

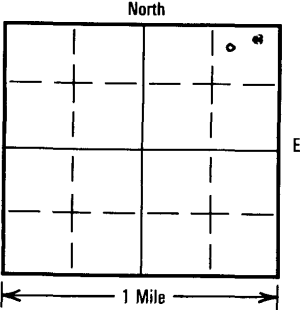
SOUTH DAKOTA WATER WELL COMPLETION REPORT

6100-94-340
07-92

Location NE 1/4 NE 1/4 Sec 24 Twp 2N Rg 8E

Well Owner: U.S. Air Force
 Business Name: Ellsworth Air Force Base
 Address: Ellsworth, S.D.
57704

County Pennington



Please mark well location with an "X"

Well Completion Date See Attached Forms

WELL LOG:

FORMATION	DEPTH	
	FROM	TO
<u>See Form #5</u>		

LOCATION:
 Distance from nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)? _____ ft. from _____ (identify source).

PROPOSED USE:
 Domestic/Stock Municipal Business Test Holes
 Irrigation Industrial Institutional Monitoring well

METHOD OF DRILLING: 10.25" = O.D.
6.25" = I.D.

CASING DATA:
 Steel Plastic PVC Other
 If other describe _____

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
_____ LB/FT	<u>2</u> IN	_____ FT	_____ FT	_____ IN
_____ LB/FT	_____ IN	_____ FT	_____ FT	_____ IN
_____ LB/FT	_____ IN	_____ FT	_____ FT	_____ IN

STATIC WATER LEVEL See forms _____ Feet
 If flowing: closed in pressure _____ PSI
 GPM flow _____ through _____ inch pipe
 Controlled by Valve Reducers Other _____
 Reduced Flowrate _____ GPM
 Can well be completely shut in? _____

GROUTING DATA
 Grout Type Best/Cast No. of Sacks _____ Grout Weight _____ lb./gal From _____ ft. To _____ ft.
 Describe grouting procedure See Attached Forms

WELL TEST DATA:
 Pumped Describe: _____
 Bailed _____
 Other _____
 Pumping Level Below Land Surface _____ ft. After _____ Hrs. pumped _____ GPM
 _____ ft. After _____ Hrs. pumped _____ GPM
 If pump installed, pump rate _____ GPM

SCREEN: Perforated pipe Manufactured
 Diameter 2 IN Length 10 FEET
 Material Stainless Steel
 Slot Size 0.010 Set From _____ Feet to _____ Feet
 Other information See forms

REMARKS well ID #5
MW 940202
MW 940203

WAS A PACKER OR SEAL USED? YES NO
 If so, what material? Bentonite
 Describe packer(s) and location? See forms

This well was drilled under license # 565
 And this report is true and accurate.
 Drilling firm Huntingdon Eng'g & Env.
 Signature of License Representative: _____
 Signature of Well Owner or Equitable Property Holder: _____

DISINFECTION:
 Was well disinfected upon completion? _____ YES, How: _____
 NO, Why Not? Monitoring Only

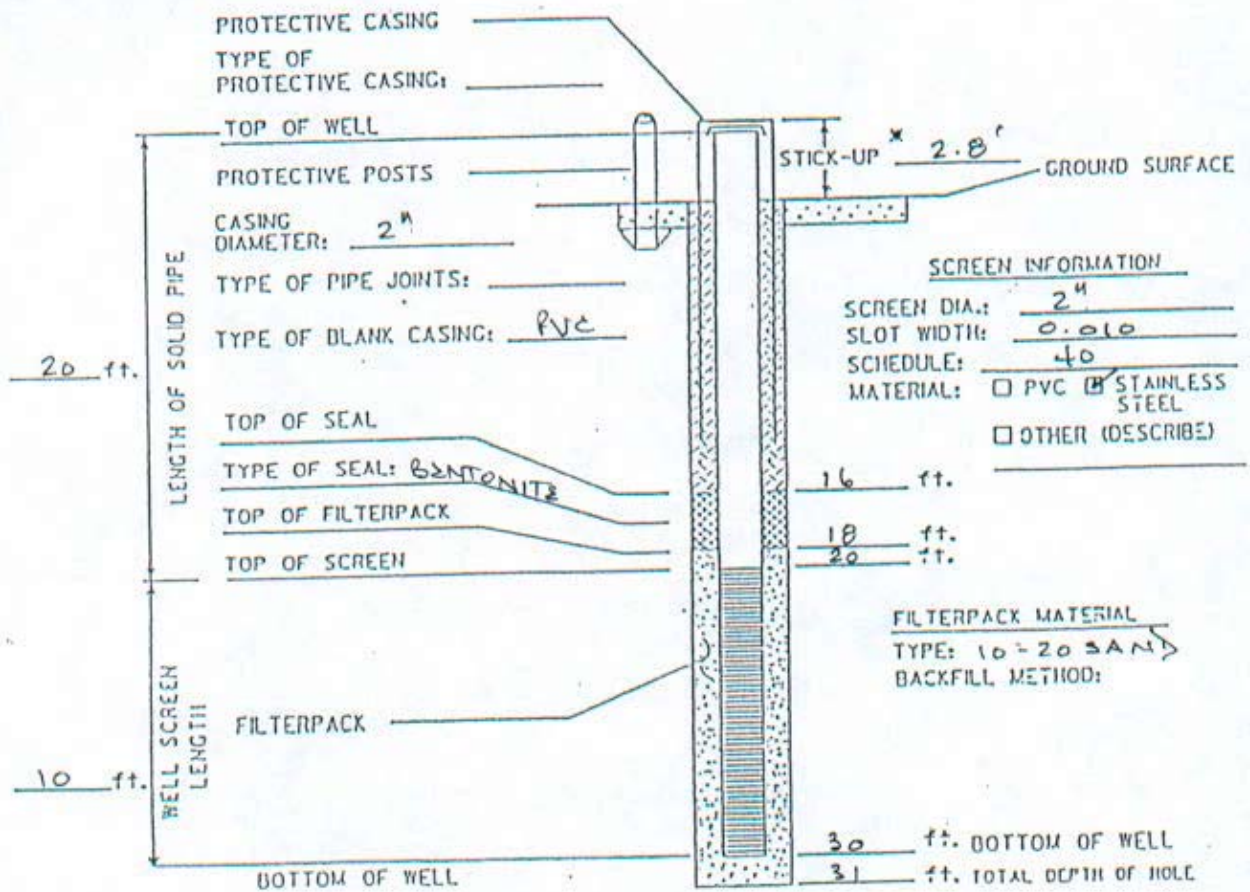
Date: 1/23/95

Laboratory sent to for water quality analysis _____

DATE GROUDED:			MONITORING WELL:	
DRILLING SUB: <u>HUNTING DON</u>			<u>MW940202</u>	
ELEVATION GROUND WATER: <u>22'</u>			PROJECT: <u>ELSWORTH AFB</u>	
DATE INSTALLED: <u>6/16/94</u>	STARTED: <u>10/5</u>	COMPLETED: <u>12/30</u>	LOCATION (Coordinates or Station):	
ELEVATION TOP OF HOLE:			SIGNATURE OF INSPECTOR: <u>[Signature]</u>	
TOTAL DEPTH OF HOLE: <u>31'</u>			HOLE NO. (as shown on drawing title and file number):	

MONITORING WELL CONSTRUCTION DIAGRAM

(ALL MEASUREMENTS FROM GROUND SURFACE)



WATER LEVEL SUMMARY

READING	DATE	TIME	LEVEL	WATER LEVEL MEASUREMENT REFERENCE
1	<u>6/16/94</u>	<u>1045</u>	<u>22'</u>	TOC <u>(TOBH)</u>
2				TOC TOBH
3				TOC TOBH

DEPTH FROM TOP OF CASING AFTER DEVELOPMENT:

WELL DEVELOPMENT

SEE WELL DEVELOPMENT DATA SHEET

HTW DRILLING LOG

Monitoring Well: MW940202		Soil Boring: SB940209 MW940202	
1. Company Name: EA Engineering		2. Drilling Sub: HUNTINGDON	Sheet 1 of 4
3. Project: Ellsworth AFB		4. Location: OU-2	
5. Name of Driller: KENNY, ST, TOYD		6. Drill Rig Designation: CME-75	
7. Sizes and Types of Drilling and Sampling Equipment	6" x 5' CONTINUOUS	8. Hole Location:	
	SPLIT SPOON SAMPLE,		
	10' 1/4 of HSA		
9. Surface Elevation:		10. Date Started: 6/15/94	
		11. Date Completed: 6/16/94	

12. Surface Composition: GRASS		15. Depth Groundwater Encountered (from samples): 23'	
13. Depth to Top Shale: 27'		16. Depth to Water & Time After Drilling Completed: 22' @ 1045 on 6/16	
14. Total Depth of Hole: 31'		17. Other Water Level Measurements/Times:	
18. Geotechnical Samples	Disturbed	Undisturbed	19. Number & Type of Cores Taken:
20. Samples for chemical Analyses	TPH	TCL VOC	TCL SVOC
	TAL Metals	TCL PEST/PCB	Other
22. Disposition of Soil Boring	Backfilled	Monitoring Well	Other
		MW940202	23. Signature of Inspector: <i>[Signature]</i>

Depth (a)	Analyt Sample (b)	Head space (c)	ASTM Column (d)	Lithological Description (e)	Remarks
1			ML	DARK REDDISH BROWN (5YR 3/3), VERY DRY, CLAYEN SILT WITH TRACE (10%) VERY FINE SAND; LOOSE SOFT TO FIRM; ROOTS & ROOTLETS TO 1'	
2			ML	BROWN (7.5YR 5/3), VERY DRY, CLAYEN SILT; FIRM	
3					
4			CL	(5YR 4/2) DARK REDDISH GRAY, FIRM, SILTY CLAY WITH TRACE (8%) VERY FINE SAND; SOME (25%) CALICHE POT'S + STRINGS; FIRM TO STIFF	
5				@ 5' - CALICHE REDUCED TO LITTLE (15%)	



HTW DRILLING LOG

Boring No: SB940209 / HW940202

Project: Ellsworth AFB

Inspector: M. STIENLICK

Sheet 2 of 4

Depth (a)	Analyt Sample (b)	Head space (c)	ASTM Column (d)	Lithologic Description	Remarks (h)
6 7 8			CL	<p>(54R 4/2) DARK REDDISH GRAY, FIRM, SILTY CLAY WITH TRACE (8%) VERY FINE SAND; LITTLE (15%) CALICHE POIS + STRINGERS; FIRM TO STIFF</p>	
9 10 11			MH CL	<p>YELLOWISH RED (54R 5/6), FIRM TO DAMP, CLAYEY SILT WITH TRACE (10%) VERY FINE SAND; FIRM TO STIFF</p> <p>(54R 4/2) DARK REDDISH GRAY, DAMP, SILTY CLAY WITH LITTLE (20%) FINE TO MEDIUM SAND; TRACE (5%) CALICHE POIS + STRINGERS; FIRM TO STIFF</p> <p>@ 10' - SAND SIZE INCREASED TO FINE TO COARSE + AMOUNT TO SOME (25%) + PRESENCE OF FINE TO MEDIUM GRAVEL (TRACE (10%))</p>	
12 13			ML	<p>BROWN (7.54R 4/3), DAMP, SILTY CLAY; + DARK GRAY (7.54R 4/1) LITTLE (20%) IRON OXIDE STAINING; STIFF</p>	

HTW DRILLING LOG

Boring No:

SB940202 / HW940202

Project: Ellsworth AFB

Inspector:

M. STEHLER

Sheet 2 of 4

Depth (a)	Analyt Sample (b)	Head space (c)	ASTM Column (d)	Lithologic Description (e)	Remarks (h)
				(7.54R 4/6)	
15			SM	STRONG BROWN, DAMP, SILTY FINE SAND; LITTLE (20%) IRON OXIDE STAINING; MEDIUM DENSE; POORLY GRAINED	
16			GC	DARK BROWN (7.54R 3/2), DAMP TO MOIST, CLAYEY FINE TO COARSE GRAVEL (ANGULAR) WITH SOME (35%) FINE TO COARSE SAND; MEDIUM DENSE TO DENSE	
17				@ 16' - SAND CONTENT DECREASES TO LITTLE (15%)	
18					
19					
20					
21					
22					
				@ 23' - GROUNDWATER ENCOUNTERED	

HTW DRILLING LOG

Boring No:

56940209 / HW940202

Project: Ellsworth AFB

Inspector:

M. STIEHLER

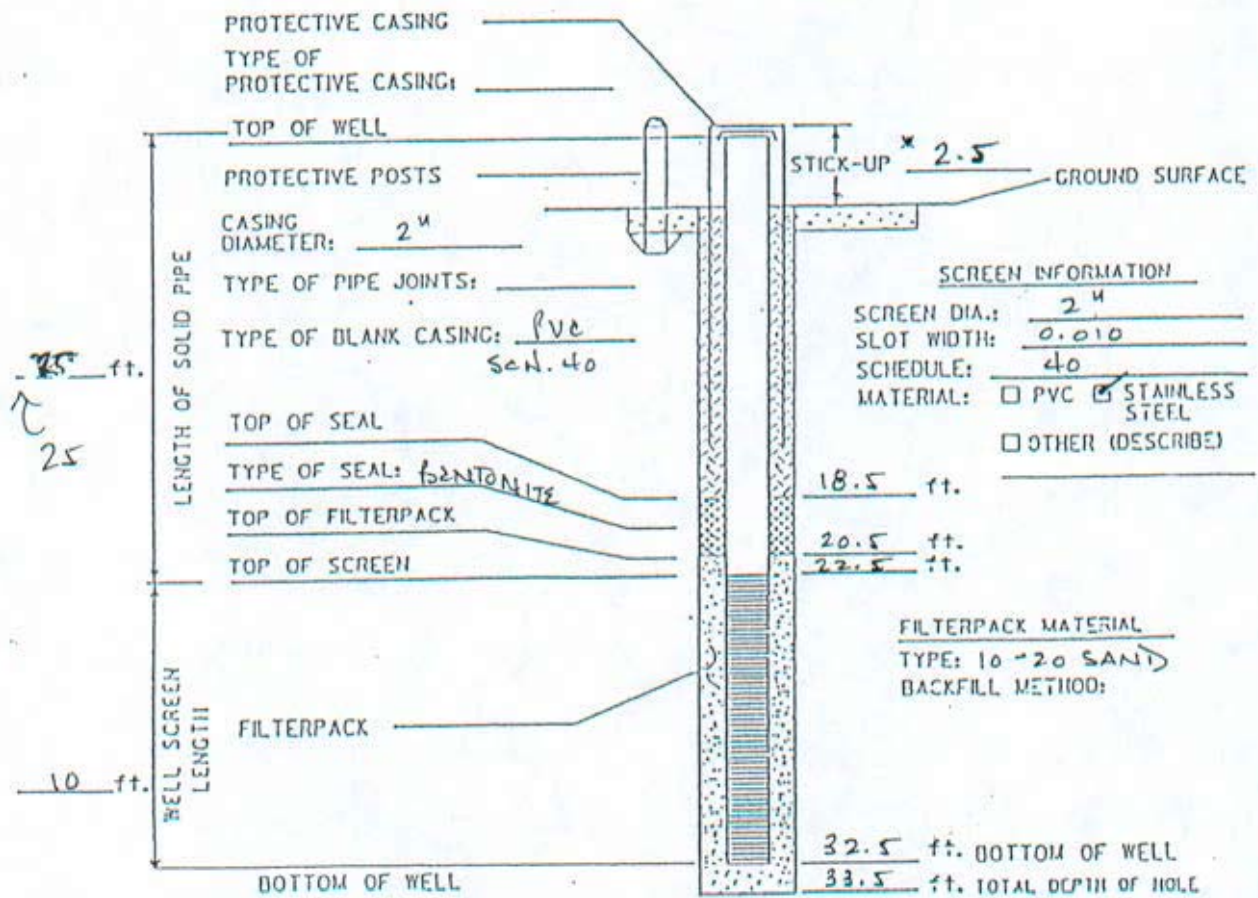
Sheet 4 of 4

Depth (a)	Analyt Sample (b)	Head space (c)	ASTM Column (d)	Lithologic Description (e)	Remarks (h)
24			GW	DARK BROWN (7.5 YR 3/2), WET, FINE TO COARSE SANDY GRAVEL (FINE TO COARSE) (SUBANGULAR); LITTLE (15%) SILT; DENSE	
25			SM	DARK YELLOWISH BROWN (10 YR 4/4), WET, SILTY FINE TO COARSE SAND; LITTLE (15%) FINE TO COARSE GRAVEL; DENSE @ 25' - GRAVEL CONTENT INCREASES TO AND (45%)	
26					
27					
28				FRACTURED SHALE: DARK GREENISH GRAY (5Y 4/1), WET, SILTY CLAY, VERY STIFF AND HARD, BLOCKS OF FRACTURED SHALE	
29					
30					
31					
				TOTAL DEPTH = 31 FEET GROUNDWATER ENCOUNTERED @ 23'	

DATE GROUTED:			MONITORING WELL:	
DRILLING SUB: <u>HUNTINGDON</u>			<u>MW 940203</u> / <u>SB940207</u>	
ELEVATION GROUND WATER			PROJECT <u>SUSWORTH AFB</u>	
DATE INSTALLED <u>6/15/94</u>	STARTED	COMPLETED	LOCATION (Coordinates or Station)	
ELEVATION TOP OF HOLE			SIGNATURE OF INSPECTOR <u>Ray Stiebel</u>	
TOTAL DEPTH OF HOLE <u>33.5'</u>			HOLE NO. (as shown on drawing title and file number)	

MONITORING WELL CONSTRUCTION DIAGRAM

(ALL MEASUREMENTS FROM GROUND SURFACE)



WATER LEVEL SUMMARY

READING	DATE	TIME	LEVEL	WATER LEVEL MEASUREMENT REFERENCE
1	<u>6/15/94</u>	<u>1300</u>	<u>24.5'</u>	TOC <u>TOBH</u>
2				TOC TOBH
3				TOC TOBH

DEPTH FROM TOP OF CASING AFTER DEVELOPMENT:


WELL DEVELOPMENT

SEE WELL DEVELOPMENT DATA SHEET

HTW DRILLING LOG

Monitoring Well: MU1940203		Soil Boring: SB940207 DP940207	
1. Company Name: EA Engineering		2. Drilling Sub: HUNTINGDON	Sheet 1 of 5
3. Project: Ellsworth AFB 60378.95		4. Location: OU-2 off-site Add-On	
5. Name of Driller: Ken Divers		6. Drill Rig Designation: CME-75 (Big Red)	
7. Sizes and Types of Drilling and Sampling Equipment	10.25" x 6.25" id Hollow Stem Auger	8. Hole Location: ~100' (S-SE) of IT well 0205 ~400' (E) of SB940207	
	5' x 6" od Continuous Split barrel Sampler	9. Surface Elevation:	
		10. Date Started: 6.3.94 (0820)	11. Date Completed: 6.3.94 (1000)

12. Surface Composition: flat grassy field		15. Depth Groundwater Encountered (from samples): 25'	
13. Depth to Top Shale: 26'		16. Depth to Water & Time After Drilling Completed: 28.5' ~10 mins	
14. Total Depth of Hole: 30'		17. Other Water Level Measurements/Times:	
18. Geotechnical Samples	Disturbed	Undisturbed	19. Number & Type of Cores Taken:
NONE			
20. Samples for chemical Analyses		TPH	✓ TCL VOC
1. 0-6" (0825) 3. 24.25" (0925)		TAL Metals	TCL SVOC
2. 9-10" (0840) DP940207(1000)		TCL PEST/PCB	Other
22. Disposition of Soil Boring	Backfilled	Monitoring Well	Other
			23. Signature of Inspector D.C. Mello

Depth (a)	Analyt Sample (b)	Head space (c)	ASTM Column (d)	Lithological Description (e)	Remarks
		(ppm)			
—		2.8	CL	0-5' Very Dark Gray (10YR 3/1), dry, silty Clay (CL), remement layering, no plasticity, low-med. competence, calcitic material throughout, some secondary fractures, 12-14" root material zone	- SB940207-1 0-6" (0825)
1					
—		2.8	CL		
2					
—					
3					
—					
4					- Easy drilling
—					
5		2.8	CL		- Borehole = 1.2 ppm BZ = 0 ppm

HTW DRILLING LOG


Boring No: SB940207
DP940207

Project: Ellsworth AFB

60378.95

Inspector: D.C. Metallo

Sheet 2 of 5

Depth (a)	Analyt Sample (b)	Head space (c)	ASTM Column (d)	Lithologic Description (e)	Remarks (h)
—		(ppm)			
6		2.5	CL	5-10' Very Dark Greyish Brown (2.5Y3/2), dry, silty Clay (cl), tightly layered w/ a 15-20% vfg sand content starting mid-section extending to bottom of section, no plasticity, med-high competence, some calcitic material throughout	
7					
8		2.5	CL		
9					
10		2.5	CL		- SB940207-2 9-10' (0840)
11		2.7	CL	10-13.5' Brown (10YR 4/3), slightly moist, silty Clay (cl) w/ 15-20% vfg Sand, tightly layered, no plasticity, med-high competence, no fractures, some calcitic material throughout	- Borehole = 1.0 ppm BZ = 0 ppm
12					
13		2.7	CL		

HTW DRILLING LOG

Boring No: 5B940207
DP940207

Project: Ellsworth AFB

60378.95

Inspector: D.C. Metello

Sheet 3 of 5

Depth (a)	Analyt Sample (b)	Head space (c)	ASTM Column (d)	Lithologic Description (e)	Remarks (h)
— 14		(ppm) 2.7	SC	13.5-15' Brown (10 VR 4/3), slightly moist, clayey vf-fg Sand (SC), layered, low competence, no plasticity, primary fractures b/w bedding planes	
— 15		2.7	SC		- Borehole = 1.0 ppm BE = 0 ppm
— 16		2.2	CL-SC	15- 16 16.5' Olive Brown (2.54 4/3), slightly moist, clayey vf-fg Sand (CL-SC), layered - blocky structures, no fractures	-15-20' color of section all the same
— 17		2.2	SM	16.5-18', slightly moist, silty vf-mg Sand (sm)	
— 18			CH	18-19' slightly moist, Clay (CH), fractured, med-high plasticity	
— 19		2.2	SM-SW	19-20 slightly moist, silty well graded vf-vc g Sand (sm-sw) w/ small-med sized well rounded pebbles	
— 20					
— 21		2.0	CL	20-22 Olive Brown (2.54 4/3), moist, silty Clay (CL) w/ 25-35% vf g Sand, layered, some fractures, sand content increases to 50-60% ~ 21.8'	

HTW DRILLING LOG

Boring No: SB940207
DP940207

Project: Ellsworth AFB

60378.95

Inspector: D.C. Metallo

Sheet 4 of 5

Depth (a)	Analyt Sample (b)	Head space (c)	ASTM Column (d)	Lithologic Description (e)	Remarks (h)
—	—	(ppm)	—	20-22' See Description Previous Page	—
22	—	2	CL	—	—
—	—	—	SM	—	—
23	—	2	SW	22-25' Olive Brown (2.54 4/3), moist, (two graded sequences - as follows)	- 22-25' 2 graded sequences 1st = 1' thick 2nd = 2' thick
—	—	—	GM	Silty vf-fg Sand, well graded → into a m-vcg sand w/ small-med pebble sized gravel	—
24	—	—	SM	—	—
—	—	2	SW	—	- SB940207-3 24'-25' (0925)
25	—	—	GM	—	—
—	—	1.5	GM	25-26' Dark Greyish Brown (2.54 4/2), wet sandy (m-vcg) Gravel w/ s-l pebbles (GM) - bottom of above graded sequence, water bearing zone	- 25' wetness on sample
26	—	—	—	—	—
—	—	1.5	W SHLE	26-30' Dark Greyish Brown (2.54 4/2) slightly moist-moist, weathered Shale (W SHLE) on highly fractured (well developed secondary fractures), w/ med.-large blocky structures, med. Competence, layered, Fe staining throughout	—
27	—	—	—	—	—
—	—	1.5	W SHLE	—	—
28	—	—	—	—	—
29	—	—	—	—	—

HTW DRILLING LOG

Boring No: SB940207
DP940207

Project: Ellsworth AFB

60378.95

Inspector:

D.C. Metallo

Sheet 5 of 5

Depth (a)	Analyt Sample (b)	Head space (c)	ASTM Column (d)	Lithologic Description (e)	Remarks (h)
30		(ppm) 1.5	W SHLE	26-30' See Description Previous Page	
31				<ul style="list-style-type: none"> - Boring terminated 30' - DP940207 taken (1000) ∇ : 1st encountered ~25' : 28.5' ~ 10 mins after drilling 	
32				<ul style="list-style-type: none"> - Augers pulled, hole left open - potential well location 	
33				<p>Drums Used</p> <ul style="list-style-type: none"> 3 - soil 2 - water 	
34					
35					
36					
37					