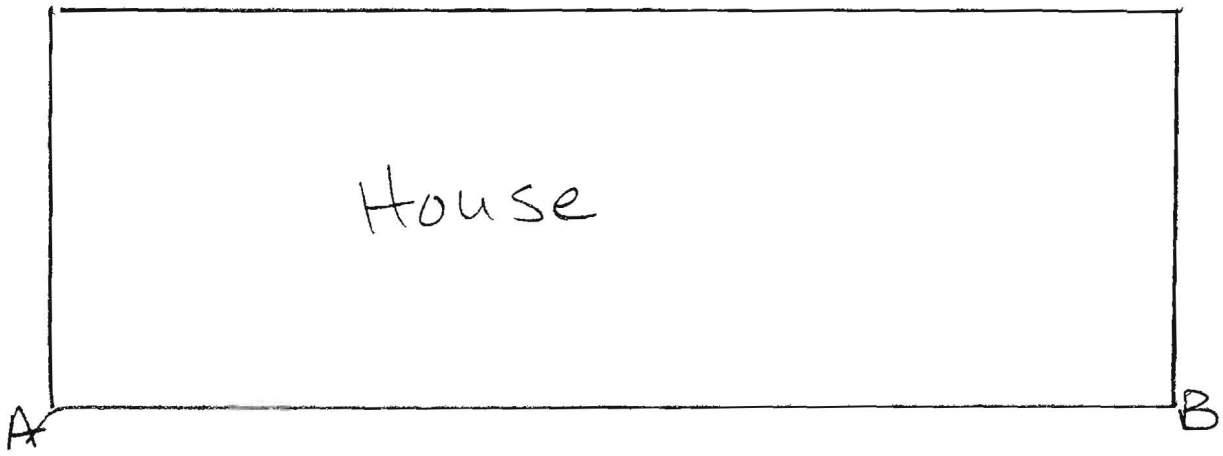


SPECIAL CONDITIONS
NOTE - APPROVING AUTHORITIES SHOULD USE SEPARATE SHEET IF NEEDED

Grout/Slurry Needs to Be 2 lbs/gallon or 25 gallons per bag

DENV-Permit 97 — © COUNTY

Phil Spitler
3745 Chatham Rd.
Ellicott City, MD
Howard County



Well Number	A	B
1	87.7	56.6
2	101.3	55.6
3	95	42.4

WaterFurnace

Grouting Mixture Procedures

~~33 gallons of water~~

~~11 ounces of EZ Mud~~

~~50 pound bag of Benseal~~

OR:

~~2lb/gal~~

25 ~~30 gallons of water~~ Gallons

1-1/2 quarts of Aqua Grout

50 pound bag of Benseal

WF 794

REPLACEMENT WELL DRAWING

Property Owner: Philip Spitler

Property Address: 3745 Chatham Rd.
Ellicott City, MD 21042

Owner's Phone Number: _____

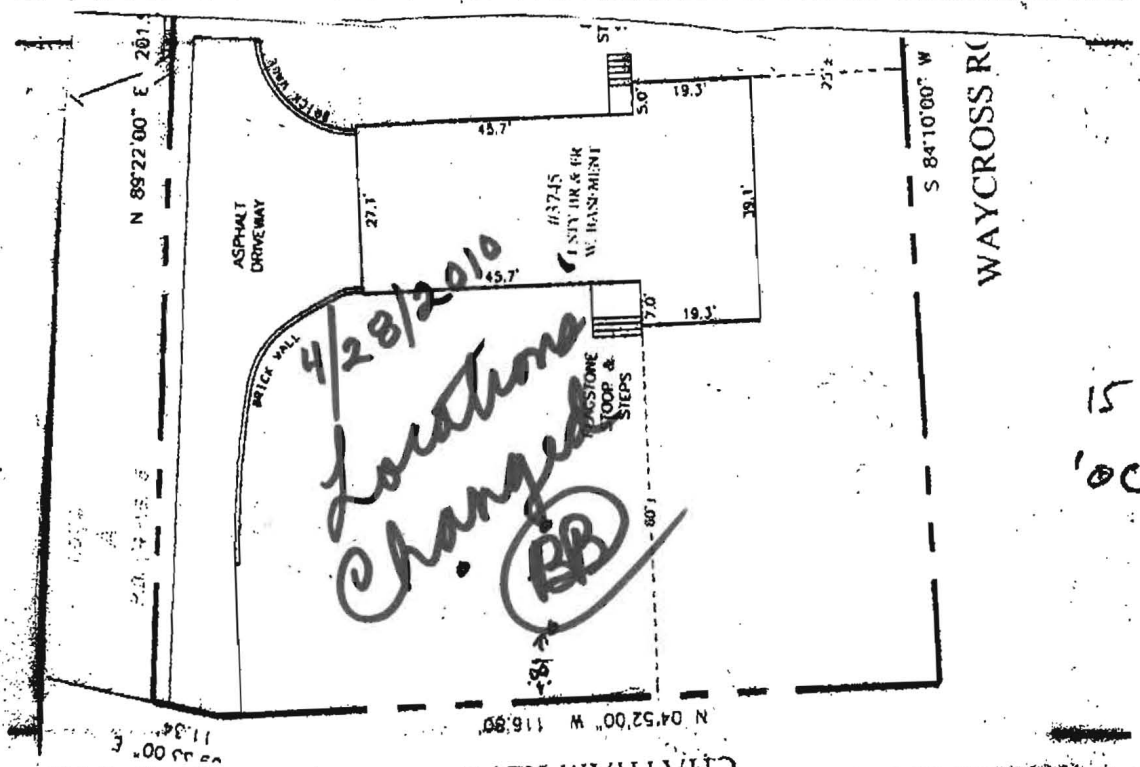
Property Owner's Signature: _____

Well Driller's Signature: Curtis Warshaw

Distance Between Well and:

1. Road	18
2. House	42
3. Septic	N/A
4. Ex. Well	N/A
5. Prop. Lines	18'
6. Oil Tanks	N/A
7. Neighbor's Septic	___

Directions To Property:

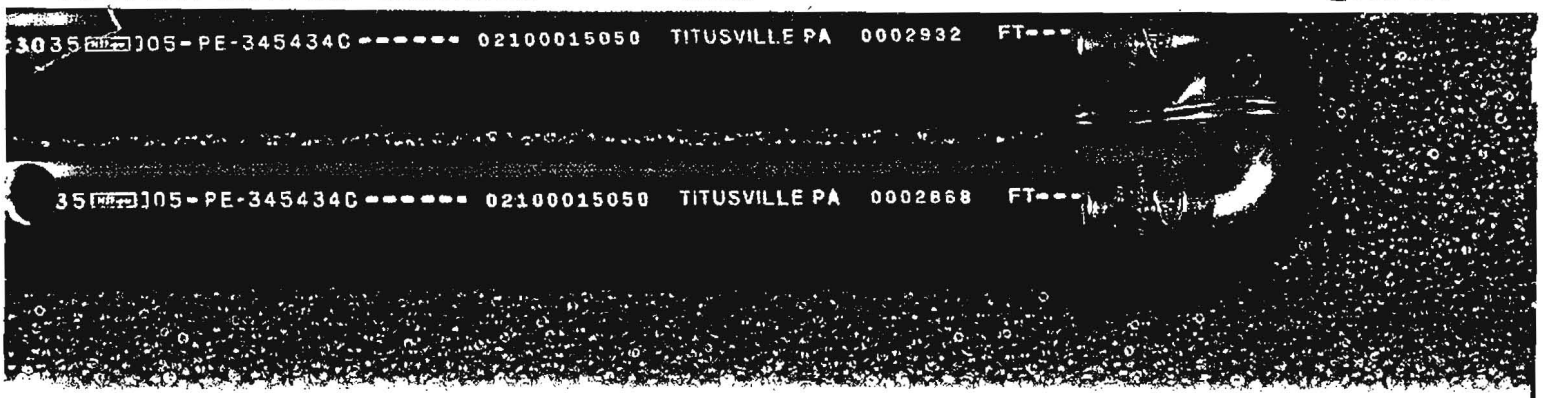


FILL IN THIS SECTION IF _____ REPLACEMENT OF AN EXISTING WELL ON THE PROPERTY

I intend or am contracted to abandon and seal the old well according to COMAR 26.04.04.11 after a replacement well water system has been completed.

YES_____ NO_____

Master Well Driller Signature Date



SPECIFICATIONS

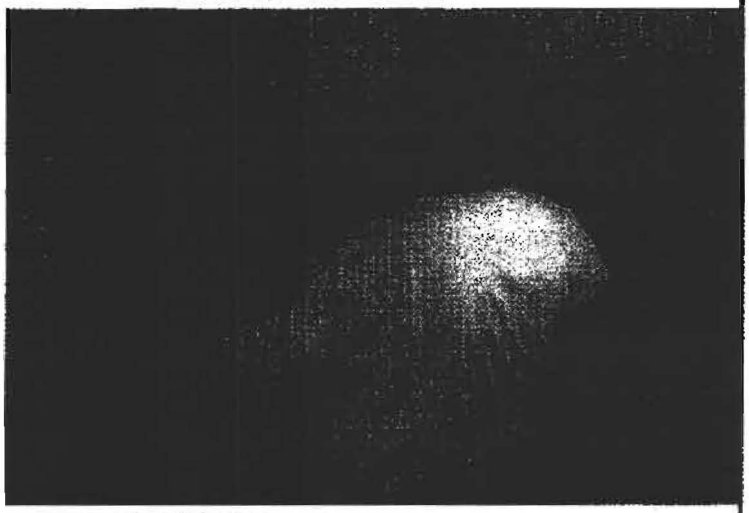
Charter Plastics Geothermal Pipe is manufactured from NSF Certified, High Density Polyethylene resins listed in PPI TR-4 as a PE 3408 Piping formulation. These materials carry a recommended Hydrostatic Design Basis (HDB) of 1,600 psi and a maximum recommended Hydrostatic Design Stress (HDS) of 800 psi at 73°F.

Charter Geothermal Pipe is manufactured and rated according to the following standards:
Material: ASTM D 3350, ASTM D 2837, ASTM D 1693,
Pipe: ASTM D 3035, ASTM D 2447, ASTM F714,
ASTM D 2513 (Sections 4.1 and 4.2)

All Charter Geothermal Pipe complies with the standards set forth by the International Ground Source Heat Pump Association (IGSHPA), Sections IC, 2.1 thru 2.4.

A certification of materials is available by request.

Charter Plastics offers the following products specifically engineered to meet the performance demands of geothermal installations:



Hydrostatic Burst Testing

PROPERTIES	CHARTER GEO PIPE	CHARTER GEO — HT (HIGH TENSILE)
Long Term Hydrostatic Strength @ 73° F, ASTM D 2837	>5000 hours	>5000 hours
UV Stabilizer, ASTM D 1603	1600 psi	1600 psi
	2% - 2.5% C	2% - 2.5% C

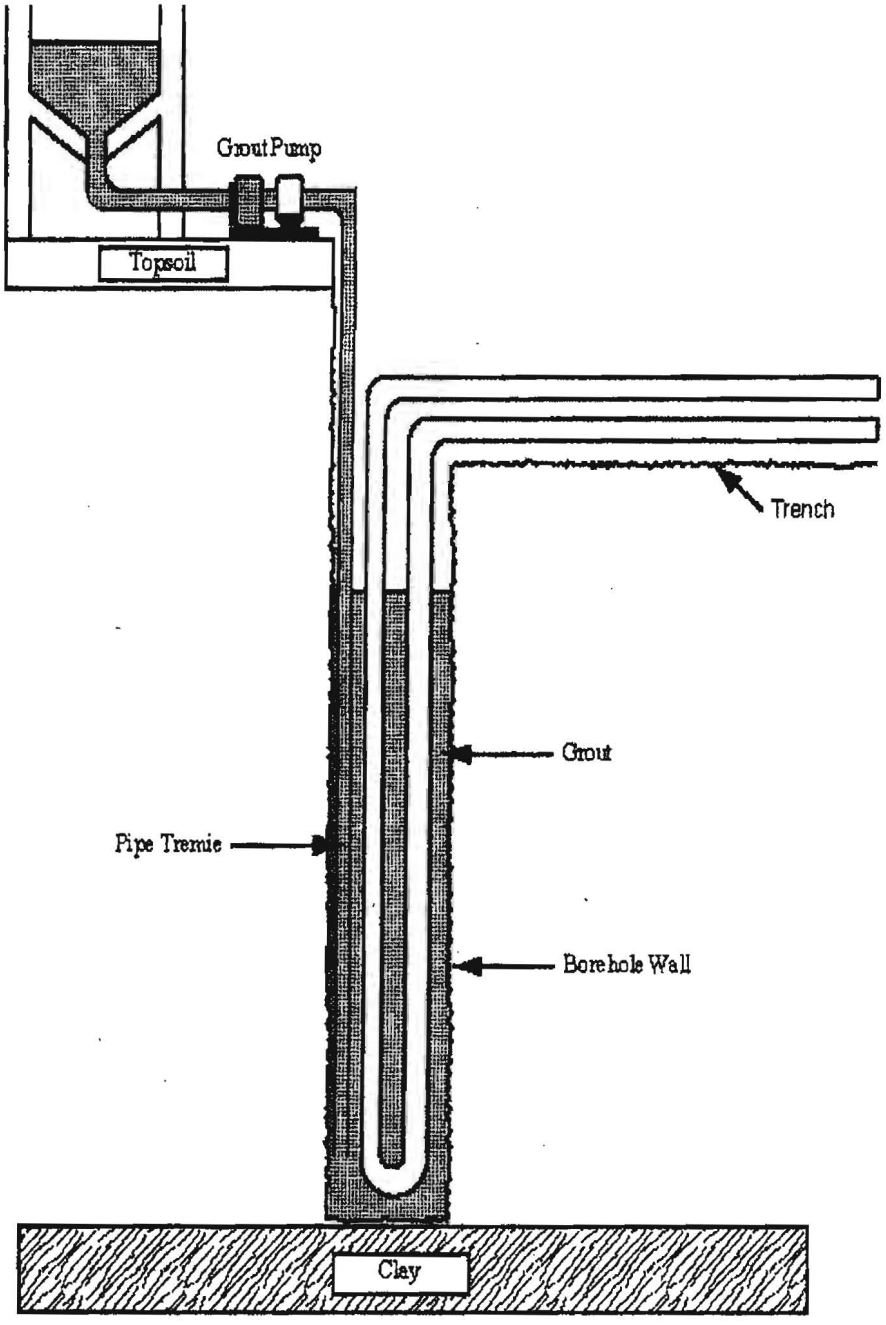


Figure 1-8 Tremie Pipe Method with Pump.

Table 2-1
Commercially Available Bentonite Grouting Materials

Product	Solids (%)	Water (Gal)	Yield[1] (Gal)	Grout[1] Weight (lb/Gal)	Thermal[1,2] Conductivity (Btu/hr ft F)	Permeability[1,2,3] (cm/s)
Aquaguard	30	14	16.8	9.92	0.43	$1x10^{-6}$
Aquagrout	22.7	20	23.2	9.50	0.43	$8x10^{-8}$
Benseal/EZ Mud	15.3	33	36.6	8.94	0.38	$6x10^{-8}$
BH Grout	30	14	16.8	9.93	0.45	$3x10^{-8}$
Enviroplug	30	14	16.9	9.86	0.44	$1x10^{-8}$
Groutwell[4]	18	27	30.7	9.05	0.41	$1x10^{-7}$
Puregold	30	14	16.9	9.87	0.44	$2x10^{-8}$
Quick Grout	20	23	27.0	9.25	0.41	$3x10^{-7}$
Volclay Grout	20	23	27.5	9.08	0.43	$1x10^{-7}$

1. Paul and Remund et al (1996). 2. Remund et al (1993). 3. Measured permeability after approximately 80 hours. 4. Groutwell is a powdered bentonite product. Groutwell DF is a granular form of the same bentonite grout product, and displays the same physical properties.

Placement of the bentonite slurry into the borehole is generally done with a positive displacement pump and a tremie pipe. The ability to pump the grout through the tremie pipe depends on the viscosity of the grout slurry, which is a function of the type of bentonite grout being used and the time required to adequately mix and pump the slurry completely through the tremie pipe. Each of the bentonite grouting products were tested, at manufacturer's recommended percent solids, for viscosity as a function of time (Heiberger and Remund, 1997). There are significant differences in the viscosities of the various bentonite grouting products. Grouts with lower viscosities will pump easier, and those that have low and relatively constant viscosities will provide a longer working time. This should always be considered when selecting a bentonite grout so that the grouting contractor can effectively place the grout into the GHEX borehole after insertion of the U-bend.

Heiberger and Remund (1997) measured pumping pressures that were required to pump all of the commercially available bentonite grouts as a function of grout flow rate, tremie pipe diameter and pumping time. Results of those tests are summarized in