WASTE SCIENCE AND TECHNOLOGY CORP.

LOG OF BORING

BORING NO. PW-1

SHEET 3 OF 6

CLIENT	PROJECT	PROJECT NO.
EPA REGION III	STANDARD CHLORINE	047118.0123

PROJECT LOCATION	COORDINATES	ELEVATION (DATUM)	TOTAL DEPTH	DATE START
			156'	11/3/2003

SURFACE CONDITIONS	DATE FINISH
	11/11/2003

DRILLING CONTRACTOR		
CHESAPEAKE GEOSYSTEMS		
DRILL RIG	DRILLER	INSPECTOR
SIMCO 9100	B. VAN DOREN	M. NAPOLITAN
CHECKED BY		APPROVED BY

SAMPLING							CORING									
SAMPLE TYPE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD	DEPTH IN FEET	SAMPLE TYPE	LOG	CLASSIFICATION OF MATERIAL	REMARKS
SPT	8	10	14	14/18	24	2								61			SAME AS ABOVE; WET	2ft of sand blow in
														2			1.0 ft of blow in	hole was cleaned
														3				1.1 ppm
														4				
														5				
SPT	9	5	6	7/8	13	2								6			SAME to 66.5' SAME GRAVEL (QUARTZ)	~2ft of Heaving Sand
														7			ABRUPT CHANGE TO Silty Clay; Brownish	1tole cleaned prior to
														8			black (5YR 2/1); miraceous; stiff;	sample
														9			dense (MERCHANTVILLE Fm); DRY	BACKGROUND PID
														70			SAME AS ABOVE TO 70.5'	
SPT	10	26	20	50/5	70+	2								1			silty SAND; Light Brownish Gray (5YR 6/1)	1.0 ft of blowin
														2			Fine to medium; subrounded; wet; well sorted	Cleaned before sample
SPT	11	14	11	19/46	30	2								3			silty sandy CLAY; med light gray (N6)	BACKGROUND PID
														4			dense stiff; DRY	
SPT	12	24	36	50/2/-	86+	2								5			SAME AS ABOVE; MORE SILT & SAND (N6)	0.0 ppm
														6				
SPT	13	11	12	12/22	24	1.8								7			silty SAND; med. light gray to med. gray	0.0 ppm
														8			(N6 to N5); well sorted; moist;	Advanced w/ 6" Roller
SPT	14	6	6	8/8	14	2								9			Subrounded	cone (mud) w/ 2" SPT
														80			silty SAND; (N6 to N5); (coarse to fine) ~~poorly~~ sorted;	0.0 ppm
SPT	15	7	10	17/29	27	1.5								1			moist; subrounded to angular; loose	0.0 ppm
														2			w/ GRAVEL (Dusky Yellow 5Y 6/4); mica	
SPT	16	4	7	17/20	24	1.1								3			GRADING TO SILTY CLAY; (N6 to N5)	0.0 ppm
														4			stiff; dense w/ 3" of stiff lean Clay	
SPT	17	7	11	13/23	24	2								5			@ 78'. (lignite or Charcoal fragments)	
														6			silty CLAY; dark GRAY (N3 to N4) w/	0.0 ppm
SPT	18	7	13	17/22	30	2								7			Black mottles (N1 to N2); Dense; stiff; DRY	
														8			silty CLAY; (N6); dense; lignite	0.0 ppm
SPT	20	10	19	23/28	42	2								9			CLAY; GRAY to DUSKY BROWN	0.0 ppm
														0				

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LOG OF BORING

BORING NO. PW-1

SHEET 4 OF 6

CLIENT	PROJECT	PROJECT NO.
US EPA REGION III	STANDARD CHLORINE	047118.0123

PROJECT LOCATION	COORDINATES	ELEVATION (DATUM)	TOTAL DEPTH	DATE START
			156'	11/03/2003

SURFACE CONDITIONS

DATE FINISH 11/11/2003

DRILLING CONTRACTOR: CHESAPEAKE GEOSYSTEMS INC.

DRILL RIG	DRILLER	INSPECTOR
SIMCO 9100	B. VAN DOREN	M. NAPOLITAN

CHECKED BY

APPROVED BY

SAMPLING							CORING									
SAMPLE TYPE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD	DEPTH IN FEET	SAMPLE TYPE	LOG	CLASSIFICATION OF MATERIAL	REMARKS
SPT	21	5	12	15/22	27	2								91			CLAY; RED & GRAY mottled; Dusky Brown (5YR 2/2); dense stiff; DRY	0.0ppm
SPT	22	5	13	16/21	29	2								3			SAME AS ABOVE	0.0ppm
SPT	23	10	15	18/25	33	2								5			CLAY; DUSKY BROWN (5YR 2/2); dense stiff; dry grading sandy @ 95.5' (N6 to N5)	0.0ppm
SPT	24	5	13	18/20	31	2								7			silty CLAY; (N6 to N5 GRAY); GRADING TO silty SAND; medium to fine grained; moist (N6 to N5); well sorted.	0.0ppm
SPT	25	7	13	20/10	33	2								9			~~Sandy SILT - GRADING TO FINE GRAINED~~	0.0ppm
SPT	26	6	11	15/21	26	2								100			~~SAND; WET~~	
SPT	27	7	11	15/26	26	2								3			Sandy SILT grading to silty SAND; (N6 to N5); wet; Very Fine to medium grained; Well Sorted; dense silt to loose sand;	0.0ppm
SPT	28	28	50/2	—	—	0.5								5			GRAVEL; Red; angular; well sorted; Very coarse; Wet	0.0ppm
SPT	29	18	36	32/32	68	2								7			SAND; GRAY (N6 to N5) and Dark Yellowish orange (10YR 6/6); medium to fine grained	0.0ppm
SPT	30	5	16	50/2/-	66+	1.4								9			CLAY interbed (Gray N6); stiff 6" @ 109.5'	
SPT	31	32	50/2/-	-/-	—	0.5								110			silty SAND to sandy SILT grading to SAND; Light Brown 5YR 5/6 to Pale Yellowish brown 10YR (5/4). medium; Some RED color to orange; WET	0.0ppm
SPT	32	50	50/2	-/-	—	0								3			SAND; orange brown to Dark Yellowish brown (10YR 6/6); medium; well sorted; loose; moist; subrounded	0.0ppm
SPT	33	50/3	—	—	—	0.3								5			SAND; pale yellowish BROWN (10YR 6/2); med; wet	0.0ppm
SPT	34	50/6	—	—	—	0								7			SAND; GRAY (N6 to N5); Coarse well sorted; wet.	0.0ppm
SPT	35	50	50/3	—	—	0.2								9				
														120				

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LOG OF BORING

BORING NO PW-1

SHEET 5 OF 6

CLIENT	PROJECT	PROJECT NO.
US EPA REGION III	STANDARD CHLORINE	04718.0123

PROJECT LOCATION	COORDINATES	ELEVATION (DATUM)	TOTAL DEPTH	DATE START
			156'	11/03/2003

SURFACE CONDITIONS	DATE FINISH
	11/11/2003

DRILLING CONTRACTOR: CHESAPEAKE GEOSYSTEMS INC.

DRILL RIG	DRILLER	INSPECTOR
SIMCO 9100	B. Van DOREN	M. NAPOLITAN / A. BUGGINS.

CHECKED BY: | APPROVED BY:

SAMPLE TYPE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	DEPTH IN FEET	CLASSIFICATION OF MATERIAL	REMARKS
SPT	36	50	150/2	—	—	0.6	121	tz SAND; medium to Coarse; NG+ONS	ADVANCED MUD ROTARY
							2	GRAY; DENSE; well sorted, subrounded	6" ROLLER w/ 2" SPT
SPT	37	65	180/2	—	—	0.5	3	SAME AS ABOVE	0.0ppm
							4		
SPT	38	45	70	80/5	150	2	5	SAND; GRAY (N5) to Dark Yellowish orange	0.0ppm
							6	(10yr 6/6); coarse grading to fine silt	
SPT	39	20	40	50/	90	1	7	sand @ 125.5'; well sorted; subrounded	
							8	dense; wet	
SPT	40	20	50/	—	—	0.6	9	sand dark yellowish orange	0.0ppm.
							130	coarse; grading light orange sand	
SPT	41	40	50/1	—	—	0.9	1	@ 6", well sorted; dry: grading; grey	
							2	clay (~1") @ bottom of sample.	
SPT	42	100/5	—	—	—	0.6	3	sand gray grading → light yel	[illegible]
							4	well sorted, [illegible]	
SPT	43	100/5	—	—	—	0.8	5	sand light yellow [illegible]	[illegible]
							6	grading gray sand [illegible]	
SPT	44	150/5	—	—	—	0.7	7	light gray sand grading silty gray	0.0ppm
							8	well sorted, subrounded	
SPT	45	70	100/3	—	—	1.1	9	As above - wet	0.0ppm
							140	As above	0.0ppm
SPT	46	20	70	100/1	—	1		As above - [illegible]	
							2		0.0ppm
SPT	47	50	120/6	—	—	0.1	3		
							4	dense,	
SPT	48	100	160/4	—	—	0.7	5	GRAY SAND; medium to Coarse	
							6		
							7		
							8		DRILLING RATE
							9	(CLAY?) CHANGE IN CUTTINGS TO	SLOWED MUD COLOR
							500	RED & GRAY CLAY	CHANGE TO RED BROWN

WASTE SCIENCE AND TECHNOLOGY CORP.

LOG OF BORING

BORING NO. PW-1

SHEET 6 OF 6

CLIENT	PROJECT	PROJECT NO.
USEPA REGION III	STANDARD CHLORINE	047117.0123

PROJECT LOCATION	COORDINATES	ELEVATION (DATUM)	TOTAL DEPTH	DATE START
			156'	11/03/2003

SURFACE CONDITIONS

DATE FINISH 11/11/2003

DRILLING CONTRACTOR: CHESAPEAKE GEOSYSTEMS

DRILL RIG	DRILLER	INSPECTOR
SIMCO 9100	B. VAN DOREN	M. NAPOLITAN

CHECKED BY

APPROVED BY

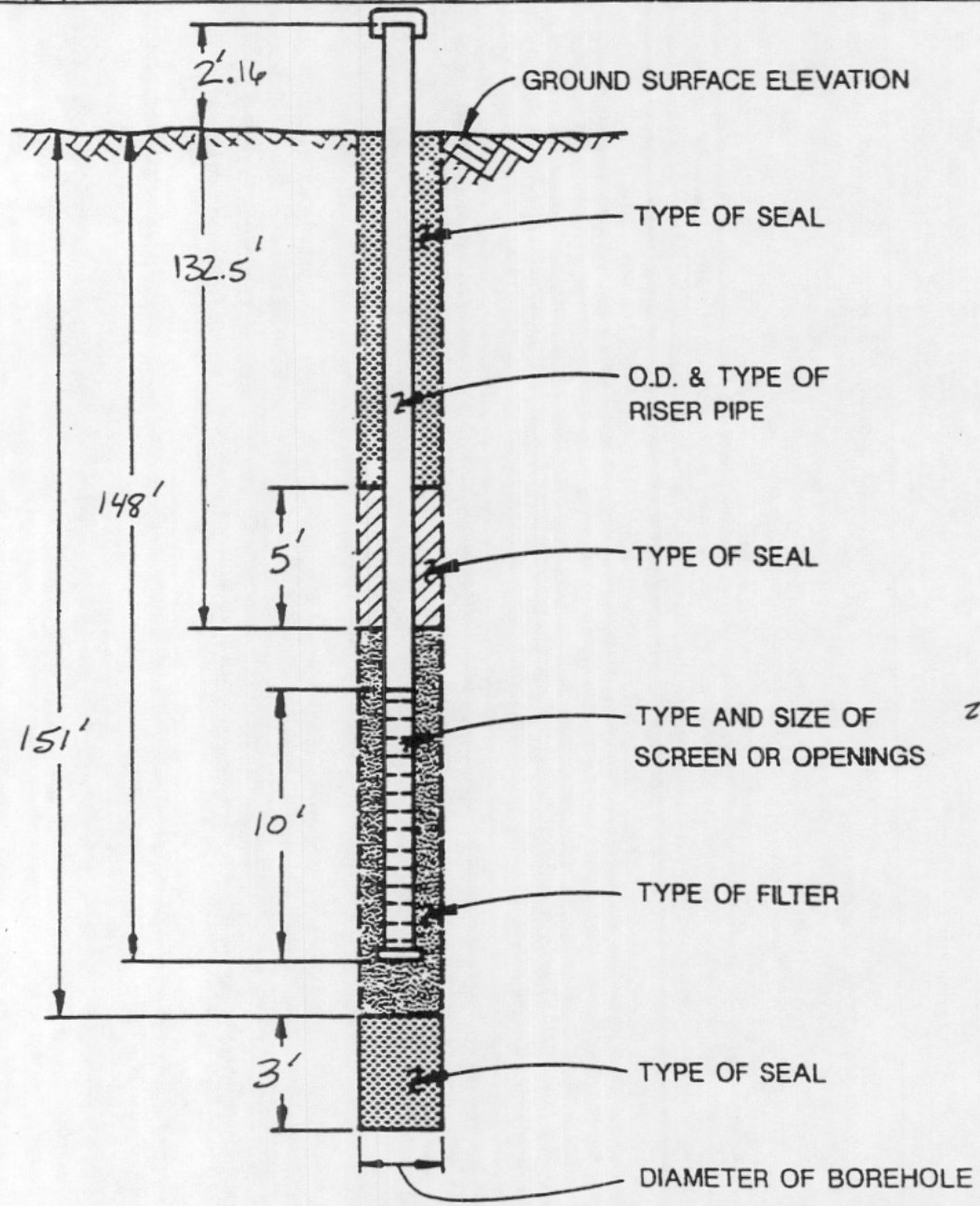
SAMPLING: SAMPLE TYPE	SAMPLE NUMBER	SET 6"	2ND 6"	3RD 6"	N VALUE	SAMPLE RECOV.	CORING: CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOV.	RQD RECOV.	PERCENT RECOV.	RQD	DEPTH IN FEET	SAMPLE TYPE	LOG	CLASSIFICATION OF MATERIAL	REMARKS
														15			SAME CUTTINGS & DRILL RATE	
														2				
														3				
														4				
SPT	49	15	30	40/5	70	1.8								5			CLAY; RED & GRAY MOTTLED; some tan	EOB 154'
														6			and yellow mottles; dense; nonplastic	w/ 6" HOLE
														7			DRY; 0.0 ppm	SAMPLED 154-156'
														8			EOB 156'	
														9				
														160				
														2				
														3				
														4				
														5				
														6				
														7				
														8				
														9				
														0				
														2				
														3				
														4				
														5				
														6				
														7				
														8				
														9				
														0				

PIEZOMETER / WELL INSTALLATION LOG

DELAWARE PERMIT # 195516

NO. PW-1

CLIENT: US EPA REGION III	PROJECT: STANDARD CHLORINE		PROJECT NO.: 047118.0123
PROJECT LOCATION: NEAR MW15	COORDINATES: 582657N M.N 439276 E	TOP OF RISER ELEVATION:	DATE: 11/11/2003
STRATUM MONITORED: POTOMAC SAND		INSPECTOR: M. NAPOLITAN	
CHECKED BY:	APPROVED BY:		
DRILLING CONTRACTOR: CHESAPEAKE GEOSYSTEMS	DRILL RIG: SIMCO 9100	DRILLER: B. VAN DOREN	



~46 ft MSL

CEMENT/BENTONITE GROUT

2" ID 304 FLUSH THREAD STAINLESS STEEL

BENTONITE CHIPS

2" ID 0.020 SLOT 304 SS WIRE WRAPED

#1 FILPRO US. SILICA SAND

BENTONITE CHIPS

10" 0'-70' BGS
6" 70'-144' BGS

METHOD OF INSTALLATION: GRAVITY SAND & BENTONITE NOLGPLUG; TREMMIE CEMENT BENTONITE GROUT
ROTARY WASH 70'-144' (NO BENTONITE ADD); 0'-70' BGS HIGH YIELD USED.

REMARKS: SET 4" STEEL (ID) CASING IN 10" BOREHOLE TO 70' BGS. CEMENT & BENTONITE GROUTED ANNULUS 70' TO 0' (13.2 lbs/gal TO 10.5 lbs/gal) 5.5 bags #1 SAND; 1 BAG BENT CHIPS BOT. SEAL; 1 BAG BENT CHIPS TOP; COMPLETED W/ 6" STEEL CASING W/ LOCKING CAP.

BLACK & VEATCH

WELL SAMPLING LOG

Project: Standard Chlorine	Project Number: 47118.0123
	Date: 11-14-03
Well ID: PW-1	Weather: Sunny 45°, windy
Purged by: SE	Site Conditions: well in good condition, surrounding ground is very muddy. No overgrowth
Measurement Reference Point: Top of PVC	
Static Water Level: 46.71'	Well Depth: 152'
Initial Time: 0715	Final Time: 0840
Casing Diameter: 2"	Bore Volume: 16.85
Pump Type: Grundfos	Depth to Pump Intake: 145'

Time	Water Level ft	pH std. units	Specific Conductance ~~µohms/cm~~	Turbidity NTU	DO mg/L	Temp. °C	ORP mV	Q gpm	Comments
0715	46.71	10.89	0.611 mS/cm	54.9	8.12	13.7	59	1.5	
0725	47.22	8.10	0.190	999	6.50	12.2	-168	1.5	
0735	47.61	7.24	0.159	999	4.60	14.0	-71	1.5	
0750	47.78	5.55	0.141	300	2.20	14.2	-51	1.5	
0805	47.72	5.48	0.135	85	1.79	14.2	-42	1.5	
0815	47.01	5.42	0.134	35	1.35	14.3	-40	1.5	
0830	46.92	5.36	0.136	18	1.05	14.5	-41	1.5	
0840	46.90	5.35	0.134	11	1.00	14.5	-40	1.5	

Sample ID	Collection Time	Water Level ft	pH std. units	Specific Conductance µohms/cm	Turbidity NTU	DO mg/L	Temp. °C	ORP mV	Q gpm
SCD-PW1-111403	0845	46.90	5.34	0.135	11	0.98	14.5	-41	0.25

Notes: Duplicate (PW-91) also collected aswell as Field Blank (PW-91FB)

Needed to purge (152-46.71)(.16)(3) = 51 gallons