United States Department of the Interior

U.S. GEOLOGICAL SURVEY
Water Resourses Division
Massachusetts-Rhode Island District
10 Bearfoot Road
Northborough, MA 01532
Tel. (508) 490-5000
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October 6, 1999

Ms. Anna Krasko
U.S. Environmental Protection Agency, Region I
1 Congress Street
Suite 1100 (HBO)
Boston, MA 02114-2023

Dear Ms. Krasko:

Enclosed are the VOC analyses of the vapor samples at Centredale Manor done by Scott Clifford and working copies of graphs showing the distribution and concentration of TCE and PCE along the Woonasquatucket River, the mill raceway and wetland area, and the cross channel. The y-axis is the same on these three graphs for comparison of VOC concentrations.

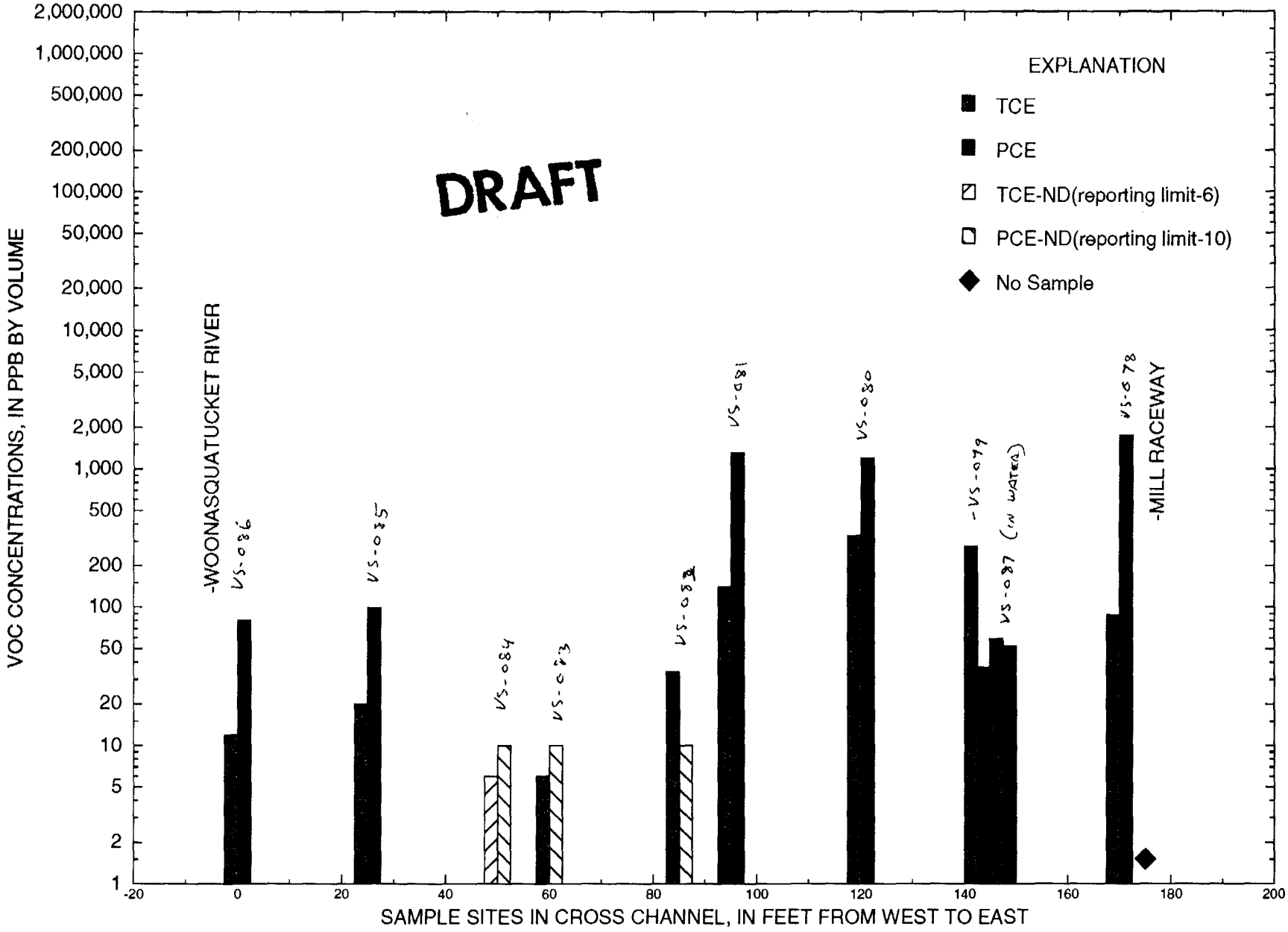
We will be generating a map of the Centredale Manor site as we discussed on the phone yesterday (sample site from GPS data, sample ID and total VOCs at each sample site, and the other features shown on the map you gave to Forest Lyford). Please call me (508 490-5056) if you have any questions or comments regarding the graphs I have enclosed or the map we will be generating.

Sincerely,

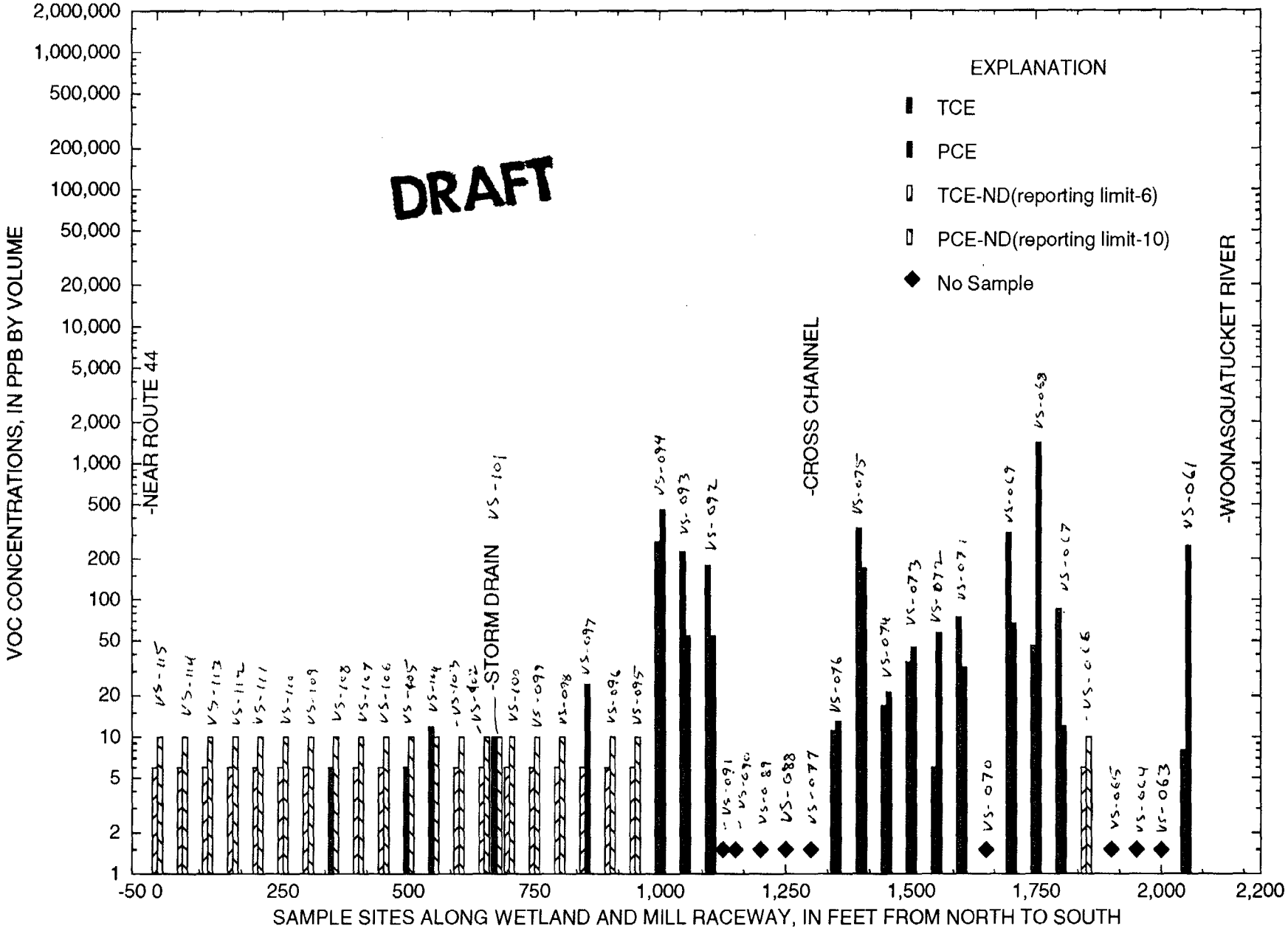
Peter E. Church
Hydrologist

cc: Forest P. Lyford, Hydrologist, MA-RI District

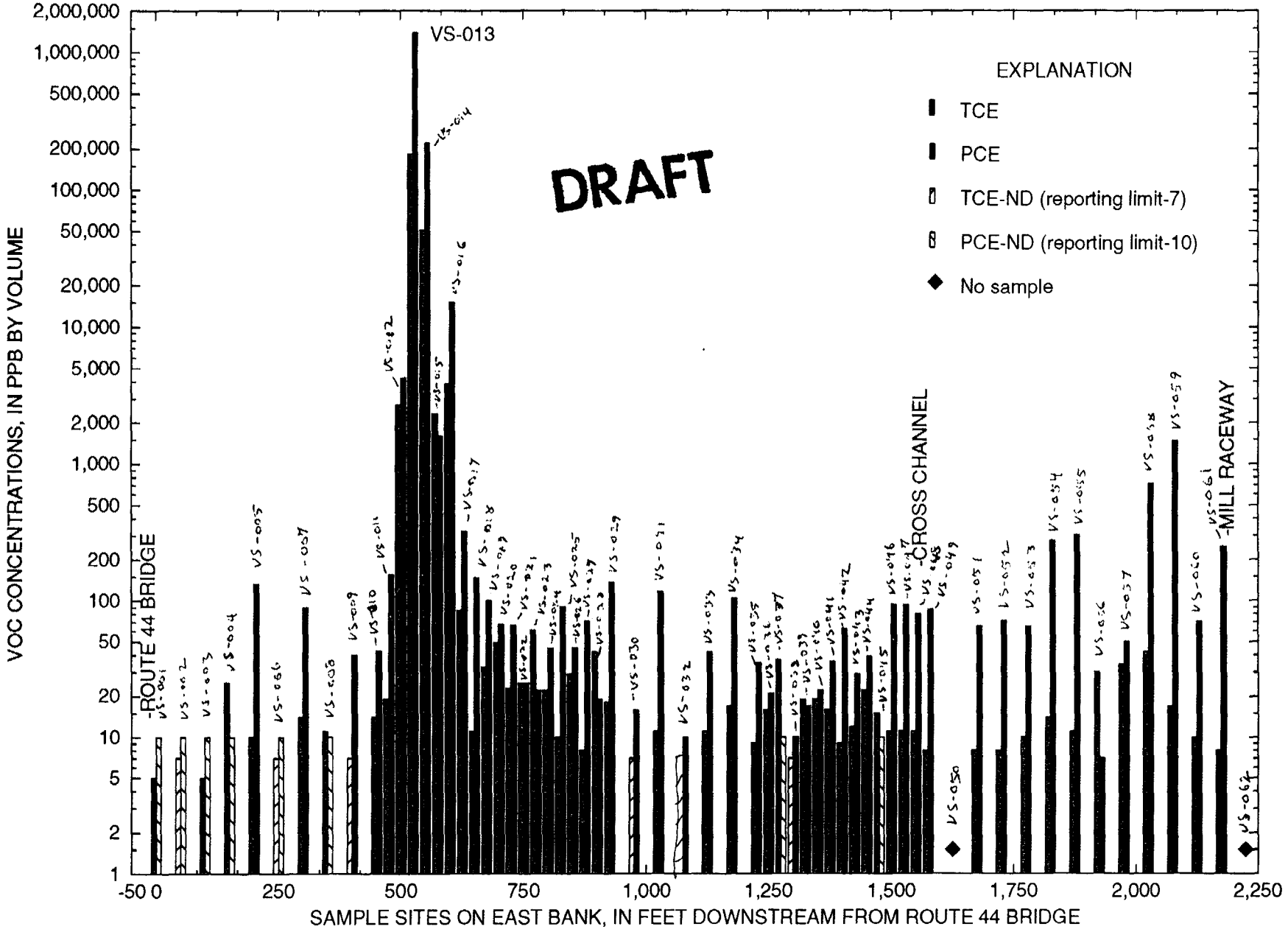
VOC CONCENTRATIONS IN VAPOR-DIFFUSION SAMPLERS IN CROSS CHANNEL, CENTREDALE MANOR SITE, NORTH PROVIDENCE, RHODE ISLAND



VOC CONCENTRATIONS IN VAPOR-DIFFUSION SAMPLERS ALONG THE WETLAND AND IN THE FORMER MILL RACEWAY, CENTREDALE MANOR SITE, NORTH PROVIDENCE, RHODE ISLAND



VOC CONCENTRATIONS IN VAPOR-DIFFUSION SAMPLERS IN THE WOONASQUATUCKET RIVER, CENTREDALE MANOR SITE, NORTH PROVIDENCE, RHODE ISLAND



U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION I
OFFICE OF ENVIRONMENTAL MEASUREMENT & EVALUATION
60 WESTVIEW STREET, LEXINGTON, MA 02421

MEMORANDUM

DATE: September 29, 1999

SUBJ: **Centredale Manor** - Volatile Organic Analysis of Passive Vapor Collectors, and Aqueous Samples

FROM: Scott Clifford, Chemist

TO: Peter Church, USGS

THRU: Dr. William J. Andrade, Advanced Analytical Chemistry Expert

PROJECT NUMBER: 99090042

DATE OF ANALYSES: 09/21/99 - 09/22/99

ANALYTICAL PROCEDURE:

Passive vapor samples were analyzed using Region I's standard air screening method, Ambient Air Grab Sample Analysis for Volatile Organic Compounds. Vapor samples were collected in 40 mL VOA vials and were analyzed using a Photovac gas chromatograph equipped with a 4' x 1/8" SE-30 column and photoionization detector, and a Shimadzu GC-14A equipped with a 30m x 0.53mm DBPS-624 column, photoionization and electron capture detectors. Concentrations of volatile organics were calculated using the external standard technique.

Target Compounds for Vapor Samples

1,1,1-Trichloroethane (111 TCA)
Trichloroethylene (TCE)
Tetrachloroethylene (C_2Cl_4)
Benzene
Toluene
Ethyl Benzene
Chloro Benzene
m/p-Xylene
o-Xylene

Notes: 1,3 and 1,4 Dichlorobenzenes were also monitored using a continuous strip chart. None was detected(reporting limit of 400 ppb/v).

Results Notes: ND = Nothing detected above reporting limit. Reporting limit is in parenthesis.

CC: Anna Krasko

File: J:\CHEMSTRY\REPORTS\FIELD\99090042FD.WPD

Centredale Manor Passive Vapor Sample Results - 09/21/99 - 09/22/99									
	Results ppb/v unless noted								
Sample	TCE	C_2Cl_4	111 TCA	Benzene	Toluene	Ethyl Benzene	Chloro Benzene	m/p-Xylene	o-Xylene
VS001	5	ND(10)	ND(8)	ND(7)	ND(35)	ND(40)	ND(40)	ND(40)	ND(60)
VS002	ND(7)	ND(10)	ND(8)	ND(7)	ND(35)	ND(40)	ND(40)	ND(40)	ND(60)
VS003	5	ND(10)	ND(8)	ND(7)	ND(35)	ND(40)	ND(40)	ND(40)	ND(60)
VS004	25	ND(10)	ND(8)	ND(7)	ND(35)	ND(40)	ND(40)	ND(40)	ND(60)
VS005	10	132	ND(8)	ND(7)	ND(35)	ND(40)	ND(40)	ND(40)	ND(60)
VS006	ND(7)	ND(10)	ND(8)	ND(7)	ND(35)	ND(40)	ND(40)	ND(40)	ND(60)
VS007	14	90	ND(8)	ND(7)	ND(35)	ND(40)	ND(40)	ND(40)	ND(60)
VS008	11	ND(10)	ND(8)	ND(7)	ND(35)	ND(40)	ND(40)	ND(40)	ND(60)
VS009	ND(7)	40	ND(8)	ND(7)	ND(35)	ND(40)	ND(40)	ND(40)	ND(60)
VS010	14	43	ND(8)	ND(7)	ND(35)	ND(40)	ND(40)	ND(40)	ND(60)
VS010 Field Dup	11	40	ND(8)	ND(7)	ND(35)	ND(40)	ND(40)	ND(40)	ND(60)
VS011	19	156	ND(8)	ND(7)	ND(35)	ND(40)	ND(40)	ND(40)	ND(60)
VS012	2720	4270	ND(8)	ND(7)	ND(35)	ND(40)	ND(40)	ND(40)	ND(60)
VS013	182 ppm/v	1390 ppm/v	ND(8)	ND(7)	ND(35)	ND(40)	ND(40)	ND(40)	ND(60)
VS014	51 ppm/v	219 ppm/v	ND(8)	ND(15 ppm/v)	ND(32 ppm/v)	ND(21 ppm/v)	ND(25 ppm/v)	ND(21 ppm/v)	ND(36 ppm/v)
VS015	2330	1610	ND(8)	ND(75)	ND(160)	ND(110)	ND(130)	ND(110)	ND(290)
VS016	3830	15 ppm/v	ND(8)	ND(375)	ND(800)	ND(550)	ND(650)	ND(550)	ND(1450)
VS017	85	322	ND(8)	ND(19)	ND(40)	ND(30)	ND(35)	ND(30)	ND(75)
VS018	11	147	ND(8)	ND(19)	ND(40)	ND(30)	ND(35)	ND(30)	ND(75)
VS019*	33	100	ND(8)	ND(19)	64	ND(30)	ND(35)	240	430
VS020	49	67	ND(8)	ND(19)	ND(40)	ND(30)	ND(35)	ND(30)	ND(75)
VS020 Field Dup	44	56	ND(8)	ND(19)	ND(40)	ND(30)	ND(35)	ND(30)	ND(75)
VS021	23	66	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS022	25	25	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS023	61	22	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS024	22	45	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS025	10	91	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)

Centredale Manor Passive Vapor Sample Results - 09/21/99 - 09/22/99									
	Results ppb/v unless noted								
Sample	TCE	C_2Cl_4	111 TCA	Benzene	Toluene	Ethyl Benzene	Chloro Benzene	m/p-Xylene	o-Xylene
VS026	29	45	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS027	8	71	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS028	42	19	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS029	18	136	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS030	ND(7)	16	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS030 Field Dup	ND(7)	16	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS031	11	117	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS032	ND(7)	10	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS033	11	42	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS034	17	104	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS035	9	35	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS036	16	21	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS037	7	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS038	ND(7)	10	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS039	19	17	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS040	19	22	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS040 Field Dup	19	22	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS041	16	36	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS042	9	62	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS043	12	29	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS044	22	39	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS045	15	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS046	11	93	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS047	11	93	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS048	11	86	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS049	8	86	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS051	8	65	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS052	8	72	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS053	10	65	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)

Centredale Manor Passive Vapor Sample Results - 09/21/99 - 09/22/99									
	Results ppb/v unless noted								
Sample	TCE	C_2Cl_4	111 TCA	Benzene	Toluene	Ethyl Benzene	Chloro Benzene	m/p-Xylene	o-Xylene
VS054	14	273	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS055	11	302	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS056	30	7	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS057	34	50	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS058	42	718	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS059	17	1470	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS060	10	71	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS060 Field Dup	19	89	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS061	8	248	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS066	ND(6)	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS067	85	12	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS068	46	1410	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS069	309	67	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS071	74	32	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS072	6	57	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS073	35	45	ND(8)	ND(6)	ND(30)	ND(40)	43	ND(40)	ND(60)
VS074	17	21	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS075	333	170	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS076	11	13	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS078	87	1740	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS079	273	37	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS080	331	1200	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS080 Field Dup	331	1230	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS081	140	1310	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS082	34	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS083	6	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS084	ND(6)	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS085	20	99	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS086	12	80	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)

Centredale Manor Passive Vapor Sample Results - 09/21/99 - 09/22/99									
	Results ppb/v unless noted								
Sample	TCE	C_2Cl_4	111 TCA	Benzene	Toluene	Ethyl Benzene	Chloro Benzene	m/p-Xylene	o-Xylene
VS087	59	52	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS092	178	54	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS093	225	54	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS094	266	456	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS095	ND(6)	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS096	ND(6)	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS097	ND(6)	24	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS098	ND(6)	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS099	ND(6)	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS100	ND(6)	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS100 Field Dup	ND(6)	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS101	10	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS102	ND(6)	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS103*	ND(6)	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	260	ND(40)	ND(60)
VS104*	12	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	248	ND(40)	ND(60)
VS105*	6	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	59	ND(40)	ND(60)
VS106	ND(6)	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS107	ND(6)	ND(10)	ND(8)	9	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS108	6	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS109	ND(6)	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS110	ND(6)	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS110 Field Dup	ND(6)	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS111	ND(6)	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS112	ND(6)	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS113	ND(6)	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS114	ND(6)	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS115	ND(6)	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)
VS116	ND(6)	ND(10)	ND(8)	ND(6)	ND(30)	ND(40)	ND(40)	ND(40)	ND(60)

* Sample contained unidentified peaks