

Project: Motiva - Monitoring Well and Soil Boring Data

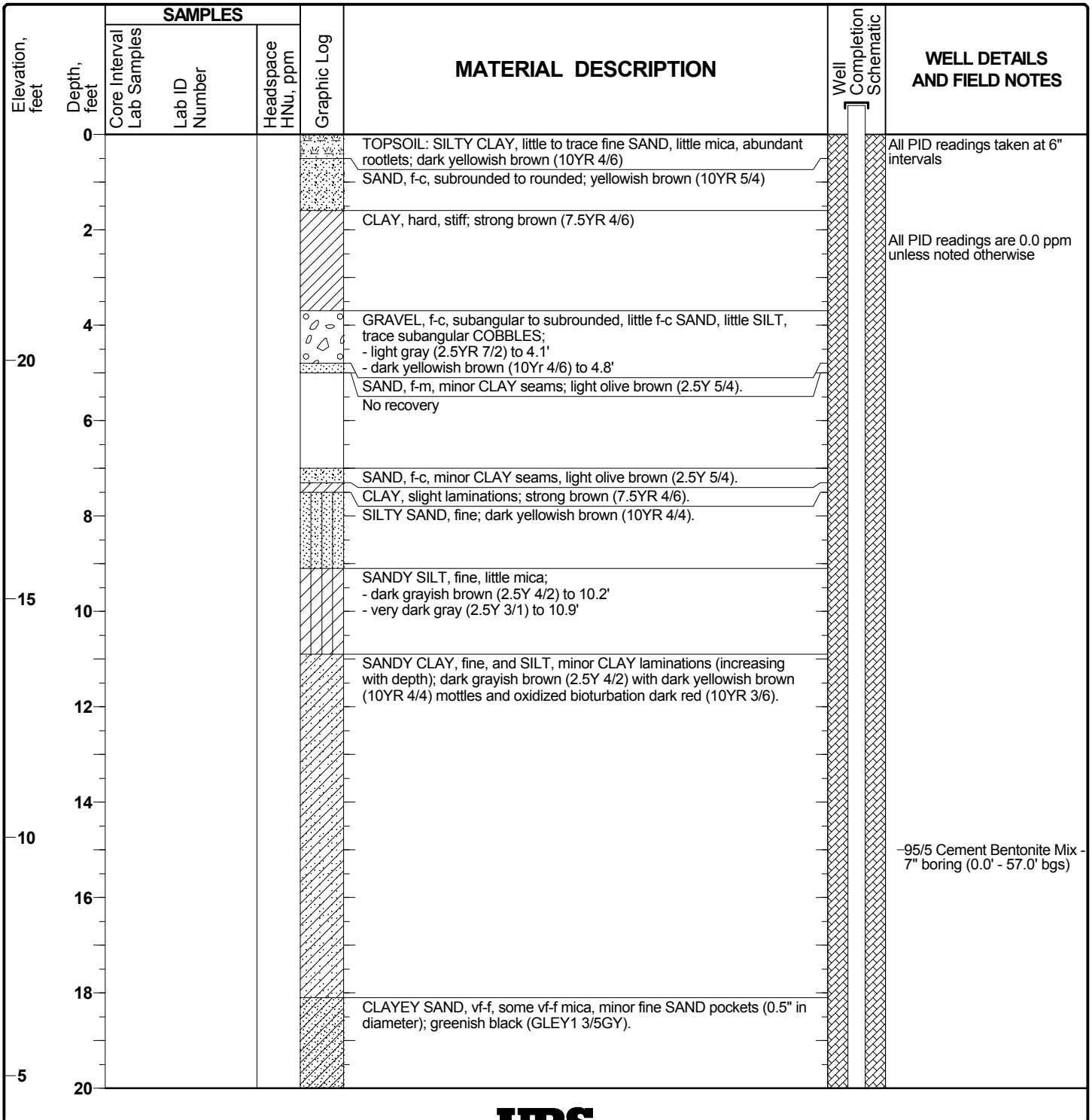
Project Location: Delaware City Refinery

Project Number: 20240412.W1000

Log of Monitoring Well D58B

Sheet 1 of 7

Date(s) Drilled	6/1/2007	Logged By	Stephen Zahniser	Checked By	
Drilling Method	Roto Sonic	Drill Bit Size/Type		Total Depth of Borehole	137.0 feet
Drill Rig Type	Roto-Sonic	Drilling Contractor	Boart Longyear	Surface Elevation	24.74 NAVD88
Groundwater Level(s)		Sampling Method(s)		Top of Casing Elevation	
Location	Delaware City Refinery - Soy Field		Borehole Completion		



MOTIVA MOTIVA-ALL.GPJ FAGWGN01.GDT 5/13/08



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Log of Monitoring Well D58B

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Elevation, feet	Depth, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Schematic	WELL DETAILS AND FIELD NOTES
		Core Interval Lab Samples	Lab ID Number	Headspace HNu, ppm				
20								
	22							
	24					SILTY SAND, vf-f, some mica, minor fine SAND, little SILT lenses; very dark greenish gray (GLE Y1 3/5GY).		
0	26					SAND, very fine, some SILT, micaceous; very dark greenish gray (GLE Y1 3/5GY).		
	28							
-5	30							
	32					SILT and fine SAND, micaceous (mica coarser than above); dark greenish gray (GLE Y1 3/5GY).		
	34							
-10	36							
	38							
-15	40					SILT, little CLAY, trace very fine SAND, micaceous; very dark greenish gray (GLE Y1 3/5GY).		
	42							

Quaternary-Merchantville Contact (39.0')

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Elevation, feet	Depth, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Schematic	WELL DETAILS AND FIELD NOTES
		Core Interval Lab Samples	Lab ID Number	Headspace HNu, ppm				
-20	44					SILT, little to some CLAY, micaceous; dark greenish gray (GLEY1 3/5GY).		
	46							
	48							
-25	50							
	52							
-30	54					SILTY CLAY, micaceous, interbedded SILTY, very micaceous seams; dark greenish gray (GLEY1 3/5GY).		
	56					SAA, increasing CLAY content, decreasing SILT content, little to some glauconite (increasing with depth); greenish black (GLEY1 2.5/N).		
	58							
-35	60							
	62							
	64							
-40	66						-95/5 Cement Bentonite Mix - 6" boring	

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Elevation, feet	Depth, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Schematic	WELL DETAILS AND FIELD NOTES
		Core Interval Lab Samples	Lab ID Number	Headspace HNu, ppm				
68								
-45	70							
	72							
	74							
-50	76							
	78							
-55	80							
	82							
	84							
-60					CLAY, little to some SILT, glauconitic, some mica; greenish black (GLEY1 2.5/N) with gray layers (10YR 5/1).			
	86							
	88							
-65	90							

MOTIVA MOTIVA-ALL.GPJ FAGWGN01.GDT 5/13/08



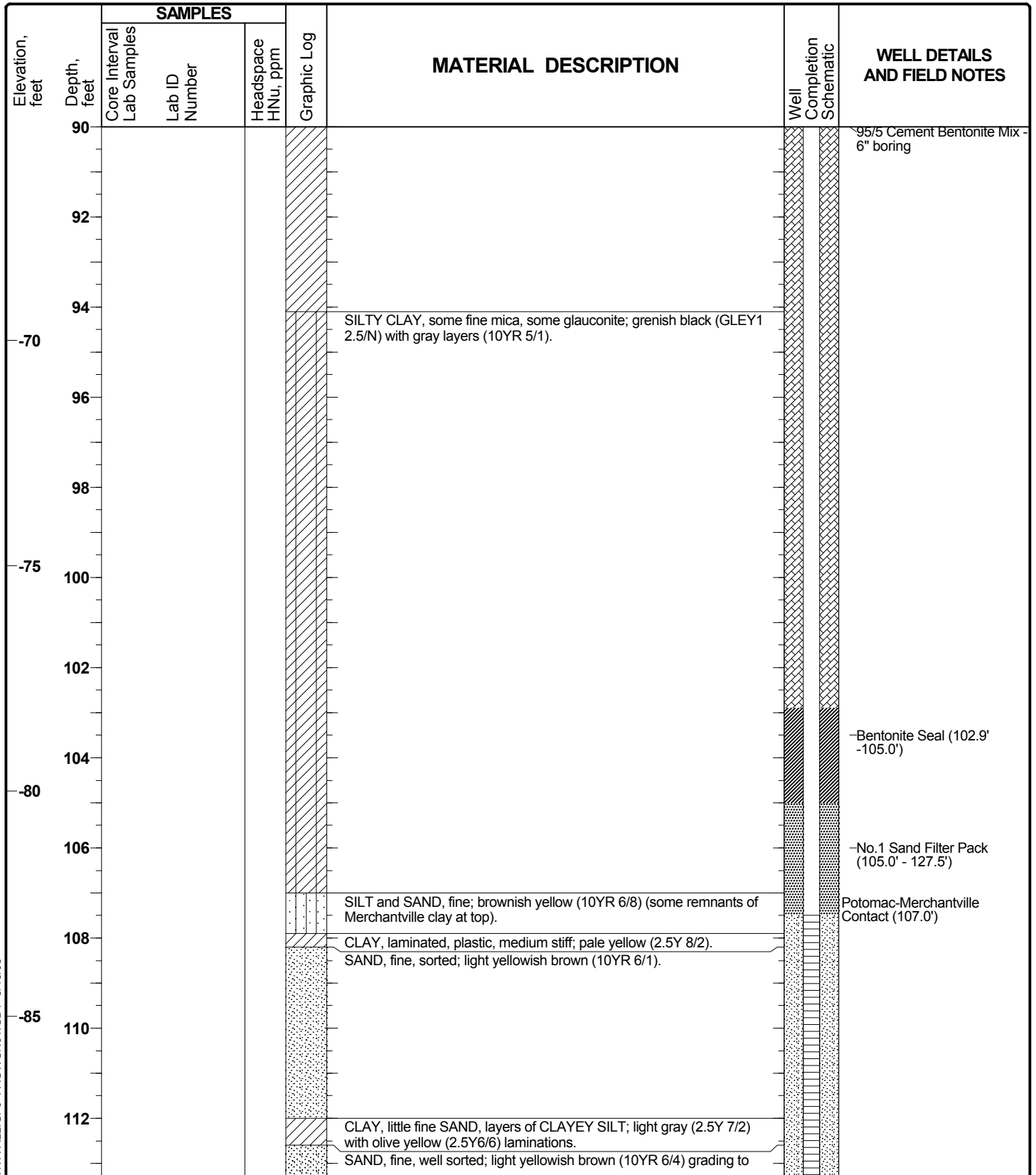
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Project Location: Delaware City Refinery

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Log of Monitoring Well D58B

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MOTIVA MOTIVA-ALL.GPJ FAGWGN01.GDT 5/13/08



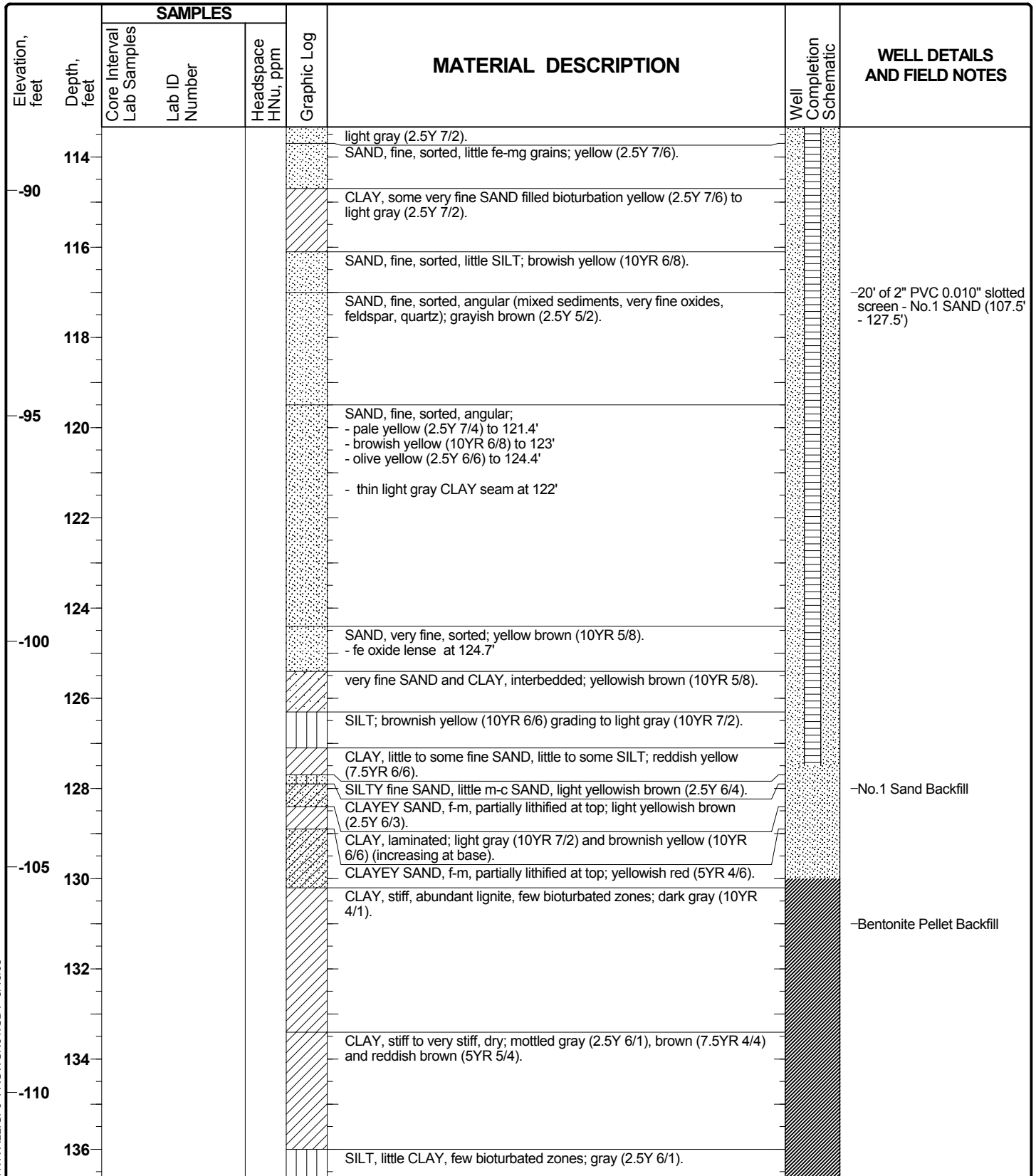
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Log of Monitoring Well D58B

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MOTIVA MOTIVA-ALL.GPJ FAGWGN01.GDT 5/13/08



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Log of Monitoring Well D58B

Sheet 7 of 7

Elevation, feet	Depth, feet	SAMPLES			Graphic Log	MATERIAL DESCRIPTION	Well Completion Schematic	WELL DETAILS AND FIELD NOTES
		Core Interval Lab Samples	Lab ID Number	Headspace HNu, ppm				
					EOB (137.0')			
138								
-115	140							
	142							
	144							
-120	146							
	148							
-125	150							
	152							
	154							
-130	156							
	158							
-135	160							

MOTIVA MOTIVA-ALL.GPJ FAGWGN01.GDT 5/13/08





MWH Americas, Inc.
335 Phoenixville Pike
Malvern, Pennsylvania 19355

Boring ID: D58B

EC13-91

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Project Name: Valero
Location: Delaware City, DE
Project Number:
Date Started: Unknown
Date Finished: Unknown
Drilling Method: Roto-Sonic
Sampling Method:
State Permit Number: NA

Boring Location: Delaware City Refinery
Drilling Company: ProSonic ()
Ground Elevation (ft/msl): 24.7
Total Depth (ft): 137.0'
Boring Diameter (in): "
Water Level During Drilling (ft/bgs):
Weather Conditions:
Logged By: Stephon

Depth (feet)	Blow Counts	Recovery (inches)	PID (ppm)	Sample ID	Sample Interval	USCS	Lithology	Lithologic Description	Well Diagram	Remarks
0						CL	CL	0' - 0.5' Dark yellowish brown (10YR 4/6) silty CLAY, some rootlets, little mica, little to trace fine-grained sand		All PID readings taken at 6 intervals
1						SP	SP	0.5' - 1.6' Yellowish brown (10YR 5/4) fine-coarse-grained subrounded to rounded SAND		
2						CH	CH	1.6' - 3.7' Strong brown (7.5YR 4/6) CLAY, hard, stiff		All PID readings are 0.0 ppm unless noted otherwise
3										
4				3.7		GW	GW	3.7' - 4.8' Light gray (2.5Y 7/2) fine-coarse-grained subangular to subrounded GRAVEL, little fine-coarse-grained sand and silt, trace subangular cobbles		
5						SW	SW	4.1' dark yellowish brown (10YR 4/6)		
6				Qc1				4.8' - 7.3' Light olive brown (2.5Y 5/4) fine-medium-grained SAND, minor clay seams		
7								7' - 7.3'		
8				7.5		CH	CH	7.3' - 7.5' Strong brown (7.5YR 4/6) CLAY, slight laminations		
9						SP	SP	7.5' - 9.1' Dark yellowish brown (10YR 4/4) silty fine-grained SAND		
10						SM	SM			
11						ML	ML	9.1' - 10.9' Dark grayish brown (2.5Y 4/2) fine-grained sandy SILT, little mica		
12								10.2' very dark gray (2.5Y 3/1)		
13										
14										
15						CL	CL	10.9' - 18.1' Dark grayish brown mottled with dark yellowish brown (10YR 4/4) fine-grained sandy CLAY and SILT, variations minor clay laminations with increase in clay laminations with depth		

Depth (feet)	Blow Counts	Recovery (inches)	PID (ppm)	Sample ID	Sample Interval	USCS	Lithology	Lithologic Description	Well Diagram	Remarks
15										
16										
17										
18						SP-SC		18.1' - 22.3' Greenish black (GLEY 1 2.5/N) clayey very fine-fine-grained SAND, some very fine-fine-grained mica, minor fine-grained sand pockets (~0.5" in diameter)		
19										
20										
21										
22						SW-SM		22.3' - 24.1' Very dark greenish gray (GLEY 1 3/5GY) silty very fine-fine-grained SAND, some fine-grained mica, minor sand lenses (interbedded with silt)		
23										
24						SP-SM		24.1' - 31.6' Very dark greenish gray (GLEY 1 3/5GY) very fine-grained SAND, some silt, micaceous		
25										
26										
27										
28										
29										
30										
31										
32						ML		31.6' - 39' Very dark greenish gray (GLEY 1 3/5GY) SILT and fine-grained SAND, micaceous		
33										



MWH

MWH Americas, Inc.
335 Phoenixville Pike
Malvern, Pennsylvania 19355

Boring ID: D58B

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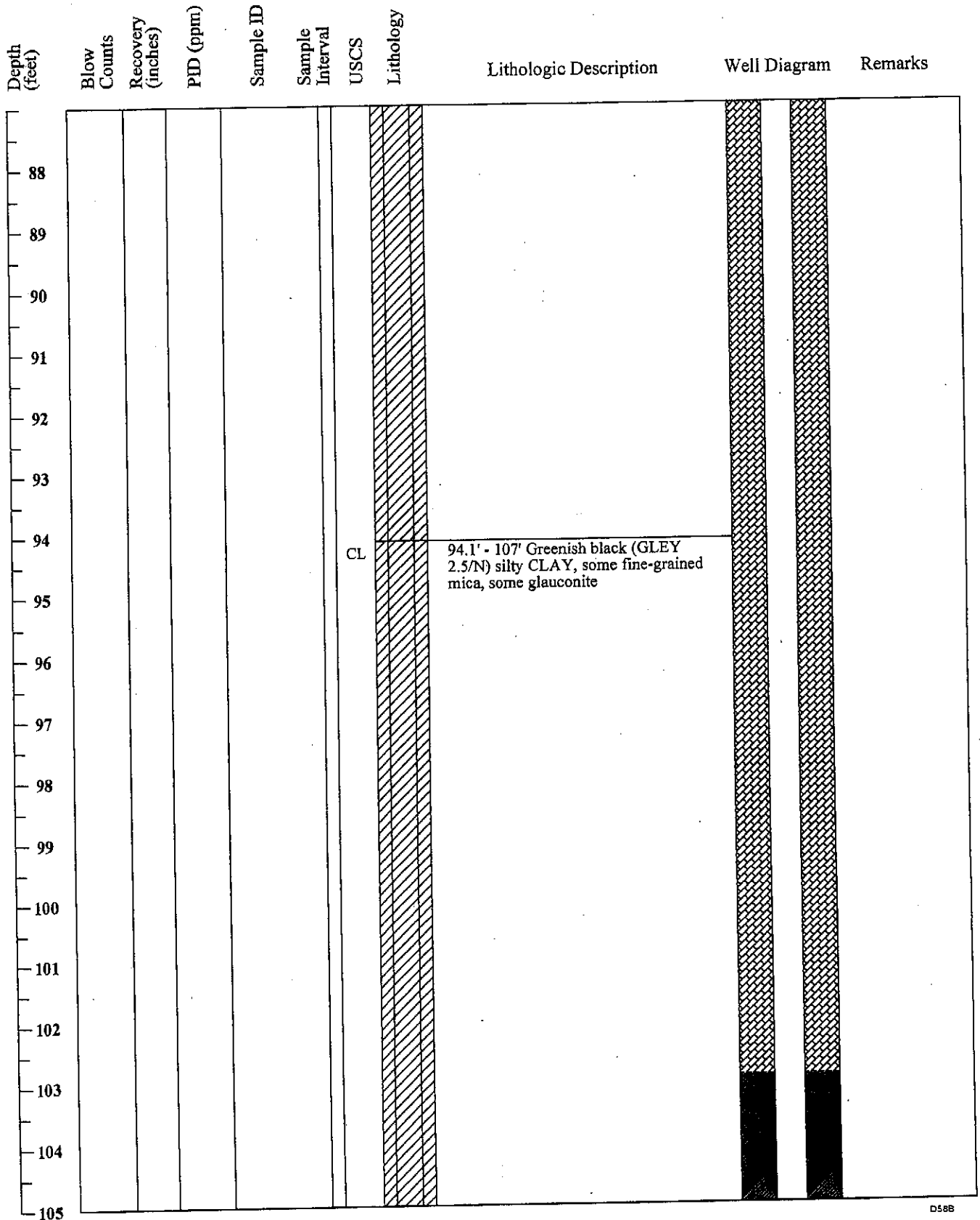
Depth (feet)	Blow Counts	Recovery (inches)	PID (ppm)	Sample ID	Sample Interval	USCS	Lithology	Lithologic Description	Well Diagram	Remarks
33										
34										
35										
36										
37										
38										
39						ML		39' - 44.1' Very dark greenish gray (GLE Y 1 3/5GY) SILT, trace very fine-grained SAND, micaceous, little clay		Quaternary-Merchantville Contact (39.0')
40										
41										
42										
43										
44						ML		44.1' - 54' Very dark-greenish gray (GLE Y 1 3/5GY) SILT, little to some clay, micaceous		
45										
46										
47										
48										
49										
50										
51										



Depth (feet)	Blow Counts	Recovery (inches)	PID (ppm)	Sample ID	Sample Interval	USCS	Lithology	Lithologic Description	Well Diagram	Remarks
52										
53										
54						CL		54' - 84.5' Very dark greenish gray (GLE Y 1 3/5GY) silty CLAY, micaceous, mica rich, silty seams interbedded		
55										
56								55.9' greenish black (GLE Y 1 2.5/N) increase in clay decrease in silt, little some some glauconite (increases with depth)		
57										
58										
59										
60										
61										
62										
63										
64										
65										
66										
67										
68										
69										



Depth (feet)	Blow Counts	Recovery (inches)	PID (ppm)	Sample ID	Sample Interval	USCS	Lithology	Lithologic Description	Well Diagram	Remarks
70										
71										
72										
73										
74										
75										
76										
77										
78										
79										
80										
81										
82										
83										
84										
85						CL		84.5' - 94.1' Black (GLE Y 1 2.5/N) CLAY, little to some silt, glauconite, some mica, gray (10YR 5/1) zones scattered throughout		
86										
87										



Depth (feet)	Blow Counts	Recovery (inches)	PID (ppm)	Sample ID	Sample Interval	USCS	Lithology	Lithologic Description	Well Diagram	Remarks
106										
107						SP-SM		107' - 107.9' Brownish yellow (10YR 6/8) fine-grained SAND and SILT, some clay at top		Potomac-Merchantville Contact (107.0')
108						CH SP		107.9' - 108.2' Pale yellow (2.5Y 8/2) CLAY, laminated, plastic, medium stiff		
109								108.2' - 112' Light yellowish brown (10YR 6/4) fine-grained sorted SAND		
110										
111										
112						CL SP		112' - 112.6' Light gray (2.5Y 7/2) CLAY, little fine-grained sand and rows of clayey silt, olive yellow (2.5Y 6/6) laminations		
113								112.6' - 113.7' Light yellowish brown (10YR 6/4) grading to light gray (2.5Y 7/2) fine-grained well sorted SAND		
114						SP		113.7' - 114.7' Yellow (2.5Y 7/6) fine-grained sorted SAND, little fine-grained ?		
115						CL		114.7' - 116.1' Light gray (2.5Y 7/2) CLAY, some very fine-grained sand, filled bioturbation		
116						SP-SM		116.1' - 117' Brownish yellow (10YR 6/8) fine-grained sorted SAND, little silt		
117						SP		117' - 119.5' Grayish brown (2.5Y 5/2) fine-grained sorted angular SAND (mixed sediments very fine oxidized, quartz)		
118										
119										
120						SP		119.5' - 124.4' Pale yellow (2.5Y 7/4) fine-grained angular sorted SAND		
121								121.4' brownish yellow (10YR 6/8)		
122								122' gray (10YR 6/8) thin clay seams		
123										

Depth (feet)	Blow Counts	Recovery (inches)	PID (ppm)	Sample ID	Sample Interval	USCS	Lithology	Lithologic Description	Well Diagram	Remarks
124								123' olive yellow (2.5Y 6/6)		
125						SP		124.4' - 125.4' Yellowish brown (10YR 5/8) very fine-grained sorted SAND, fe-oxide lense at 124.7' bgs		
126						SC		125.4' - 126.3' Yellowish brown (10YR 5/8) interbedded very fine-grained SAND and CLAY		
127						ML		126.3' - 127.1' Brownish yellow (10YR 6/6) to light gray (10YR 7/2) SILT		
128						CL		127.1' - 127.7' Reddish yellow (7.5YR 6/6) CLAY, little to some silt, little fine-grained sand		
129						SM SW SC CL		127.7' - 127.9' Light yellowish brown (2.5Y 6/4) silty fine-grained SAND, little medium-coarse-grained sand		
130						CL		127.9' - 128.4' Light yellowish brown (2.5Y 6/3) clayey fine-medium-grained SAND, particularly lithified at top		
131						SW CH		128.4' - 128.9' Light gray (10YR 7/2) and brownish yellow (10YR 6/6) CLAY laminated (increasing lamination at base)		
132								128.9' - 129.9' Light gray (10YR 7/2) and brownish yellow (10YR 6/6) CLAY, trace to little fine-grained sand, very fine-grained and seam at 128.9' bgs		
133								129.9' - 130.2' Yellowish red (5Y 4/8) clayey fine-medium-grained SAND, particularly lithified at top		
134						CH		130.2' - 133.4' Dark gray (10YR 4/1) CLAY, hard, stiff, continuous abundant lignite and few bioturbated zones (silty clay)		
135								133.4' - 136' Gray (2.5Y 6/1), brown (7.4YR 4/4) and reddish brown (5YR 5/4) mottled CLAY, hard to very hard, very stiff, dry		
136						ML		136' - 137' Gray (2.5Y 6/1) SILT, little clay (minor bioturbation ?)		
137								137' End of Boring		
138										
139										
140										
141										