

A total of 18 SVOCs, two pesticides, one PCB, and dioxins were detected at concentrations exceeding reference values in sediment samples collected along the Woonasquatucket River upstream of the Centredale Manor property. Seventeen of the SVOCs were detected at the highest concentrations in sample SD-37 (collected approximately 1.8 miles upstream of the Centredale Manor property), and 16 of the 18 SVOCs were detected at elevated levels only at sample SD-37. Elevated PCB levels were detected in one sample upstream of the Centredale Manor property (SD-33). Dioxin concentrations detected upstream of the Centredale Manor property ranged from 0.003 J ppb to 0.09 J ppb, significantly lower than the dioxin concentrations detected adjacent to and downstream of the Centredale Manor property.

Table 4

**Summary of Analytical Results
Sediment Sample Analysis for Woonasquatucket River Samples SD-33 to SD-39**

Sample Location	Compound/Element	Sample Concentration	Reference Concentration*	Comments
SD-33 (APB10) (DAF12A) AAL24-039	SVOCs			
	Benzo(k)fluoranthene	1,000 J ppb	150 J ppb	6.7 × Ref
	PESTICIDES/PCBs			
	Aroclor-1254	7,800 J ppb	57 U ppb	140 × SQL
	DIOXINS			
	Dioxins [†]	0.094 J ppb	0.002 UJ ppb	47 × SQL
SD-34 (APB11) (DAF13A) AAL24-040	SVOCs			
	Benzo(k)fluoranthene	600 J ppb	150 J ppb	4.0 × Ref
	DIOXINS			
	Dioxins [†]	0.020 J ppb	0.002 UJ ppb	10 × SQL
SD-35 (APB12) (DAF14A) AAL24-041	SVOCs			
	Bis(2-ethylhexyl)phthalate	3,300 J ppb	160 J ppb	21 × Ref
	DIOXINS			
	Dioxins [†]	0.003 J ppb	0.002 UJ ppb	1.5 × SQL
SD-37 (APB17) (DAF16A) AAL24-043	SVOCs			
	Naphthalene	930 ppb	570 U ppb	1.6 × SQL
	Acenaphthene	1,600 ppb	570 U ppb	2.8 × SQL
	Dibenzofuran	1,300 ppb	570 U ppb	2.3 × SQL
	Fluorene	2,000 ppb	570 U ppb	3.5 × SQL
	Phenanthrene	17,000 ppb	280 J ppb	61 × Ref
	Anthracene	3,100 ppb	96 J ppb	32 × Ref

Table 4

Summary of Analytical Results
Sediment Sample Analysis for Woonasquatucket River Samples SD-33 to SD-39
(Concluded)

Sample Location	Compound/Element	Sample Concentration	Reference Concentration*	Comments	
SD-37 (concluded)	Carbazole	2,000 J ppb	570 UJ ppb	3.5 × SQL	
	Fluoranthene	17,000 ppb	670 ppb	25 × Ref	
	Pyrene	17,000 ppb	560 J ppb	30 × Ref	
	Benzo(a)anthracene	8,600 ppb	340 J ppb	25 × Ref	
	Chrysene	7,900 ppb	370 J ppb	21 × Ref	
	Benzo(b)fluoranthene	8,400 ppb	450 J ppb	19 × Ref	
	Benzo(k)fluoranthene	2,400 ppb	150 J ppb	16 × Ref	
	Benzo(a)pyrene	6,200 ppb	430 J ppb	14 × Ref	
	Indeno(1,2,3-cd)pyrene	2,700 ppb	200 J ppb	13 × Ref	
	Dibenz(a,h)anthracene	880 ppb	69 J ppb	13 × Ref	
	Benzo(g,h,i)perylene	2,600 ppb	250 J ppb	10 × Ref	
	PESTICIDES/PCBs				
		4,4'-DDT	11 J ppb	5.7 U ppb	1.9 × SQL
	Endrin Ketone	20 J ppb	5.7 U ppb	3.5 × SQL	

J = The associated numerical value is an estimated quantity.

U = The compound was analyzed for, but not detected. The associated numerical value is the sample quantitation limit or the adjusted sample quantitation limit.

UJ = The compound was analyzed for, but not detected. The associated numerical value is the estimated sample quantitation limit.

ppb = Parts per billion.

PCBs = Polychlorinated Biphenyls.

SVOCs = Semivolatile Organic Compounds.

Ref = Reference value.

SQL = Sample Quantitation Limit.

* For SVOCs, the reference concentration or the reference SQL is presented. For dioxins, the estimated detection limit for 2,3,7,8-TCDD that is used to calculate the total toxicity equivalence value for the reference sample is presented.

† Values presented for dioxins are the 2,3,7,8-tetrachlorodibenzo dioxin toxicity equivalence on a dry-weight basis.

Note: Analytical results for numerous pesticides and PCBs in sediment samples were rejected. Refer to Attachment B for complete analytical results.

[5; 6; 7]

On 15 January 1999, START personnel, along with personnel from the EPA OEME, collected a total of three drinking water samples from the Pied Piper Nursery School and from the Yacht Club Bottling Works, Inc. Additionally, 17 soil samples were collected on the Centredale Manor and Brook Village properties, the Lee Romano Little League Field, and the Boys and Girls Club property [3; Figures 3A and 3B].

A total of 20 samples were submitted to the EPA Region VII laboratory to be analyzed for dioxins and HCX. Three of the 17 soil samples collected had dioxin levels exceeding the EPA Region I Residential Action Level for dioxin (1 ppb). All of the elevated levels were noted in samples collected from the Centredale Manor property [Figure 3A]. The exceedences ranged from 2.5 ppb to 5.5 ppb, with the highest concentration detected in soil sample SS-99-03 (5.5 ppb) [12]. Table 5 summarizes dioxins exceeding the EPA Region I Residential Action Level of 1 ppb.

On 27 January 1999, EPA ERT and WESTON REAC personnel collected a total of five soil samples from the Lee Romano Little League Field property which were analyzed for dioxins. Analytical levels indicate that there were no dioxin levels exceeding the EPA Region I Residential Action Level for dioxin (1 ppb) [12; Figure 3B].

START personnel, along with EPA Region I, EPA OEME, EPA Emergency Response Team (ERT), and WESTON Response Engineering and Analytical Contract (REAC) personnel, conducted soil sampling (Phase I) on and around the Centredale Manor and Brook Village properties on 16 through 18 February 1999. A geophysical survey was also conducted on the Centredale Manor and Brook Village properties to assist in determining if there were any buried objects (i.e., drums, tanks) which may be contributing to the on-site contamination [3]. Soil samples were submitted to a private laboratory to be analyzed for dioxins. The findings of this survey and validated data are not yet available.

Table 5

**Soil Sample Results from 15 January 1999
Above Residential Direct Exposure Criteria**

Sample Location	Compound	Sample Concentration	Direct Exposure Criteria* (Residential)
SS-99-03 (DAF33J)	DIOXINS		
	Dioxins†	5.5 ppb	1.0 ppb
SS-99-04 (DAF34J)	DIOXINS		
	Dioxins†	2.5 ppb	1.0 ppb
SS-99-05 (DAF35J) (Dup. of SS-99-04)	DIOXINS		
	Dioxins†	2.5 ppb	1.0 ppb

ppb = Parts per billion.

* For dioxins, the EPA Region I Residential Action Level is presented for comparison purposes.

† Values presented for dioxins are the 2,3,7,8-tetrachlorodibenzo dioxin toxicity equivalence on a dry-weight basis.

[12]

SUMMARY

The Centredale Manor Site, for the purpose of this Expanded Site Inspection (ESI), consists of the Centredale Manor property as well as portions of the Brook Village property and the Woonasquatucket River (upstream of, adjacent to, and downstream of the Centredale Manor property). The Centredale Manor property is located at 2074 Smith Street in North Providence, Rhode Island. The 4.74-acre property is bordered by apartments to the north, a drainage channel to the east, a wooded area to the south, and the Woonasquatucket River to the west. An eight-story apartment building housing 135 residents is currently located on the property.

A chemical manufacturing facility and a drum recycling facility reportedly operated at the property between 1943 and 1971. Prior to this time, the property was occupied by a textile mill; additional information regarding the types of textiles produced was not available. In the mid-1970s, the existing buildings at the property were demolished.

From 1977 to 1996, numerous investigations of the Centredale Manor property and/or the Woonasquatucket River were completed by various organizations. Specifically, in 1977, representatives of the State of Rhode Island responded to complaints of fumes at the property which resulted in the discovery of approximately 60 drums. In the early 1980s, an additional 400 drums were identified either on the property or along the Woonasquatucket River. The drums reportedly contained caustics, solvents, polychlorinated biphenyls (PCBs), and ink wastes. Subsequently, a Notice of Violation was issued to the property owners for violations of the State Hazardous Waste Management Act.

In 1986, an EPA Preliminary Assessment (PA) was completed, and in 1990 an EPA Screening Site Inspection (SSI) of the Centredale Manor property was completed. As part of the SSI, samples were collected which indicated the presence of six volatile organic compounds (VOCs), 29 semivolatile organic compounds (SVOCs), four pesticides, two PCB congeners, and six inorganic elements. In 1996, as part of an EPA Site Inspection Prioritization (SIP), sediment samples were collected from along the Woonasquatucket River and from wetlands along the drainage channel. Analytical results of the samples indicated the presence of two VOCs, thirteen SVOCs, and ten inorganic elements. None of these samples were analyzed for dioxin.

In June 1996, fish tissue samples were collected and analyzed for inorganic elements, PCBs and dioxin. Based on elevated dioxin levels detected in fish tissue samples, a fish consumption advisory was issued. In January 1997, EPA representatives collected water and sediment samples at seven dam locations along the river. The results indicated elevated concentrations of numerous SVOCs, chlorinated pesticides, PCBs, inorganic elements, and dioxin.

In September 1998, as part of this ESI, soil and sediment samples were collected from the Centredale Manor Site. Analytical results (of both sediment and soil samples) revealed numerous SVOCs as well as dioxin at concentrations exceeding reference values. Subsequently, in January 1999, additional samples were collected from the Centredale Manor and Brook Village properties, as well as the Lee Romano Little League Field and the Boys and Girls Club to better determine the extent of dioxin contamination. The investigations of the Centredale Manor Site by EPA is continuing at this present time.

**CENTREDALE MANOR
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