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TABLE 6-18A
SUMMARY OF CANCER RISKS AND HAZARD INDICES
REASONABLE MAXIMUM EXPOSURE SCENARIO
AREA D, BEACON POINT AREA
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risk >10-4	Chemicals with Cancer Risk >10-5	Chemicals with Cancer Risk >10-6	Hazard Index	Chemicals with HI > 1
Commercial Worker (Current/Future)	Exposed Surface Soils in Current Commercial Area	Incidental Ingestion	6.3E-05	--	Benzo(a)pyrene, Aroclor (total)	Benzo(a)anthracene, Benzo(b)fluooranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene, Arsenic	2.9E+00	Aroclor (total), Chromium
		Dermal Contact	3.9E-05	--	Benzo(a)pyrene, Aroclor (total)	Benzo(a)anthracene, Benzo(b)fluooranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene	1.1E+00	Aroclor (total)
		Total	1.0E-04	--	Benzo(a)pyrene, Aroclor (total)	Benzo(a)anthracene, Benzo(b)fluooranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene, Arsenic	4.0E+00	Aroclor (total), Chromium
Commercial Worker (Future)	All Soils in Current Commercial Area, regardless of Depth and Pavement	Incidental Ingestion	5.1E-04	TEQ-Dioxins/Furans	Benzo(a)pyrene, Aroclor (total), Arsenic	Benzo(a)anthracene, Benzo(b)fluooranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene	5.2E+00	Aroclor (total), Chromium
		Dermal Contact	6.2E-05	--	Benzo(a)pyrene, Aroclor (total)	Benzo(a)anthracene, Benzo(b)fluooranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene, Arsenic, TEQ-Dioxins/Furans	2.4E+00	Aroclor (total)
		Total	5.7E-04	TEQ-Dioxins/Furans	Benzo(a)pyrene, Aroclor (total), Arsenic	Benzo(a)anthracene, Benzo(b)fluooranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene	7.5E+00	Aroclor (total), Chromium
Frequent Recreational User Adult (Current/Future)	Exposed Surface Soils in Boat Launch Area	Incidental Ingestion	3.0E-06	--	--	Arsenic	7.5E-02	--
		Dermal Contact	5.7E-07	--	--	--	2.5E-02	--
		Total	3.5E-06	--	--	Arsenic	1.0E-01	--
Frequent Recreational User Child (Current/Future)	Exposed Surface Soils in Boat Launch Area	Incidental Ingestion	6.9E-06	--	--	Aroclor (total), Arsenic	1.5E-01	--
		Dermal Contact	9.6E-07	--	--	--	4.3E-02	--
		Total	7.9E-06	--	--	Aroclor (total), Arsenic	1.9E-01	--

TABLE 6-18A (Cont.)
SUMMARY OF CANCER RISKS AND HAZARD INDICES
REASONABLE MAXIMUM EXPOSURE SCENARIO
AREA D, BEACON POINT AREA
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risk >10-4	Chemicals with Cancer Risk >10-5	Chemicals with Cancer Risk >10-6	Hazard Index	Chemicals with HI > 1
Wetland/Marsh Receptor Adult (Current/Future)	Exposed Surface Soils, Sediments, & Wetland Soils in Wetlands	Incidental Ingestion	8.4E-06	--	--	Aroclor (total), Arsenic, TEQ-Dioxins/Furans	2.5E-01	--
		Dermal Contact	9.5E-06	--	--	Benzo(a)pyrene, Aroclor (total)	5.2E-01	--
		Total	1.8E-05	--	--	Benzo(a)pyrene, Aroclor (total), Arsenic, TEQ-Dioxins/Furans	7.7E-01	--
	Surface Water in wetlands and river	Dermal Contact	1.9E-08	--	--	--	2.5E-03	--
	Total All Routes		1.8E-05	--	--	Benzo(a)pyrene, Aroclor (total), Arsenic, TEQ-Dioxins/Furans	7.7E-01	--
Wetland/Marsh Receptor Pre-adolescent (Current/Future)	Exposed Surface Soils, Sediments, & Wetland Soils in Wetlands	Incidental Ingestion	4.8E-06	--	--	Aroclor (total), TEQ-Dioxins/Furans	5.5E-01	--
		Dermal Contact	1.0E-05	--	--	Benzo(a)pyrene, Aroclor (total)	2.2E+00	Aroclor (total)
		Total	1.5E-05	--	--	Aroclor (total), Benzo(a)pyrene, Arsenic, TEQ-Dioxins/Furans	2.7E+00	Aroclor (total)
	Surface Water in wetlands and river	Dermal Contact	5.8E-09	--	--	--	3.1E-03	--
	Total All Routes		1.5E-05	--	--	Aroclor (total), Benzo(a)pyrene, Arsenic, TEQ-Dioxins/Furans	2.7E+00	Aroclor (total)

TABLE 6-18B
SUMMARY OF CANCER RISKS AND HAZARD INDICES
CENTRAL TENDENCY EXPOSURE SCENARIO
AREA D, BEACON POINT AREA
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risk $>10^{-4}$	Chemicals with Cancer Risk $>10^{-5}$	Chemicals with Cancer Risk $>10^{-6}$	Hazard Index	Chemicals with HI > 1
Commercial Worker (Current/Future)	Exposed Surface Soils in Current Commercial Area	Incidental Ingestion	4.2E-06	--	--	Benzo(a)pyrene	4.1E-01	--
		Dermal Contact	5.0E-07	--	--	--	2.5E-02	--
		Total	4.7E-06	--	--	Benzo(a)pyrene	4.4E-01	--
Commercial Worker (Future)	All Soils in Current Commercial Area, regardless of Depth and Pavement	Incidental Ingestion	4.0E-05	--	TEQ-Dioxins/Furans	Benzo(a)pyrene	4.7E-01	--
		Dermal Contact	3.7E-07	--	--	--	4.2E-02	--
		Total	4.0E-05	--	TEQ-Dioxins/Furans	Benzo(a)pyrene	5.1E-01	--
Frequent Recreational User Adult (Current/Future)	Exposed Surface Soils in Boat Launch Area	Incidental Ingestion	2.5E-07	--	--	--	1.9E-02	--
		Dermal Contact	1.4E-08	--	--	--	1.6E-03	--
		Total	2.6E-07	--	--	--	2.0E-02	--
Frequent Recreational User Child (Current/Future)	Exposed Surface Soils in Boat Launch Area	Incidental Ingestion	6.7E-07	--	--	--	4.1E-02	--
		Dermal Contact	5.5E-08	--	--	--	6.6E-03	--
		Total	7.2E-07	--	--	--	4.7E-02	--
Wetland/Marsh Receptor Adult (Current/Future)	Exposed Surface Soils, Sediments, & Wetland Soils in Wetlands	Incidental Ingestion	6.0E-07	--	--	--	1.3E-01	--
		Dermal Contact	2.3E-07	--	--	--	6.9E-02	--
		Total	8.3E-07	--	--	--	2.0E-01	--
	Surface Water in wetlands and river	Dermal Contact	5.4E-09	--	--	--	1.0E-03	--
	Total All Routes		8.4E-07	--	--	--	2.0E-01	--
Wetland/Marsh Receptor Pre-adolescent (Current/Future)	Exposed Surface Soils, Sediments, & Wetland Soils in Wetlands	Incidental Ingestion	3.9E-07	--	--	--	2.8E-01	--
		Dermal Contact	4.3E-07	--	--	--	4.4E-01	--
		Total	8.1E-07	--	--	--	7.1E-01	--
	Surface Water in wetlands and river	Dermal Contact	1.9E-09	--	--	--	1.3E-03	--
	Total All Routes		8.1E-07	--	--	--	7.1E-01	--

TABLE 6-19
SUMMARY OF REMEDIAL INVESTIGATIONS AND RECOMMENDATIONS
AREA D, BEACON POINT AREA
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK OU3 - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Chemicals of Potential Concern	Receptor	Reasonable Maximum Exposure (RME) Risk Estimates						Lead Results [1]	Asbestos Results [2]
		ILCR	Risk Drivers			HI	Risk Drivers		
Surface Soil/Sediment (0 to 2 feet)	Wetland/Marsh Receptor (adult) (current/future)	1.8E-05	$>10^{-4}$	$>10^{-5}$	$>10^{-6}$	0.77	>1.0		Asbestos was detected at an average concentration of 2%. This slightly exceeds the 1% concentration which defines an asbestos-containing material. Detected concentrations ranged from 0.99-30%.
benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, aldrin, alpha-chlordane, dieldrin, heptachlor epoxide, dioxins/furans, asbestos; antimony, arsenic, barium, cadmium, chromium, copper, lead, manganese, mercury, nickel, thallium, vanadium, zinc, Aroclor-1016, Aroclor-1248, Aroclor-1254, Aroclor-1260, Aroclor-1262, Aroclor-1268			None	None	benzo(a)pyrene, arsenic, Aroclor (total), dioxins/furans		None		
	Wetland/Marsh Receptor (pre-adolescent) (current/future)	1.5E-05	$>10^{-4}$	$>10^{-5}$	$>10^{-6}$	2.70	>1.0		
			None	Aroclor (total)	benzo(a)pyrene, arsenic, dioxins/furans		Aroclor (total)		
	Frequent Recreational User (adult) (current/future)	3.5E-06	$>10^{-4}$	$>10^{-5}$	$>10^{-6}$	0.1	>1.0	Slope Factor Approach - The model predicts fetuses born to exposed women will have a probability of up to 4.66% of having fetal blood lead levels exceeding the established level of concern (10 ug/dl).	
			None	None	arsenic				
	Frequent Recreational User (child) (current/future)	7.9E-06	$>10^{-4}$	$>10^{-5}$	$>10^{-6}$	0.19	>1.0	IEUBK - The model predicts a probability of up to 2.39% of a child having blood lead levels exceeding the established level of concern (10 ug/dl).	
			None	None	arsenic, Aroclor (total)		None		
	Commercial Worker (current/future)	1.0E-04	$>10^{-4}$	$>10^{-5}$	$>10^{-6}$	4	>1.0	Slope Factor Approach - The model predicts fetuses born to exposed workers will have a probability of up to 17.02% of having fetal blood lead levels exceeding the established level of concern (10 ug/dl).	
			None	benzo(a)pyrene, Aroclor (total)	benzo(a)anthracene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, arsenic		Aroclor (total), chromium		
All Soil/Sediment (0 to15 feet)	Commercial Worker (future)	5.7E-04	$>10^{-4}$	$>10^{-5}$	$>10^{-6}$	7.5	>1.0	Slope Factor Approach - The model predicts fetuses born to exposed workers will have a probability of up to 53.32% of having fetal blood lead levels exceeding the established level of concern (10 ug/dl).	Asbestos was detected at an average concentration of 2%. This slightly exceeds the 1% concentration which defines an asbestos-containing material. Detected concentrations ranged from 0.99-30%.
benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, asbestos, dioxins/furans; antimony, arsenic, barium, cadmium, chromium, total, copper, lead, manganese, mercury, nickel, thallium, vanadium, zinc, Aroclor-1016, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260, Aroclor-1262, Aroclor-1268			dioxins/furans	benzo(a)pyrene, Aroclor (total), arsenic	benzo(a)anthracene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene		Aroclor (total), chromium		

TABLE 6-19 (cont.)
SUMMARY OF REMEDIAL INVESTIGATIONS AND RECOMMENDATIONS
AREA D, BEACON POINT AREA
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK OU3 - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Chemicals of Potential Concern	Receptor	Reasonable Maximum Exposure (RME) Risk Estimates						Lead Results (1)	Asbestos Results (2)
		ILCR	Risk Drivers			HI	Risk Drivers		
Surface Water			$>10^{-4}$	$>10^{-5}$	$>10^{-6}$		>1.0		
heptachlor epoxide antimony manganese	Wetland/Marsh Receptor (adult) (current/future)	1.9E-08	None	None	None	0.0025	None		
	Wetland/Marsh Receptor (pre-adolescent) (currrent/future)	5.8E-09	$>10^{-4}$ None	$>10^{-5}$ None	$>10^{-6}$ None	0.0031	>1.0 None		

Notes:

1) The risk from lead for an adult was evaluated following "Recommendations of the Technical Review Workgroup for Lead for the Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil", USEPA, December 1996.

2) The National Emission Standards for Hazardous Air Pollutants - EPA regulation 40 CFR Subpart M, Part 61 (NESHAP) defines asbestos as material containing more than one percent asbestos.

TABLE 6-20
SELECTION OF CHEMICALS OF POTENTIAL CONCERN
AREA E, ELM STREET - SURFACE SOIL/SEDIMENT
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Parameter	Frequency	Range Of Detects	Range Of Nondetects	Average	Location of Maximum	COPC Screening Level (1)	N/C (2)	SSL Inhalation (3)	State Residential Direct Exposure (4)	State Industrial Direct Exposure (4)	Background Concentration (5)	Select As COPC? (6)
Volatile Organic Compounds (ug/kg)												
2-BUTANONE	4/6	30 - 130	24 - 29	53	RM-SD-ES06-02	4700000	N	-	500000	1000000	-	N
ACETONE	3/7	98 - 490	24 - 34	111	RM-SD-ES06-02	780000	N	100000000	500000	1000000	-	N
CARBON DISULFIDE	1/5	11 - 11	24 - 34	14	RM-SD-ES03-02	780000	N	720000	500000	1000000	-	N
CHLOROMETHANE	1/5	8 - 8	24 - 34	13	RM-SD-ES01-01	49000	C	-	47000	440000	-	N
TOLUENE	2/7	5 - 300	24 - 34	54	RM-SD-ES01-01	1600000	N	650000	500000	1000000	-	N
Semivolatile Organic Compounds (ug/kg)												
4-METHYLPHENOL	4/11	66 - 770	250 - 34000	1840	RM-SD-ES01-01	39000	N	-	340000	2500000	-	N
ACENAPHTHYLENE	6/11	29 - 1300	360 - 34000	1887	RM-SD-ES02-01			-	1000000	2500000	-	N
ANTHRACENE	4/8	71 - 300	360 - 34000	2329	RM-SD-ES02-01	2300000	N	-	1000000	2500000	-	N
BENZO(A)ANTHRACENE	8/11	100 - 1600	360 - 34000	1933	RM-SD-ES02-01, RM-SD-ES02-01	880	C	-	1000	7800	-	Y
BENZO(A)PYRENE	8/11	160 - 2500	360 - 34000	2075	RM-SD-ES02-01	88	C	-	1000	1000	-	Y
BENZO(B)FLUORANTHENE	9/11	33 - 5600	820 - 34000	2560	RM-SD-ES02-01, RM-SD-ES02-01	880	C	-	1000	7800	-	Y
BENZO(G,H,I)PERYLENE	8/11	81 - 1400	360 - 34000	1887	RM-SD-ES02-01	-	-	-	1000000	2500000	-	N
BENZO(K)FLUORANTHENE	5/10	110 - 930	360 - 34000	2098	OU3-E-SD03-0002	8800	C	-	8400	78000	-	N
BIS(2-ETHYLHEXYL)PHTHALATE	3/11	110 - 9400	220 - 34000	2628	RM-SD-ES03-01	46000	C	31000000	44000	410000	-	N
BUTYLBENZYL PHTHALATE	1/10	19 - 19	220 - 34000	1970	ES1100AC-002(0.5-1.0)	1600000	N	930000	1000000	2500000	-	N
CARBAZOLE	4/11	57 - 180	220 - 34000	1753	RM-SD-ES02-01	32000	C	-	31000	290000	-	N
CHRYSENE	9/11	19 - 2700	820 - 34000	2130	RM-SD-ES02-01, RM-SD-ES02-01	88000	C	-	84000	780000	-	N
DI-N-BUTYL PHTHALATE	1/10	150 - 150	220 - 34000	1961	RM-SD-ES07-02	780000	N	2300000	1000000	2500000	-	N
DIBENZO(A,H)ANTHRACENE	4/11	25 - 520	360 - 34000	1839	RM-SD-ES02-01	88	C	-	84	780	-	Y
FLUORANTHENE	9/11	21 - 3000	820 - 34000	2280	RM-SD-ES02-01	310000	N	-	1000000	2500000	-	N
FLUORENE	2/11	210 - 435	220 - 34000	1825	RM-SD-ES01-01	310000	N	-	1000000	2500000	-	N
INDENO(1,2,3-CD)PYRENE	8/11	90 - 1800	360 - 34000	1925	RM-SD-ES02-01	880	C	-	840	7800	-	Y
NAPHTHALENE	1/11	91 - 91	220 - 34000	1814	RM-SD-ES02-01	160000	N	-	1000000	2500000	-	N
PHENANTHRENE	8/11	130 - 1700	360 - 34000	1962	RM-SD-ES02-01	-	-	-	1000000	2500000	-	N
PHENOL	3/11	130 - 770	250 - 34000	1880	RM-SD-ES02-01	4700000	N	-	1000000	2500000	-	N
PYRENE	9/11	28 - 4700	820 - 34000	2483	RM-SD-ES02-01	230000	N	-	1000000	2500000	-	N
Pesticides/PCBs (ug/kg)												
4,4'-DDD	2/11	1.5 - 9.2	2.5 - 17	4	OU3-E-SD01-0002	2700	C	-	2600	24000	-	N
4,4'-DDE	6/11	1.8 - 280	3.3 - 17	35	OU3-E-SD03-0002	1900	C	-	1800	17000	-	N
4,4'-DDT	2/11	0.14 - 11	2.2 - 17	4	RM-SD-ES03-01	1900	C	-	1800	17000	-	N
ALDRIN	4/11	0.062 - 120	1.1 - 8.6	14	RM-SD-ES02-01	38	C	3000	36	340	-	Y
ALPHA-BHC	2/11	0.13 - 0.19	1.3 - 8.6	2	OU3-E-SD01-0002	100	C	800	97	910	-	N
ALPHA-CHLORDANE	7/11	0.28 - 360	1.6 - 8.6	66	OU3-E-SD03-0002	1800	C	20000	490	2200	-	N
AROCLOR-1242	2/11	18000 - 30000	22 - 170	4395	OU3-E-SD03-0002	320	C	-	1000	10000	-	Y
AROCLOR-1254	8/11	36 - 40000	33 - 160	11040	OU3-E-SD03-0002	160	N	-	1000	10000	-	Y
AROCLOR-1262	3/11	110 - 2100	22 - 170	275	RM-SD-ES01-01	320	C	-	1000	10000	-	Y
AROCLOR-1268	4/11	4.6 - 520	22 - 170	90	RM-SD-ES01-01	320	C	-	1000	10000	-	Y
BETA-BHC	1/11	24 - 24	1.1 - 8.6	4	OU3-E-SD02-0002	350	C	-	340	3200	-	N
DELTA-BHC	1/11	4.25 - 4.25	1.1 - 8.6	2	RM-SD-ES01-01	-	-	-	97	910	-	N
DIELDRIN	4/11	0.67 - 230	3.3 - 17	24	OU3-E-SD03-0002	40	C	1000	38	360	-	Y
ENDOSULFAN I	5/11	1.1 - 330	1.3 - 4.1	32	RM-SD-ES02-01	47000	N	-	410000	1200000	-	N
ENDOSULFAN II	2/11	3.9 - 22	2.5 - 17	6	OU3-E-SD02-0002	47000	N	-	410000	1200000	-	N
ENDOSULFAN SULFATE	4/11	0.091 - 20	2.2 - 17	5	OU3-E-SD03-0002	-	-	-	410000	1200000	-	N

TABLE 6-20 (cont.)
SELECTION OF CHEMICALS OF POTENTIAL CONCERN
AREA E, ELM STREET - SURFACE SOIL/SEDIMENT
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Parameter	Frequency	Range Of Detects	Range Of Nondetects	Average	Location of Maximum	COPC Screening Level (1)	N/C (2)	SSL Inhalation (3)	State Residential Direct Exposure (4)	State Industrial Direct Exposure (4)	Background Concentration (5)	Select As COPC? (6)
Pesticides/PCBs (ug/kg) (cont'd.)												
ENDRIN	3/11	1.3 - 12	2.5 - 17	4	OU3-E-SD02-0002	2300	N	-	20000	610000	-	N
ENDRIN ALDEHYDE	7/11	1.7 - 380	3.3 - 8	82	OU3-E-SD03-0002	-	-	-	20000	610000	-	N
ENDRIN KETONE	4/11	0.21 - 16	2.2 - 17	4	RM-SD-ES02-01	-	-	-	20000	610000	-	N
GAMMA-BHC (LINDANE)	1/11	4.9 - 4.9	1.1 - 8.6	2	OU3-E-SD02-0002	490	C	-	20000	610000	-	N
GAMMA-CHLORDANE	8/11	0.14 - 86	1.7 - 4.1	17	RM-SD-ES02-01	1800	C	20000	490	2200	-	N
HEPTACHLOR	1/11	8 - 8	1.1 - 8.6	3	OU3-E-SD02-0002	140	C	100	140	1300	-	N
HEPTACHLOR EPOXIDE	3/11	0.43 - 65	1.3 - 8.6	8	RM-SD-ES01-01	70	C	5000	67	630	-	N
METHOXYCHLOR	1/11	0.37 - 0.37	11 - 86	17	RM-SD-ES06-02	39000	N	-	340000	10000000	-	N
PCB Congeners (ug/kg) [7]												
2',3,4,4',5-PENTACHLOROBIPHENYL (123)	1/1	46 - 46	-	46	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
2,2',3,3',4,4',5-HEPTACHLOROBIPHENYL (170)	1/1	23.6 - 23.6	-	24	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
2,2',3,4,4',5,5'-HEPTACHLOROBIPHENYL (180)	1/1	11.9 - 11.9	-	12	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
2,3',4,4',5,5'-HEXACHLOROBIPHENYL (167)	1/1	2.86 - 2.86	-	3	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
2,3',4,4',5-PENTACHLOROBIPHENYL (118)	1/1	4.84 - 4.84	-	5	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
2,3,3',4,4',5'-HEXACHLOROBIPHENYL (157)	1/1	11.5 - 11.5	-	12	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
2,3,3',4,4',5,5'-HEPTACHLOROBIPHENYL (189)	1/1	0.618 - 0.618	-	1	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
2,3,3',4,4',5-HEXACHLOROBIPHENYL (156)	1/1	4.62 - 4.62	-	5	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
2,3,4,4',5-PENTACHLOROBIPHENYL (114)	1/1	98.2 - 98.2	-	98	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
3,3',4,4',5,5'-HEXACHLOROBIPHENYL (169)	1/1	0.014 - 0.014	-	0.01	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
3,3',4,4',5-PENTACHLOROBIPHENYL (126)	1/1	0.179 - 0.179	-	0.2	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
3,3',4,4'-TETRACHLOROBIPHENYL (77)	1/1	2.81 - 2.81	-	3	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
DECACHLOROBIPHENYL	1/1	2 - 2	-	2	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
TOTAL DICHLOROBIPHENYLS	1/1	11 - 11	-	11	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
TOTAL HEPTACHLOROBIPHENYLS	1/1	48.2 - 48.2	-	48	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
TOTAL HEXACHLOROBIPHENYLS	1/1	223 - 223	-	223	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
TOTAL MONOCHLOROBIPHENYLS	1/1	0.308 - 0.308	-	0.3	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
TOTAL NONACHLOROBIPHENYLS	1/1	9.87 - 9.87	-	10	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
TOTAL OCTACHLOROBIPHENYLS	1/1	29.8 - 29.8	-	30	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
TOTAL PENTACHLOROBIPHENYLS	1/1	449 - 449	-	449	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
TOTAL TETRACHLOROBIPHENYLS	1/1	156 - 156	-	156	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
TOTAL TRICHLOROBIPHENYLS	1/1	47.9 - 47.9	-	48	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
Metals (mg/kg)												
ALUMINUM	11/11	10100 - 29600	-	19173	OU3-E-SD02-0002	7800	N	-	-	-	22600	N[8]
ANTIMONY	2/11	2.8 - 3.1	2 - 10.6	2	OU3-E-SD03-0002	3.1	N	-	27	8200	ND	Y
ARSENIC	9/11	4.4 - 25.4	12.2 - 13.8	13	RM-SD-ES02-01	0.43	C	750	10	10	11.6	Y
BARIUM	11/11	36.2 - 232	-	106	OU3-E-SD03-0002	550	N	690000	4700	140000	329	N
BERYLLIUM	4/11	0.69 - 1.2	0.5 - 0.78	1	OU3-E-SD02-0002	16	C	1300	2	2	1.3	N
CALCIUM	11/11	2460 - 94100	-	11769	RM-SD-ES01-01	-	-	-	-	-	7420	N
CHROMIUM	10/11	24.2 - 211	27 - 27	77	RM-SD-ES02-01	23	N	270	100	100	35.2	Y
COBALT	11/11	7.3 - 12	-	10	OU3-E-SD02-0002	470	N	-	1000	2500	12.4	N
COPPER	11/11	35.4 - 425	-	191	RM-SD-ES02-01	310	N	-	2500	76000	123	Y
IRON	11/11	18300 - 52300	-	28764	RM-SD-ES02-01	2300	N	-	-	-	24100	N[8]

TABLE 6-20 (cont.)
SELECTION OF CHEMICALS OF POTENTIAL CONCERN
AREA E, ELM STREET - SURFACE SOIL/SEDIMENT
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Parameter	Frequency	Range Of Detects	Range Of Nondetects	Average	Location of Maximum	COPC Screening Level (1)	N/C (2)	SSL Inhalation (3)	State Residential Direct Exposure (4)	State Industrial Direct Exposure (4)	Background Concentration (5)	Select As COPC? (6)
Metals (mg/kg) (cont.)												
LEAD	11/11	5.9 - 404	-	164	RM-SD-ES02-01	400[9]	N	-	500	1000	344	Y
MAGNESIUM	11/11	5610 - 56800	-	11745	RM-SD-ES01-01	-	-	-	-	-	5690	N
MANGANESE	11/11	228 - 413	-	307	RM-SD-ES02-01	160	N	-	1600	47000	660	N
MERCURY	4/11	0.33 - 0.89	0.08 - 0.32	0.3	OU3-E-SD02-0002	2.3	N	10	20	610	0.28	N
NICKEL	11/11	19.7 - 38.5	-	28	RM-SD-ES02-02	160	N	13000	1400	7500	40.4	N
POTASSIUM	10/11	2200 - 4590	1590 - 1590	2938	RM-SD-ES07-02	-	-	-	-	-	2680	N
SILVER	3/11	1.6 - 2.4	0.72 - 4.4	1	RM-SD-ES02-01	39	N	-	340	10000	3.3	N
SODIUM	4/11	2030 - 3700	304 - 2700	1319	OU3-E-SD02-0002	-	-	-	-	-	248	N
THALLIUM	2/11	0.24 - 3.5	2.4 - 4.7	2	OU3-E-SD02-0002	0.55	N	-	5.4	160	ND	Y
VANADIUM	11/11	33.3 - 125	-	70	RM-SD-ES02-01	55	N	-	470	14000	81.9	Y
ZINC	11/11	35.6 - 348	-	183	RM-SD-ES02-02	2300	N	-	20000	610000	604	N
Dioxin (ug/kg)												
TOXICITY EQUIVALENCY FACTOR	7/7	0.00096 - 0.0356	-	0.0144	RM-SD-ES06-02	0.0043	C	-	-	-	-	Y
Total Organic Carbon (mg/kg)												
TOTAL ORGANIC CARBON	3/3	2130 - 53600	-	19733	OU3-E-SD02-0002	-	-	-	-	-	-	N

Notes:
1) Based on current USEPA Region III guidance (USEPA Region III, 10-1-99). Residential Soil Ingestion is used for soil and sediment. Value for noncarcinogens is based on a target hazard quotient of O.I. Value for carcinogens is based on a cancer risk of IE-6.
2) COPC screening level based on noncarcinogenic (N)/carcinogenic (C) effects.
3) USEPA Soil Screening Levels (USEPA, May 1996).
4) CTDEP, January 1996. In some cases, calculated or surrogate or ceiling value presented as detailed in Table 6-1.
5) Maximum background concentrations presented for inorganics only because background concentrations for organics were not used in COPC selection.
6) COPC selection criteria discussed in Section 6.2 and presented/defined in Table 6-1. Chemical was selected as a COPC (Y = yes) if maximum detected concentration exceeded screening levels, except that noncarcinogenic inorganics detected at concentrations exceeding screening levels (based on Region III criteria) but less than Region III risk-based concentrations AND maximum background concentration were not selected as COPCs.
7) PCB Congeners will be evaluated qualitatively in the uncertainty section. Note all Aroclors/PCBs congeners selected as COPCs.
8) USEPA Region I does not advocate quantitative risk assessment of aluminum or iron.
9) Value is based on OSWER soil screening level for residential land use (USEPA, July 14, 1994).
ND Compound was not present at detectable concentrations in background samples.
- Not available or not applicable.

TABLE 6-21
SELECTION OF CHEMICALS OF POTENTIAL CONCERN
AREA E, ELM STREET - ALL SOIL/SEDIMENT (0-15')
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Parameter	Frequency	Range Of Detects	Range Of Nondetects	Average	Location of Maximum	COPC Screening Level (1)	N/C (2)	SSL Inhalation (3)	State Residential Direct Exposure (4)	State Industrial Direct Exposure (4)	Background Concentration (5)	Select As COPC? (6)
Volatile Organic Compounds (ug/kg)												
2-BUTANONE	4/6	30 - 130	24 - 29	53	RM-SD-ES06-02	4700000	N	-	500000	1000000	-	N
ACETONE	3/7	98 - 490	24 - 34	111	RM-SD-ES06-02	780000	N	100000000	500000	1000000	-	N
CARBON DISULFIDE	1/5	11 - 11	24 - 34	14	RM-SD-ES03-02	780000	N	720000	500000	1000000	-	N
CHLOROMETHANE	1/5	8 - 8	24 - 34	13	RM-SD-ES01-01	49000	C	-	47000	440000	-	N
TOLUENE	2/7	5 - 300	24 - 34	54	RM-SD-ES01-01	1600000	N	650000	500000	1000000	-	N
Semivolatile Organic Compounds (ug/kg)												
4-METHYLPHENOL	4/14	66 - 770	230 - 34000	1471	RM-SD-ES01-01	39000	N	-	340000	2500000	-	N
ACENAPHTHYLENE	6/14	29 - 1300	230 - 34000	1508	RM-SD-ES02-01	-		-	1000000	2500000	-	N
ANTHRACENE	4/8	71 - 300	360 - 34000	2329	RM-SD-ES02-01	2300000	N	-	1000000	2500000	-	N
BENZO(A)ANTHRACENE	9/14	100 - 1600	230 - 34000	1544	RM-SD-ES02-01, RM-SD-ES02-01	880	C	-	1000	7800	-	Y
BENZO(A)PYRENE	9/14	110 - 2500	230 - 34000	1655	RM-SD-ES02-01	88	C	-	1000	1000	-	Y
BENZO(B)FLUORANTHENE	11/14	33 - 5600	230 - 34000	2031	RM-SD-ES02-01, RM-SD-ES02-01	880	C	-	1000	7800	-	Y
BENZO(G,H,I)PERYLENE	8/14	81 - 1400	230 - 34000	1509	RM-SD-ES02-01	-	-	-	1000000	2500000	-	N
BENZO(K)FLUORANTHENE	7/13	37 - 930	230 - 34000	1634	OU3-E-SD03-0002	8800	C	-	8400	78000	-	N
BIS(2-ETHYLHEXYL)PHTHALATE	3/14	110 - 9400	220 - 34000	2090	RM-SD-ES03-01	46000	C	31000000	44000	410000	-	N
BUTYLBENZYL PHTHALATE	1/13	19 - 19	220 - 34000	1543	ES1100AC-002(0.5-1.0)	1600000	N	930000	1000000	2500000	-	N
CARBAZOLE	4/14	57 - 180	220 - 34000	1403	RM-SD-ES02-01	32000	C	-	31000	290000	-	N
CHRYSENE	10/14	19 - 2700	230 - 34000	1696	RM-SD-ES02-01, RM-SD-ES02-01	88000	C	-	84000	780000	-	N
DI-N-BUTYL PHTHALATE	1/13	150 - 150	220 - 34000	1536	RM-SD-ES07-02	780000	N	2300000	1000000	2500000	-	N
DIBENZO(A,H)ANTHRACENE	4/14	25 - 520	230 - 34000	1470	RM-SD-ES02-01	88	C	-	84	780	-	Y
FLUORANTHENE	11/14	21 - 3000	230 - 34000	1810	RM-SD-ES02-01	310000	N	-	1000000	2500000	-	N
FLUORENE	2/14	210 - 435	220 - 34000	1460	RM-SD-ES01-01	310000	N	-	1000000	2500000	-	N
INDENO(1,2,3-CD)PYRENE	9/14	90 - 1800	230 - 34000	1538	RM-SD-ES02-01	880	C	-	840	7800	-	Y
NAPHTHALENE	1/14	91 - 91	220 - 34000	1451	RM-SD-ES02-01	160000	N	-	1000000	2500000	-	N
PHENANTHRENE	9/14	110 - 1700	230 - 34000	1566	RM-SD-ES02-01	-	-	-	1000000	2500000	-	N
PHENOL	3/14	130 - 770	230 - 34000	1503	RM-SD-ES02-01	4700000	N	-	1000000	2500000	-	N
PYRENE	11/14	28 - 4700	230 - 34000	1968	RM-SD-ES02-01	230000	N	-	1000000	2500000	-	N
Pesticides/PCBs (ug/kg)												
4,4'-DDD	2/14	1.5 - 9.2	2.3 - 17	3	OU3-E-SD01-0002	2700	C	-	2600	24000	-	N
4,4'-DDE	9/14	0.76 - 280	3.3 - 17	38	OU3-E-SD03-0002	1900	C	-	1800	17000	-	N
4,4'-DDT	2/14	0.14 - 11	2.2 - 17	3	RM-SD-ES03-01	1900	C	-	1800	17000	-	N
ALDRIN	6/14	0.062 - 120	1.1 - 8.6	12	RM-SD-ES02-01	38	C	3000	36	340	-	Y
ALPHA-BHC	2/14	0.13 - 0.19	1.2 - 8.6	2	OU3-E-SD01-0002	100	C	800	97	910	-	N
ALPHA-CHLORDANE	8/14	0.28 - 360	1.2 - 8.6	53	OU3-E-SD03-0002	1800	C	20000	490	2200	-	N
AROCLOR-1242	2/14	18000 - 30000	22 - 170	3456	OU3-E-SD03-0002	320	C	-	1000	10000	-	Y
AROCLOR-1254	10/14	36 - 40000	33 - 160	10035	OU3-E-SD03-0002	160	N	-	1000	10000	-	Y

TABLE 6-21 (cont.)
SELECTION OF CHEMICALS OF POTENTIAL CONCERN
AREA E, ELM STREET - ALL SOIL/SEDIMENT (0-15')
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Parameter	Frequency	Range Of Detects	Range Of Nondetects	Average	Location of Maximum	COPC Screening Level (1)	N/C (2)	SSL Inhalation (3)	State Residential Direct Exposure (4)	State Industrial Direct Exposure (4)	Background Concentration (5)	Select As COPC? (6)
Pesticides/PCBs (ug/kg) (continued)												
AROCLOR-1262	3/14	110 - 2100	22 - 170	219	RM-SD-ES01-01	320	C	-	1000	10000	-	Y
AROCLOR-1268	4/14	4.6 - 520	22 - 170	73	RM-SD-ES01-01	320	C	-	1000	10000	-	Y
BETA-BHC	2/14	6.5 - 24	1.1 - 8.6	4	OU3-E-SD02-0002	350	C	-	340	3200	-	N
DELTA-BHC	1/14	4.25 - 4.25	1.1 - 8.6	2	RM-SD-ES01-01	-	-	-	97	910	-	N
DIELDRIN	7/14	0.15 - 230	3.3 - 17	25	OU3-E-SD03-0002	40	C	1000	38	360	-	Y
ENDOSULFAN I	8/14	0.28 - 330	1.3 - 4.1	27	RM-SD-ES02-01	47000	N	-	410000	1200000	-	N
ENDOSULFAN II	5/14	0.6 - 74	2.5 - 17	10	OU3-E-SD03-0204	47000	N	-	410000	1200000	-	N
ENDOSULFAN SULFATE	7/14	0.091 - 22	2.2 - 17	5	OU3-E-SD03-0204	-	-	-	410000	1200000	-	N
ENDRIN	6/14	0.3 - 17	2.5 - 17	5	OU3-E-SD03-0204	2300	N	-	20000	610000	-	N
ENDRIN ALDEHYDE	10/14	1.1 - 380	3.3 - 8	72	OU3-E-SD03-0002	-	-	-	20000	610000	-	N
ENDRIN KETONE	4/14	0.21 - 16	2.2 - 17	3	RM-SD-ES02-01	-	-	-	20000	610000	-	N
GAMMA-BHC (LINDANE)	4/14	0.051 - 4.9	1.1 - 8.6	2	OU3-E-SD02-0002	490	C	-	20000	610000	-	N
GAMMA-CHLORDANE	11/14	0.14 - 86	1.7 - 4.1	15	RM-SD-ES02-01	1800	C	20000	490	2200	-	N
HEPTACHLOR	2/14	4.6 - 8	1.1 - 8.6	2	OU3-E-SD02-0002	140	C	100	140	1300	-	N
HEPTACHLOR EPOXIDE	6/14	0.073 - 65	1.3 - 8.6	10	RM-SD-ES01-01	70	C	5000	67	630	-	N
METHOXYCHLOR	1/14	0.37 - 0.37	11 - 86	14	RM-SD-ES06-02	39000	N	-	340000	10000000	-	N
PCB Congeners (ug/kg) (7)												
2',3,4,4',5-PENTACHLOROBIPHENYL (123)	2/2	1.11 - 46	-	24	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
2,2',3,3',4,4',5-HEPTACHLOROBIPHENYL (170	2/2	1.52 - 23.6	-	13	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
2,2',3,4,4',5,5'-HEPTACHLOROBIPHENYL (180	1/2	11.9 - 11.9	0.502 - 0.502	6	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
2,3',4,4',5,5'-HEXACHLOROBIPHENYL (167)	2/2	0.082 - 2.86	-	1	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
2,3',4,4',5-PENTACHLOROBIPHENYL (118)	1/2	4.84 - 4.84	0.118 - 0.118	2	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
2,3,3',4,4',5'-HEXACHLOROBIPHENYL (157)	2/2	0.308 - 11.5	-	6	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
2,3,3',4,4',5,5'-HEPTACHLOROBIPHENYL (189	1/2	0.618 - 0.618	0.0167 - 0.0167	0.3	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
2,3,3',4,4',5-HEXACHLOROBIPHENYL (156)	2/2	0.126 - 4.62	-	2	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
2,3,4,4',5-PENTACHLOROBIPHENYL (114)	2/2	2.34 - 98.2	-	50	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
3,3',4,4',5,5'-HEXACHLOROBIPHENYL (169)	1/2	0.014 - 0.014	0.00175 - 0.0017	0.01	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
3,3',4,4',5-PENTACHLOROBIPHENYL (126)	2/2	0.00513 - 0.179	-	0.09	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
3,3',4,4'-TETRACHLOROBIPHENYL (77)	2/2	0.0685 - 2.81	-	1	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
DECACHLOROBIPHENYL	1/2	2 - 2	0.0555 - 0.0555	1	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
TOTAL DICHLOROBIPHENYLS	2/2	0.692 - 11	-	6	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
TOTAL HEPTACHLOROBIPHENYLS	1/2	48.2 - 48.2	1.51 - 1.51	24	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
TOTAL HEXACHLOROBIPHENYLS	2/2	3.23 - 223	-	113	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
TOTAL MONOCHLOROBIPHENYLS	2/2	0.0397 - 0.308	-	0.17	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y

TABLE 6-21 (cont.)
SELECTION OF CHEMICALS OF POTENTIAL CONCERN
AREA E, ELM STREET - ALL SOIL/SEDIMENT (0-15')
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Parameter	Frequency	Range Of Detects	Range Of Nondetects	Average	Location of Maximum	COPC Screening Level (1)	N/C (2)	SSL Inhalation (3)	State Residential Direct Exposure (4)	State Industrial Direct Exposure (4)	Background Concentration (5)	Select As COPC? (6)
PCB Congeners (ug/kg) (7) (continued)												
TOTAL NONACHLOROBIPHENYLS	1/2	9.87 - 9.87	0.352 - 0.352	5	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
TOTAL OCTACHLOROBIPHENYLS	1/2	29.8 - 29.8	1.05 - 1.05	15	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
TOTAL PENTACHLOROBIPHENYLS	2/2	9.43 - 449	-	229	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
TOTAL TETRACHLOROBIPHENYLS	2/2	3.85 - 156	-	80	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
TOTAL TRICHLOROBIPHENYLS	2/2	2.27 - 47.9	-	25	OU3-E-SD01-0002	320	C	-	1000	10000	-	Y
Metals (mg/kg)												
ALUMINUM	14/14	10100 - 29600	-	19486	OU3-E-SD02-0002	7800	N	-	-	-	22600	N(8)
ANTIMONY	2/14	2.8 - 3.1	2 - 10.6	2	OU3-E-SD03-0002	3.1	N	-	27	8200	ND	Y
ARSENIC	12/14	3.4 - 25.4	12.2 - 13.8	11	RM-SD-ES02-01	0.43	C	750	10	10	11.6	Y
BARIUM	14/14	36.2 - 232	-	94	OU3-E-SD03-0002	550	N	690000	4700	140000	329	N
BERYLLIUM	7/14	0.69 - 1.2	0.5 - 0.78	1	OU3-E-SD03-0204, OU3-E-SD02-000	16	C	1300	2	2	1.3	N
CALCIUM	14/14	2460 - 94100	-	9910	RM-SD-ES01-01	-	-	-	-	-	7420	N
CHROMIUM	13/14	24.2 - 211	27 - 27	68	RM-SD-ES02-01	23	N	270	100	100	35.2	Y
COBALT	14/14	7.3 - 14.4	-	10	OU3-E-SD01-0204	470	N	-	1000	2500	12.4	N
COPPER	14/14	28.3 - 425	-	158	RM-SD-ES02-01	310	N	-	2500	76000	123	Y
IRON	14/14	18300 - 52300	-	30221	RM-SD-ES02-01	2300	N	-	-	-	24100	N(8)
LEAD	14/14	5.9 - 404	-	134	RM-SD-ES02-01	400(9)	N	-	500	1000	344	Y
MAGNESIUM	14/14	5610 - 56800	-	11001	RM-SD-ES01-01	-	-	-	-	-	5690	N
MANGANESE	14/14	228 - 413	-	312	RM-SD-ES02-01	160	N	-	1600	47000	660	N
MERCURY	4/14	0.33 - 0.89	0.08 - 0.32	0.26	OU3-E-SD02-0002	2.3	N	10	20	610	0.28	N
NICKEL	14/14	19.7 - 38.5	-	27	RM-SD-ES02-02	160	N	13000	1400	7500	40.4	N
POTASSIUM	13/14	2200 - 4590	1590 - 1590	3018	RM-SD-ES07-02	-	-	-	-	-	2680	N
SILVER	3/14	1.6 - 2.4	0.72 - 4.4	1	RM-SD-ES02-01	39	N	-	340	10000	3.3	N
SODIUM	7/14	2030 - 4410	304 - 2700	1809	OU3-E-SD01-0204	-	-	-	-	-	248	N
THALLIUM	2/14	0.24 - 3.5	2.4 - 4.7	2	OU3-E-SD02-0002	0.55	N	-	5.4	160	ND	Y
VANADIUM	14/14	33.3 - 125	-	65	RM-SD-ES02-01	55	N	-	470	14000	81.9	Y
ZINC	14/14	35.6 - 348	-	163	RM-SD-ES02-02	2300	N	-	20000	610000	604	N
Dioxin (ug/kg)												
TOXICITY EQUIVALENCY FACTOR	8/8	0.0009605 - 0.0356	-	0.013	RM-SD-ES06-02	0.0043	C	-	-	-	-	Y

Notes:
1) Based on current USEPA Region III guidance (USEPA Region III, 10-1-99). Residential Soil Ingestion is used for soil and sediment. Value for noncarcinogens is based on a target hazard quotient of 0.1. Value for carcinogens is based on a cancer risk of 1E-6.
2) COPC screening level based on noncarcinogenic (N)/carcinogenic (C) effects.
3) USEPA Soil Screening Levels (USEPA, May 1996).
4) CTDEP, January 1996. In some cases, calculated or surrogate or ceiling value presented as detailed in Table 6-1.

TABLE 6-21 (cont.)
SELECTION OF CHEMICALS OF POTENTIAL CONCERN
AREA E, ELM STREET - ALL SOIL/SEDIMENT (0-15')
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Parameter	Frequency	Range Of Detects	Range Of Nondetects	Average	Location of Maximum	COPC Screening Level (1)	N/C (2)	SSL Inhalation (3)	State Residential Direct Exposure (4)	State Industrial Direct Exposure (4)	Background Concentration (5)	Select As COPC? (6)

5) Maximum background concentrations presented for inorganics only because background concentrations for organics were not used in COPC selection.
6) COPC selection criteria discussed in Section 6.2 and presented/defined in Table 6-1. Chemical was selected as a COPC (Y = yes) if maximum detected concentration exceeded screening levels, except that noncarcinogenic inorganics detected at concentrations exceeding screening levels (based on Region III criteria) but less than Region III risk-based concentrations AND maximum background concentration were not selected as COPCs.
7) PCB Congeners will be evaluated qualitatively in the uncertainty section. Note all Aroclors/PCB congeners selected as COPC.
8) USEPA Region I does not advocate quantitative risk assessment of aluminum or iron.
9) Value is based on OSWER soil screening level for residential land use (USEPA, July 14, 1994).
- Not available or not applicable.

TABLE 6-22A
COMPARISON OF MAXIMUM CONCENTRATIONS TO GROUNDWATER PROTECTION BENCHMARKS
AREA E, ELM STREET - SURFACE SOIL/SEDIMENT
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Parameter	Frequency	Range Of Detects	Range Of Nondetects	Average	Location of Maximum	SSL Migration To Groundwater (1)	State Pollutant Mobility (GB) (2)
Volatile Organic Compounds (ug/kg)							
2-BUTANONE	4/6	30 - 130	24 - 29	53	RM-SD-ES06-02	-	80000
ACETONE	3/7	98 - 490	24 - 34	111	RM-SD-ES06-02	16000	140000
CARBON DISULFIDE	1/5	11 - 11	24 - 34	14	RM-SD-ES03-02	32000	140000
CHLOROMETHANE	1/5	8 - 8	24 - 34	13	RM-SD-ES01-01	-	540
TOLUENE	2/7	5 - 300	24 - 34	54	RM-SD-ES01-01	12000	67000
Semivolatile Organic Compounds (ug/kg)							
4-METHYLPHENOL	4/11	66 - 770	250 - 34000	1840	RM-SD-ES01-01	-	7000
ACENAPHTHYLENE	6/11	29 - 1300	360 - 34000	1887	RM-SD-ES02-01	-	84000
ANTHRACENE	4/8	71 - 300	360 - 34000	2329	RM-SD-ES02-01	12000000	400000
BENZO(A)ANTHRACENE	8/11	100 - 1600	360 - 34000	1933	RM-SD-ES02-01, RM-SD-ES02-01	2000	1000
BENZO(A)PYRENE	8/11	160 - 2500	360 - 34000	2075	RM-SD-ES02-01	8000	1000
BENZO(B)FLUORANTHENE	9/11	33 - 5600	820 - 34000	2560	RM-SD-ES02-01, RM-SD-ES02-01	5000	1000
BENZO(G,H,I)PERYLENE	8/11	81 - 1400	360 - 34000	1887	RM-SD-ES02-01	-	40000
BENZO(K)FLUORANTHENE	5/10	110 - 930	360 - 34000	2098	OU3-E-SD03-0002	49000	1000
BIS(2-ETHYLHEXYL)PHTHALATE	3/11	110 - 9400	220 - 34000	2628	RM-SD-ES03-01	3600000	11000
BUTYLBENZYL PHTHALATE	1/10	19 - 19	220 - 34000	1970	ES1100AC-002(0.5-1.0)	930000	200000
CARBAZOLE	4/11	57 - 180	220 - 34000	1753	RM-SD-ES02-01	600	360
CHRYSENE	9/11	19 - 2700	820 - 34000	2130	RM-SD-ES02-01, RM-SD-ES02-01	160000	960
DI-N-BUTYL PHTHALATE	1/10	150 - 150	220 - 34000	1961	RM-SD-ES07-02	2300000	140000
DIBENZO(A,H)ANTHRACENE	4/11	25 - 520	360 - 34000	1839	RM-SD-ES02-01	2000	0.96
FLUORANTHENE	9/11	21 - 3000	820 - 34000	2280	RM-SD-ES02-01	4300000	56000
FLUORENE	2/11	210 - 435	220 - 34000	1825	RM-SD-ES01-01	560000	56000
INDENO(1,2,3-CD)PYRENE	8/11	90 - 1800	360 - 34000	1925	RM-SD-ES02-01	14000	9.6
NAPHTHALENE	1/11	91 - 91	220 - 34000	1814	RM-SD-ES02-01	84000	56000
PHENANTHRENE	8/11	130 - 1700	360 - 34000	1962	RM-SD-ES02-01	-	40000
PHENOL	3/11	130 - 770	250 - 34000	1880	RM-SD-ES02-01	100000	800000
PYRENE	9/11	28 - 4700	820 - 34000	2483	RM-SD-ES02-01	4200000	40000
Pesticides/PCBs (ug/kg)							
4,4'-DDD	2/11	1.5 - 9.2	2.5 - 17	4	OU3-E-SD01-0002	16000	29
4,4'-DDE	6/11	1.8 - 280	3.3 - 17	35	OU3-E-SD03-0002	54000	21
4,4'-DDT	2/11	0.14 - 11	2.2 - 17	4	RM-SD-ES03-01	32000	21
ALDRIN	4/11	0.062 - 120	1.1 - 8.6	14	RM-SD-ES02-01	500	0.41
ALPHA-BHC	2/11	0.13 - 0.19	1.3 - 8.6	2	OU3-E-SD01-0002	0.5	1.1
ALPHA-CHLORDANE	7/11	0.28 - 360	1.6 - 8.6	66	OU3-E-SD03-0002	10000	66
AROCLOR-1242	2/11	18000 - 30000	22 - 170	4395	OU3-E-SD03-0002	-	-
AROCLOR-1254	8/11	36 - 40000	33 - 160	11040	OU3-E-SD03-0002	-	-
AROCLOR-1262	3/11	110 - 2100	22 - 170	275	RM-SD-ES01-01	-	-
AROCLOR-1268	4/11	4.6 - 520	22 - 170	90	RM-SD-ES01-01	-	-

TABLE 6-22A (cont.)
COMPARISON OF MAXIMUM CONCENTRATIONS TO GROUNDWATER PROTECTION BENCHMARKS
AREA E, ELM STREET - SURFACE SOIL/SEDIMENT
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Parameter	Frequency	Range Of Detects	Range Of Nondetects	Average	Location of Maximum	SSL Migration To Groundwater (1)	State Pollutant Mobility (GB) (2)
Pesticides/PCBs (ug/kg) (cont'd.)							
BETA-BHC	1/11	24 - 24	1.1 - 8.6	4	OU3-E-SD02-0002	3	3.9
DELTA-BHC	1/11	4.25 - 4.25	1.1 - 8.6	2	RM-SD-ES01-01	-	1.1
DIELDRIN	4/11	0.67 - 230	3.3 - 17	24	OU3-E-SD03-0002	4	7
ENDOSULFAN I	5/11	1.1 - 330	1.3 - 4.1	32	RM-SD-ES02-01	18000	8400
ENDOSULFAN II	2/11	3.9 - 22	2.5 - 17	6	OU3-E-SD02-0002	18000	8400
ENDOSULFAN SULFATE	4/11	0.091 - 20	2.2 - 17	5	OU3-E-SD03-0002	-	8400
ENDRIN	3/11	1.3 - 12	2.5 - 17	4	OU3-E-SD02-0002	1000	-
ENDRIN ALDEHYDE	7/11	1.7 - 380	3.3 - 8	82	OU3-E-SD03-0002	-	-
ENDRIN KETONE	4/11	0.21 - 16	2.2 - 17	4	RM-SD-ES02-01	-	-
GAMMA-BHC (LINDANE)	1/11	4.9 - 4.9	1.1 - 8.6	2	OU3-E-SD02-0002	9	40
GAMMA-CHLORDANE	8/11	0.14 - 86	1.7 - 4.1	17	RM-SD-ES02-01	10000	66
HEPTACHLOR	1/11	8 - 8	1.1 - 8.6	3	OU3-E-SD02-0002	23000	13
HEPTACHLOR EPOXIDE	3/11	0.43 - 65	1.3 - 8.6	8	RM-SD-ES01-01	700	20
METHOXYCHLOR	1/11	0.37 - 0.37	11 - 86	17	RM-SD-ES06-02	160000	8000
PCB Congeners (ug/kg)							
2',3,4,4',5-PENTACHLOROBIPHENYL (123)	1/1	46 - 46	-	46	OU3-E-SD01-0002	-	-
2,2',3,3',4,4',5-HEPTACHLOROBIPHENYL (170)	1/1	23.6 - 23.6	-	24	OU3-E-SD01-0002	-	-
2,2',3,4,4',5,5'-HEPTACHLOROBIPHENYL (180)	1/1	11.9 - 11.9	-	12	OU3-E-SD01-0002	-	-
2,3',4,4',5,5'-HEXACHLOROBIPHENYL (167)	1/1	2.86 - 2.86	-	3	OU3-E-SD01-0002	-	-
2,3',4,4',5-PENTACHLOROBIPHENYL (118)	1/1	4.84 - 4.84	-	5	OU3-E-SD01-0002	-	-
2,3,3',4,4',5'-HEXACHLOROBIPHENYL (157)	1/1	11.5 - 11.5	-	12	OU3-E-SD01-0002	-	-
2,3,3',4,4',5,5'-HEPTACHLOROBIPHENYL (189)	1/1	0.618 - 0.618	-	1	OU3-E-SD01-0002	-	-
2,3,3',4,4',5-HEXACHLOROBIPHENYL (156)	1/1	4.62 - 4.62	-	5	OU3-E-SD01-0002	-	-
2,3,4,4',5-PENTACHLOROBIPHENYL (114)	1/1	98.2 - 98.2	-	98	OU3-E-SD01-0002	-	-
3,3',4,4',5,5'-HEXACHLOROBIPHENYL (169)	1/1	0.014 - 0.014	-	0.01	OU3-E-SD01-0002	-	-
3,3',4,4',5-PENTACHLOROBIPHENYL (126)	1/1	0.179 - 0.179	-	0.2	OU3-E-SD01-0002	-	-
3,3',4,4'-TETRACHLOROBIPHENYL (77)	1/1	2.81 - 2.81	-	3	OU3-E-SD01-0002	-	-
DECACHLOROBIPHENYL	1/1	2 - 2	-	2	OU3-E-SD01-0002	-	-
TOTAL DICHLOROBIPHENYLS	1/1	11 - 11	-	11	OU3-E-SD01-0002	-	-
TOTAL HEPTACHLOROBIPHENYLS	1/1	48.2 - 48.2	-	48	OU3-E-SD01-0002	-	-
TOTAL HEXACHLOROBIPHENYLS	1/1	223 - 223	-	223	OU3-E-SD01-0002	-	-
TOTAL MONOCHLOROBIPHENYLS	1/1	0.308 - 0.308	-	0.3	OU3-E-SD01-0002	-	-
TOTAL NONACHLOROBIPHENYLS	1/1	9.87 - 9.87	-	10	OU3-E-SD01-0002	-	-
TOTAL OCTACHLOROBIPHENYLS	1/1	29.8 - 29.8	-	30	OU3-E-SD01-0002	-	-
TOTAL PENTACHLOROBIPHENYLS	1/1	449 - 449	-	449	OU3-E-SD01-0002	-	-
TOTAL TETRACHLOROBIPHENYLS	1/1	156 - 156	-	156	OU3-E-SD01-0002	-	-
TOTAL TRICHLOROBIPHENYLS	1/1	47.9 - 47.9	-	48	OU3-E-SD01-0002	-	-

TABLE 6-22A (cont.)
COMPARISON OF MAXIMUM CONCENTRATIONS TO GROUNDWATER PROTECTION BENCHMARKS
AREA E, ELM STREET - SURFACE SOIL/SEDIMENT
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Parameter	Frequency	Range Of Detects	Range Of Nondetects	Average	Location of Maximum	SSL Migration To Groundwater (1)	State Pollutant Mobility (GB) (2)
Metals (mg/kg)							
ALUMINUM	11/11	10100 - 29600	-	19173	OU3-E-SD02-0002	-	-
ANTIMONY	2/11	2.8 - 3.1	2 - 10.6	2	OU3-E-SD03-0002	5	-
ARSENIC	9/11	4.4 - 25.4	12.2 - 13.8	13	RM-SD-ES02-01	29	-
BARIUM	11/11	36.2 - 232	-	106	OU3-E-SD03-0002	1600	-
BERYLLIUM	4/11	0.69 - 1.2	0.5 - 0.78	1	OU3-E-SD02-0002	63	-
CALCIUM	11/11	2460 - 94100	-	11769	RM-SD-ES01-01	-	-
CHROMIUM	10/11	24.2 - 211	27 - 27	77	RM-SD-ES02-01	38	-
COBALT	11/11	7.3 - 12	-	10	OU3-E-SD02-0002	-	-
COPPER	11/11	35.4 - 425	-	191	RM-SD-ES02-01	-	-
IRON	11/11	18300 - 52300	-	28764	RM-SD-ES02-01	-	-
LEAD	11/11	5.9 - 404	-	164	RM-SD-ES02-01	-	-
MAGNESIUM	11/11	5610 - 56800	-	11745	RM-SD-ES01-01	-	-
MANGANESE	11/11	228 - 413	-	307	RM-SD-ES02-01	-	-
MERCURY	4/11	0.33 - 0.89	0.08 - 0.32	0.3	OU3-E-SD02-0002	2	-
NICKEL	11/11	19.7 - 38.5	-	28	RM-SD-ES02-02	130	-
POTASSIUM	10/11	2200 - 4590	1590 - 1590	2938	RM-SD-ES07-02	-	-
SILVER	3/11	1.6 - 2.4	0.72 - 4.4	1	RM-SD-ES02-01	34	-
SODIUM	4/11	2030 - 3700	304 - 2700	1319	OU3-E-SD02-0002	-	-
THALLIUM	2/11	0.24 - 3.5	2.4 - 4.7	2	OU3-E-SD02-0002	0.7	-
VANADIUM	11/11	33.3 - 125	-	70	RM-SD-ES02-01	6000	-
ZINC	11/11	35.6 - 348	-	183	RM-SD-ES02-02	12000	-
Dioxin (ug/kg)							
TOXICITY EQUIVALENCY (TEQ)	7/7	0.00096 - 0.0356	-	0.0144	RM-SD-ES06-02	-	-
Total Organic Carbon (mg/kg)							
TOTAL ORGANIC CARBON	3/3	2130 - 53600	-	19733	OU3-E-SD02-0002	-	-

Notes:
1) USEPA Soil Screening Levels (USEPA, May 1996). Values associated with dilution and attenuation factor (DAF) of 20 are used.
2) CTDEP, January 1996. State Pollutant Mobility criteria for metals and PCBs are not included since direct comparison of the aqueous SPLP criteria (in ug/L) and the soil analytical results (in ug/kg or mg/kg) cannot be made. TCLP and SPLP results for soil samples are presented in a separate table. In some cases, calculated or surrogate or ceiling value presented as detailed in Table 6-1.
- Not available or not applicable.

TABLE 6-22B
COMPARISON OF MAXIMUM CONCENTRATIONS TO GROUNDWATER PROTECTION BENCHMARKS
AREA E, ELM STREET ALL SOIL/SEDIMENT (0-15')
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Parameter	Frequency	Range Of Detects	Range Of Nondetects	Average	Location of Maximum	SSL Migration To Groundwater (1)	State Pollutant Mobility (GB) (2)
Volatile Organic Compounds (ug/kg)							
2-BUTANONE	4/6	30 - 130	24 - 29	53	RM-SD-ES06-02	-	80000
ACETONE	3/7	98 - 490	24 - 34	111	RM-SD-ES06-02	16000	140000
CARBON DISULFIDE	1/5	11 - 11	24 - 34	14	RM-SD-ES03-02	32000	140000
CHLOROMETHANE	1/5	8 - 8	24 - 34	13	RM-SD-ES01-01	-	540
TOLUENE	2/7	5 - 300	24 - 34	54	RM-SD-ES01-01	12000	67000
Semivolatile Organic Compounds (ug/kg)							
4-METHYLPHENOL	4/14	66 - 770	230 - 34000	1471	RM-SD-ES01-01	-	7000
ACENAPHTHYLENE	6/14	29 - 1300	230 - 34000	1508	RM-SD-ES02-01	-	84000
ANTHRACENE	4/8	71 - 300	360 - 34000	2329	RM-SD-ES02-01	12000000	400000
BENZO(A)ANTHRACENE	9/14	100 - 1600	230 - 34000	1544	RM-SD-ES02-01, RM-SD-ES02-01	2000	1000
BENZO(A)PYRENE	9/14	110 - 2500	230 - 34000	1655	RM-SD-ES02-01	8000	1000
BENZO(B)FLUORANTHENE	11/14	33 - 5600	230 - 34000	2031	RM-SD-ES02-01, RM-SD-ES02-01	5000	1000
BENZO(G,H,I)PERYLENE	8/14	81 - 1400	230 - 34000	1509	RM-SD-ES02-01	-	40000
BENZO(K)FLUORANTHENE	7/13	37 - 930	230 - 34000	1634	OU3-E-SD03-0002	49000	1000
BIS(2-ETHYLHEXYL)PHTHALATE	3/14	110 - 9400	220 - 34000	2090	RM-SD-ES03-01	3600000	11000
BUTYLBENZYL PHTHALATE	1/13	19 - 19	220 - 34000	1543	ES1100AC-002(0.5-1.0)	930000	200000
CARBAZOLE	4/14	57 - 180	220 - 34000	1403	RM-SD-ES02-01	600	360
CHRYSENE	10/14	19 - 2700	230 - 34000	1696	RM-SD-ES02-01, RM-SD-ES02-01	160000	960
DI-N-BUTYL PHTHALATE	1/13	150 - 150	220 - 34000	1536	RM-SD-ES07-02	2300000	140000
DIBENZO(A,H)ANTHRACENE	4/14	25 - 520	230 - 34000	1470	RM-SD-ES02-01	2000	0 96
FLUORANTHENE	11/14	21 - 3000	230 - 34000	1810	RM-SD-ES02-01	4300000	56000
FLUORENE	2/14	210 - 435	220 - 34000	1460	RM-SD-ES01-01	560000	56000
INDENO(1,2,3-CD)PYRENE	9/14	90 - 1800	230 - 34000	1538	RM-SD-ES02-01	14000	9 6
NAPHTHALENE	1/14	91 - 91	220 - 34000	1451	RM-SD-ES02-01	84000	56000
PHENANTHRENE	9/14	110 - 1700	230 - 34000	1566	RM-SD-ES02-01	-	40000
PHENOL	3/14	130 - 770	230 - 34000	1503	RM-SD-ES02-01	100000	800000
PYRENE	11/14	28 - 4700	230 - 34000	1968	RM-SD-ES02-01	4200000	40000
Pesticides/PCBs (ug/kg)							
4,4'-DDD	2/14	1.5 - 9.2	2.3 - 17	3	OU3-E-SD01-0002	16000	29
4,4'-DDE	9/14	0.76 - 280	3.3 - 17	38	OU3-E-SD03-0002	54000	21
4,4'-DDT	2/14	0.14 - 11	2.2 - 17	3	RM-SD-ES03-01	32000	21
ALDRIN	6/14	0.062 - 120	1.1 - 8.6	12	RM-SD-ES02-01	500	0 41
ALPHA-BHC	2/14	0.13 - 0.19	1.2 - 8.6	2	OU3-E-SD01-0002	0.5	1.1
ALPHA-CHLORDANE	8/14	0.28 - 360	1.2 - 8.6	53	OU3-E-SD03-0002	10000	66

TABLE 6-22B (cont.)
COMPARISON OF MAXIMUM CONCENTRATIONS TO GROUNDWATER PROTECTION BENCHMARKS
AREA E, ELM STREET ALL SOIL/SEDIMENT (0-15')
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Parameter	Frequency	Range Of Detects	Range Of Nondetects	Average	Location of Maximum	SSL Migration To Groundwater (1)	State Pollutant Mobility (GB) (2)
Pesticides/PCBs (ug/kg) (cont.)							
AROCLOR-1242	2/14	18000 - 30000	22 - 170	3456	OU3-E-SD03-0002	-	-
AROCLOR-1254	10/14	36 - 40000	33 - 160	10035	OU3-E-SD03-0002	-	-
AROCLOR-1262	3/14	110 - 2100	22 - 170	219	RM-SD-ES01-01	-	-
AROCLOR-1268	4/14	4.6 - 520	22 - 170	73	RM-SD-ES01-01	-	-
BETA-BHC	2/14	6.5 - 24	1.1 - 8.6	4	OU3-E-SD02-0002	3	3.9
DELTA-BHC	1/14	4.25 - 4.25	1.1 - 8.6	2	RM-SD-ES01-01		1.1
DIELDRIN	7/14	0.15 - 230	3.3 - 17	25	OU3-E-SD03-0002	4	7
ENDOSULFAN I	8/14	0.28 - 330	1.3 - 4.1	27	RM-SD-ES02-01	18000	8400
ENDOSULFAN II	5/14	0.6 - 74	2.5 - 17	10	OU3-E-SD03-0204	18000	8400
ENDOSULFAN SULFATE	7/14	0.091 - 22	2.2 - 17	5	OU3-E-SD03-0204	-	8400
ENDRIN	6/14	0.3 - 17	2.5 - 17	5	OU3-E-SD03-0204	1000	-
ENDRIN ALDEHYDE	10/14	1.1 - 380	3.3 - 8	72	OU3-E-SD03-0002	-	-
ENDRIN KETONE	4/14	0.21 - 16	2.2 - 17	3	RM-SD-ES02-01	-	-
GAMMA-BHC (LINDANE)	4/14	0.051 - 4.9	1.1 - 8.6	2	OU3-E-SD02-0002	9	40
GAMMA-CHLORDANE	11/14	0.14 - 86	1.7 - 4.1	15	RM-SD-ES02-01	10000	66
HEPTACHLOR	2/14	4.6 - 8	1.1 - 8.6	2	OU3-E-SD02-0002	23000	13
HEPTACHLOR EPOXIDE	6/14	0.073 - 65	1.3 - 8.6	10	RM-SD-ES01-01	700	20
METHOXYCHLOR	1/14	0.37 - 0.37	11 - 86	14	RM-SD-ES06-02	160000	8000
PCB Congeners (ug/kg)							
2',3,4,4',5-PENTACHLOROBIPHENYL (123)	2/2	1.11 - 46	-	24	OU3-E-SD01-0002	-	-
2,2',3,3',4,4',5-HEPTACHLOROBIPHENYL (170)	2/2	1.52 - 23.6	-	13	OU3-E-SD01-0002	-	-
2,2',3,4,4',5,5'-HEPTACHLOROBIPHENYL (180)	1/2	11.9 - 11.9	0.502 - 0.502	6	OU3-E-SD01-0002	-	-
2,3',4,4',5,5'-HEXACHLOROBIPHENYL (167)	2/2	0.082 - 2.86	-	1	OU3-E-SD01-0002	-	-
2,3',4,4',5-PENTACHLOROBIPHENYL (118)	1/2	4.84 - 4.84	0.118 - 0.118	2	OU3-E-SD01-0002	-	-
2,3,3',4,4',5'-HEXACHLOROBIPHENYL (157)	2/2	0.308 - 11.5	-	6	OU3-E-SD01-0002	-	-
2,3,3',4,4',5,5'-HEPTACHLOROBIPHENYL (189)	1/2	0.618 - 0.618	0.0167 - 0.0167	0.3	OU3-E-SD01-0002	-	-
2,3,3',4,4',5-HEXACHLOROBIPHENYL (156)	2/2	0.126 - 4.62	-	2	OU3-E-SD01-0002	-	-
2,3,4,4',5-PENTACHLOROBIPHENYL (114)	2/2	2.34 - 98.2	-	50	OU3-E-SD01-0002	-	-
3,3',4,4',5,5'-HEXACHLOROBIPHENYL (169)	1/2	0.014 - 0.014	0.00175 - 0.00175	0.01	OU3-E-SD01-0002	-	-
3,3',4,4',5-PENTACHLOROBIPHENYL (126)	2/2	0.00513 - 0.179	-	0.1	OU3-E-SD01-0002	-	-
3,3',4,4'-TETRACHLOROBIPHENYL (77)	2/2	0.0685 - 2.81	-	1	OU3-E-SD01-0002	-	-
DECACHLOROBIPHENYL	1/2	2 - 2	0.0555 - 0.0555	1	OU3-E-SD01-0002	-	-
TOTAL DICHLOROBIPHENYLS	2/2	0.692 - 11	-	6	OU3-E-SD01-0002	-	-

TABLE 6-22B (cont.)
COMPARISON OF MAXIMUM CONCENTRATIONS TO GROUNDWATER PROTECTION BENCHMARKS
AREA E, ELM STREET ALL SOIL/SEDIMENT (0-15')
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Parameter	Frequency	Range Of Detects	Range Of Nondetects	Average	Location of Maximum	SSL Migration To Groundwater (1)	State Pollutant Mobility (GB) (2)
PCB Congeners (ug/kg) (cont.)							
TOTAL HEPTACHLOROBIPHENYLS	1/2	48.2 - 48.2	1.51 - 1.51	24	OU3-E-SD01-0002	-	-
TOTAL HEXACHLOROBIPHENYLS	2/2	3.23 - 223	-	113	OU3-E-SD01-0002	-	-
TOTAL MONOCHLOROBIPHENYLS	2/2	0.0397 - 0.308	-	0.2	OU3-E-SD01-0002	-	-
TOTAL NONACHLOROBIPHENYLS	1/2	9.87 - 9.87	0.352 - 0.352	5	OU3-E-SD01-0002	-	-
TOTAL OCTACHLOROBIPHENYLS	1/2	29.8 - 29.8	1.05 - 1.05	15	OU3-E-SD01-0002	-	-
TOTAL PENTACHLOROBIPHENYLS	2/2	9.43 - 449	-	229	OU3-E-SD01-0002	-	-
TOTAL TETRACHLOROBIPHENYLS	2/2	3.85 - 156	-	80	OU3-E-SD01-0002	-	-
TOTAL TRICHLOROBIPHENYLS	2/2	2.27 - 47.9	-	25	OU3-E-SD01-0002	-	-
Metals (mg/kg)							
ALUMINUM	14/14	10100 - 29600	-	19486	OU3-E-SD02-0002	-	-
ANTIMONY	2/14	2.8 - 3.1	2 - 10.6	2	OU3-E-SD03-0002	5	-
ARSENIC	12/14	3.4 - 25.4	12.2 - 13.8	11	RM-SD-ES02-01	29	-
BARIUM	14/14	36.2 - 232	-	94	OU3-E-SD03-0002	1600	-
BERYLLIUM	7/14	0.69 - 1.2	0.5 - 0.78	1	OU3-E-SD03-0204, OU3-E-SD02-0002	63	-
CALCIUM	14/14	2460 - 94100	-	9910	RM-SD-ES01-01	-	-
CHROMIUM	13/14	24.2 - 211	27 - 27	68	RM-SD-ES02-01	38	-
COBALT	14/14	7.3 - 14.4	-	10	OU3-E-SD01-0204	-	-
COPPER	14/14	28.3 - 425	-	158	RM-SD-ES02-01	-	-
IRON	14/14	18300 - 52300	-	30221	RM-SD-ES02-01	-	-
LEAD	14/14	5.9 - 404	-	134	RM-SD-ES02-01	-	-
MAGNESIUM	14/14	5610 - 56800	-	11001	RM-SD-ES01-01	-	-
MANGANESE	14/14	228 - 413	-	312	RM-SD-ES02-01	-	-
MERCURY	4/14	0.33 - 0.89	0.08 - 0.32	0.26	OU3-E-SD02-0002	2	-
NICKEL	14/14	19.7 - 38.5	-	27	RM-SD-ES02-02	130	-
POTASSIUM	13/14	2200 - 4590	1590 - 1590	3018	RM-SD-ES07-02	-	-
SILVER	3/14	1.6 - 2.4	0.72 - 4.4	1	RM-SD-ES02-01	34	-
SODIUM	7/14	2030 - 4410	304 - 2700	1809	OU3-E-SD01-0204	-	-
THALLIUM	2/14	0.24 - 3.5	2.4 - 4.7	2	OU3-E-SD02-0002	0.7	-
VANADIUM	14/14	33.3 - 125	-	65	RM-SD-ES02-01	6000	-
ZINC	14/14	35.6 - 348	-	163	RM-SD-ES02-02	12000	-
Dioxin (ug/kg)							
TOXICITY EQUIVALENCY FACTOR	8/8	0.0009605 - 0.03562	-	0.013	RM-SD-ES06-02	-	-

TABLE 6-22B (cont.)
COMPARISON OF MAXIMUM CONCENTRATIONS TO GROUNDWATER PROTECTION BENCHMARKS
AREA E, ELM STREET ALL SOIL/SEDIMENT (0-15')
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Parameter	Frequency	Range Of Detects	Range Of Nondetects	Average	Location of Maximum	SSL Migration To Groundwater (1)	State Pollutant Mobility (GB) (2)

Notes:
1) USEPA Soil Screening Levels (USEPA, May 1996). Values associated with dilution and attenuation factor (DAF) of 20 are used.
2) CTDEP, January 1996. State Pollutant Mobility criteria for metals and PCBs are not included since direct comparison of the aqueous SPLP criteria (in ug/L) and the soil analytical results (in ug/kg or mg/kg) cannot be made. TCLP and SPLP results for soil samples are presented in a separate table. In some cases, calculated or surrogate or ceiling value presented as detailed in Table 6-1.
- Not available or not applicable.

TABLE 6-23
SELECTION OF CHEMICALS OF POTENTIAL CONCERN
AREA E, ELM STREET - SURFACE WATER
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Parameter	Frequency	Range Of Detects	Range Of Nondetects	Average	Location of Maximum	COPC Screening Level (1)	N/C (2)	Federal MCL (3)	State MCL (4)	Select As COPC? (5)
Volatiles (ug/L)										
ACETONE	1/6	14 - 14	10 - 10	7	RM-SW-ES02-01	370	N	-	-	N
STYRENE	1/6	7 - 7	10 - 10	5	RM-SW-ES06-02	160	N	100	100	N
Semivolatiles (ug/L)										
BIS(2-ETHYLHEXYL)PHTHALATE	1/6	3.5 - 3.5	10 - 10	5	RM-SW-ES02-02	4.8	C	6	6	N
Pesticides/PCBs (ug/L)										
ALPHA-BHC	1/6	0.0011 - 0.0011	0.05 - 0.05	0.02	RM-SW-ES03-02	0.011	C	-	-	N
ALPHA-CHLORDANE	5/6	0.0027 - 0.09	0.05 - 0.05	0.03	RM-SW-ES06-02	0.19	C	2	0.002	Y
AROCLOR-1254	5/6	0.21 - 4.7	0.5 - 0.5	2	RM-SW-ES06-02	0.0034	N	0.5	0.5	Y
AROCLOR-1268	1/6	0.26 - 0.26	0.5 - 1	0.3	RM-SW-ES01-01	0.034	-	0.5	0.5	Y
GAMMA-CHLORDANE	1/6	0.013 - 0.013	0.05 - 0.05	0.02	RM-SW-ES06-02	0.19	C	2	0.002	Y
HEPTACHLOR EPOXIDE	1/6	0.039 - 0.039	0.05 - 0.05	0.03	RM-SW-ES02-01	0.0012	C	0.2	0.2	Y
Inorganics (ug/L)										
ALUMINUM	4/6	3460 - 23000	95.6 - 850	8740	RM-SW-ES06-02	3700	N	50	-	N(6)
ARSENIC	2/6	11.3 - 42.9	6 - 12.2	12	RM-SW-ES07-02	0.045	C	50	50	Y
BARIUM	6/6	18.9 - 181	-	62	RM-SW-ES07-02	260	N	2000	2000	N
CADMIUM	1/6	2.3 - 2.3	2 - 2	1	RM-SW-ES07-02	1.8	N	5	5	Y
CALCIUM	6/6	19700 - 80100	-	43275	RM-SW-ES03-02	-	-	-	-	N
CHROMIUM	2/6	6.5 - 101	5 - 18	21	RM-SW-ES07-02	11	N	100	100	Y
COBALT	3/6	3.4 - 15.2	2 - 2	5	RM-SW-ES07-02	220	N	-	-	N
COPPER	5/6	44.4 - 389	5.2 - 5.2	111	RM-SW-ES07-02	150	N	1300	-	Y
IRON	6/6	516 - 44900	-	16719	RM-SW-ES07-02	1100	N	300	-	N(6)
LEAD	5/6	26.8 - 642	3 - 3	139	RM-SW-ES07-02	-	-	15	-	Y
MAGNESIUM	6/6	9300 - 97500	-	44450	RM-SW-ES03-02	-	-	-	-	N
MANGANESE	6/6	506 - 998	-	689	RM-SW-ES02-02	73	N	50	-	Y
NICKEL	4/6	11.8 - 63.6	10 - 10	26	RM-SW-ES07-02	73	N	100	100	N
POTASSIUM	6/6	6220 - 25300	-	12838	RM-SW-ES03-02	-	-	-	-	N
SILVER	2/6	7 - 7.4	3 - 3	3	RM-SW-ES07-02	18	N	100	50	N
SODIUM	6/6	45500 - 563000	-	263317	RM-SW-ES03-02	-	-	-	28000(7)	N
VANADIUM	4/6	8 - 152	2 - 2	33	RM-SW-ES07-02	26	N	-	-	Y
ZINC	5/6	43.6 - 573	5.1 - 5.1	222	RM-SW-ES03-02	1100	N	5000	-	N

Notes:
1) Based on current USEPA Region III guidance (USEPA Region III, 10-1-99). Value for noncarcinogens is based on a target hazard quotient of 0.1. Value for carcinogens is based on a cancer risk of IE-6.
2) COPC screening level based on noncarcinogenic (N)/carcinogenic (C) effects.
3) Maximum Contaminant Level (USEPA, October 1996). Values presented for lead and copper are action levels.
4) Title 19, Health and Safety, the Public Health Code of the State of Connecticut, Chapter 11 Environmental Health.
5) Chemical selected as COPC if maximum detected concentration exceeds screening levels or MCLs.
6) USEPA Region I does not advocate quantitative risk assessment of the health effects of this metal due to lack of an adequate toxicity criteria.
7) This is a state notification level and is not risk based.
- Not available or not applicable.

TABLE 6-24
SELECTION OF RECEPTORS AND EXPOSURE PATHWAYS
AREA E, ELM STREET
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Soils, Sediments, & Wetland Soils	Soils, Sediments, & Wetland Soils	Exposed Surface Soils, Sediments, & Wetland Soils	Wetland/Marsh Receptor	Adult	Ingestion	Quant	Residential properties are located in the vicinity of the site. However, due to the density and height of vegetation, visits to the area are presumed to occur infrequently. Adults may be exposed to contaminated soil/sediment through inadvertent contact.
						Dermal	Quant	Residential properties are located in the vicinity of the site. However, due to the density and height of vegetation, visits to the area are presumed to occur infrequently. Adults may be exposed to contaminated soil/sediment through inadvertent contact.
						Inhalation	Qual	Inhalation exposures represent a relatively minor exposure relative to dermal and ingestion pathways. A qualitative comparison of site soil data to USEPA Generic SSLs will be performed.
					Pre-adolescent Child	Ingestion	Quant	Residential properties are located in vicinity of the site. However, due to the density and height of vegetation, visits to the area are presumed to occur infrequently. Children may be exposed to contaminated soil/sediment through inadvertent contact.
						Dermal	Quant	Residential properties are located in vicinity of the site. However, due to the density and height of vegetation, visits to the area are presumed to occur infrequently. Children may be exposed to contaminated soil/sediment through inadvertent contact.
						Inhalation	Qual	Inhalation exposures represent a relatively minor exposure relative to dermal and ingestion pathways. A qualitative comparison of site soil data to USEPA Generic SSLs will be performed.
	Surface Water	Surface Water	Surface Water in Wetland	Wetland/Marsh Receptor	Adult	Ingestion	Qual	Residents in the vicinity of Area E may be exposed to contaminated surface water through inadvertent contact during infrequent visits. Exposure is expected to be minimal since limited contact with surface water is anticipated.
						Dermal	Quant	Residents in the vicinity of Area E be exposed to contaminated surface water through inadvertent contact during infrequent visits.
						Inhalation	None	Inhalation exposures represent a relatively minor exposure relative to dermal pathways.
					Pre-adolescent Child	Ingestion	Qual	Residents in the vicinity of Area E may be exposed to contaminated surface water through inadvertent contact during infrequent visits. Exposure is expected to be minimal since limited contact with surface water is anticipated.
						Dermal	Quant	Residents in the vicinity of Area E may be exposed to contaminated surface water through inadvertent contact during infrequent visits.
						Inhalation	None	Inhalation exposures represent a relatively minor exposure relative to dermal pathways.

Notes:
Quant - Quantitative Analysis
Qual - Qualitative Analysis
SSLs - EPA Soil Screening Levels

TABLE 6-25
EXPOSURE POINT CONCENTRATIONS
AREA E, ELM STREET
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Chemical of Potential Concern	Wetland Marsh Receptor (Adult and Child)			
	Surface Sediment/Wetland Material (mg/kg)		Surface Water (ug/L)	
	RME	CTE	RME	CTE
Semivolatile Organic Compounds				
Benzo(a)anthracene	9.3	1.3	NA	NA
Benzo(a)pyrene	9.8	1.4	NA	NA
Benzo(b)fluoranthene	11	1.8	NA	NA
Dibenzo(a,h)anthracene	8.8	1.2	NA	NA
Indeno(1,2,3-cd)pyrene	9.4	1.3	NA	NA
Pesticides/PCBs				
Aldrin	0.061	0.01	NA	NA
Alpha-chlordane	NA	NA	0.09	0.032
Aroclor-1242	30	4.4	NA	NA
Aroclor-1254	40	9.7	4.7	1.5
Aroclor-1262	2.1	0.29	NA	NA
Aroclor-1268	0.52	0.088	0.26	0.26
Aroclor, total	70	15	7	3.9
Dieldrin	0.23	0.028	NA	NA
Gamma-chlordane	NA	NA	0.013	0.013
Heptachlor epoxide	NA	NA	0.032	0.026
PCB Congeners:				
(Dioxin-like)				
Toxicity Equivalence Concentration (TEQ)	0.000081	0.000081	NA	NA
(Nondioxin-like)				
Total	0.81	0.81	NA	NA
Inorganics				
Antimony	3.1	2.1	NA	NA
Arsenic	22.1	11.8	42.9	13.4
Beryllium	NA	NA	NA	NA
Cadmium	NA	NA	2.3	1.3
Chromium (total)	170	70.5	101	24.3
Manganese	NA	NA	882	651
Thallium	3.5	1.8	NA	NA
Vanadium	105	68	152	37.3
Dioxins				
Toxicity Equivalence Concentration (TEQ)	0.000036	0.000012	NA	NA

Notes:

ND: Contaminant has been selected as a Chemical of Potential Concern (COPC) for this area/medium; however, this COPC was not detected (ND) in the respective sample subset for this receptor.

NA: Contaminant has not been selected as a COPC for this area/medium; an exposure point concentration is not applicable (NA).

CTE: Central Tendency Exposure - The arithmetic mean risk or median risk at this site.

RME: Reasonable Maximum Exposure - The highest exposure that is reasonably expected to occur at this site.

TABLE 6-26A
SUMMARY OF CANCER RISKS AND HAZARD INDICES
REASONABLE MAXIMUM EXPOSURE SCENARIO
AREA E, ELM STREET WETLANDS
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risk >10^{-4}	Chemicals with Cancer Risk >10^{-5}	Chemicals with Cancer Risk >10^{-6}	Hazard Index	Chemicals with HI > 1
Wetland/Marsh Receptor Adult (Current/Future)	Exposed Surface Soils, Sediments, in Entire Area (0 - 2 ft bgs)	Incidental Ingestion	9.1E-06	--	--	Benzo(a)pyrene, Dibenzo(a,h)anthracene, Aroclor (total)	2.9E-01	--
		Dermal Contact	1.9E-05	--	--	Benzo(a)pyrene, Dibenzo(a,h)anthracene, Aroclor (total)	6.6E-01	--
		Total	2.8E-05	--	Aroclor (total)	Benzo(a)pyrene, Dibenzo(a,h)anthracene, Arsenic	9.5E-01	--
	Surface Water in Wetlands	Dermal Contact	9.0E-05	--	Aroclor (total)	--	6.5E+00	Aroclor (total)
	Total All Routes		1.2E-04	Aroclor (total)	--	Benzo(a)pyrene, Dibenzo(a,h)anthracene, Arsenic	7.5E+00	Aroclor (total)
Wetland/Marsh Receptor Pre-adolescent (Current/Future)	Exposed Surface Soils, Sediments, in Entire Area (0 - 2 ft bgs)	Incidental Ingestion	5.2E-06	--	--	Benzo(a)pyrene, Aroclor (total)	6.4E-01	--
		Dermal Contact	2.0E-05	--	--	Benzo(a)pyrene, Dibenzo(a,h)anthracene, Aroclor (total)	2.8E+00	Aroclor (total)
		Total	2.5E-05	--	Aroclor (total)	Benzo(a)pyrene, Dibenzo(a,h)anthracene	3.4E+00	Aroclor (total)
	Surface Water in Wetlands	Dermal Contact	2.8E-05	--	Aroclor (total)	--	8.2E+00	Aroclor (total)
	Total All Routes		5.3E-05	--	Aroclor (total)	Benzo(a)pyrene, Dibenzo(a,h)anthracene, Arsenic	1.2E+01	Aroclor (total)

TABLE 6-26B
SUMMARY OF CANCER RISKS AND HAZARD INDICES
CENTRAL TENDENCY EXPOSURE SCENARIO
AREA E, ELM STREET WETLANDS
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risk $>10^{-4}$	Chemicals with Cancer Risk $>10^{-5}$	Chemicals with Cancer Risk $>10^{-6}$	Hazard Index	Chemicals with HI > 1
Wetland/Marsh Receptor Adult (Current/Future)	Exposed Surface Soils, Sediments, in Entire Area (0 - 2 ft bgs)	Incidental Ingestion	2.2E-07	--	--	--	3.4E-02	--
		Dermal Contact	9.9E-08	--	--	--	1.9E-02	--
		Total	3.2E-07	--	--	--	5.2E-02	--
	Surface Water in Wetlands	Dermal Contact	7.3E-06	--	--	Aroclor (total)	3.6E+00	Aroclor (total)
	Total All Routes		7.6E-06	--	--	Aroclor (total)	3.7E+00	Aroclor (total)
Wetland/Marsh Receptor Pre-adolescent (Current/Future)	Exposed Surface Soils, Sediments, in Entire Area (0 - 2 ft bgs)	Incidental Ingestion	1.4E-07	--	--	--	8.1E-02	--
		Dermal Contact	1.8E-07	--	--	--	1.2E-01	--
		Total	3.2E-07	--	--	--	2.0E-01	--
	Surface Water in Wetlands	Dermal Contact	2.6E-06	--	--	Aroclor (total)	4.6E+00	Aroclor (total)
	Total All Routes		2.9E-06	--	--	Aroclor (total)	4.8E+00	Aroclor (total)

TABLE 6-27
SUMMARY OF REMEDIAL INVESTIGATIONS AND RECOMMENDATIONS
AREA E, ELM STREET WETLANDS
DRAFT FINAL REMEDIAL INVESTIGATION - AREA III
RAYMARK FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Chemicals of Potential Concern			Receptor	Reasonable Maximum Exposure (RME) Risk Estimates						Lead Results [1]	Asbestos Results [2]
				ILCR	Risk Drivers			HI	Risk Drivers		
Surface Soil/Sediment (0 to 2 feet)			Wetland/Marsh Receptor (adult) (current/future)	2.8E-05	$>10^{-4}$	$>10^{-5}$	$>10^{-6}$	0.95	>1.0	Maximum lead concentration was 404 mg/kg.	Asbestos was not sampled in this study area.
benzo(a)anthracene	antimony	thallium			None	Aroclor (total)	benzo(a)pyrene dibenzo(a,h)anthracene arsenic		None		
benzo(a)pyrene	arsenic	vanadium									
benzo(b)fluoranthene	chromium	Aroclor-1242									
dibenzo(a,h)anthracene	copper	Aroclor-1254									
indeno(1,2,3-cd)pyrene	lead	Aroclor-1262	Wetland/Marsh Receptor User (pre-adolescent) (current/future)	2.5E-05	$>10^{-4}$	$>10^{-5}$	$>10^{-6}$	3.4	>1.0		
dioxins/furans		Aroclor-1268			None	Aroclor (total)	benzo(a)pyrene dibenzo(a,h)anthracene		Aroclor (total)		
aldrin											
dieldrin											
Surface Water			Wetland/Marsh Receptor (adult) (currrent/future) (non-swimmer)	9.0E-05	$>10^{-4}$	$>10^{-5}$	$>10^{-6}$	6.5	>1.0		
alpha-chlordane	arsenic	manganese			None	Aroclor (total)	None		Aroclor (total)		
gamma-chlordane	cadmium	vanadium									
heptachlor epoxide	chromium	Aroclor-1254									
		Aroclor-1268									
			Wetland/Marsh Receptor (pre-adolescent) (currrent/future) (non-swimmer)	2.8E-05	$>10^{-4}$	$>10^{-5}$	$>10^{-6}$	8.2	>1.0		
					None	Aroclor (total)	None		Aroclor (total)		

TABLE 7-1
SEDIMENT TOTAL ORGANIC CARBON STATISTICS
DRAFT FINAL REMEDIAL INVESTIGATION – AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

AOC	Sediment TOC, %				n
	min	median	mean	max	
D	0.2	2.9	6.6	82.6	31
E	0.2	7.9	6.3	9.9	9
Ref	0.5	4.4	3.5	4.8	4

TABLE 7-2
SEDIMENT AVS - SEM STATISTICS
DRAFT FINAL REMEDIAL INVESTIGATION
RAYMARK - FERRY CREEK - OU3 - AREA III
STRATFORD, CONNECTICUT

	Summed SEM - AVS				
	umole/g (dry)				
AOC	minimum	median	mean	maximum	Frequency < 0
D	-12.5	-0.8	-1.7	5.2	4/6
E	-2.4	-2.4	-2.4	-2.4	1/1
BKG	-27.5	1.9	-6.7	5.5	1/3
	Difference between duplicates				
QC	1.1	9.7	10.1	27.6	1/6[a]

[a]Frequency with which one duplicate is positive and one is negative

TABLE 7-3
CONTAMINANTS OF ECOLOGICAL CONCERN[1]
DRAFT FINAL REMEDIAL INVESTIGATION – AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

CONTAMINANTS OF CONCERN				
Metals and Metalloids	**PAHs**	**Dioxins and Furans**	**Pesticides**	**PCBs**
Arsenic	Acenaphthene	Penta- through hepta-chlorodioxins and furans	DDD	Aroclor 1016
Cadmium	Acenaphthylene		DDE	Aroclor 1221
Chromium	Anthracene		DDT	Aroclor 1232
Copper	Benzo(a)anthracene			Aroclor 1242
Lead	Benzo(a)pyrene			Aroclor 1248
Mercury	Benzo(b)fluoranthene			Aroclor 1254
Nickel	Chrysene			Aroclor 1260
Silver	Dibenz(a,h)fluoranthene			Aroclor 1262
Zinc	Fluoranthene			Aroclor 1268
	Fluorene			
	2-Methylnaphthalene			
	Naphthalene			
	Phenanthrene			
	Pyrene			

(1) COCs evaluated in the Phase II Ecological Risk Assessment (NOAA, 1998).

TABLE 7-4
ASSESSMENT AND MEASUREMENT ENDPOINTS
DRAFT FINAL REMEDIAL INVESTIGATION – AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Assessment Endpoint	Indicator Species or Group	Measurement Endpoints
Benthic community	Benthic infauna Fiddler crab	• Maximum Acceptable Tissue Concentrations (MATCs) for invertebrates • Threshold Effects Levels (TELs) for chemicals in sediment • Amphipod survival tests
Oysters	Eastern oyster	As above
Fish	Mummichog	• Criteria for chemicals in water
Fish-eating birds	Back-crowned night heron	• Toxicity Reference Values (TRVs) for birds
Semi-aquatic mammals	Raccoon	• TRVs for mammals

TABLE 7-5
COMPARISON OF AWQC FOR COCs WITH MEASURED WATER CONCENTRATIONS (µg/L)
EXCEEDING CRITERIA
DRAFT FINAL REMEDIAL INVESTIGATION – AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

COC	Chronic AWQC [a]		Concentration (µg/L)	Qualifier	AOC	Sample ID
	Freshwater	Marine				
CADMIUM	1.1 +	9.30	2.3	J	E	RM-SW-ES07-02
CHROMIUM	11 (Cr^{+6})	50 (Cr^{+6})	101		E	RM-SW-ES07-02
	74 + (Cr^{+3})	10300 (Cr^{+3})	22.3		BKG	RM-SW-GM07-04
COPPER	11.8 +	2.9	36.5	J	D	RM-SW-BN01-02
			46.6	J	D	RM-SW-BN02-02
			6		D	RM-SW-BN03-02
			802	J	D	RM-SW-BS01-01
			54.6		E	RM-SW-ES02
			80		E	RM-SW-ES03-02
			82.7		E	RM-SW-ES06-02
			389		E	RM-SW-ES07-02
			18		BKG	RM-SW-GM03
			35.4	J	BKG	RM-SW-GM04-02
			51.8	J	BKG	RM-SW-GM05-02
			13.1	J	BKG	RM-SW-GM06-02
LEAD	3.2 +	8.5	35.8		D	RM-SW-BS01-01
			33.8		E	RM-SW-ES02
			59.2		E	RM-SW-ES03-02
			62.1		E	RM-SW-ES06-02
			642		E	RM-SW-ES07-02
NICKEL	158 +	8.3	8.4		E	RM-SW-ES02
			57.7		E	RM-SW-ES03-02
			14	J	E	RM-SW-ES06-02
			63.6		E	RM-SW-ES07-02
SILVER	3.4	1.9	7		E	RM-SW-ES06-02
			7.4		E	RM-SW-ES07-02
ZINC	106 +	86	219		D	RM-SW-BS01-01
			573	J	E	RM-SW-ES03-02
			121		E	RM-SW-ES06-02
			520		E	RM-SW-ES07-02
AROCLOR, TOTAL	0.014	0.03	0.5		E	RM-SW-ES01-01
			2		E	RM-SW-ES02
			4.7		E	RM-SW-ES06-02
			0.21		E	RM-SW-ES07-02

Notes:
Only detected concentrations are presented.
J - estimated
[a] - All AWQC are in ug/L. A + indicates that the AWQC is hardness dependent; the value at 100 mg/L CaCO3 shown.

TABLE 7-6
CONCENTRATIONS OF CONTAMINANTS DETECTED IN SEDIMENT SAMPLES
(DRY WEIGHT BASIS)
DRAFT FINAL REMEDIAL INVESTIGATION – AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Chemical	Area D					Area E					Reference Area			
	Detection Frequency	Avg.	Max.	Avg. HQ_{TEL}	Avg. HQ_{PEL}	Detection Frequency	Avg.	Max.	Avg. HQ_{TEL}	Avg. HQ_{PEL}	Avg. (No.)[a]	Max.	Avg. HQ_{TEL}	Avg. HQ_{PEL}
Trace Elements (mg/kg)														
Arsenic	28/32	14.2	80.3	2.0	0.3	7/9	12.9	22.1	1.8	0.3	6.8	11.2	0.9	0.2
Cadmium	19/32	10.1	103	14.9	2.4	0/9	0.39	0.7	0.6	0.1	1.2	1.6	1.8	0.3
Chromium	32/32	143	496	2.7	0.9	9/9	84.5	170	1.6	0.5	200	304	3.8	1.3
Copper	32/32	852	3650	45.6	7.9	9/9	206	364	11.0	1.9	652.5	1260	34.9	6
Lead	58/62	690	17400	22.8	6.2	9/9	177	345	5.9	1.6	97.7	141	3.2	0.9
Mercury	27/32	1.10	5.7	8.5	1.6	4/9	0.37	0.89	2.8	0.5	0.6	0.91	4.6	1.3
Nickel	32/32	61.4	330	3.9	1.4	9/9	27.9	37.9	1.8	0.7	29	38.1	1.9	0.7
Silver	17/30	2.6	21.8	3.6	1.5	4/9	1.7	4.5	2.3	1.0		ND		
Zinc	32/32	993	8650	8.0	3.7	9/9	187	344	1.5	0.7	306.5	551	2.5	1.1
Pest/PCBs (µg/kg)														
4,4'-DDD	13/32	12	270	9.8	1.5	2/9	3.9	9.2	3.2	0.5	28 (1)	99	1.3	0.1
4,4'-DDE	21/32	12	260	5.8	0.0	5/9	47.1	280	22.7	0.1	3.78 (1)	9	3.1	0.5
4,4'-DDT	7/32	2.2	7.7	1.8	0.5	2/9	3.5	6.3	2.9	0.7	0.72 (2)	1.8	0.3	0
Total PCBs	19/26	6900	145000	319.4	36.5	8/8	14350.7	70000	664	75.9	1.1 (1)	4.4	0.9	0.5
PAHS (µg/kg)														
Total PAHs	30/30	14000	75930	8.3	0.8	8/9	19144	132665	11.4	1.1	14467	72700	8.6	0.9
Dioxins (ng/kg)														
2,3,7,8-TCDD TEQ	22/22	0.14	0.9	28	5.6	7/7	0.041	0.216	8.1	1.6	6.6	16.3	1.3	0.3

Notes:
ND = not detected
a = Number in parentheses is the number of samples with levels below the detection limit
b = TCDD TEQs were calculated using dioxin and furan data; a benchmark of 0.005 ug/kg was used for HQTEL and 0.025 for HQPEL.

TABLE 7-7
CONCENTRATIONS OF METALS, PCBs, DDTs, AND PAHs IN INVERTEBRATE TISSUES (wet weight)
DRAFT FINAL REMEDIAL INVESTIGATION REPORT - AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Chemical	Area D Mussel Min	Area D Mussel Max	Reference Area Crab
Trace Elements (mg/kg)			
Arsenic	1.60	3.6	1.7
Cadmium	0.49	1.1	0.088
Chromium	0.85	2.8	3.73
Copper	16.70	29.8	52.6
Lead	0.69	1.6	3.66
Mercury	0.09	0.14	0.023
Nickel	0.50	0.75	2.75
Silver	0.65	1.1	ND
Zinc	58.4	70	23.5
Pest/PCBs (µg/kg)			
4,4'-DDD	<2.15	16	<3
4,4'-DDE	<2.15	8.4	<2
4,4'-DDT	<1.95	<2.6	<2
Total PCBs	38	266.8	80
PAHS (µg/kg)			
Total PAHs	608	1095	37
Dioxins (ng/kg)			
2,3,7,8-TCDD TEQ	NA	NA	2.29
%Lipids	2	4	1.06
%Solids	NA	NA	32.7

NA = Not Available (not analyzed or not reported)
ND = Not Detected

TABLE 7-8
HAZARD QUOTIENTS FOR WILDLIFE BASED ON MAXIMUM CONTAMINANT[1] CONCENTRATIONS AND NOAELs
DRAFT FINAL REMEDIAL INVESTIGATION – AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Chemical	Black-crowned Night Heron		Raccoon	
	Area D	Reference	Area D	Reference
Trace Elements				
Arsenic	0.50	0.12	**9.29**	**2.16**
Cadmium	0.40	0.01	0.67	0.02
Chromium	**2.08**	**1.39**	0.81	0.52
Copper	0.64	0.42	**1.85**	**1.03**
Lead	**22.12**	0.47	**8.74**	0.13
Mercury	**1.83**	0.20	**1.86**	0.22
Nickel	0.01	0.01	0.04	0.01
Silver	0.03	0.00	0.19	0.00
Zinc	**3.75**	0.46	0.32	0.03
Pesticides and PCBs				
4,4'-DDD	**1.89**	0.09	0.00	0.00
4,4'-DDE	0.01	0.01	0.00	0.00
4,4'-DDT	**1.10**	0.00	0.00	0.00
Total PCBs	**2.50**	0.07	**4.59**	0.08
PAHs				
Total PAHs	0.02	0.01	0.56	0.30
Dioxins				
2,3,7,8-TCDD TEQ	0.00	0.03	0.00	0.00

(1) Quotients indicate the extent to which toxicity reference values are exceeded. A quotient greater than one indicates potential risk. Quotients were obtained by dividing the dose for eachcontaminant by the toxicty reference value, a no-observed-adverse-effect level (NOAEL). Bold numbers on table indicate potential ecological risk.

TABLE 7-9
HAZARD QUOTIENTS FOR WILDLIFE BASED ON MEAN CONTAMINANT[1] CONCENTRATIONS AND NOAELs
DRAFT FINAL REMEDIAL INVESTIGATION – AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

	Black-crowned Night Heron		Raccoon	
Chemical	**Area D**	**Reference**	**Area D**	**Reference**
Trace Elements				
Arsenic	0.26	0.12	**4.46**	**2.02**
Cadmium	0.17	0.01	0.22	0.02
Chromium	0.80	**1.12**	0.28	0.39
Copper	0.29	0.36	0.72	0.82
Lead	**1.01**	0.41	0.38	0.11
Mercury	**1.05**	0.17	0.93	0.18
Nickel	0.00	0.01	0.01	0.01
Silver	0.02	0.00	0.12	0.00
Zinc	**1.87**	0.41	0.12	0.03
Pesticides and PCBs				
4,4'-DDD	0.58	0.03	0.00	0.00
4,4'-DDE	0.00	0.00	0.00	0.00
4,4'-DDT	0.40	0.00	0.00	0.00
Total PCBs	0.33	0.07	0.44	0.08
PAHs				
Total PAHs	0.01	0.00	0.25	0.06
Dioxins				
2,3,7,8-TCDD TEQ	0.00	0.03	0.00	0.00

(1) Quotients indicate the extent to which toxicity reference values are exceeded. A quotient greater than one indicates potential risk. Quotients were obtained by dividing the dose for each contaminant by the toxicity reference value, a no-observed-adverse-effect-level (NOAEL). Bold numbers on table indicate potential ecological risk.

TABLE 7-10
SEDIMENT TOXICITY TEST RESULTS
DRAFT FINAL REMEDIAL INVESTIGATION – AREA III
RAYMARK - FERRY CREEK - OU3
STRATFORD, CONNECTICUT

Area	Sample ID	Amphipod Survival *Ampelisca* Survival (% of control)	Amphipod Survival *Ampelisca* Rank	Reference
D	BN03	87.0	-	SAIC (1998)
	D-1	79.3	+	SAIC (1999a)
	D-2	59.8	++	
	D-3	50.0	++	
	D-4	62.0	+	
	D-5	68.5	+	
	D-6	3.3	+++	
E	E-1	68.5	+	
Ref	GM08	72.0	+	SAIC (1998)

Ranks: - not toxic, + low toxicity, ++ moderate toxicity, +++ severe toxicity

TABLE 7-11
RISK SUMMARY
DRAFT FINAL REMEDIAL INVESTIGATION – AREA III
RAYMARK – FERRY CREEK – OU3
STRATFORD, CONNECTICUT

Assessment Endpoint Indicator Species or Group	Risk Summary	
	Direct Effect Measurements	Potential Effect Measurements
Benthic community Benthic infauna Fiddler crab Oysters Eastern oyster	Amphipod survival tests • 6 of 7 samples toxic in Area D, 4 of 4 in Area E, and 1 of 1 in reference area • 3 of the samples in Area D have moderate or severe toxicity, 1 in Area E, and none in reference area	Maximum Acceptable Tissue Concentrations (MATCs) for invertebrates • exceeded by copper in Area D and the reference area Threshold Effects Levels (TELs) for chemicals in sediment • exceeded by metals, pesticides, PCBs, dioxins, and PAHs in Areas D and E
Fish Mummichog		Criteria for chemicals in water • exceeded by metals in D and E • exceeded by PCBs in Area E
Fish-eating birds Black-crowned night heron		TRVs for birds • exceeded by metals in Area D
Semi-aquatic mammals Raccoon		TRVs for mammals • exceeded by arsenic in Area D

TABLE 8-1
SUMMARY OF CONTAMINANTS
DRAFT FINAL REMEDIAL INVESTIGATION – AREA III
RAYMARK – FERRY CREEK – OU3
STRATFORD, CONNECTICUT

LOCATION	VOCs	SVOCs	Pesticides	PCBs	Dioxins/ Furans	Metals	Asbestos
SURFACE WATERS							
Area D	I	I	I	ND	NA	I	NA
Area E	I	I	I	I	NA	F	NA
SEDIMENTS							
Area D	I	F	I	I	F/I	F	I
Area E	I	F/I	I/F	F	F/I	F	ND
SOILS							
Area D	I	F	F	F	F	F	I
Area E	ND	F	I	I	ND	I	NA
BIOTA							
Area D	NA	F	I	I	NA	F	NA
Area E	NA	NA	NA	NA	NA	NA	NA

I = Infrequent
F = Frequent
I/F = Subsurface vs. Surface
F/I = Surface vs. Subsurface
ND = Not Detected
NA = Not Analyzed

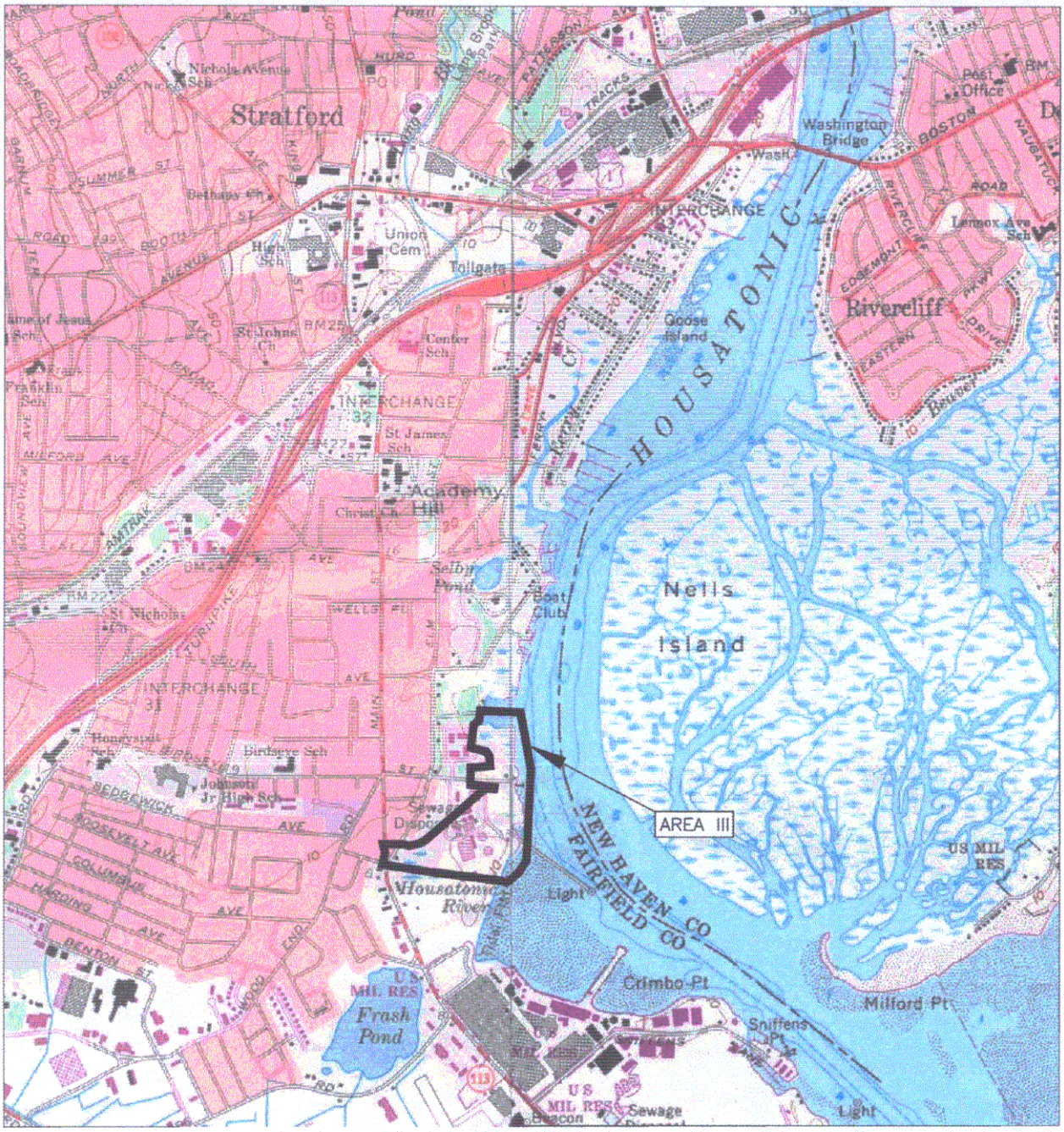
TABLE 8-2
SUMMARY OF RISKS
DRAFT FINAL REMEDIAL INVESTIGATION – AREA III
RAYMARK – FERRY CREEK - OU3
STRATFORD, CONNECTICUT

AREA	MATRIX	HUMAN HEALTH RISK					ECOLOGICAL RISK			
		NON-CARCINOGENIC	CARCINOGENIC	LEAD	ASBESTOS	COMMENTS	BENTHOS	FISH	WILDLIFE	COMMENTS
D	SURFACE SOIL	Yes	Yes	Yes	Yes	CT DEP target cancer risk exceeded.	-	-	-	Benthos: high (one location; moderate in others) Fish: moderate Wildlife: low
	SUBSURFACE SOIL	Yes	Yes	Yes	Yes	CT DEP target cancer risk exceeded.	-	-	-	
	SEDIMENT	Yes	No	No	-	CT DEP target cancer risk exceeded.	Yes	-	Yes[2]	
	SURFACE WATER	No	No	No	-		-	Yes	Yes[2]	
	BIOTA	-	-	-	-		Yes[1]	-	Yes[2]	
	TOXICITY TESTS	-	-	-	-		Yes	-	-	
E	SURFACE WATER	Yes	Yes[3]	No	-	CT DEP target cancer risk exceeded.	-	Yes	-	Benthos: moderate Fish: moderate
	SEDIMENT	Yes	Yes[3]	No	-	CT DEP target cancer risk exceeded.	Yes	-	-	
	BIOTA	-	-	-	-		Yes	-	-	
	TOXICITY TESTS	-	-	-	-		Yes	-	-	

Notes:
- = not evaluated
[1]There was a similar risk level at background/reference location
[2] Effects to wildlife from sediment, surface water, and biota were assessed collectively
[3]Human health effects to the wetland/marsh receptor from sediment and surface water were assessed collectively

Human Health Risk Assessment:
Non-Carcinogenic: Yes = HI $\geq$1 No = HI<1
Carcinogenic: Yes = Cancer Risk $>10^{-4}$ No = Cancer Risk $<10^{-4}$
Lead: Yes = Greater than 5% probability that blood lead levels exceed 10 µg/dL
Asbestos: Yes = average asbestos $\geq$ 1%
CT DEP Target Level is 10^{-6} for single contaminants and total risk no greater than 10^{-5} for multiple contaminants

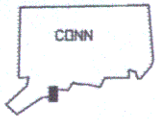
FIGURES



BASEMAP: PORTIONS OF THE FOLLOWING U.S.G.S. QUADRANGLE MAPS: BRIDGEPORT, CONN., 1970 (PHOTOREVISED: 1984) AND MILFORD, CONN., 1960 (PHOTOREVISED: 1984), SCALE ALTERED FOR CLARITY

0 — 1/2 — 1 MILE

1000 — 0 — 1000 — 2000 — 3000 — 4000 — 5000 FEET



QUADRANGLE LOCATION

SITE LOCUS		FIGURE 1–1
AREA III DRAFT FINAL – RI REPORT		TETRA TECH NUS, INC.
RAYMARK – FERRY CREEK (OU3) – STRATFORD, CT		55 Jonspin Road Wilmington, MA 01887 (978)658–7899
DRAWN BY: D.W. MACDOUGALL	REV.: 0	
PROJECT MANAGER: H. FORD	DATE: NOVEMBER 2000	
SCALE: AS SHOWN	ACAD NAME: DWG\7491\0920\USGS_3.DWG	

TARGET SHEET

THE MATERIAL DESCRIBED BELOW
WAS NOT SCANNED BECAUSE:

(X) OVERSIZED

() NON-PAPER MEDIA

() OTHER:

DESCRIPTION: DOC# 11537
FIGURE 1-2 OU3 STUDY AREA.

THE OMITTED MATERIAL IS AVAILABLE FOR REVIEW
BY APPOINTMENT
AT THE EPA NEW ENGLAND SUPERFUND RECORDS CENTER,
BOSTON, MA

TARGET SHEET

THE MATERIAL DESCRIBED BELOW
WAS NOT SCANNED BECAUSE:

(X) OVERSIZED

() NON-PAPER MEDIA

() OTHER:

DESCRIPTION: DOC# 11537
FIGURE 3-1 ESTIMATED THICKNESS
OF FILL - AREA D.

THE OMITTED MATERIAL IS AVAILABLE FOR REVIEW
BY APPOINTMENT
AT THE EPA NEW ENGLAND SUPERFUND RECORDS CENTER,
BOSTON, MA

TARGET SHEET

THE MATERIAL DESCRIBED BELOW
WAS NOT SCANNED BECAUSE:

(X) OVERSIZED

() NON-PAPER MEDIA

() OTHER:

DESCRIPTION: DOC# 11542
FIGURE 4-1, SAMPLE LOCATION PLAN -
AREA D REMEDIAL INVESTIGATION REPORT -
AREA III RAYMARK - FERRY CREEK (OU3)
STRATFORD, CT.

THE OMITTED MATERIAL IS AVAILABLE FOR REVIEW
BY APPOINTMENT
AT THE EPA NEW ENGLAND SUPERFUND RECORDS CENTER,
BOSTON, MA