HMM ASSOCIATES, INC.

ENGINEERS, ENVIRONMENTAL CONSULTANTS & PLANNERS

LETTER OF TRANSMITTAL

Other:

DATE: February 20, 1990

TO: Richard Goehlert
U.S. EPA
JFK Federal Building
HSN-CAN5
Boston, MA 02203-2211

FROM: Richard Cote
HMM Associates
196 Baker Avenue
Concord, MA 01742

RE: Savage Well Site

JOB NO: 2176-120

SUBJECT: Additional Soils Investigation - Subtask 2F

__X__ For Your Information
_____ Per Your Request

__X__ For Your Review/Comments
____ For Your Authorization

REMARKS:

The following is a summary of the additional soils investigation undertaken by HMM Associates designed to investigate potential contaminant source areas that were not fully evaluated by the Phase II-A soil boring/soil gas program and more specifically to determine whether VOC contamination exists in the soil vadose zone beneath building slabs. Specifically the work addressed the following locations:

1. An area under the O.K. Tool Building floor slab in the vicinity of the former floor drain excavated by Normandeau Associates, Inc.

2. A storm drain and stockpiled soils located outside the O.K. Tool Building.

3. Areas below the Hitchiner Building in the immediate vicinity of the former location of a photographic lab dry well; and

4. Areas under the easternmost portions of the Hendrix Building, including any floor drains.

The actual sampling of soils/waste materials at the above mentioned locations was accomplished using split-spoon samplers and an open tube sludge sampler and other hand sampling techniques. At all the sub-slab locations, the concrete surface was penetrated using a Bosch masonry drive/percussion hammer. Samples collected were all screened immediately for volatile organic compounds with an OVA/HNu using headspace analytical techniques. The results of field screening are summarized on an attached table. Selected samples were then submitted for laboratory analysis of VOC's. All analytical results are also summarized on an attached table.

The site specific summary of the sampling techniques used and protocol followed during sampling operations for the various locations are outlined below. In addition the sampling points are indicated on the attached site maps.

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1. Soil samples were collected underneath the O.K. Tool Building concrete slab in an area encompassing approximately 2,000 square feet. This area is located adjacent to and hydraulically downgradient of the floor drain excavation described previously (see attached map for detailed sampling point locations). The samples were collected using a 2-foot split-spoon sampler driven by a 140-pound weight using a portable tripod and motorized winch assembly. Each split-spoon sample was divided into two portions; one for screening purposes and the other for possible laboratory analysis. All samples for laboratory analysis were immediately placed in an insulated cooler with ice to reduce the potential for volatilization of the sample. After each sample was collected the split-spoon sampler was decontaminated with Alconox soap solution, methanol solution and deionized water. At the completion of each of the 8 borings (refusal) the split-spoon sample exhibiting the highest OVA/HNu response or exhibiting visual or olfactory evidence of contamination was submitted for analysis of volatile organic compounds OVA/HNu responses ranged from 1 to 40 ppm. Continuous soil sampling was performed at each location to a depth at which penetration could not be continued. A maximum depth of 6.8' was achieved in Boring SL-2. Further depths could not be penetrated due to hole collapse and large cobbles. As indicated, a total of 8 soil samples were submitted for laboratory analysis. No samples showed visual, olfactory or other obvious evidence of contamination.

2. In addition to the sub-slab soil samples, soil/sludge samples were collected from three locations outside the O.K. Tool Building. One sample from each location was submitted for laboratory analysis of VOC's.

   a. A soil/sludge sample was extracted from the storm drain of the entry ramp at the northeast corner of the building. The sample was collected using a manually operated soil/sludge tube sampler. The matrix of the sample was primarily wet sand and silt. Sample handling and decontamination procedures were as described for the sub-slab work.

   b. One composite soil sample was also collected from each of the two stockpiled soils areas directly behind the O.K. Tool Building. These piles are the result of the excavation and treatability study work previously performed by Normandeau Associates, Inc. The composite samples were collected manually from a small auger attached to a Bosch rotary hammer.

3. Four sub-slab soil samples for laboratory analysis were also collected at the Hitchiner complex in the immediate vicinity of the former location of a photographic lab dry well. Four borings were completed, each extending approximately 1-2' below the ground surface. The samples were collected by manually driving the 2-foot split-spoon with a sledge hammer. All samples appeared to be sandy, gravelly fill. OVA/HNu responses ranged from .4 to 30 PPM with the HNu generally exhibiting the higher response.

4. A soil/sludge composite sample was extracted from a floor drain in the easternmost portion of the Hendrix facility, near MW-29. The soil/sludge was obtained from a depth of approximately 1 foot below the ground surface and consisted of sands and gravels as well as surficial layers of debris. The sample was again collected with the sludge tube sampler. OVA/HNU responses on the composite sample were 5 ppm OVA, 150 ppm HNU.

   In addition, under the concrete slab in the easternmost portion of the Hendrix building, three borings were excavated and three soil samples were collected using the split spoon sampler (manual driven). Again, the samples were obtained from a depth of approximately 1-2 feet below the ground surface. OVA/HNU readings from the sand and gravel samples ranged from 2 to 100 ppm.

Analytical Results

The results of the additional soils investigation have identified higher levels of tetrachloroethylene (PCE) beneath the O.K. Tool building slab than had been previously identified in soils sampled elsewhere at the site during the RI. The eight samples collected beneath the slab had PCE levels ranging from 83 ug/l to 2,400 ug/l. The highest levels, 2,400 ug/l in SL-1 and 1,300 ug/l in SL-2, were detected in soils located immediately adjacent to the excavation. Sample SL-8, located approximately 70 feet from the excavation at the easternmost edge of the building, had PCE at a level of 900 ug/l. Trichloroethene (TCE) was detected at 19 ug/l in soil sample SL-8. The presence of methylene chloride, identified in five of the samples, has been determined to be the result of laboratory contamination.

Two of the samples collected from the stockpiles located north of the O.K. Tool building were found to contain PCE at levels below the detection limit while the third contained PCE at 44 ug/l. The sample collected from the storm drain contained PCE at 840 ug/l, TCE at 160 ug/l, and 1,2-DCE at 320 ug/l.

The four samples collected beneath the Hitchiner facility contained no detectable VOC's with the exception of Acetone, detected at 22 ug/l in SL-9.

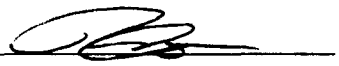
Sampling of soils beneath the Hendrix building indicated detectable levels of PCE in three of four samples. PCE was detected at 100 ug/l in SL-16, collected from a floor drain, at 110 ug/l in SL-13, and at 5 ug/l in SL-14.

One sample from each sub-floor area was also analyzed for the complete HSL parameters including ABN's, PCB's, and metals. The results do not appear to indicate a source for these contaminant parameters at any of the locations.

Discussion

The results of the additional soils investigation do not appear to indicate the presence of VOCs in vadose zone soils at levels high enough to serve as a long-term source for groundwater contamination. Elevated levels of PCE (i.e., in the 1 to 2 ppm range) were identified in soils beneath the O.K. Tool floor slab, but these levels are significantly lower than levels of PCE detected in groundwater immediately downgradient of O.K. Tool.

There are, however, high levels of PCE contamination in groundwater downgradient from the O.K. Tool facility, and most likely, beneath the O.K. Tool building. Treatability studies including soil column flushing studies are currently being completed, and source control alternatives will be evaluated in detail in the upcoming Draft FS Report.



Signature

2/24/90

Date

COMMENTS:

Signature

Date

HNV/OVA RESPONSES
AREA 1 - O.K. TOOL

Area #	Boring #	Sample Depth	OVA Reading (ppm)	HNU Reading (ppm)
1	SL-1	0-2'	8	-
1	SL-2	0-2'	13	-
1	SL-2	2-4'	26	-
1	SL-2	4-6.5'	16	-
1	SL-3	0-2'	2	-
1	SL-3	2-3.5'	9.5	-
1	SL-3	3.5-5'	-	-
1	SL-4	0-2'	8	-
1	SL-4	2-4'	20	-
1	SL-4	4-6.5'	No Recovery	-
1	SL-5	0-2'	20	-
1	SL-5	2-4'	35	-
1	SL-6	0-2'	10	20
1	SL-6	2-4'	40	40
1	SL-7	0-2'	20	30
1	SL-7	2-3.5'	24	30
1	SL-8	0-2'	20	15
1	SL-8	2-4'	24	25

AREA 2 - O.K. TOOL

		OVA	HNU
Storm Drain		17.5	10
SS-1 0-.5'	1	15	
SS-2 0-.5'	ND*	20	
SS-3 0-.5'	ND	25	

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* ND - None detected.

AREA 3 - HITCHINER

Boring #	Sample Depth	OVA	HNU
SL-10	0-1'	30	25
SL-10	0-2'	0.4	20
SL-11	0-2'	5	25
SL-12	0-2'	2	25

AREA 4 - HENDRIX

Boring #	Sample Depth	OVA	HNU
SL-13	0-2'	6.6	100+
SL-14	0-2'	0.2	30
SL-15	0-2'	3	40
Floor Drain	-	5	150

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* ND - None detected.

Volatile Organic Compounds in Soil

Designation: Additional Soils Investigation 11-17-89 thru 12-6-89

Parameter (ug/kg):	Well Number:	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7
	Depth (ft):	0 - 2	4 - 6.5	1 - 3.5	2 - 4	2 - 4	2 - 4	1 - 3
Chloromethane		ND	ND	ND	ND	ND	ND	ND
Bromomethane		ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride		ND	ND	ND	ND	ND	ND	ND
Chloroethane		ND	ND	ND	ND	ND	ND	ND
Methylene Chloride		960	1800	360	2200	1800	ND	ND
Trichlorofluoromethane		ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene		ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane		ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene		ND	ND	ND	ND	ND	ND	ND
Chloroform		ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane		ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane		ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride		ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane		ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane		ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene		ND	ND	ND	ND	ND	ND	ND
Trichloroethene		ND	ND	ND	ND	ND	ND	ND
Benzene		ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane		ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane		ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene		ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether		ND	ND	ND	ND	ND	ND	ND
Bromoform		ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane		ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene		2400	1300	83	360	740	130	930
Toluene		ND	ND	ND	ND	ND	ND	ND
Chlorobenzene		ND	ND	ND	ND	ND	ND	ND
Ethylbenzene		ND	ND	ND	ND	ND	ND	ND
Acetone		ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide		ND	ND	ND	ND	ND	ND	ND
2-Butanone		ND	ND	ND	ND	ND	ND	ND
Vinyl Acetate		ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone		ND	ND	ND	ND	ND	ND	ND
2-Hexanone		ND	ND	ND	ND	ND	ND	ND
Styrene		ND	ND	ND	ND	ND	ND	ND
Total Xylenes		ND	ND	ND	ND	ND	ND	ND
Dibromoethane (EDB)		ND	ND	ND	ND	ND	ND	ND
Methyl-t-Butylether (MTBE)		ND	ND	ND	ND	ND	ND	ND
Total Volatiles		3360	3100	443	2560	2540	130	930

ND = None Detected

Volatile Organic Compounds in Soil

Designation: Additional Soils Investigation 11-17-89 thru 12-6-89

Parameter (ug/kg):	Well Number:	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14
	Depth (ft):	2 - 4	0 - 1	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2
Chloromethane		ND	ND	ND	ND	ND	ND	ND
Bromomethane		ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride		ND	ND	ND	ND	ND	ND	ND
Chloroethane		ND	ND	ND	ND	ND	ND	ND
Methylene Chloride		ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane		ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene		ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane		ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene		ND	ND	ND	ND	ND	ND	ND
Chloroform		ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane		ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane		ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride		ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane		ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane		ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene		ND	ND	ND	ND	ND	ND	ND
Trichloroethene		19	ND	ND	ND	ND	ND	ND
Benzene		ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane		ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane		ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene		ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether		ND	ND	ND	ND	ND	ND	ND
Bromoform		ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane		ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene		900	ND	ND	ND	ND	110	5
Toluene		ND	ND	ND	ND	ND	ND	ND
Chlorobenzene		ND	ND	ND	ND	ND	ND	ND
Ethylbenzene		ND	ND	ND	ND	ND	ND	ND
Acetone		ND	22	ND	ND	ND	ND	ND
Carbon Disulfide		ND	ND	ND	ND	ND	ND	ND
2-Butanone		ND	ND	ND	ND	ND	ND	ND
Vinyl Acetate		ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone		ND	ND	ND	ND	ND	ND	ND
2-Hexanone		ND	ND	ND	ND	ND	ND	ND
Styrene		ND	ND	ND	ND	ND	ND	ND
Total Xylenes		ND	ND	ND	ND	ND	ND	ND
Dibromoethane (EDB)		ND	ND	ND	ND	ND	ND	ND
Methyl-t-Butylether (MTBE)		ND	ND	ND	ND	ND	ND	ND
Total Volatiles		919	22	0	0	0	110	5

ND = None Detected

Volatile Organic Compounds in Soil

Designation: Additional Soils Investigation 11-17-89 thru 12-6-89

Parameter (ug/kg):	Well Number: SL-15	SL-16	SS-1	SS-2	SS-3	SS-4
	Depth (ft): 0 - 2	0 - 2	0 - 0.5	0 - 0.5	0 - 0.5	---
Chloromethane	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	320
Chloroform	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	ND	160
Benzene	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	100	44	ND	ND	840
Toluene	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	87	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND
Vinyl Acetate	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND
Total Xylenes	ND	ND	ND	ND	ND	ND
Dibromoethane (EDB)	ND	ND	ND	ND	ND	ND
Methyl-t-Butylether (MTBE)	ND	ND	ND	ND	ND	ND
Total Volatiles	0	100	131	0	0	1320

ND = None Detected

Acid/Base/Neutral Extractable Compounds in Soil

	Designation: Additional Soils Investigation 11-17-89 thru 12-6-89		
	Well Number: SL-4	SL-11	SL-14
	Depth(ft): 2 - 4	0 - 2	0 - 2
Parameter (ug/kg):			
bis(2-Chloroethyl) Ether	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND
bis(2-Chloroisopropyl) Ether	ND	ND	ND
N-Nitroso-Di-n-Propylamine	ND	ND	ND
Hexachloroethane	ND	ND	ND
Nitrobenzene	ND	ND	ND
Isophorone	ND	ND	ND
bis(2-Chloroethoxy) Methane	ND	ND	ND
1,2,4-trichlorobenzene	ND	ND	ND
Naphthalene	ND	ND	ND
4-Chloroaniline	ND	ND	ND
Dimethyl Phthalate	ND	ND	ND
Acenaphthylene	ND	ND	ND
3-Nitroaniline	ND	ND	ND
Acenaphthene	ND	ND	ND
Dibenzofuran	ND	ND	ND
2,4-Dinitrotoluene	ND	ND	ND
2,6-Dinitrotoluene	ND	ND	ND
Diethyphthalate	ND	ND	ND
4-Chlorophenyl-phenylether	ND	ND	ND
Fluorene	ND	ND	ND
4-Nitroaniline	ND	ND	ND
N-Nitrosodiphenylamine	ND	ND	ND
4-Bromophenyl-phenylether	ND	ND	ND
Hexachlorobenzene	ND	ND	ND
Phenanthrene	ND	ND	ND
Anthracene	ND	ND	ND
Di-n-Butylphthalate	ND	Trace	ND
Fluoranthene	ND	ND	ND
Pyrene	ND	ND	ND
Butylbenzylphthalate	ND	ND	ND
3,3'-Dichlorobenzidine	ND	ND	ND
Benzo(a)Anthracene	ND	ND	ND
bis(2-Ethylhexyl) Phthalate	ND	ND	ND
Chrysene	ND	ND	ND
Di-n-Octylphthalate	ND	ND	ND
Benzo(b)Fluoranthene	ND	ND	ND
Benzo(k)Fluoranthene	ND	ND	ND
Benzo(a)Pyrene	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	ND	ND	ND
Dibenz(a,h)Anthracene	ND	ND	ND
Benzo(g,h,i)Perylene	ND	ND	ND
Phenol	ND	ND	ND
2-Chlorophenol	ND	ND	ND
2-Methylphenol	ND	ND	ND
4-Methylphenol	ND	ND	ND
2-Nitrophenol	ND	ND	ND
2,4-Dimethylphenol	ND	ND	ND
2,4-Dichlorophenol	ND	ND	ND
4-Chloro-3-Methylphenol	ND	ND	ND
2,4,6-trichlorophenol	ND	ND	ND
2,4,5-trichlorophenol	ND	ND	ND
2,4-Dinitrophenol	ND	ND	ND
2,4-Nitrophenol	ND	ND	ND
4,6-Dinitro-2-methylphenol	ND	ND	ND
Pentachlorophenol	ND	ND	ND
Total:	0	0	0

ND = None Detected

Polychlorinated Biphenyl Hydrocarbons in Soil

Designation: Additional Soils Investigation 11-17-89 thru 12-6-89

Well Number:	SL-4	SL-11	SL-14
Depth(ft):	2 - 6	0 - 2	0 - 2
Parameter(mg/kg):			
Aroclor 1016	ND	ND	ND
Aroclor 1221	ND	ND	ND
Aroclor 1232	ND	ND	ND
Aroclor 1242	ND	ND	ND
Aroclor 1248	ND	ND	ND
Aroclor 1254	ND	ND	ND
Aroclor 1260	ND	ND	ND
Total:	0	0	0

ND = None Detected

Metals in Soil

Designation: Additional Soils Investigation 11-17-89 thru 12-6-89

Well Number:	SL-4	SL-11	SL-14
Depth(ft):	2 - 4	0 - 2	0 - 2
Parameter(mg/kg):			
Arsenic	12	9.0	13
Antimony	ND	ND	ND
Barium	22.3	15.4	25.8
Beryllium	3.12	3.02	3.97
Cadmium	ND	ND	ND
Chromium	7.74	8.17	7.68
Copper	5.61	4.15	7.74
Lead	5.2	6	11
Mercury	ND	ND	ND
Nickel	5.26	6.14	7.8
Zinc	20.9	15.6	29.1
Aluminum	7,300	4,400	7,600
Iron	10,200	7,080	10,300
Manganese	140	96.8	103
Vanadium	51	8.0	12
Total Solids (%):	86.3	94.4	92.1

ND = None Detected NT = Not Tested

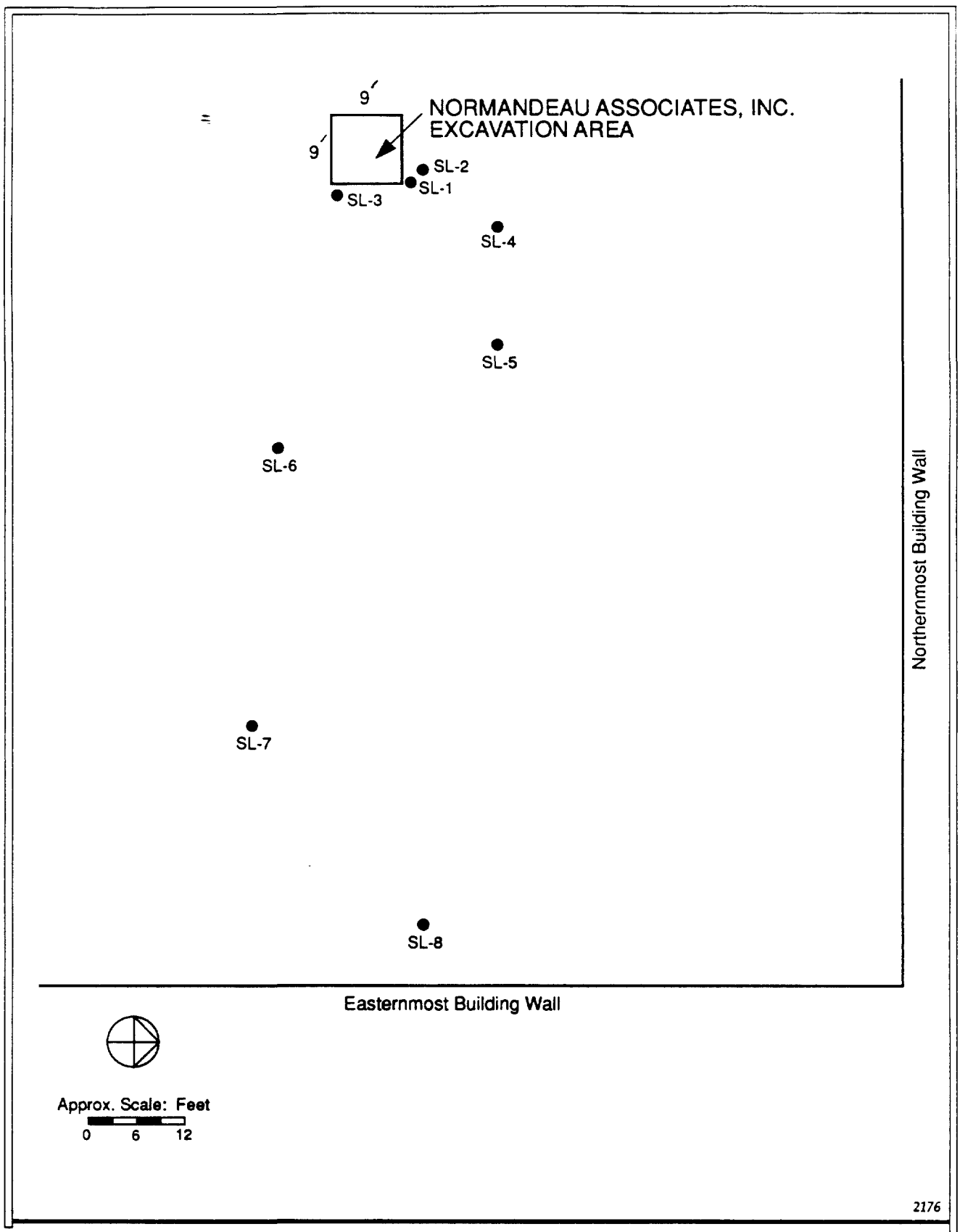


FIGURE 1
O.K. TOOL SUB-SLAB BORING LOCATION MAP

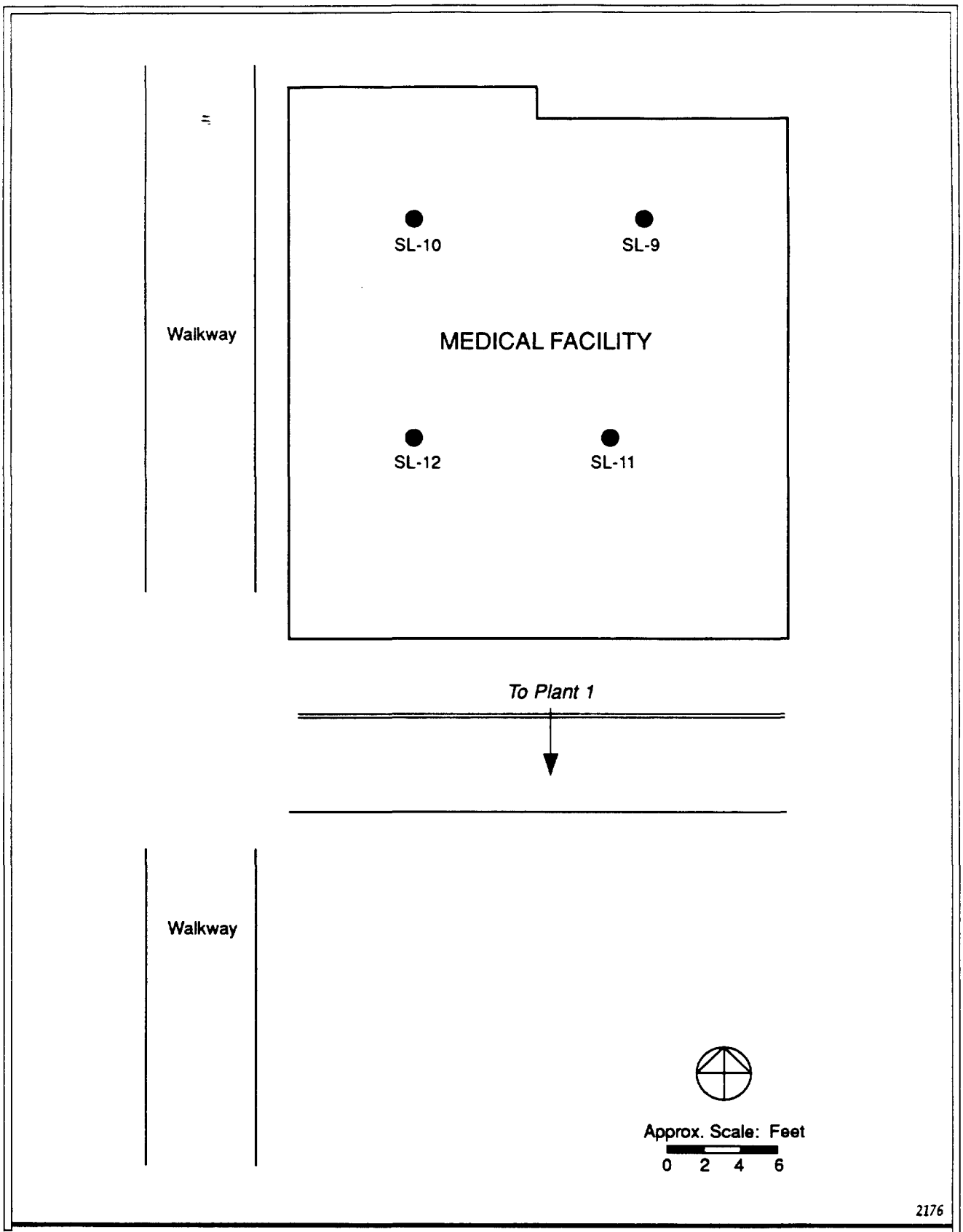


FIGURE 2

HITCHINER SUB-SLAB BORING LOCATION MAP - MEDICAL FACILITY

(Former Location of Photographic Lab Dry Well)

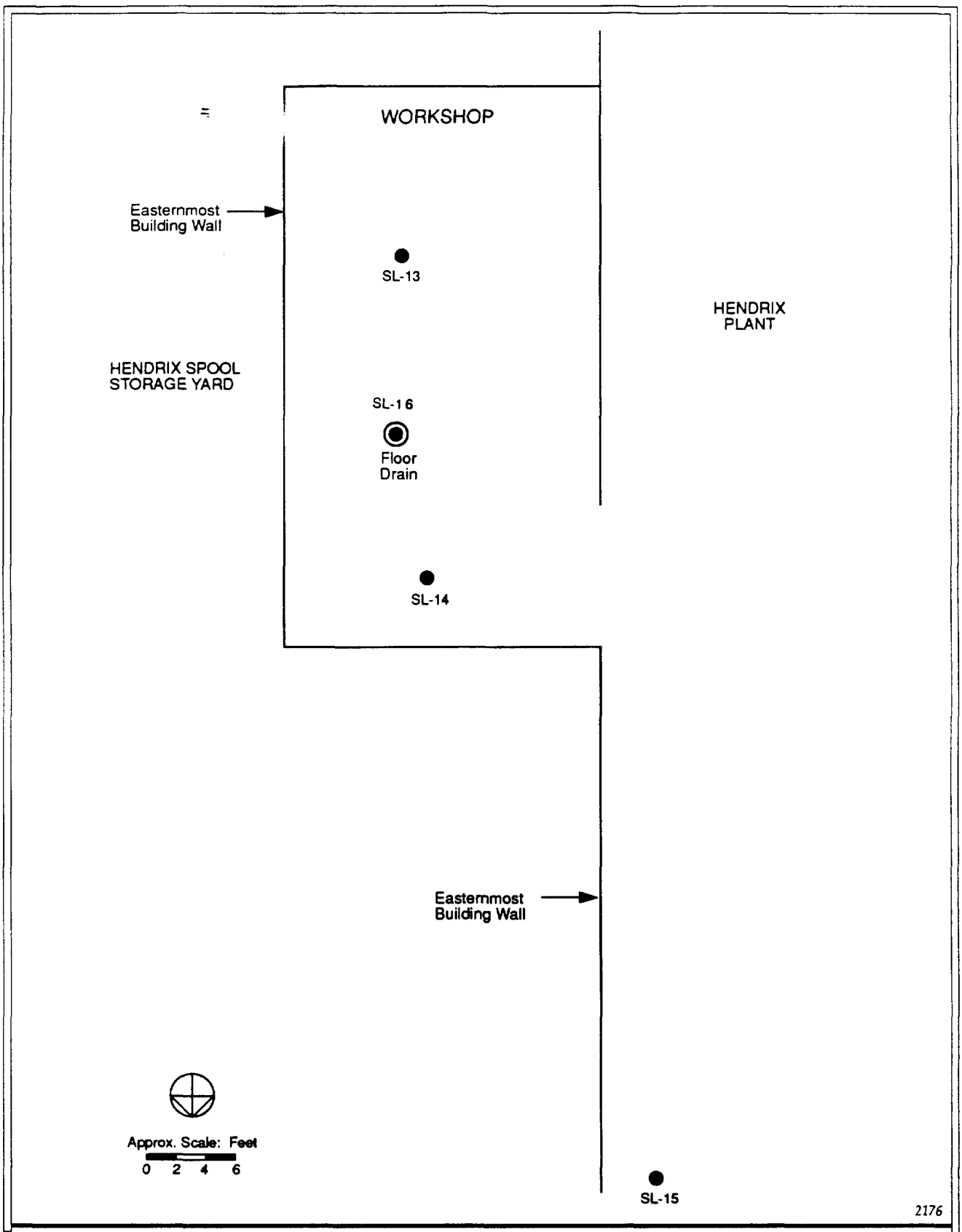


FIGURE 3
HENDRIX SUB-SLAB BORING LOCATION MAP

STATE OF NEW HAMPSHIRE

Inter-Department Communication

DATE Feb.28,1990

FROM Patricia Bickford pb
DES Laboratory

AT (OFFICE) Environmental Services
Laboratory Unit

SUBJECT Lab Results from Savage
Municipal Well Site

TO James Zeppieri,Waste Management Engineering Bureau

In response to your memo concerning samples #'s 140725,140726, 140565 and 140566, please review the following points:

1. All samples were run within seven days of the sampling date since no preservative was used.
2. Trip blanks for both sampling dates were blank.
3. As you know, DES lab requests samples in duplicate so that one sample can be screened by GC/FID headspace analysis to determine if dilutions are necessary for GC/MS. Sample #140725 indicated the presence of trichloroethene at 6.9ug/L on the head-space analysis although the spectrum scan showed numerous other peaks from a sample run previously which was highly contaminated. Sample #140565 indicated nothing present.
4. The corresponding samples were run on GC/MS using EPA method 624 and without dilution. Tune and QC calibration check reports for both analyses are attached. Sample #140726 clearly indicated (see attached chromatogram) the presence of trichloroethene. It is DES lab practice for the analyst to confirm the presence of all peaks in a chromatogram and indicate hits on the printout. A Matrix Spike run from the same sample-but not run consecutively- confirmed the hit (see attached Matrix Spike report). Sample #140566 indicated all analytes were below our detection limit.
5. Based on the QC reports and analysis data I am confident that trichloroethylene was present in sample #140726 at a level of 10±2ug/L. However, we should also consider that the trichloroethene could come from vial contamination or sampling error.

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene

Site _____
Instrument ID HP5985 Date 1-2-90 Time 1:03pm
Sample Range _____ Analyst MWA

Tune Check: 5337

m/e	Ion Abundance Criteria	% Relative Abundance
50	15 - 40% of the base peak	21.8
75	30 - 60% of the base peak	45.8
95	Base peak, 100% relative abundance	100.0
96	5 -9% of the base peak	7.6
173	Less than 1% of the base peak	~~68.2~~ 0.0
174	Greater than 50% of the base peak	~~4.8~~ 68.2
175	5 - 9% of mass 174	~~67.7~~ 4.8 ( )[1]
176	Greater than 95%, but less than 101% of 174	~~4.9~~ 67.7 ( )[1]
177	5 - 9% of mass 176	4.9 ( )[2]

1 Value in parenthesis is % of mass 174.
2 Value in parenthesis is % of mass 176.

Comments:

Internal standard lot #

Internal standard: abundance of ion mass 96 = (fluorobenzene)

Tuning standard: abundance of ion mass 95 = (p-fluorobromobenzene)

VOA CALIBRATION CHECK

Analyst: MWR

Instrument : HP5985

Date: 01-02-90

Sample #:5337

Site:

COMPOUND	TRUE	NEW	% DIFF
Methylene Chloride	53.1	51.5	-3.0
1,1-Dichloroethene	39.0	33.8	-13.3
1,1-Dichloroethane	37.6	44.0	17.0
1,2-Dichloroethene	30.2	33.0	9.2
Chloroform	35.6	35.8	.4
d4-1,2 Dichloroethane	30.2	33.1	9.5
1,2-Dichloroethane	29.6	31.6	6.8
Methyl-T-Butyl Ether	47.4	64.4	35.9
1,1,1-Trichloroethane	32.1	34.3	7.0
Cyclohexane	24.9	24.8	-.6
Bromodichloromethane	31.7	28.1	-11.5
Trichloroethene	35.1	33.3	-5.3
d6-Benzene	21.3	24.4	14.5
Benzene	35.1	37.3	6.2
Dibromochloromethane	39.2	41.4	5.7
Bromoform	34.7	35.2	1.3
Tetrachloroethylene	38.9	39.7	2.0
Toluene	34.7	40.8	17.7
Chlorobenzene	35.4	37.9	7.1
Ethylbenzene	34.7	34.1	-1.8
p-BFB	33.5	28.8	-14.0
Styrene	0.0	0.0	*********
m-Xylene	34.6	35.0	1.2
p-Xylene	34.8	39.0	12.1

MATRIX SPIKE & SURROGATE RECOVERIES

SAMPLE # 140477 FRN 5344 SAMPLE RANGE

____ WATER ? ✓ SOIL ? ____ UNITS: ✓ ug/L ____ ug/kg SITE Jaffrey

COMPOUND	CONC. SPIKE ADDED	CONC. MS (ug/L)	% REC.	COMMENTS
1,1-Dichloroethene	38.8 ug/L	32.77	84.5	
Trichloroethene	35.1 ug/L	30.67	87.4	
Chlorobenzene	35.5 ug/L	30.49	85.9	
Toluene	41.6 ug/L	34.57	83.1	
Benzene	42.1 ug/L	38.38	91.2	
d_4-Dichloroethane X	~~16.0~~ 30.2 ug/L	31.22	103.4	
Benzene-d6 X	21.3 ug/L	21.83	102.5	
p-Bromofluorobenzene X	33.5 ug/L	36.38	108.6	

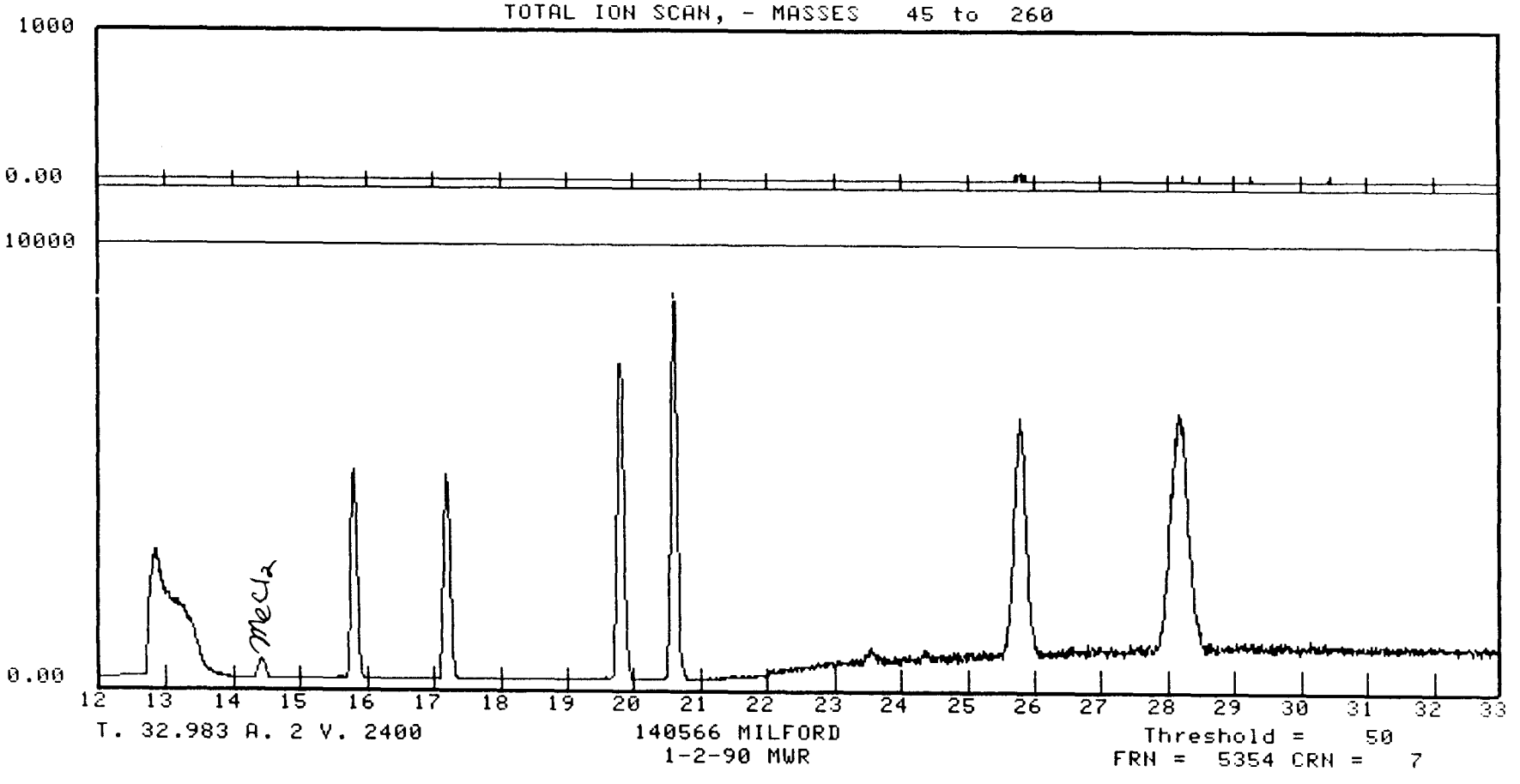
Date 1-2-90

Analyst MWR

Site Jaffrey

Sample # 140477

PARAMETER	LEV 1	DUP	% D	LEV 1	DUP	% D	LEV 1	DUP	% D
chloroform									
1, 2-dichloroethane									
1,1,1-trichloroethane									
bromodichloromethane									
* trichloroethene	30.67	32.32	5.38						
* benzene	38.38	39.56	3.07						
dibromochloromethane									
bromoform									
tetrachloroethylene									
* toluene	34.57	35.50	2.69						
* chlorobenzene	30.49	31.58	3.74						
ethylbenzene									
m-xylene									
o-xylene									
p-xylene									
cis-1, 2-dichloroethane									
1,1-dichloroethane									
p-fluorobromobenzene									
1,4-dichlorobenzene									
T-1,2-dichloroethene									
carbon tetrachloride									
1,2-dichloropropane									
1,3-dichloropropene									
1,1,2-trichloroethane									
m-dichlorobenzene									
o-dichlorobenzene									
chloromethane									
bromomethane									
dichlorodifluoromethane									
vinyl chloride									
chloroethane									
methylene chloride									
trichlorofluoromethane									
* 1,1-dichloroethene	32.77	33.88	3.39						
1,3-cis-dichloropropene									
2-chloroethyl vinyl ether									
1,1,2,2-tetrachloroethane									
THF									
acetone									
~~2-butanone~~ d4 dichloroethane	31.22	31.18	0.13						
carbon disulfide									
~~2-hexanone~~ d6 benzene	21.83	22.11	1.28						
4-methyl-2-pentanone									
styrene ~~d5 BFB~~	86								
~~vinyl acetate~~ p-BFB	36.38	31.14	14.46						
diethyl ether									


TOTAL ION SCAN, - MASSES 45 to 260
1000
0.00
10000
0.00
MeCl2
12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33
T. 32.983 A. 2 V. 2400
140566 MILFORD
1-2-90 MWR
Threshold = 50
FRN = 5354 CRN = 7

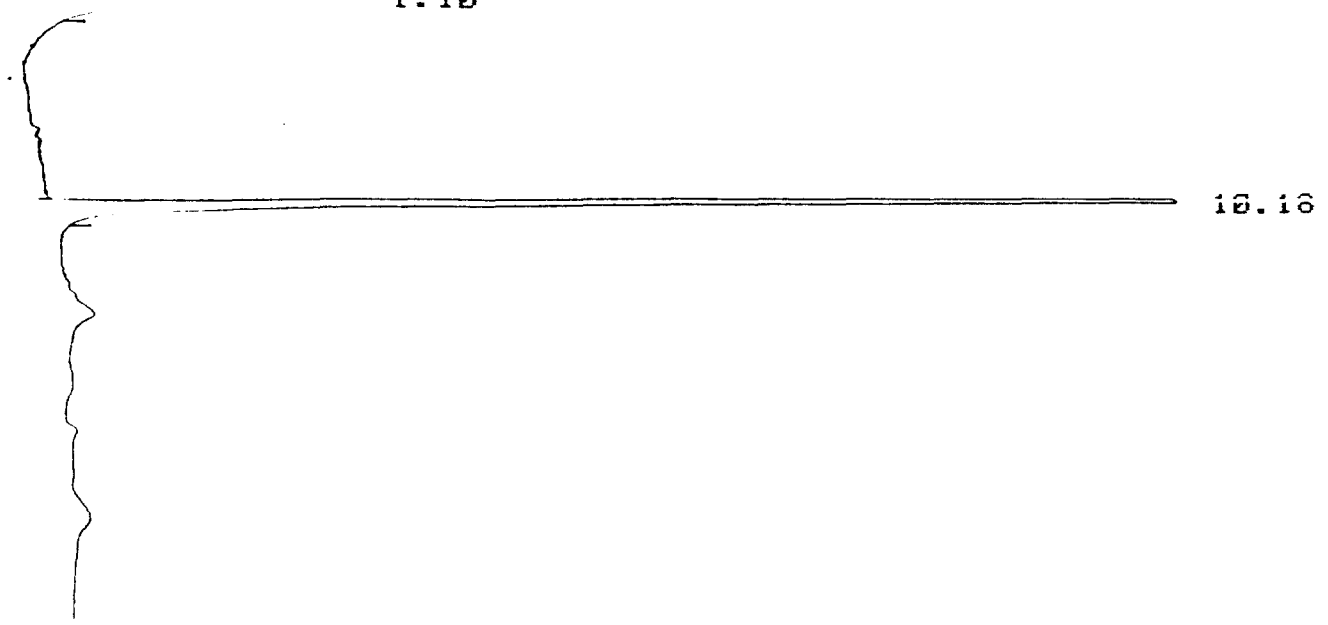
FILE NUMBER 5354
140566 MILFORD
1-2-90 MWR

AREA	R. TIME	START	STOP	MAXIMA	# SUMS	MASS	BASE
8946.0	19.8	19.7	20.0	747.0	28.0	56.0	B
1783.0	17.2	17.1	17.3	177.0	18.0	63.0	B
1698.0	20.6	20.5	20.7	159.0	19.0	63.0	B
18571.0	17.2	17.1	17.4	1583.0	30.0	65.0	B
1983.0	19.9	19.8	20.0	171.0	21.0	78.0	B
1669.0	14.4	14.4	14.5	134.0	20.0	84.0	B
47824.0	19.8	19.7	20.0	3997.0	39.0	84.0	B
3108.0	25.8	25.6	26.0	150.0	34.0	84.0	B
653.0	15.8	15.8	15.9	85.0	13.0	91.0	B
2353.0	23.6	23.5	23.7	162.0	24.0	91.0	B
2343.0	15.8	15.7	15.9	241.0	20.0	95.0	B
5048.0	20.6	20.5	20.8	416.0	25.0	95.0	B
35243.5	28.2	27.9	28.6	1285.0	69.0	95.0	B
51945.0	20.6	20.5	20.8	4300.0	37.0	96.0	B
3364.0	20.6	20.5	20.7	297.0	22.0	97.0	B
7082.5	25.8	25.7	26.1	413.0	45.0	97.0	B
52090.0	25.8	25.5	26.1	2338.0	57.0	98.0	B
5663.0	15.8	15.7	16.0	578.0	23.0	128.0	B
7648.0	15.8	15.7	16.0	766.0	26.0	130.0	B

No. CALIB. RUNS = 1 METHOD TYPE = ISTD

TYPE	TIME	MASS	FACTOR	RESULT	NAME	
C1	14.4	84.0	2.3787	2.37	METHYLENE CHLORIDE -2.1=0.27	BD
C1	15.7	96.0	1.8650	.00	1,1-DICHLOROETHYLENE	
I1	15.8	128.0	1.0000	19.10	BROMOCHLOROMETHANE	
C1	16.4	63.0	3.3422	.00	1,1-DICHLOROETHANE	
C1	16.7	96.0	1.5694	.00	1,2-DICHLOROETHYLENE(C&T)	
C1	17.0	83.0	3.5562	.00	CHLOROFORM	
C1	17.2	65.0	1.9558	32.03	d4-DICHLOROETHANE	
C1	17.4	62.0	2.2336	.00	1,2-DICHLOROETHANE	
C1	18.0	73.0	2.7571	.00	METHYL-T-BUTYL ETHER	
C1	18.2	97.0	2.5013	.00	1,1,1-TRICHLOROETHANE	
C1	18.6	83.0	3.3636	.00	BROMODICHLOROMETHANE	
C1	18.4	56.0	3.3367	.00	CYCLOHEXANE	
C2	19.7	130.0	.3221	.00	TRICHLOROETHYLENE	
C2	20.2	129.0	.3908	.00	DIBROMOCHLOROMETHANE	
C2	19.8	84.0	.9749	21.63	D6-BENZENE	
C2	19.9	78.0	.9811	.39	BENZENE	contamination cell #7 BD
I2	20.6	96.0	1.0000	22.90	FLUOROBENZENE	
C2	21.7	173.0	.2601	.00	BROMOFORM	
C2	22.9	166.0	.3597	.00	TETRACHLOROETHYLENE	
C2	23.6	91.0	1.2048	.36	TOLUENE	contamination cell #7 result
C2	24.5	112.0	.7964	.00	CHLOROBENZENE	
I3	25.8	98.0	1.0000	19.40	D-10-ETHYLBENZENE	
C3	26.1	91.0	1.0487	.00	ETHYLBENZENE	
C3	28.2	95.0	.4524	29.01	PARA-FLUOROBROMOBENZENE	
C3	29.9	106.0	.3869	.00	META-XYLENE	
C3	30.8	106.0	.3496	.00	ORTHO&PARA-XYLENES	

OPTN # 1 @
ID: 1 4 0 5 6 5 @
START 0.01 1.10 0.29



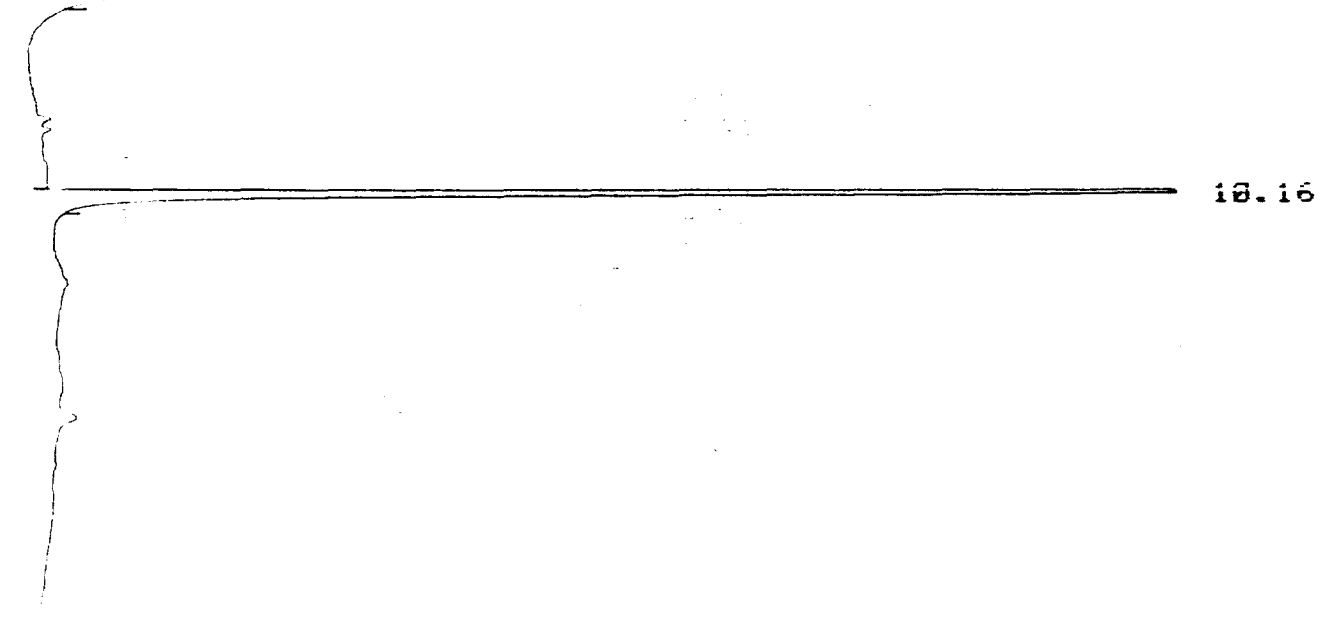
HP RUN # 71
ID:140565
ISTD

RT	EXP RT	AREA	CAL #	AMT
10.16	10.16	23490	(R) 1	

DIL FACTOR: 1.0000 E+ 0 ISTD AMT: 1.0000 E+ 0
SAMPLE AMT: 0.0000 E+ 0

050

OPTN # 1 @
ID: 1 4 0 5 6 7 @
START 1.00 0.28



HP RUN # 72
ID:140567

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene

Site _____
Instrument ID HP5985 Date 1-3-90 Time 7:03
Sample Range _____ Analyst MWR

Tune Check: 5358

m/e	Ion Abundance Criteria	% Relative Abundance
50	15 - 40% of the base peak	20.7
75	30 - 60% of the base peak	42.6
95	Base peak, 100% relative abundance	100.0
96	5 -9% of the base peak	8.8
173	Less than 1% of the base peak	0.0
174	Greater than 50% of the base peak	64.1
175	5 - 9% of mass 174	5.0 (7.8)[1]
176	Greater than 95%, but less than 101% of 174	61.6 (96.1)[1]
177	5 - 9% of mass 176	3.4 (5.5)[2]

1 Value in parenthesis is % of mass 174.
2 Value in parenthesis is % of mass 176.

Comments:

Internal standard lot # 63406

Internal standard: abundance of ion mass 96 = 52056 (fluorobenzene)

Tuning standard: abundance of ion mass 95 = (p-fluorobromobenzene)

VOA CALIBRATION CHECK Analyst: MWR

Instrument : HP5985 Date: 01-03-90

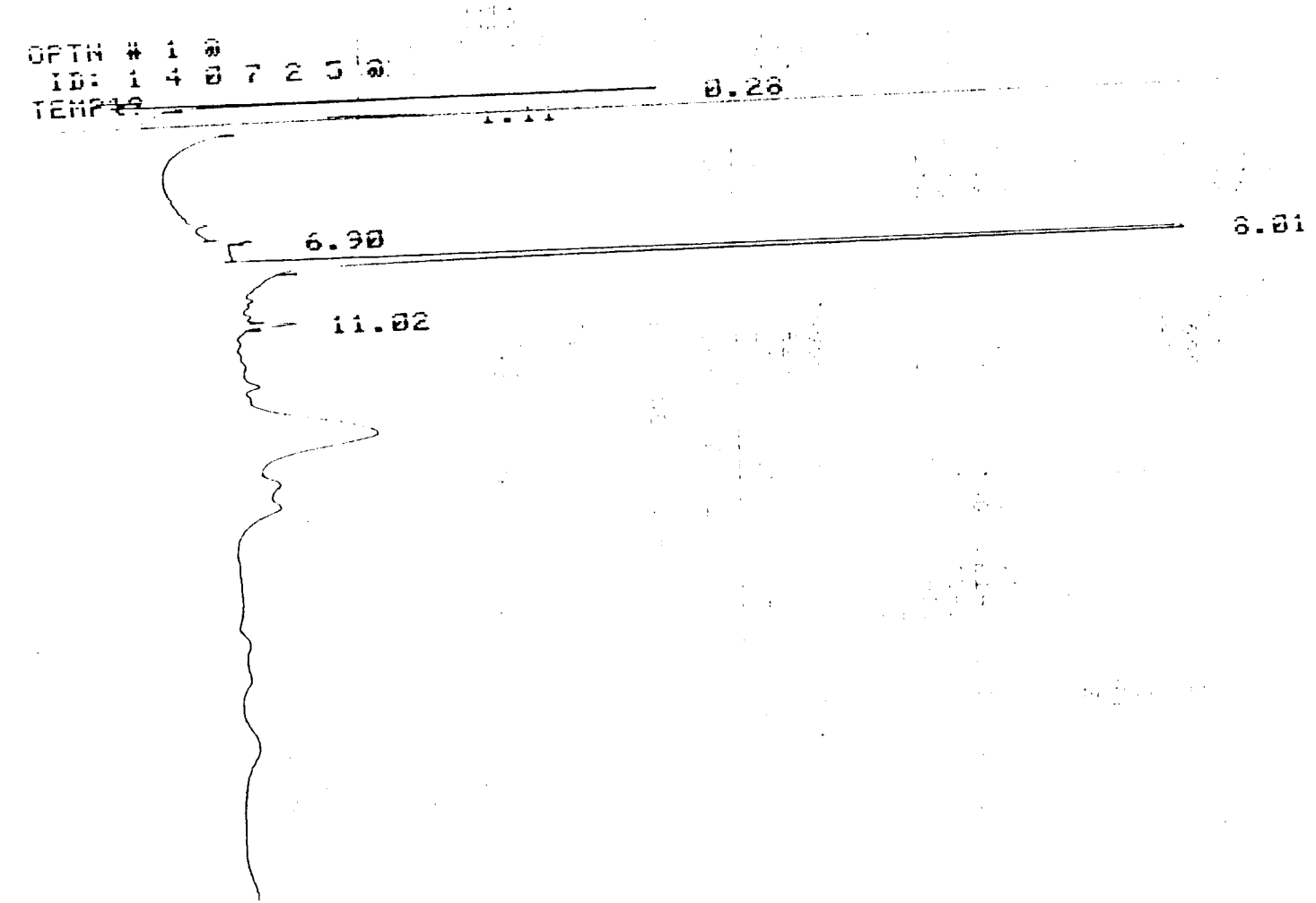
Sample #:5358 Site:

COMPOUND	TRUE	NEW	% DIFF
Methylene Chloride	53.1	57.1	7.4
1,1-Dichloroethene	39.0	36.2	-7.1
1,1-Dichloroethane	37.6	46.0	22.4
1,2-Dichloroethene	30.2	34.6	14.7
Chloroform	35.6	39.8	11.7
d4-1,. Dichloro thane	30.2	31.4	3.9
1,2-Dichloroethane	29.6	33.9	14.6
Methyl-T-Butyl Ether	47.4	71.0	49.8
1,1,1-Trichloroethane	32.1	35.8	11.6
Cyclohexane	24.9	26.7	7.3
Bromodichloromethane	31.7	37.7	18.9
Trichloroethene	35.1	35.7	1.7
d6-Benzene	21.3	18.3	-14.2
Benzene	35.1	35.5	1.1
Dibromochloromethane	39.2	39.0	-.4
Bromoform	34.7	33.2	-4.2
Tetrachloroethylene	38.9	35.8	-8.1
Toluene	34.7	33.8	-2.6
Chlorobenzene	35.4	34.3	-3.1
Ethylbenzene	34.7	36.9	6.3
p-BFB	33.5	34.4	2.6
Styrene	0.0	0.0	*********
m-Xylene	34.6	36.5	5.5
p-Xylene	34.8	32.5	-6.7

SAMPLE # 140726 FRN 5363 SAMPLE RANGE _____

_____ WATER ? ✓ SOIL ? _____ UNITS: ✓ ug/L _____ ug/kg SITE Milford

COMPOUND	CONC. SPIKE ADDED	CONC. MS (ug/L)	% REC.	COMMENTS
1,1-Dichloroethene	38.8 ug/L	36.13	93.1	
Trichloroethene	35.1 ug/L	44.55 - 10.6 (background) = 33.95	96.7	
Chlorobenzene	35.5 ug/L	35.40	99.7	
Toluene	41.6 ug/L	45.15	108.5	
Benzene	42.1 ug/L	41.76	99.2	
d_4-Dichloroethane X	~~30.2~~ ~~16.0~~ ug/L	33.49	110.9	
Benzene-d6 X	21.3 ug/L	20.56	96.5	
p-Bromofluorobenzene X	33.5 ug/L	29.95	89.4	

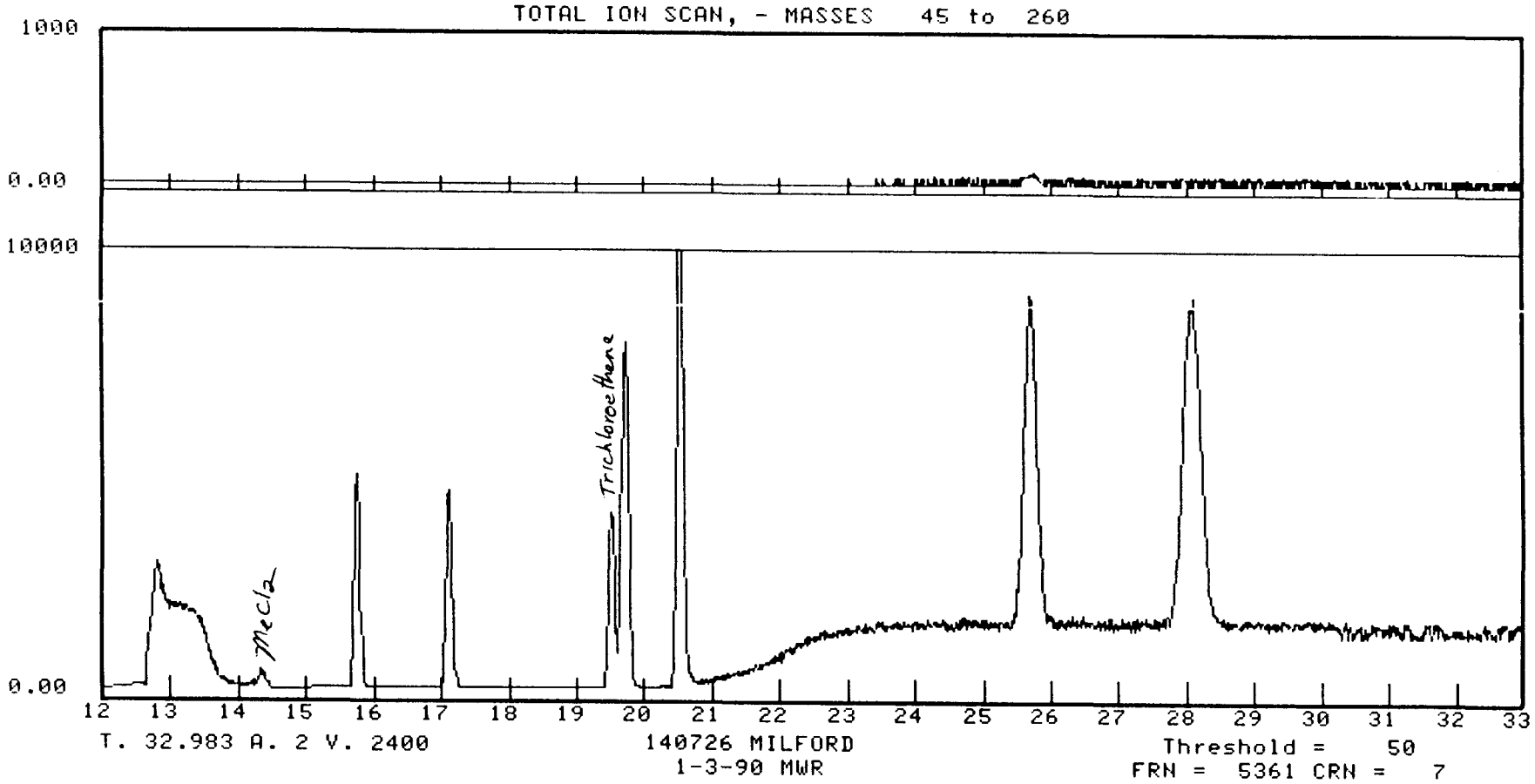


HP RUN # 6
ID:140725
ISTD

RT	EXP RT	AREA	CAL #	AMT	
6.90	6.89	188	8	6.892	trichloroethylene
8.01	8.04	16950	(R) 1		
11.02	11.03	432	11	4.483	toluene

DIL FACTOR: 1.0000 E+ 0
SAMPLE AMT: 0.0000 E+ 0

ISTD AMT: 2.7300 E+ 2

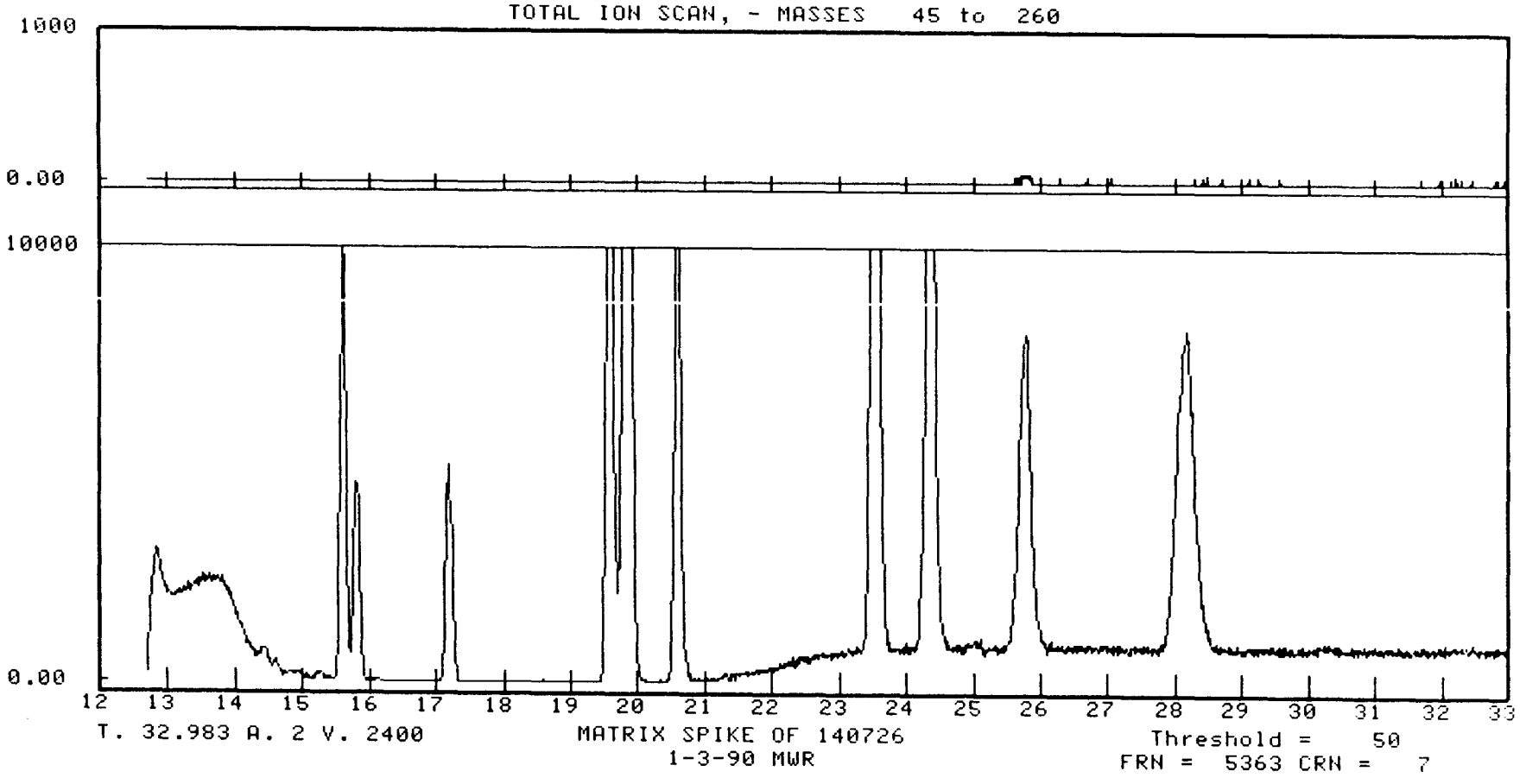

TOTAL ION SCAN, - MASSES 45 to 260
1000
0.00
10000
0.00
Trichloroethene
MeCl2
12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33
T. 32.983 A. 2 V. 2400
140726 MILFORD
1-3-90 MWR
Threshold = 50
FRN = 5361 CRN = 7

FILE NUMBER 5361
140726 MILFORD
1-3-90 MWR

AREA	R. TIME	START	STOP	MAXIMA	# SUMS	MASS	BASE
9027.0	19.7	19.6	19.9	811.0	26.0	56.0	B
1407.0	19.5	19.5	19.6	143.0	18.0	62.0	B
1604.0	17.1	17.0	17.2	208.0	17.0	63.0	B
1948.0	20.5	20.5	20.7	214.0	18.0	63.0	B
773.0	28.1	28.0	28.2	77.0	20.0	63.0	B
16999.0	17.1	17.0	17.3	1566.0	28.0	65.0	B
9395.0	32.9	27.3	33.0	73.0	584.0	83.0	F
1147.0	14.3	14.2	14.5	113.0	18.0	84.0	B
46056.0	19.7	19.6	20.0	4084.0	37.0	84.0	B
884.0	15.8	15.7	15.9	103.0	14.0	91.0	B
2487.0	15.8	15.7	15.9	256.0	20.0	95.0	B
9242.0	19.5	19.4	19.7	840.0	26.0	95.0	B
5504.0	20.6	20.4	20.7	502.0	25.0	95.0	B
55807.0	28.1	27.7	28.5	1793.0	80.0	95.0	B
59025.0	20.5	20.4	20.8	5547.0	35.0	96.0	B
5931.0	19.5	19.4	19.7	531.0	24.0	97.0	B
3925.0	20.5	20.4	20.7	369.0	23.0	97.0	B
8157.0	25.7	25.6	26.0	567.0	35.0	97.0	B
67448.0	25.7	25.4	26.0	3210.0	56.0	98.0	B
5947.0	15.8	15.7	15.9	569.0	23.0	128.0	B
7348.0	15.8	15.7	15.9	706.0	25.0	130.0	B
8800.0	19.5	19.4	19.7	906.0	25.0	130.0	B

No. CALIB. RUNS = 1 METHOD TYPE = ISTD

TYPE	TIME	MASS	FACTOR	RESULT	NAME	
C1	14.3	84.0	2.3787	1.55	METHYLENE CHLORIDE -279-0	BD
C1	15.7	96.0	1.8650	.00	1,1-DICHLOROETHYLENE	
I1	15.8	128.0	1.0000	19.10	BROMOCHLOROMETHANE	
C1	16.4	63.0	3.3422	.00	1,1-DICHLOROETHANE	
C1	16.7	96.0	1.5694	.00	1,2-DICHLOROETHYLENE(C&T)	
C1	17.0	83.0	3.5562	.00	CHLOROFORM	
C1	17.1	65.0	1.9558	27.91	d4-DICHLOROETHANE	
C1	17.4	62.0	2.2336	.00	1,2-DICHLOROETHANE	
C1	18.0	73.0	2.7571	.00	METHYL-T-BUTYL ETHER	
C1	18.2	97.0	2.5013	.00	1,1,1-TRICHLOROETHANE	
C1	18.6	83.0	3.3636	.00	BROMODICHLOROMETHANE	
C1	18.4	56.0	3.3367	.00	CYCLOHEXANE	
C2	19.5	130.0	.3221	10.60	TRICHLOROETHYLENE	10.60
C2	20.2	129.0	.3908	.00	DIBROMOCHLOROMETHANE	
C2	19.7	84.0	.9749	18.33	D6-BENZENE	
C2	20.0	78.0	.9811	.00	BENZENE	
I2	20.5	96.0	1.0000	22.90	FLUOROBENZENE	
C2	21.7	173.0	.2601	.00	BROMOFORM	
C2	22.9	166.0	.3597	.00	TETRACHLOROETHYLENE	
C2	23.7	91.0	1.2048	.00	TOLUENE	
C2	24.5	112.0	.7964	.00	CHLOROBENZENE	
I3	25.7	98.0	1.0000	19.40	D-10-ETHYLBENZENE	
C3	26.1	91.0	1.0487	.00	ETHYLBENZENE	
C3	28.1	95.0	.4524	35.48	PARA-FLUOROBROMOBENZENE	
C3	29.9	106.0	.3869	.00	META-XYLENE	
C3	30.8	106.0	.3496	.00	ORTHO&PARA-XYLENES	


TOTAL ION SCAN, - MASSES 45 to 260
1000
0.00
10000
0.00
12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33
T. 32.983 A. 2 V. 2400
MATRIX SPIKE OF 140726
1-3-90 MWR
Threshold = 50
FRN = 5363 CRN = 7

12494.0	15.6	15.5	15.8	1098.0	28.0	98.0	B
841.0	19.6	19.5	19.7	95.0	14.0	98.0	B
70365.0	25.8	25.5	26.1	3107.0	60.0	98.0	B
78051.0	24.4	24.2	24.7	4515.0	50.0	112.0	B
5546.0	15.8	15.7	16.0	513.0	24.0	128.0	B
7486.0	15.8	15.7	16.0	700.0	23.0	130.0	B
39726.0	19.6	19.5	19.8	3869.0	33.0	130.0	B

No. CALIB. RUNS = 1 METHOD TYPE = ISTD

TYPE	TIME	MASS	FACTOR	RESULT	NAME
C1	14.4	84.0	2.3787	2.05	METHYLENE CHLORIDE
C1	15.6	96.0	1.8650	36.13	1,1-DICHLOROETHYLENE
I1	15.8	128.0	1.0000	19.10	BROMOCHLOROMETHANE
C1	16.4	63.0	3.3422	.00	1,1-DICHLOROETHANE
C1	16.7	96.0	1.5694	.00	1,2-DICHLOROETHYLENE(C&T)
C1	17.0	83.0	3.5562	.00	CHLOROFORM
C1	17.2	65.0	1.9558	33.49	d4-DICHLOROETHANE
C1	17.4	62.0	2.2336	.00	1,2-DICHLOROETHANE
C1	18.0	73.0	2.7571	.00	METHYL-T-BUTYL ETHER
C1	18.2	97.0	2.5013	.00	1,1,1-TRICHLOROETHANE
C1	18.6	83.0	3.3636	.00	BROMODICHLOROMETHANE
C1	18.4	56.0	3.3367	.00	CYCLOHEXANE
C2	19.6	130.0	.3221	44.55	TRICHLOROETHYLENE
C2	20.2	129.0	.3908	.00	DIBROMOCHLOROMETHANE
C2	19.8	84.0	.9749	20.56	D6-BENZENE
C2	19.9	78.0	.9811	41.76	BENZENE
I2	20.6	96.0	1.0000	22.90	FLUOROBENZENE
C2	21.7	173.0	.2601	.00	BROMOFORM
C2	22.9	166.0	.3597	.00	TETRACHLOROETHYLENE
C2	23.6	91.0	1.2048	45.15	TOLUENE
C2	24.4	112.0	.7964	35.40	CHLOROBENZENE
I3	25.8	98.0	1.0000	19.40	D-10-ETHYLBENZENE
C3	26.1	91.0	1.0487	.00	ETHYLBENZENE
C3	28.2	95.0	.4524	29.95	PARA-FLUOROBROMOBENZENE
C3	29.9	106.0	.3869	.00	META-XYLENE
C3	30.8	106.0	.3496	.00	ORTHO&PARA-XYLENES