FILE COPY-DO NOT MARK.

401068

#2-0112

Superfund Records Center
SITE: Covitch Property
BREAK: 1.3
OTHER: 556466

SDMS DocID 556466

COVITCH PROPERTY #2-0112
WELL INSTALLATION/G.W.& SEDIMENT
ANALYSIS OCTOBER 1985

MONITORING WELL INSTALLATION

AND

GROUND WATER AND RIVER BOTTOM SEDIMENT

QUALITY ANALYSES

AFT/DAVIDSON COMPANY

ARCADE FACILITY

WHITTINSVILLE, MASSACHUSETTS

CASWELL, EICHLER & HILL, INC.

PORTSMOUTH, NEW HAMPSHIRE

OCTOBER 1985

INTRODUCTION

The Massachusetts Department of Environmental Quality Engineering (DEQE) requested that a hydrogeologic site assessment be conducted at the ATF/Davidson Company (ATF/D) Arcade facility in Whitinsville, Massachusetts. In that ATF/D is a subsidiary of White Consolidated Industries (WCI) of Cleveland, Ohio, WCI and ATF/D retained Caswell, Eichler and Hill, Inc. (CEH) to develop and implement a plan that would satisfy DEQE requirements concerning the general hydrogeologic site assessment. This assessment would include the installation of monitoring wells, the collection of soil, river bottom and grounwater samples, the measurement of groundwater elevations, the completion of a vertical and horizontal survey of the monitoring well locations, and completion of selected laboratory analyses for volatile organics (EPA 624), oil and grease, barium, total cyanide and priority pollutant metals.

CEH, a professional firm of geologists, hydrologists and geophysicists, assumed the project's lead role. Environmental Field Services (EFS) and Resource Analysts, Inc. (RAI) of Hampton, New Hampshire performed the ground water sampling and laboratory analyses. New England Boring Contractors, Inc. of Glastonbury, Connecticut performed the drilling, soil sampling and monitoring well construction. Bibeault and Florentz, Inc. of Woonsocket, Rhode Island performed the elevational and location survey to establish horizontal and vertical control on the monitoring wells.

WORK PERFORMED

A. DRILLING AND MONITORING WELL CONSTRUCTION. As shown on the FACILITY MAP AND SHALLOW HORIZONTAL FLOWNET (Figure 1), eight locations (M-1 through M-8) were chosen for the installation of shallow monitoring wells. Where possible, hollow stem augers (3 inch I.D.) were advanced to below the water table, and standard split-spoon sampling was completed to note stratigraphy. Threaded, flush joint, ten-slot PVC screen (1.5 inch I.D.) was set at and below the water table, and solid PVC riser of the same design and dimension was installed to roughly two feet above land surface. Ottawa sand was packed around the screen, and a two foot thick bentonite seal was installed approximately one foot above the top of the screen. Additional sand was added to within two feet of land surface in each boring, and a locking steel protective pipe was cemented in place. All wells were fully developed upon completion, and all augers were thoroughly washed between borings.

B. GROUND WATER, SOIL AND RIVER BOTTOM SAMPLING AND LABORATORY ANALYSES. Each completed monitoring well was either pumped dry six times, or six times its volume was extracted prior to sampling. Standard EPA sampling and sample preservation and analysis techniques were employed by EFS and RAI. Ground water samples that were to be tested for volatile organic compounds were taken with a stainless steel bailer. Samples that were to be tested for metals and inorganics were taken with a peristaltic pump. Dedicated tubing was used in each well, and all samples for metals and inorganics were field filtered. Chain of Custody and Field Data forms were completed for each well and set of samples. Please note that the Temperature (°C) Readings reported on the field data forms correspond to the Conductivity (umhos) when it was read, not when the sample was first extracted from the well.

Each ground water sample was analysed for volatile organic compounds (EPA 624), barium, priority pollutant metals, and total cyanide. Samples from M-3 were also analysed for oil and grease.

During construction of the monitoring wells, standard soil sampling was conducted in each boring. An eighteen inch split-spoon sample was taken at the surface and every five feet thereafter. A final sample was taken, or attempted in the case of hollow stem auger refusal, at the bottom of each boring. The samples were placed in standard soil sample jars and kept for future inspeciton and possible laboratory analysis.

Five benthic cores (B-1 through B-5) were taken from the littoral (near-shore) zone of the Mumford River bottom using a canoe and hand corer. The cores were placed in a standard 1 liter glass sample jar and kept cool prior to delivery to the laboratory. Each sample was analysed for priority pollutant metals and barium.

C. SURVEY FOR HORIZONTAL AND VERTICAL CONTROL. Upon completion of the drilling and monitoring well construction, the locations of the borings and wells were surveyed for horizontal and vertical control. Vertical control was established using a U.S.G.S. benchmark in feet above mean sea level (FT-MSL). Each well top and the immediately adjacent ground surface were surveyed to the nearest hundreth of a foot. Where a well could not be installed, the ground surface at the location of the boring was surveyed. These data, coupled with the subsurface data gathered during the drilling and water level measurement tasks, allowed for the construction of all figures and tables presented herein.

HYDROGEOLOGIC SETTING

The AFT/D Arcade site lies along 3200 feet of the north bank of the Mumford River in Whitinsville, Massachusetts. It is bounded on the east by Sidney Covitch properties, north by Main Street, and west by the Whittinsville Water Company. The Mumford River, which forms the site's southern bondary, flows from west to east.

Nearly the entire site is comprised of foundry fill which is a fine to coarse sand and gravel with some pumice-like material, foundry bed glass and ash. This foundry material was continually removed for years from the large foundry at the western end of the Covitch property, and graded out into the river. The resulting land mass presently supports a demolitions debris storage area which abuts the Covitch property, and the ATF/D Arcade facility. The western terminus of the fill consists of an island in the Mumford River, and the aforementioned Whitinsville Water Company parcel.

RESULTS AND CONCLUSIONS

A. SITE HYDROGEOLOGY. All of the monitoring wells encountered foundry fill throughout their entire depth except M-1. Because one boring was required to be drilled to refusal, M-1 encountered river bottom sediments (brown washed fine to coarse sand and gravel with occasional cobbles and small boulders) at approximately elevation 297. Hollow-stem auger and split-spoon refusal was encountered at elevation 294. This refusal elevation probably corresponds to the bedrock surface elevation as an outcrop is clearly visible about 200 feet to the southeast. This outcrop is at the shoreline of a naturally occuring (bedrock supported) island in the Mumford River comprising the study area's southwestern boundary. Foundry fill was advanced out into the river to the island, effectively incorporating it into the new land mass formed by the fill.

The locations where monitoring wells were completed are shown on Figure 1. Further, data from the drilling and water level measurement tasks were used to construct Monitoring Well and Subsurface Data (Table 1), and Cross Sections A-A', B-B' and C-C' (Figures 2, 3 and 4). Examination of these constructs can educate the reader as to the hydrogeologic nature of the site far better than reading numerous descriptive paragraphs. Some time digesting these compilations is, therefore, recommended prior to and while reading the remainder of the report.

Ground water generally flows south beneath the site, discharging to the river. The average velocity of groundwater flow can be computed, for example, by examining Figure 4. A flow line from M-7 to the river is approximately 450 feet in length. Given the grain size characteristics of the fill, we have estimated a hydraulic conductivity (K) of 1×10^{-3} cm/sec (3.28×10^{-5} ft/sec), and a corresponding effective porosity (n_e) of o.20. Using these estimates and a calculated hydraulic gradient (i) of 4.44×10^{-3} (where, $\frac{306' - 304'}{450'}$) it is possible to estimate the seepage velocity ($\overline{v}$).

$$\overline{v} = \frac{Ki}{n_e} = \frac{(3.28 \times 10^{-5} \text{ ft/sec})(4.44 \times 10^{-3})}{0.20}$$

$$= 7.28 \times 10^{-7} \text{ ft/sec}$$

$$= 23 \text{ ft/yr}$$

B. GROUND WATER QUALITY. Appendix B contains the groundwater quality data for each well. Additionally, as seen on the field data form, conductivity, temperature (at the time of conductivity reading) and pH were also determined. As the results of the analyses show, no significantly elevated levels of priority pollutant metals were detected. Barium slightly exceeded the Safe Drinking Water Standards in M-5 and M-8. Several of the wells, however, exhibited volatile organic contamination. Samples from M-3 contained 210 ug/l vinyl chloride, 250 ug/l 1,2-trans-dichloroethylene and 10 ug/l trichloroethylene. Samples from M-6 contained 15 mg/l 1,2-trans-dichloroethylene, 30 ug/l trichloroethylene and 950 ug/l tetrachloroethylene. Samples from M-8 contained 260 ug/l vinyl chloride, a trace of 1,1 dichloroethane, 610 ug/l 1,2-trans-dichloroethylene, 30 ug/l trichloroethylene and a trace of tetrachloroethylene.

TABLE I

MONITORING WELL AND SUBSURFACE ELEVATIONAL DATA
ARCADE SITE

WELL#	LAND SURFACE ELEVATION (FT-MSL)	TOP OF PIPE ELEVATION (FT-MSL)	LENGTH OF RISER (FT)	7-16-85 WATER TABLE ELEVATION (FT-MSL)	7-18-85 WATER TABLE ELEVATION (FT-MSL)	WATER TABLE ELEVATION NOTED DURING DRILLING (FT-MSL)	BOTTOM OF BORING ELEVATION (FT-MSL)	TOP OF SCREEN ELEVATION (FT-MSL)	BOTTOM OF SCREEN ELEVATION (FT-MSL)
M-1	312.12	314.04	1.92	305.73	305.73	303.32	293.82	303.12	298.12
M-2	312.87	314.99	2.12	306.21	306.24	305.57	300.87	305.87	300.87
M-3	310.99	312.65	1.66	305.90	305.75	305.99	299.49	305.99	300.99
M-4	311.19	313.24	2.05	305.60	305.56	305.69	299.69	306.19	301.19
M-5	310.72	312.85	2.13	305.55	305.50	305.22	299.22	305.72	300.72
M-6	310.69	312.99	2.30	305.59	305.52	305.19	299.19	305.69	300.69
M-7	309.87	312.94	3.07	306.23	306.13	305.07	298.87	305.37	300.37
M-8	310.15	312.72	2.57	305.66	305.59	305.15	298.85	305.45	300.45

To place the above concentrations of volatile organic compounds in some form of reference, they should be viewed relative to Suggested No Adverse Reaction Limit (SNARL) standards. These standards were developed by EPA to be used as guidelines. Given the present knowledge of these chemical compounds, a SNARL suggests both concentrations and exposure times that an average person may endure without significant adverse reactions occuring. The SNARL's for those compounds found in the groundwater samples are as follows:

VINYL CHLORIDE	NO LIMIT SET
1,2-trans-DICHLOROETHYLENE	1 DAY - 2700 ug/l 10 DAY - 270 ug/l
TRICHLOROETHYLENE	1 DAY - 2000 ug/l 10 DAY - 200 ug/l LIFETIME - 75 ug/l
TETRACHLOROETHYLENE	1 DAY - 2300 ug/l 10 DAY - 180 ug/l LIFETIME - 40 ug/l
1,1 DICHLOROETHANE	THE SUM OF ALL TRIHALOMETHANES SHOULD NOT EXCEED 0.01 mg/l ON A LIFETIME BASIS

Review of these data would suggest that contamination is significant (10 day exposure limit or less) in M-3 (250 ug/l 1,2-trans-dichloroethylene), M-6 (950 ug/l tetrachloroethylene) and M-8 (610 ug/l 1,2 trans-dichloroethylene).

C. RIVER BOTTOM SEDIMENT QUALITY. Appendix B contains the results of the laboratory analyses for priority pollutant metals in each of the five benthic samples (B-1 through B-5) taken from the river bottom. All of the samples were characterized as dark organic peat and muck. The locations of these samples are shown on Figure 1, with the exception of B-4 and B-5 which are located outside the area depicted. B-4 is located east of the study area, about 100 feet above the large dam in the center of the Covitch property. B-5 is located west of the study area, and toward the western end of the Whitinsville Water Company property. In that the river flows west to east, B-5 is upgradient of the study area, while B-4 is downgradient.

Of the fourteen metals evaluated, only chromium appears to be cause for concern. To provide perspective, some discussion of EP Toxicity and soil samples is warranted. An EP Toxicity test evaluates both the concentration and mobility of materials such as metals in the subsurface. In terms of concentration, the leachable amount of a metal from a soil sample (ug/g) can not exceed 100 times the level set for that metal (mg/l) in the Primary Drinking Water Standards. To relate EP Toxicity in water samples to potential EP Toxicity in soil samples, multiply the Primary Drinking Water Standard for any given constituent by 2000. This conversion factor accounts for the dilution necessary when preparing a standard soil sample for analysis. In the case of chromium, up to 410 ug/g was found in the benthic samples, and the level at which chromium is potentially EP Toxic in sediment samples is 100 ug/l.

The upgradient to downgradient (in terms of river flow) concentrations of chromium in the benthic samples were as follows:

B-5	65 ug/g
B-1	410 ug/g
B-2	250 ug/g
B-3	400 ug/g
B-4	100 ug/g

As seen, the upgradient concentration is itself moderately high, although not potentially EP Toxic. The remaining four downgradient samples all, however, exceed the criteria for delineating potential EP Toxicity. These elevated chromium concentrations can be coming from one or both of two possible sources, those being the ATF/D Arcade facility, or some unknown upgradient facility. In that ATF/D and WCI officials have stated that they have never used chromium at the Arcade facility, and because ground water samples from M-1 through M-8 showed no chromium, we must conclude that it is coming from an upgradient source.

One possible explanation of the pronounced increase in concentration between B-5 and the remaining samples (B-4 through B-1) concerns changes in the morphology of the river from the Whitinsville Water Company parcel, past the Arcade facility to the dam on the Covitch property. The dam creates a large head pong (Whitin Pond) that extends back up the river past the ATF/D Arcade facility. As chromium laden organic material flows past the channelized portion of the river opposite the Whitinsville Water Company, it can tend to remain in suspension because of adequate flow velocity. As this material enters the head pond, however, decreased flow velocity would tend to facilitate settling. As the organics degrade, the concentration of incorporated metals such as chromium would increase in the sediments. In that both textile and tannery facilities (which normally use chromium in their processes) were reported in operation further up-river (unchecked by CEH), this settling and accretion theory seems to be the most plausible explanation for the levels of contamination noted in the benthic samples.

SUMMARY

The subsurface area of this investigation is generally comprised of less than 15 feet of foundry fill overlying river bottom sediments which overlie bedrock. The site lies along the northern bank of the Mumford River which flows from west to east. Ground water generally flows south beneath the site, discharging to the river at a seepage velocity of approximately 23 feet per year.

Ground water quality beneath the site is generally good with respect to priority pollutant metals, but three monitoring wells (M-3, M-6 and M-8) showed evidence of volatile organic contamination.

The Mumford River bottom sediments are heavily contaminated with chromium in the Whitin Pond area above the large dam on the Covitch property. The heaviest contamination appears to range from the dam, up-river past the ATF/D Arcade facility. A source upgradient of ATF/D is most likely responsible for the elevated chromium levels noted in the benthic samples.

NEW ENGLAND BORING CONTRACTORS OF CONN. INC.

Glastonbury, CT 06033 — Springfield, MA 01103
203-633-4640 413-733-1232

CLIENT: CEH
PROJECT NAME: ATF Davidson
LOCATION: Whitinsville, MA

BORING NUMBER: M-1
SHEET No. 1 of 1

DRILLER: T. Roe
INSPECTOR: M. Eichler
DATE START: 7/8/85
DATE FINISH: 7/8/85

ARCHITECT ENGINEER:

FILE NO.:
SURFACE ELEV.:
LINE & STATION:
OFFSET:

	Casing	Sampler	Core Barrel
TYPE	HSA	SS	
SIZE I.D.	3-3/8"	1-3/8"	
HAMMER WT.		140	
HAMMER FALL		30"	

DEPTH	SAMPLE NO.	DEPTH RANGE	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	REC.	COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS
	S1	0-1.5	4	12	14	16"			
5'	S2	5.0-6.5	1	2	1	14"			Black Br. Fine Sand, Little Silt, Med.-Crs. Sand, Occasional Cobbles, Bricks
10'	S3	10.0-11.5	1	2	10	10"		14.5	
15'	S4	15.0-16.5	13	21	20	18"			Grey Br. Fine-Crs. Sand and Gravel Little Silt, Occasional Cobbles and Boulders
	S5	18.3	100/0					18.3	
20'									

HSA and Spoon Refusal @ 18.3
Water @ 8.8

Installed Monitor Well @ 14.0
Materials:
5.0 - 1½" PVC Screen
11.0 - 1½" PVC Riser
1 - Bag Ottawa Sand
50 - lbs. Bentonite
1 - Bag Sand Mix
1 - Locking Protector Pipe

SAMPLE IDENTIFICATION
S — SPLIT SPOON
T — THIN WALL TUBE
U — UNDISTURBED PISTON
O — OPEN END ROD

PENETRATION RESISTANCE
140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Med. Dense	5-8	M/Stiff

PROPORTIONS USED
trace 0 to 10%
little 10 to 20%
some 20 to 35%

REMARKS:
Developing Time:
M-1 - M-8 2½ Hrs.
Developed Consecutively

NEW ENGLAND BORING CONTRACTORS OF CONN. INC.

Glastonbury, CT 06033 — Springfield, MA 01103
203-633-4640 413-733-1232

CLIENT: CEH
PROJECT NAME: ATF Davidson
LOCATION: Whitinsville, MA

BORING NUMBER: M-2
SHEET No. 1 of 1

DRILLER: T. Roe
INSPECTOR: M. Eichler
DATE START: 7/8/85
DATE FINISH: 7/8/85

ARCHITECT ENGINEER:

	Casing	Sampler	Core Barrel
TYPE	HSA	SS	
SIZE I.D.	3-3/8"	1-3/8"	
HAMMER WT.		140	
HAMMER FALL		30"	

FILE NO.:
SURFACE ELEV.:
LINE & STATION:
OFFSET:

DEPTH	SAMPLE NO.	DEPTH RANGE	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	REC.	COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS
	S1	0-1.5	3	8	11	14"			
5'	S2	5.0-6.5	2	4	6	18"			Br. Black Fine Sand, Some Silt, Little Med.-Crs. Sand, Fine Gravel, Occasional Cobbles, Bricks, Foundry Fill
10'	S3	10.0-11.5	1	3	4	10"		12.0	
15'									Bottom of Boring 12.0 Water @ 7.3 Installed Monitor Well @ 12.0 Materials: 5.0 - 1½" PVC Screen 9.0 - 1½" PVC Riser ½ - Bag Sand 25 - lbs. Bentonite Pelle 1 - Bag Sand Mix 1 - Locking Protector Pipe

SAMPLE IDENTIFICATION
S — SPLIT SPOON
T — THIN WALL TUBE
U — UNDISTURBED PISTON
O — OPEN END ROD

PENETRATION RESISTANCE
140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Med. Dense	5-8	M/Stiff

PROPORTIONS USED
trace 0 to 10%
little 10 to 20%
some 20 to 35%

REMARKS:

NEW ENGLAND BORING CONTRACTORS OF CONN. INC.

Glastonbury, CT 06033 — Springfield, MA 01103
203-633-4640 413-733-1232

CLIENT: CEH
PROJECT NAME: ATF Davidson
LOCATION: Whitinsville, MA

BORING NUMBER: M-3
SHEET No. 1 of 1

DRILLER: T. Roe
INSPECTOR: M. Eichler
DATE START: 7/8/85
DATE FINISH: 7/8/85

ARCHITECT ENGINEER:

FILE NO.:
SURFACE ELEV.:
LINE & STATION:
OFFSET:

	Casing	Sampler	Core Barrel
TYPE	HSA	SS	
SIZE I.D.	3-3/8"	1-3/8"	
HAMMER WT.		140	
HAMMER FALL		30"	

DEPTH	SAMPLE NO.	DEPTH RANGE	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	REC.	COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS
	S1	0-1.5	5	17	11	18"			
5'	S2	5.0-5.7	1	100/2		8"		7.0	Br. Black Fine-Crs. Sand, Some Silt, Fine Gravel, Asphalt, Few Cobbles, Boulders
10'	S3	10.0-11.5	4	5	6	8"		11.5	Dark Br. Black Fine-Crs. Sand, Little Silt, Fine Gravel
15'									

Bottom of Boring 11.5
Water @ 5.0

Installed Monitor Well @ 10.0
Materials:
- 5.0 - 1½" PVC Screen
- 7.0 - 1½" PVC Riser
- 1 - Bag Ottawa Sand
- 25 - lbs. Bentonite Pelle
- 1 - Bag Sand Mix
- 1 - Locking Protector Pi

SAMPLE IDENTIFICATION
- S — SPLIT SPOON
- T — THIN WALL TUBE
- U — UNDISTURBED PISTON
- O — OPEN END ROD
- W

PENETRATION RESISTANCE
140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Med. Dense	5-8	M/Stiff

PROPORTIONS USED
- trace 0 to 10%
- little 10 to 20%
- some 20 to 35%

REMARKS:

NEW ENGLAND BORING CONTRACTORS OF CONN. INC.

Glastonbury, CT 06033 — 203-633-4640
Springfield, MA 01103 — 413-733-1232

CLIENT: CEH
PROJECT NAME: ATF Davidson
LOCATION: Whitinsville, MA

BORING NUMBER: M-4
SHEET No. 1 of 1

DRILLER: T. Roe
INSPECTOR: M. Eichler
DATE START: 7/9/85
DATE FINISH: 7/9/85

ARCHITECT ENGINEER:

FILE NO.:
SURFACE ELEV.:
LINE & STATION:
OFFSET:

	Casing	Sampler	Core Barrel
TYPE	HSA	SS	
SIZE I.D.	3-3/8"	1-3/8"	
HAMMER WT.		140	
HAMMER FALL		30"	

DEPTH	SAMPLE NO.	DEPTH RANGE	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	REC.	COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS
	S1	0-1.5	3	4	4	6"			
5'	S2	5.0-6.5	2	2	9	10"			Black Br. Fine-Crs. Sand, Some Fine Gravel, Little Silt, Occasional Cobbles, Bricks, Many Cobbles, Boulde
10'	S3	10.0-11.5	2	2	4	4"		11.5	
15'									Bottom of Boring 11.5 Water @ 5.5

Installed Monitor Well @ 10.0

Materials:
- 5.0 - 1½" PVC Screen
- 7.0 - 1½" PVC Riser
- 1 - Bag Ottawa Sand
- 50 - lbs. Bentonite Pell
- 1 - Bag Sand Mix
- 1 - Locking Protector P

SAMPLE IDENTIFICATION
- S — SPLIT SPOON
- T — THIN WALL TUBE
- U — UNDISTURBED PISTON
- O — OPE...

PENETRATION RESISTANCE
140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-30	Med. Dense	5-8	M/Stiff

PROPORTIONS USED
- trace 0 to 10%
- little 10 to 20%
- some 20 to 35%

REMARKS:

NEW ENGLAND BORING CONTRACTORS OF CONN. INC.

Glastonbury, CT 06033 — Springfield, MA 01103
203-633-4640 413-733-1232

CLIENT: CEH
PROJECT NAME: ATF Davidson
LOCATION: Whitinsville, MA

BORING NUMBER: M-5
SHEET No. 1 of 1

DRILLER: T. Roe
INSPECTOR: M. Eichler
DATE START: 7/8/85
DATE FINISH: 7/8/85

ARCHITECT ENGINEER

	Casing	Sampler	Core Barrel
TYPE	HSA	SS	
SIZE I.D.	3-3/8"	1-3/8"	
HAMMER WT.		140	
HAMMER FALL		30"	

FILE NO.
SURFACE ELEV.
LINE & STATION
OFFSET

DEPTH	SAMPLE NO.	DEPTH RANGE	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	REC.	COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS
	S1	0-1.5	4	5	8	6"			
5'	S2	5.0-6.5	2	4	1	6"			Black Br. Fine-Crs. Sand, Some Fine Gravel, Little Silt, Occasional Cobbles, Cement, Ash
10'	S3	10.0-11.5	1	2	3	10"		11.5	
15'									Bottom of Boring 11.5 Water @ 5.5 Installed Monitor Well @ 10.0 Materials: 5.0 - 1½" PVC Screen 7.0 - 1½" PVC Riser 1 - Bag Ottawa Sand 50 - lbs. Bentonite Pelle[ts] 1 - Bag Sand Mix 1 - Locking Protector Pipe

SAMPLE IDENTIFICATION
- S — SPLIT SPOON
- T — THIN WALL TUBE
- U — UNDISTURBED PISTON
- O — OPEN END ROD

PENETRATION RESISTANCE
140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Med. Dense	5-8	M/Stiff

PROPORTIONS USED

trace	0 to 10%
little	10 to 20%
some	20 to 35%

REMARKS:

1 Hr. Standby Time to Clear Utilities

NEW ENGLAND BORING CONTRACTORS OF CONN. INC.

Glastonbury, CT 06033 — 203-633-4640 — Springfield, MA 01103 — 413-733-1232

CLIENT: CEH

PROJECT NAME: ATF Davidson

LOCATION: Whitinsville, MA

BORING NUMBER: M-6

SHEET No. 1 of 1

DRILLER: T. Roe

INSPECTOR: M. Eichler

DATE START: 7/9/85

DATE FINISH: 7/9/85

ARCHITECT ENGINEER:

FILE NO.:

SURFACE ELEV.:

LINE & STATION:

OFFSET:

	Casing	Sampler	Core Barrel
TYPE	HSA	SS	
SIZE I.D.	3-3/8"	1-3/8"	
HAMMER WT.		140	
HAMMER FALL		30"	

SAMPLE NO.	DEPTH RANGE	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	REC.	COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS
S1	0-1.5	6	10	9	12"			
S2	5.0-6.5	6	3	3	12"			Black Br. Fine-Crs. Sand, Some Fine Gravel, Few Cobbles, Boulders, Ash, Little Silt
S3	10.0-11.5	1	1	1	8"		11.5	
								Bottom of Boring 11.5 Water @ 5.5
								Installed Monitor Well @ 10.0 Materials: 5.0 - 1½" PVC Screen 7.0 - 1½" PVC Riser 1 - Bag Ottawa Sand 50 - lbs. Bentonite Pellet 1 - Bag Sand Mix 1 - Locking Protector Pip

SAMPLE IDENTIFICATION

- SPLIT SPOON
- THIN WALL TUBE
- UNDISTURBED PISTON
- OPEN END ROD
- WASH SAMPLE

PENETRATION RESISTANCE
140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Med. Dense	5-8	M/Stiff

PROPORTIONS USED

trace	0 to 10%
little	10 to 20%
some	20 to 35%

REMARKS:

NEW ENGLAND BORING CONTRACTORS OF CONN. INC.

Glastonbury, CT 06033 — Springfield, MA 01103
203-633-4640 — 413-733-1232

CLIENT: CEH
PROJECT NAME: ATF Davidson
LOCATION: Whitinsville, MA

BORING NUMBER: M-7
SHEET No. 1 of 1

DRILLER: T. Roe
INSPECTOR: M. Eichler
DATE START: 7/9/85
DATE FINISH: 7/9/85

ARCHITECT ENGINEER:

	Casing	Sampler	Core Barrel
TYPE	HSA	SS	
SIZE I.D.	3-3/8"	1-3/8"	
HAMMER WT.		140	
HAMMER FALL		30"	

FILE NO.:
SURFACE ELEV.:
LINE & STATION:
OFFSET:

DEPTH	SAMPLE NO.	DEPTH RANGE	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	REC.	COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS
	S1	0-1.5	1	4	8	12"			
5'	S2	5.0-6.5	6	20	13	16"			Br. Black Fine-Crs. Sand, Some Gravel, Little Silt, Many Cobbles, Brick, Ashes
10'	S3	9.5-11.0	3	2	1	10"		11.0	
15'									Bottom of Boring 11.0 Water @ 4.8 Installed Monitor Well @ 9.5 Materials: 5.0 - 1½" PVC Screen 6.0 - 1½" PVC Riser 1 - Bag Ottawa Sand 50 - lbs. Bentonite Pellets 1 - Bag Sand Mix 1 - Locking Protector Pipe

SAMPLE IDENTIFICATION

- SPLIT SPOON
- THIN WALL TUBE
- UNDISTURBED PISTON
- OPEN END ROD

PENETRATION RESISTANCE
140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-30	Med. Dense		

PROPORTIONS USED

trace	0 to 10%
little	10 to 20%

REMARKS:

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NEW ENGLAND BORING CONTRACTORS OF CONN. INC.

Glastonbury, CT 06033 — 203-633-4640

Springfield, MA 01103 — 413-733-1232

CLIENT: CEH

PROJECT NAME: ATF Davidson

LOCATION: Whitinsville, MA

BORING NUMBER: M-8

SHEET No. 1 of 1

DRILLER: T. Roe

INSPECTOR: M. Eichler

DATE START: 7/9/85

DATE FINISH: 7/9/85

ARCHITECT ENGINEER:

FILE NO.:

SURFACE ELEV.:

LINE & STATION:

OFFSET:

	Casing	Sampler	Core Barrel
TYPE	HSA	SS	
SIZE I.D.	3-3/8"	1-3/8"	
HAMMER WT.		140	
HAMMER FALL		30"	

DEPTH	SAMPLE NO.	DEPTH RANGE	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	REC.	COL. A	STRATA CHANGE	FIELD CLASSIFICATION AND REMARKS
	S1	0-1.5	5	5	8	12"			
5'	S2	5.0-6.5	2	4	6	8"			Black Br. Fine-Crs. Sand, Some Gravel, Little Silt, Bricks, Ashes, Few Cobble[s] and Boulders
10'	S3	9.8-11.3	16	13	4	14"		11.3	
15'									Bottom of Boring 11.3 Water @ 5.0

Installed Monitor Well A 9.7

Materials:
- 5.0 - 1½" PVC screen
- 6.5 - 1½" PVC Riser
- 1 - Bag Ottawa Sand
- 50 - lbs. Bentonite Pelle[ts]
- 1 - Bag Sand Mix
- 1 - Locking Protector Pi[pe]

SAMPLE IDENTIFICATION
- S — SPLIT SPOON
- T — THIN WALL TUBE
- U — UNDISTURBED PISTON

PENETRATION RESISTANCE
140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft

PROPORTIONS USED
- trace 0 to 10%
- little 10 to 20%
- some 20 to 35%

REMARKS:

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LOCATION: ATF Davidson, Whitinsville, MA

ENGINEERS: Caswell, Eichler, and Hill

SAMPLING DATE: 7/18/85

WELL NUMBER	TOTAL DEPTH	DIAMETER	TIME	STATIC LEVEL TO STEEL CASING	COND./TEMP. umhos/cm	°C	pH
M-1	14'	1.5"	0950	8.31'	425	20.0	7.25
M-2	12'	1.5"	1000	8.75'	300	19.5	8.50
M-3	10'	1.5"	1010	6.90'	260	21.5	6.35
M-4	10'	1.5"	1015	7.68'	225	24.0	8.20
M-5	10'	1.5"	1017	7.35'	365	24.0	7.30
M-6	10'	1.5"	1018	7.47'	235	25.0	6.85
M-7	9.5'	1.5"	1020	6.81'	325	24.0	9.80
M-8	9.8'	1.5"	1023	7.13'	165	22.0	7.30

Total depths come from the well plans.

Caswell, Eichler, & Hill
Laboratory Number 5008
8-13-85

Field Identification: M-1

Matrix: Liquid

Lab Number	Parameter	Date analyzed	Method	Ref.	Concentration
5008-9	Total Cyanide (mg/L)	8-2-85	335.2	1	<0.010
5008-17	Silver, recoverable (mg/L)	8-9-85	303A	2	<0.005
5008-17	Arsenic, recoverable (mg/L)	7-25-85	304	2	<0.010
5008-17	Barium, recoverable (mg/L)	8-8-85	303A	2	<0.200
5008-17	Beryllium, recoverable (mg/L)	7-25-85	303C	2	<0.002
5008-17	Cadmium, recoverable (mg/L)	8-7-85	303A	2	<0.003
5008-17	Chromium, recoverable (mg/L)	8-9-85	303A	2	<0.005
5008-17	Copper, recoverable (mg/L)	8-7-85	303A	2	<0.005
5008-17	Mercury, recoverable (mg/L)	7-23-85	7641	3	<0.0006
5008-17	Nickel, recoverable (mg/L)	8-9-85	303A	2	<0.020
5008-17	Lead, recoverable (mg/L)	8-7-85	303A	2	<0.030
5008-17	Antimony, recoverable (mg/L)	8-12-85	303A	2	<0.800
5008-17	Selenium, recoverable (mg/L)	7-25-85	304	2	<0.010
5008-17	Thallium, recoverable (mg/L)	8-12-85	303A	2	<0.6[illegible]
5008-17	Zinc, recoverable (mg/L)	8-7-85	303A	2	0.028

Field Identification: M-2

Matrix: Liquid

Lab Number	Parameter	Date analyzed	Method	Ref.	Concentration
5008-10	Total Cyanide (mg/L)	8-2-85	335.2	1	<0.01
5008-18	Silver, recoverable (mg/L)	8-9-85	303A	2	<0.005
5008-18	Arsenic, recoverable (mg/L)	7-25-85	304	2	<0.010
5008-18	Barium, recoverable (mg/L)	8-8-85	303A	2	<0.2[illegible]
5008-18	Beryllium, recoverable (mg/L)	7-25-85	303C	2	<0.002
5008-18	Cadmium, recoverable (mg/L)	8-7-85	303A	2	<0.003
5008-18	Chromium, recoverable (mg/L)	8-9-85	303A	2	<0.005
5008-18	Copper, recoverable (mg/L)	8-7-85	303A	2	<0.005
5008-18	Mercury, recoverable (mg/L)	7-23-85	7641	3	<0.0006
5008-18	Nickel, recoverable (mg/L)	8-9-85	303A	2	<0.02
5008-18	Lead, recoverable (mg/L)	8-7-85	303A	2	<0.030
5008-18	Antimony, recoverable (mg/L)	8-12-85	303A	2	<0.8
5008-18	Selenium, recoverable (mg/L)	7-25-85	304	2	<0.01
5008-18	Thallium, recoverable (mg/L)	8-12-85	303A	2	<0.600
5008-18	Zinc, recoverable (mg/L)	8-7-85	303A	2	0.045

Reference:
1. EPA 600/4-79-020
2. Standard Methods, 16th Edition
3. EPA SW 846, 2nd Edition

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Field Identification: M-3

Matrix: Liquid

Lab Number	Parameter	Date analyzed	Method	Ref.	Concentration
5008-11	Total Cyanide (mg/L)	8-2-85	335.2	1	<0.01
5008-19	Silver, recoverable (mg/L)	8-9-85	303A	2	<0.005
5008-19	Arsenic, recoverable (mg/L)	7-25-85	304	2	<0.01
5008-19	Barium, recoverable (mg/L)	8-8-85	303A	2	0.34
5008-19	Beryllium, recoverable (mg/L)	7-25-85	303C	2	<0.002
5008-19	Cadmium, recoverable (mg/L)	8-7-85	303A	2	<0.003
5008-19	Chromium, recoverable (mg/L)	8-9-85	303A	2	<0.005
5008-19	Copper, recoverable (mg/L)	8-7-85	303A	2	<0.005
5008-19	Mercury, recoverable (mg/L)	7-23-85	7641	3	<0.0006
5008-19	Nickel, recoverable (mg/L)	8-9-85	303A	2	<0.02
5008-19	Lead, recoverable (mg/L)	8-7-85	303A	2	<0.03
5008-19	Antimony, recoverable (mg/L)	8-12-85	303A	2	<0.8
5008-19	Selenium, recoverable (mg/L)	7-25-85	304	2	<0.01
5008-19	Thallium, recoverable (mg/L)	8-12-85	303A	2	<0.6
5008-19	Zinc, recoverable (mg/L)	8-7-85	303A	2	0.022
5008-29	Oil and Grease (mg/L)	7-25-85	413.2	1	<5

Field Identification: M-4

Matrix: Liquid

Lab Number	Parameter	Date analyzed	Method	Ref.	Concentration
5008-12	Total Cyanide (mg/L)	8-2-85	335.2	1	<0.01
5008-20	Silver, recoverable (mg/L)	8-9-85	303A	2	<0.005
5008-20	Arsenic, recoverable (mg/L)	7-25-85	304	2	<0.010
5008-20	Barium, recoverable (mg/L)	8-8-85	303A	2	1.0
5008-20	Beryllium, recoverable (mg/L)	7-25-85	303C	2	<0.002
5008-20	Cadmium, recoverable (mg/L)	8-7-85	303A	2	<0.003
5008-20	Chromium, recoverable (mg/L)	8-9-85	303A	2	<0.005
5008-20	Copper, recoverable (mg/L)	8-7-85	303A	2	<0.005
5008-20	Mercury, recoverable (mg/L)	7-23-85	7641	3	<0.0006
5008-20	Nickel, recoverable (mg/L)	8-9-85	303A	2	<0.02
5008-20	Lead, recoverable (mg/L)	8-7-85	303A	2	<0.03
5008-20	Antimony, recoverable (mg/L)	8-12-85	303A	2	<0.8
5008-20	Selenium, recoverable (mg/L)	7-25-85	304	2	<0.01
5008-20	Thallium, recoverable (mg/L)	8-12-85	303A	2	<0.6
5008-20	Zinc, recoverable (mg/L)	8-7-85	303A	2	0.021

Reference:
1. EPA 600/4-79-020
2. Standard Methods, 16th Edition
3. EPA SW 846, 2nd Edition

Field Identification: M-5

Matrix: Liquid

Lab Number	Parameter	Date analyzed	Method	Ref.	Concentration
5008-13	Total Cyanide (mg/L)	8-2-85	335.2	1	<0.01
5008-21	Silver, recoverable (mg/L)	8-9-85	303A	2	<0.005
5008-21	Arsenic, recoverable (mg/L)	7-25-85	304	2	<0.01
5008-21	Barium, recoverable (mg/L)	8-8-85	303A	2	2.9
5008-21	Beryllium, recoverable (mg/L)	7-25-85	303C	2	<0.002
5008-21	Cadmium, recoverable (mg/L)	8-7-85	303A	2	<0.003
5008-21	Chromium, recoverable (mg/L)	8-9-85	303A	2	<0.005
5008-21	Copper, recoverable (mg/L)	8-7-85	303A	2	<0.005
5008-21	Mercury, recoverable (mg/L)	7-23-85	7641	3	<0.0006
5008-21	Nickel, recoverable (mg/L)	8-9-85	303A	2	<0.02
5008-21	Lead, recoverable (mg/L)	8-7-85	303A	2	<0.03
5008-21	Antimony, recoverable (mg/L)	8-12-85	303A	2	<0.8
5008-21	Selenium, recoverable (mg/L)	7-25-85	304	2	<0.01
5008-21	Thallium, recoverable (mg/L)	8-12-85	303A	2	<0.6
5008-21	Zinc, recoverable (mg/L)	8-7-85	303A	2	0.016

Field Identification: M-6

Matrix: Liquid

Lab Number	Parameter	Date analyzed	Method	Ref.	Concentration
5008-14	Total Cyanide (mg/L)	8-2-85	335.2	1	<0.01
5008-22	Silver, recoverable (mg/L)	8-9-85	303A	2	<0.005
5008-22	Arsenic, recoverable (mg/L)	7-25-85	304	2	<0.01
5008-22	Barium, recoverable (mg/L)	8-8-85	303A	2	0.91
5008-22	Beryllium, recoverable (mg/L)	7-25-85	303C	2	<0.002
5008-22	Cadmium, recoverable (mg/L)	8-7-85	303A	2	<0.003
5008-22	Chromium, recoverable (mg/L)	8-9-85	303A	2	<0.005
5008-22	Copper, recoverable (mg/L)	8-7-85	303A	2	<0.005
5008-22	Mercury, recoverable (mg/L)	7-23-85	7641	3	<0.0006
5008-22	Nickel, recoverable (mg/L)	8-9-85	303A	2	<0.02
5008-22	Lead, recoverable (mg/L)	8-7-85	303A	2	<0.03
5008-22	Antimony, recoverable (mg/L)	8-12-85	303A	2	<0.8
5008-22	Selenium, recoverable (mg/L)	7-25-85	304	2	<0.01
5008-22	Thallium, recoverable (mg/L)	8-12-85	303A	2	<0.6
5008-22	Zinc, recoverable (mg/L)	8-7-85	303A	2	0.020

Reference:
1. EPA 600/4-79-020
2. Standard Methods, 16th Edition
3. EPA SW 846, 2nd Edition

Field Identification: M-7

Matrix: Liquid

Lab Number	Parameter	Date analyzed	Method	Ref.	Concentration
5008-15	Total Cyanide (mg/L)	8-2-85	335.2	1	<0.01
5008-23	Silver, recoverable (mg/L)	8-9-85	303A	2	<0.005
5008-23	Arsenic, recoverable (mg/L)	7-25-85	304	2	<0.01
5008-23	Barium, recoverable (mg/L)	8-8-85	303A	2	<0.2
5008-23	Beryllium, recoverable (mg/L)	7-25-85	303C	2	<0.002
5008-23	Cadmium, recoverable (mg/L)	8-7-85	303A	2	<0.003
5008-23	Chromium, recoverable (mg/L)	8-9-85	303A	2	<0.005
5008-23	Copper, recoverable (mg/L)	8-7-85	303A	2	<0.005
5008-23	Mercury, recoverable (mg/L)	7-23-85	7641	3	<0.0006
5008-23	Nickel, recoverable (mg/L)	8-9-85	303A	2	<0.02
5008-23	Lead, recoverable (mg/L)	8-7-85	303A	2	<0.03
5008-23	Antimony, recoverable (mg/L)	8-12-85	303A	2	<0.8
5008-23	Selenium, recoverable (mg/L)	7-25-85	304	2	<0.01
5008-23	Thallium, recoverable (mg/L)	8-12-85	303A	2	<0.6
5008	Zinc, recoverable (mg/L)	8-7-85	303A	2	0.016

Field Identification: M-8

Matrix: Liquid

Lab Number	Parameter	Date analyzed	Method	Ref.	Concentration
5008-16	Total Cyanide (mg/L)	8-2-85	335.2	1	0.03
5008-24	Silver, recoverable (mg/L)	8-9-85	303A	2	<0.005
5008-24	Arsenic, recoverable (mg/L)	7-25-85	304	2	<0.01
5008-24	Barium, recoverable (mg/L)	8-8-85	303A	2	1.2
5008-24	Beryllium, recoverable (mg/L)	7-25-85	303C	2	<0.002
5008-24	Cadmium, recoverable (mg/L)	8-7-85	303A	2	<0.003
5008-24	Chromium, recoverable (mg/L)	8-9-85	303A	2	<0.005
5008-24	Copper, recoverable (mg/L)	8-7-85	303A	2	<0.005
5008-24	Mercury, recoverable (mg/L)	7-23-85	7641	3	<0.0006
5008-24	Nickel, recoverable (mg/L)	8-9-85	303A	2	<0.02
5008-24	Lead, recoverable (mg/L)	8-7-85	303A	2	<0.03
5008-24	Antimony, recoverable (mg/L)	8-12-85	303A	2	<0.8
5008-24	Selenium, recoverable (mg/L)	7-25-85	304	2	<0.01
5008-24	Thallium, recoverable (mg/L)	8-12-85	303A	2	<0.6
5008-24	Zinc, recoverable (mg/L)	8-7-85	303A	2	0.010

Reference:
1. EPA 600/4-79-020
2. Standard Methods, 16th Edition
3. EPA SW 846, 2nd Edition

Field Identification: B-1

Matrix: Solid

Lab Number	Parameter	Date analyzed	Method	Ref.	Concentratio
5008-25	Silver, recoverable (ug/g)	8-9-85	3050/303A	1/2	<0.5
5008-25	Arsenic, recoverable (ug/g)	8-6-85	3050/304	1/2	26
5008-25	Barium, recoverable (ug/g)	8-8-85	3050/303A	1/2	160
5008-25	Beryllium, recoverable (ug/g)	8-9-85	3050/303C	1/2	1.4
5008-25	Cadmium, recoverable (ug/g)	8-7-85	3050/303A	1/2	1.9
5008-25	Chromium, recoverable (ug/g)	8-9-85	3050/303A	1/2	410
5008-25	Copper, recoverable (ug/g)	8-7-85	3050/303A	1/2	110
5008-25	Mercury, recoverable (ug/g)	7-23-85	7471	1	0.34
5008-25	Nickel, recoverable (ug/g)	8-9-85	3050/303A	1/2	17
5008-25	Lead, recoverable (ug/g)	8-7-85	3050/303A	1/2	150
5008-25	Antimony, recoverable (ug/g)	8-12-85	3050/303A	1/2	<80
5008-25	Selenium, recoverable (ug/g)	7-25-85	3050/304	1/2	<1
5008-25	Thallium, recoverable (ug/g)	8-12-85	3050/303A	1/2	<60
5008	Zinc, recoverable (ug/g)	8-7-85	3050/303A	1/2	520

Field Identification: B-2

Matrix: Solid

Lab Number	Parameter	Date analyzed	Method	Ref.	Concentratio
5008-26	Silver, recoverable (ug/g)	8-9-85	3050/303A	1/2	<0.5
5008-26	Arsenic, recoverable (ug/g)	8-6-85	3050/304	1/2	26
5008-26	Barium, recoverable (ug/g)	8-8-85	3050/303A	1/2	140
5008-26	Beryllium, recoverable (ug/g)	8-9-85	3050/303C	1/2	1.1
5008-26	Cadmium, recoverable (ug/g)	8-7-85	3050/303A	1/2	2.5
5008-26	Chromium, recoverable (ug/g)	8-9-85	3050/303A	1/2	250
5008-26	Copper, recoverable (ug/g)	8-7-85	3050/303A	1/2	45
5008-26	Mercury, recoverable (ug/g)	7-23-85	7471	1	0.39
5008-26	Nickel, recoverable (ug/g)	8-9-85	3050/303A	1/2	8.3
5008-26	Lead, recoverable (ug/g)	8-7-85	3050/303A	1/2	58
5008-26	Antimony, recoverable (ug/g)	8-12-85	3050/303A	1/2	<80
5008-26	Selenium, recoverable (ug/g)	7-25-85	3050/304	1/2	<1
5008-26	Thallium, recoverable (ug/g)	8-12-85	3050/303A	1/2	<60
5008-26	Zinc, recoverable (ug/g)	8-7-85	3050/303A	1/2	460

Reference:
1. EPA SW 846, 2nd Edition
2. Standard Methods, 16th Edition

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Field Identification: B-3 Matrix: Solid

Lab Number	Parameter	Date analyzed	Method	Ref.	Concentration
5008-27	Silver, recoverable (ug/g)	8-9-85	3050/303A	1/2	<0.5
5008-27	Arsenic, recoverable (ug/g)	8-6-85	3050/304	1/2	28
5008-27	Barium, recoverable (ug/g)	8-8-85	3050/303A	1/2	180
5008-27	Beryllium, recoverable (ug/g)	8-9-85	3050/303C	1/2	1.5
5008-27	Cadmium, recoverable (ug/g)	8-7-85	3050/303A	1/2	2.9
5008-27	Chromium, recoverable (ug/g)	8-9-85	3050/303A	1/2	400
5008-27	Copper, recoverable (ug/g)	8-7-85	3050/303A	1/2	110
5008-27	Mercury, recoverable (ug/g)	7-23-85	7471	1	0.35
5008-27	Nickel, recoverable (ug/g)	8-9-85	3050/303A	1/2	12
5008-27	Lead, recoverable (ug/g)	8-7-85	3050/303A	1/2	150
5008-27	Antimony, recoverable (ug/g)	8-12-85	3050/303A	1/2	<80
5008-27	Selenium, recoverable (ug/g)	7-25-85	3050/304	1/2	<1
5008-27	Thallium, recoverable (ug/g)	8-12-85	3050/303A	1/2	<60
5008-27	Zinc, recoverable (ug/g)	8-7-85	3050/303A	1/2	920

Field Identification: B-4 Matrix: Solid

Lab Number	Parameter	Date analyzed	Method	Ref.	Concentration
5008-28	Silver, recoverable (ug/g)	8-9-85	3050/303A	1/2	<0.5
5008-28	Arsenic, recoverable (ug/g)	8-6-85	3050/304	1/2	26
5008-28	Barium, recoverable (ug/g)	8-8-85	3050/303A	1/2	120
5008-28	Beryllium, recoverable (ug/g)	8-9-85	3050/303C	1/2	1.1
5008-28	Cadmium, recoverable (ug/g)	8-7-85	3050/303A	1/2	0.9
5008-28	Chromium, recoverable (ug/g)	8-9-85	3050/303A	1/2	100
5008-28	Copper, recoverable (ug/g)	8-7-85	3050/303A	1/2	53
5008-28	Mercury, recoverable (ug/g)	7-23-85	7471	1	0.35
5008-28	Nickel, recoverable (ug/g)	8-9-85	3050/303A	1/2	9
5008-28	Lead, recoverable (ug/g)	8-7-85	3050/303A	1/2	350
5008-28	Antimony, recoverable (ug/g)	8-12-85	3050/303A	1/2	<80
5008-28	Selenium, recoverable (ug/g)	7-25-85	3050/304	1/2	<1
5008-28	Thallium, recoverable (ug/g)	8-12-85	3050/303A	1/2	<60
5008-28	Zinc, recoverable (ug/g)	8-7-85	3050/303A	1/2	310

Reference: 1. EPA SW 846, 2nd Edition
2. Standard Methods, 16th Edition

Caswell, Eichler and Hill
Laboratory Number: 5153
8-27-85

Field Identification: B-5 (Water Company) Mumford River BENTHIC Matrix: Solid
Laboratory Number: 5153-1

Parameter	Date analyzed	Method	Ref.	Concentration
Silver, recoverable (ug/g)	8-22-85	3050/303A	1/2	0.86
Arsenic, recoverable (ug/g)	8-23-85	3050/304	1/2	16
Beryllium, recoverable (ug/g)	8-22-85	3050/303C	1/2	0.57
Cadmium, recoverable (ug/g)	8-19-85	3050/303A	1/2	0.38
Chromium, recoverable (ug/g)	8-19-85	3050/303A	1/2	65
Copper, recoverable (ug/g)	8-19-85	3050/303A	1/2	10
Mercury, recoverable (ug/g)	8-21-85	7471	1	<0.4
Nickel, recoverable (ug/g)	8-22-85	3050/303A	1/2	3.8
Lead, recoverable (ug/g)	8-23-85	3050/303A	1/2	14
Antimony, recoverable (ug/g)	8-23-85	3050/303A	1/2	<5
Selenium, recoverable (ug/g)	8-22-85	3050/304	1/2	<10
Thallium, recoverable (ug/g)	8-23-85	3050/303A	1/2	<5
Zinc, recoverable (ug/g)	8-19-85	3050/303A	1/2	150

Reference: 1. EPA SW 846, 2nd Edition
2. Standard Methods, 16th Edition

Lab Number: 5008-1
Sample Designation: M-1
Date analyzed: 7-24-85

VOLATILE ORGANICS	CONCENTRATION (ug/L)	DETECTION LIMIT (ug/L)
CHLOROMETHANE	BDL	10
VINYL CHLORIDE	BDL	10
CHLOROETHANE	BDL	5
BROMOMETHANE	BDL	10
METHYLENE CHLORIDE	BDL	5
TRICHLOROFLUOROMETHANE	BDL	5
1,1-DICHLOROETHYLENE	BDL	5
1,1-DICHLOROETHANE	BDL	5
1,2-trans-DICHLOROETHYLENE	BDL	5
CHLOROFORM	BDL	5
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
BROMODICHLOROMETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
1,3-trans-DICHLOROPROPENE	BDL	5
TRICHLOROETHYLENE	BDL	5
BENZENE	BDL	5
1,3-cis-DICHLOROPROPENE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
2-CHLOROETHYL VINYL ETHER	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
BROMOFORM	BDL	5
TETRACHLOROETHYLENE	BDL	5
1,1,2,2-TETRACHLOROETHANE	BDL	5
TOLUENE	BDL	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
THF	BDL	25
MEK	BDL	25
MIBK	BDL	25
STYRENE	BDL	5
XYLENES	BDL	5

BDL = BELOW DETECTION LIMIT
METHOD REFERENCE: EPA 600/4-79-020 METHOD 624

Lab Number: 5008-2
Sample Designation: M-2
Date analyzed: 7-24-85

VOLATILE ORGANICS	CONCENTRATION (ug/L)	DETECTION LIMIT (ug/L)
CHLOROMETHANE	BDL	10
VINYL CHLORIDE	BDL	10
CHLOROETHANE	BDL	5
BROMOMETHANE	BDL	10
METHYLENE CHLORIDE	BDL	5
TRICHLOROFLUOROMETHANE	BDL	5
1,1-DICHLOROETHYLENE	BDL	5
1,1-DICHLOROETHANE	BDL	5
1,2-trans-DICHLOROETHYLENE	BDL	5
CHLOROFORM	BDL	5
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
BROMODICHLOROMETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
1,3-trans-DICHLOROPROPENE	BDL	5
TRICHLOROETHYLENE	BDL	5
BENZENE	BDL	5
1,3-cis-DICHLOROPROPENE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
2-CHLOROETHYL VINYL ETHER	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
BROMOFORM	BDL	5
TETRACHLOROETHYLENE	BDL	5
1,1,2,2-TETRACHLOROETHANE	BDL	5
TOLUENE	BDL	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
THF	BDL	25
MEK	BDL	25
MIBK	BDL	25
STYRENE	BDL	5
XYLENES	BDL	5

BDL = BELOW DETECTION LIMIT
METHOD REFERENCE: EPA 600/4-79-020 METHOD 624

Lab Number:	5008-3
Sample Designation:	M-3
Date analyzed:	7-26-85

VOLATILE ORGANICS	CONCENTRATION (ug/L)	DETECTION LIMIT (ug/L)
CHLOROMETHANE	BDL	10
VINYL CHLORIDE	190	10
CHLOROETHANE	BDL	5
BROMOMETHANE	BDL	10
METHYLENE CHLORIDE	BDL	5
TRICHLOROFLUOROMETHANE	BDL	5
1,1-DICHLOROETHYLENE	BDL	5
1,1-DICHLOROETHANE	BDL	5
1,2-trans-DICHLOROETHYLENE	250	5
CHLOROFORM	BDL	5
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
BROMODICHLOROMETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
1,3-trans-DICHLOROPROPENE	BDL	5
TRICHLOROETHYLENE	10	5
BENZENE	BDL	5
1,3-cis-DICHLOROPROPENE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
2-CHLOROETHYL VINYL ETHER	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
BROMOFORM	BDL	5
TETRACHLOROETHYLENE	BDL	5
1,1,2,2-TETRACHLOROETHANE	BDL	5
TOLUENE	BDL	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
THF	BDL	25
MEK	BDL	25
MIBK	BDL	25
STYRENE	BDL	5
XYLENES	BDL	5

BDL = BELOW DETECTION LIMIT
METHOD REFERENCE: EPA 600/4-79-020 METHOD 624

Lab Number: 5008-3 (Laboratory Duplicate)
Sample Designation: M-3
Date analyzed: 7-26-85

VOLATILE ORGANICS	CONCENTRATION (ug/L)	DETECTION LIMIT (ug/L)
CHLOROMETHANE	BDL	10
VINYL CHLORIDE	210	10
CHLOROETHANE	BDL	5
BROMOMETHANE	BDL	10
METHYLENE CHLORIDE	BDL	5
TRICHLOROFLUOROMETHANE	BDL	5
1,1-DICHLOROETHYLENE	BDL	5
1,1-DICHLOROETHANE	BDL	5
1,2-trans-DICHLOROETHYLENE	250	5
CHLOROFORM	BDL	5
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
BROMODICHLOROMETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
1,3-trans-DICHLOROPROPENE	BDL	5
TRICHLOROETHYLENE	10	5
BENZENE	BDL	5
1,3-cis-DICHLOROPROPENE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
2-CHLOROETHYL VINYL ETHER	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
BROMOFORM	BDL	5
TETRACHLOROETHYLENE	BDL	5
1,1,2,2-TETRACHLOROETHANE	BDL	5
TOLUENE	BDL	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
THF	BDL	25
MEK	BDL	25
MIBK	BDL	25
STYRENE	BDL	5
XYLENES	BDL	5

BDL = BELOW DETECTION LIMIT
METHOD REFERENCE: EPA 600/4-79-020 METHOD 624

Lab Number: 5008-4
Sample Designation: M-4
Date analyzed: 7-26-85

VOLATILE ORGANICS	CONCENTRATION (ug/L)	DETECTION LIMIT (ug/L)
CHLOROMETHANE	BDL	10
VINYL CHLORIDE	BDL	10
CHLOROETHANE	BDL	5
BROMOMETHANE	BDL	10
METHYLENE CHLORIDE	BDL	5
TRICHLOROFLUOROMETHANE	BDL	5
1,1-DICHLOROETHYLENE	BDL	5
1,1-DICHLOROETHANE	BDL	5
1,2-trans-DICHLOROETHYLENE	BDL	5
CHLOROFORM	BDL	5
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
BROMODICHLOROMETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
1,3-trans-DICHLOROPROPENE	BDL	5
TRICHLOROETHYLENE	BDL	5
BENZENE	BDL	5
1,3-cis-DICHLOROPROPENE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
2-CHLOROETHYL VINYL ETHER	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
BROMOFORM	BDL	5
TETRACHLOROETHYLENE	BDL	5
1,1,2,2-TETRACHLOROETHANE	BDL	5
TOLUENE	BDL	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
THF	BDL	25
MEK	BDL	25
MIBK	BDL	25
STYRENE	BDL	5
XYLENES	BDL	5

BDL = BELOW DETECTION LIMIT
METHOD REFERENCE: EPA 600/4-79-020 METHOD 624

Lab Number: 5008-6
Sample Designation: M-6
Date analyzed: 7-26-85

VOLATILE ORGANICS	CONCENTRATION (ug/L)	DETECTION LIMIT (ug/L)
CHLOROMETHANE	BDL	24
VINYL CHLORIDE	BDL	24
CHLOROETHANE	BDL	12
BROMOMETHANE	BDL	24
METHYLENE CHLORIDE	BDL	12
TRICHLOROFLUOROMETHANE	BDL	12
1,1-DICHLOROETHYLENE	BDL	12
1,1-DICHLOROETHANE	BDL	12
1,2-trans-DICHLOROETHYLENE	15	12
CHLOROFORM	BDL	12
1,2-DICHLOROETHANE	BDL	12
1,1,1-TRICHLOROETHANE	BDL	12
CARBON TETRACHLORIDE	BDL	12
BROMODICHLOROMETHANE	BDL	12
1,2-DICHLOROPROPANE	BDL	12
1,3-trans-DICHLOROPROPENE	BDL	12
TRICHLOROETHYLENE	30	12
BENZENE	BDL	12
1,3-cis-DICHLOROPROPENE	BDL	12
1,1,2-TRICHLOROETHANE	BDL	12
2-CHLOROETHYL VINYL ETHER	BDL	12
DIBROMOCHLOROMETHANE	BDL	12
BROMOFORM	BDL	12
TETRACHLOROETHYLENE	950	12
1,1,2,2-TETRACHLOROETHANE	BDL	12
TOLUENE	BDL	12
CHLOROBENZENE	BDL	12
ETHYLBENZENE	BDL	12
ACETONE	BDL	60
CARBON DISULFIDE	BDL	12
THF	BDL	60
MEK	BDL	60
MIBK	BDL	60
STYRENE	BDL	12
XYLENES	BDL	12

BDL = BELOW DETECTION LIMIT
METHOD REFERENCE: EPA 600/4-79-020 METHOD 624

Lab Number: 5008-8
Sample Designation: M-8
Date analyzed: 7-26-85

VOLATILE ORGANICS	CONCENTRATION (ug/L)	DETECTION LIMIT (ug/L)
CHLOROMETHANE	BDL	14
VINYL CHLORIDE	260	14
CHLOROETHANE	BDL	7
BROMOMETHANE	BDL	14
METHYLENE CHLORIDE	BDL	7
TRICHLOROFLUOROMETHANE	BDL	7
1,1-DICHLOROETHYLENE	BDL	7
1,1-DICHLOROETHANE	Trace	7
1,2-trans-DICHLOROETHYLENE	610	7
CHLOROFORM	BDL	7
1,2-DICHLOROETHANE	BDL	7
1,1,1-TRICHLOROETHANE	BDL	7
CARBON TETRACHLORIDE	BDL	7
BROMODICHLOROMETHANE	BDL	7
1,2-DICHLOROPROPANE	BDL	7
1,3-trans-DICHLOROPROPENE	BDL	7
TRICHLOROETHYLENE	30	7
BENZENE	BDL	7
1,3-cis-DICHLOROPROPENE	BDL	7
1,1,2-TRICHLOROETHANE	BDL	7
2-CHLOROETHYL VINYL ETHER	BDL	7
DIBROMOCHLOROMETHANE	BDL	7
BROMOFORM	BDL	7
TETRACHLOROETHYLENE	Trace	7
1,1,2,2-TETRACHLOROETHANE	BDL	7
TOLUENE	BDL	7
CHLOROBENZENE	BDL	7
ETHYLBENZENE	BDL	7
ACETONE	BDL	35
CARBON DISULFIDE	BDL	7
THF	BDL	35
MEK	BDL	35
MIBK	BDL	35
STYRENE	BDL	7
XYLENES	BDL	7

"Trace" denotes probable presence below listed detection limit.

BDL = BELOW DETECTION LIMIT
METHOD REFERENCE: EPA 600/4-79-020 METHOD 624