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APPENDIX G
SUPPLEMENTAL EVALUATION OF NATURE AND EXTENT OF CONTAMINATION

G.1 Area A-1: Upper Ferry Creek (Morgan Francis Property)

The following section presents a discussion of the nature and extent of contamination in Area A-1, located in upper Ferry Creek in the vicinity of the Morgan Francis property. The evaluation in based on the collection of samples from various environmental media (sediment, surface water, and surficial and subsurface soil), and a comparison of the associated analytical data with the background concentrations discussed in Section 4.3.

Overall, the results indicate that elevated concentrations of VOCs were detected infrequently in sediment throughout Area A-1. The higher concentrations were detected in surficial samples collected from the northern reaches of Ferry Creek (SD-17W and SD-18W) in September 1992, the western arm of the wetlands adjacent to the Morgan Francis property (RM-SD-MF01) in November 1994, and the area closest to the culvert at the southern most end of Area A-1 (RM-SD-MF03) in April 1995. No samples were collected for VOC analysis from the triangular shaped property located between East Broadway and Ferry Boulevard, or from depths of over 2.0 feet from the northern reaches of Ferry Creek or the western arm of the wetlands adjacent to the Morgan Francis property.

G.1.1 Area A-1: Evaluation of Sediment Results

Thirty-seven sediment samples were collected from twenty locations during various field investigations from September 1992 through July 1997. The samples were collected at various locations along the upper portion of Ferry Creek (from south of the Connecticut Turnpike to the inlet to the culvert under East Broadway) at depths of up to 20 feet within the sediment layer and from the triangular-shaped property located between East Broadway and Ferry Boulevard at depths of up to 4.0 feet.

An evaluation of the analytical data associated with these sediment samples is presented below. For the purposes of this discussion, sediment samples collected from depths of up to 2.0 feet are referred to as surficial samples. Samples obtained below 2.0 feet are considered subsurface samples. Sample results were compared to background concentrations for analytes except asbestos and TOC, which were evaluated in relation to their detection limits.

G.1.1.1 VOCs

Thirteen sediment samples from eight locations were submitted for analysis of VOCs. Elevated concentrations (detected at a concentration greater than its corresponding average background concentration) of VOCs were detected in one sample each from six of the locations, or 46 percent of the samples, including: surficial samples at locations SD-17, SD-18, RM-SD-MF01 (second round - November 1994), RM-SD-MF02 (second round - November 1994), and RM-SD-MF03; and subsurface samples at location OU3-A1-SD02. The distribution of VOCs was evaluated by grouping the results into the following concentration ranges: ≥ background concentrations (BG) but <2 x BG (low level), ≥2 x BG but <10 x BG (medium level), and ≥10 x BG (high level).

Surficial Sediments. Elevated concentrations of VOCs were detected in five of eleven surficial sediment samples collected from seven locations. The VOCs included: acetone, benzene, 2-butanone, carbon disulfide, chlorobenzene, methylene chloride, vinyl chloride,

and 1,1,1-trichloroethane (1,1,1,-TCA) at one location each; 1,1-dichloroethane (1,1-DCA) at three locations; and 1,2-dichloroethene (1,2-DCE) at two locations. The concentrations of individual VOCs ranged from 13 ug/kg to 46 ug/kg, with the exception of higher levels of VOCs in four of the samples. The higher levels included: 130 ug/kg methylene chloride at location SD-17; 260 ug/kg acetone at location SD-18; 160 ug/kg 1,1-DCA and 95 ug/kg chlorobenzene at location RM-SD-MF01 (second round - November 1994); 3400 ug/kg 1,1-DCA at location RM-SD-MF03. The highest concentration of a single VOC was 3400 ug/kg 1,1-DCA at location RM-SD-MF03. Elevated concentrations of additional VOCs may also have been present at this location; however, these compounds were not detected due to the elevated detection limits associated with high dilution.

Subsurface Sediments. Elevated concentrations of VOCs were detected in one of two subsurface sediment samples collected in the Ferry Creek channel. These VOCs included 11 ug/kg 1,1-DCA and 40 ug/kg 2-hexanone in the 2.0-4.0 foot sample at location OU3-A1-SD02. No VOCs exceeded background concentrations at location OU3-A1-SD03.

G.1.1.2 SVOCs

Seventeen sediment samples were collected from ten locations and submitted for analysis of SVOCs. Elevated concentrations of SVOCs were detected in all except two of the samples; and one additional sample contained only one SVOC above background concentrations. The samples containing the elevated concentrations of SVOCs included: surficial samples at locations SD-18, RM-SD-MF01 (first and second rounds - August 1994 and November 1994), RM-SD-MF02 (all three rounds - August 1994, November 1994, and April 1995), RM-SD-MF03, OU3-A1-SD01, OU3-A1-SD02, OU3-A1-SD03, and OU3-A1-SD04; and subsurface samples at locations OU3-A1-SD02, OU3-A1-SD03, and OU3-A1-SD04. The SVOCs were primarily comprised of two major groups: polynuclear aromatic hydrocarbons (PAHs) and phthalates. The distribution of SVOCs was evaluated by grouping the results into the following concentration ranges: ≥ background (BG) but <2 x BG (low level), ≥2 x BG but <10 x BG (medium level), and ≥10 x BG (high level).

Elevated concentrations of SVOCs were detected in twelve of fourteen surficial sediment samples. A total of twenty-one SVOCs was detected above background concentrations. These included: fourteen PAHs (acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene); five phthalates bis(2-ethylhexyl)phthalate, butylbenzylphthalate, di-n-butylphthalate, di-n-octylphthalate, and diethylphthalate); carbazole; and phenol.

Overall, the results indicate that elevated concentrations of SVOCs, primarily PAHs and phthalates, were detected frequently in both surficial and subsurface sediment throughout Area A-1. The higher concentrations of PAHs were detected in surficial sediment samples collected near the bend in the Ferry Creek channel in the northern portion of study area (RM-SD-MF02) in April 1995 and (OU3-A1-SD02) July 1997; and subsurface samples collected from the south-central extent of the Ferry Creek channel (OU3-A1-SD03) in July 1997 and the triangular-shaped property between East Broadway and Ferry Boulevard. The higher concentrations of phthalates were reported in surficial sediment samples collected from the western arm of the wetlands adjacent to the Morgan Francis property (OU3-A1-

SD01) in July 1997, and both surficial and subsurface sediment collected near the bend in the Ferry Creek channel in the northern portion of study area (RM-SD-MF02) in August 1994 and (OU3-A1-SD02) July 1997. No elevated concentrations of PAHs, and only a single phthalate, were detected in the surficial sediment from the northern reaches of Ferry Creek at the boundary of the study area (SD-16 through SD-18), and only a single PAH, and no phthalates, was detected above background levels in the surficial sediment from the triangular-shaped property (OU3-A1-SD04). Carbazole and phenol were detected infrequently at concentrations exceeding the background concentrations. When detected, elevated concentrations of carbazole were reported in surficial sediment samples collected near the bend in Ferry Creek channel in the northern portion of the study area (RM-SD-MF02) in August 1994 and April 1995. Phenol was reported at elevated concentrations in subsurface sediment from this bend in the channel, as well as in the south-central extent of Ferry Creek (OU3-A1-SD03) and the triangular-shaped property (OU3-A1-SD04) in July 1997. No samples were collected for SVOC analysis from depths of over 2.0 feet in the northern reaches of Ferry Creek or the western arm of the wetlands adjacent to the Morgan Francis property.

Surficial Samples. PAHs were detected above background concentrations in eleven of the fourteen surficial samples. The concentrations of individual PAHs ranged from 780 ug/kg to 10,000 ug/kg. Many of the PAHs were detected at concentrations less than two times the background levels. However, higher concentrations of one to nine individual PAHs were reported in all except one location, OU3-A1-SD04. The highest levels were detected in samples collected from two locations: RM-SD-MF02 (all three rounds - August 1994, November 1994, and April 1995) and OU3-A1-SD02. The highest concentration of a single PAH was 10,000 ug/kg fluoranthene at location RM-SD-MF02 (third round - April 1995). No PAHs were reported at concentrations greater than background levels at three locations: SD-16 through SD-18.

Elevated concentrations of phthalates were reported in eleven of the fourteen surficial samples. The concentrations of individual phthalates ranged from 680 ug/kg to 12,000 ug/kg. One to three phthalates were reported at concentrations greater than two times the background levels in all these locations. The highest concentration of a single phthalate was 12,000 ug/kg bis(2-ethylhexyl)phthalate in the surficial sample at location OU3-A1-SD01. No phthalates were reported at concentrations greater than background levels at three locations: SD-16, SD-17, and OU3-A1-SD04.

Carbazole and phenol were detected at elevated concentrations in two and one of the fourteen surficial samples, respectively. Carbazole concentrations, ranging from 670 ug/kg to 770 ug/kg, were reported above background levels in samples collected at location RM-SD-MF02 (second and third round - November 1994 and April 1995). Elevated phenol concentrations were detected in one sample, 3,900 ug/kg obtained at a depth of 0.5-1.0 feet at location RM-SD-MF02.

Subsurface Samples. Elevated concentrations of SVOCs were detected in all three subsurface sediment samples. A total of fourteen SVOCs were detected above background concentrations. These included: twelve PAHs (acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, phenanthrene, and pyrene); one phthalate (bis(2-ethylhexyl)phthalate); and phenol.

PAHs were detected above background concentrations in all three subsurface samples collected at depths of up to 4.0 feet. The concentrations of individual PAHs ranged from 620 ug/kg to 14,000 ug/kg. Many of the PAHs were detected at concentrations less than two times the background levels. However, higher concentrations of one to four individual PAHs were reported in all locations. The highest levels were detected in samples collected from two locations: OU3-A1-SD03 and OU3-A1-SD04. The highest concentration of a single PAH was 14,000 ug/kg fluoranthene at location OU3-A1-SD04.

Bis(2-ethylhexyl)phthalate was detected above background concentrations in all three subsurface samples. The concentrations ranged from 4,200 ug/kg to 7,000 ug/kg, all greater than two times the background levels. The highest concentration was detected in the subsurface sample at location OU3-A1-SD02.

Phenol was detected above background concentrations in all three subsurface samples. The concentrations ranged from 740 ug/kg to 1500 ug/kg. The highest concentration, detected in the subsurface sample at location OU3-A1-SD02, was the only reported value greater than two times the background concentration.

G.1.1.3 Pesticides/PCBs

Eighteen sediment samples from eleven locations were submitted for analysis of pesticides/PCBs. A single sample from one location was screened for PCBs. Elevated concentrations of pesticides were detected in all samples, except the surficial samples from locations SD-17, SD-18, and SLE-CR+300. One additional surficial sample collected at location SD-16 contained only one pesticide above background concentrations. Elevated concentrations of PCBs were detected in all except one surficial sample collected at location RM-SD-MF01 (second round - August 1995). The distribution of pesticides/PCBs was evaluated by grouping the results into the following concentration ranges: ≥ background (BG) but <2 x BG (low level), ≥2 x BG but <10 x BG (medium level), and ≥10 x BG (high level).

Overall, the results indicate that elevated concentrations of pesticides and PCBs were detected frequently in both surficial and subsurface sediment throughout Area A-1. The concentrations of pesticides were comparable across the study area, with the exception of lower levels in the surficial and subsurface samples from the triangular-shaped property between East Broadway and Ferry Boulevard (OU3-A1-SD04) in July 1997. No pesticide concentrations exceeded background levels in two of three surficial samples from the northern reaches of Ferry Creek at the boundary of the study area (SD-17 and SD-18) in September 1992 and from the central portion along the length of the Ferry Creek channel (SLE-CR+300) in August 1993; the third sample collected in the northern region (SD-16) contained a low concentration of a single pesticide. The highest concentrations of pesticides were reported in surficial samples from the western arm of the wetlands adjacent to the Morgan Francis property (RM-SD-MF01) in August 1994, near the bend in the Ferry Creek channel in the northern portion of the study area (RM-SD-MF02) in November 1994, in the southern reaches of the Ferry Creek channel (RM-SD-MF03) in April 1995. The PCBs consisted primarily of Aroclor-1262 and Aroclor-1268, with infrequent detections of Aroclor-1248 and Aroclor-1260. The highest PCB concentrations were detected in surficial samples from the southern portion of the Ferry Creek channel (RM-SD-

MF03) in April 1995 and (OU3-A1-SD03) in July 1997. Lower concentrations were detected along the western arm of the wetlands adjacent to the Morgan Francis property (RM-SD-MF01) in August 1994, November 1994, and (OU3-A1-SD01) July 1997. No samples were collected for pesticide/PCB analysis from depths of over 2.0 feet in the northern reaches of Ferry Creek or the western arm of the wetlands adjacent to the Morgan Francis property.

Surficial Samples. Pesticides were detected above background concentrations in ten of fifteen surficial samples. All except one of the twenty-one target compound list (TCL) pesticides were detected above background concentrations in at least one of the samples; no toxaphene was detected. Concentrations of individual pesticides ranged from 0.48 ug/kg to 180 ug/kg. The higher concentrations of pesticides were detected in samples collected at locations RM-SD-MF01 (first round - August 1994), RM-SD-MF02 (second round - November 1994), and RM-SD-MF03. The highest concentration of single pesticides included 180 ug/kg methoxychlor at location RM-SD-MF01 (first round - August 1994) and 180 ug/kg endrin at location RM-SD-MF03. No pesticides exceeded background concentrations at locations SD-17, SD-18, and SLE-CR+300. No pesticides were reported at concentrations greater than two times background levels at location OU3-A1-SD04; and, only a single pesticide, 4,4'-DDE detected at 2 ug/kg (less than twice the background concentration), was reported at location SD-16.

Elevated concentrations of PCBs were reported in thirteen of fifteen surficial samples. Concentrations of individual PCBs ranged from 119 ug/kg to 11,000 ug/kg. The PCBs detected above background concentrations included: Aroclor-1248 at location SD-18; Aroclor-1260 at locations SD-16, SD-17, and RM-SD-MF02 (third round - April 1995); Aroclor-1262 at locations SD-16 through SD-18, SLE-CR+300, and OU3-A1-SD01 through OU3-A1-SD04; and Aroclor-1268 in all except locations RM-SD-MF01 and OU3-A1-SD01. One of four PCBs was reported at concentrations greater than two times the background levels in all locations. The higher concentrations were detected in samples collected at locations RM-SD-MF03, SLE-CR+300, and OU3-A1-SD03. The PCB screening data for location OU3-A1-SD03 further supported the analytical data. The highest concentration of a single PCB was 11,000 ug/kg Aroclor-1268 at location RM-SD-MF03. No PCBs exceeded background concentrations at location RM-SD-MF01 (all two rounds - August and November 1994).

Subsurface Samples. Elevated concentrations of pesticides were detected in all three subsurface samples collected at depths of up to 4.0 feet. A total of fourteen pesticides were detected above background concentrations. These included: 4,4'-DDD, 4,4'-DDE, aldrin, alpha-BHC, alpha-chlordane, dieldrin, endosulfan I, endosulfan sulfate, endrin, endrin aldehyde, gamma-BHC, gamma-chlordane, heptachlor, and heptachlor epoxide. Concentrations of individual pesticides ranged from 1.1 ug/kg to 93 ug/kg. Ten to eleven pesticides were reported in samples collected at locations OU3-A1-SD02 and OU3-A1-SD03; while, only two pesticides, 4,4'-DDE and endrin aldehyde, were detected above background concentrations at location OU3-A1-SD04. The highest concentration of a single pesticide included 93 ug/kg endrin aldehyde at location OU3-A1-SD03.
PCBs were detected above background concentrations in all three subsurface samples. Concentrations of individual PCBs ranged from 1,300 ug/kg to 30,000 ug/kg. These PCBs included: Aroclor-1262 and Aroclor-1268 at locations OU3-A1-SD02 through OU3-A1-

SD04. The highest concentrations of single PCBs included 21,000 ug/kg Aroclor-1262 and 30,000 ug/kg Aroclor-1268 at location OU3-A1-SD03.

G.1.1.4 Dioxins and Furans

Twelve sediment samples from seven locations were submitted for analysis of dioxins and furans. Elevated concentrations of individual dioxin and furan congeners were detected in all samples. The most toxic dioxin congener (2,3,7,8-TCDD) was detected in only one sample, the surficial sample at location OU3-A1-SD03. The 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8-HxCDF, and 1,2,3,6,7,8-HxCDF congeners were the most frequently detected furans above background concentrations. The 1,2,3,4,6,7,8-HpCDD and OCDD congeners were the most frequently detected dioxins above background concentrations. The sums of the dioxin and furan concentrations, expressed as 2,3,7,8-TCDD Toxicity Equivalency(TEQ) concentrations, ranged from 0.0021 ug/kg to 1.185 ug/kg, based on calculations by the analytical laboratory. The TEQ concentrations were above background concentrations in all except two samples: surficial samples at locations SD-18 and RM-SD-MF01 (first round - August 1994). No TEQ concentration was reported for SD-17. The distribution of dioxins and furans was evaluated by grouping the results into the following concentration ranges: $<$ 0.001 ug/kg (low level), $\geq$ 0.001 but $<$ 0.01 ug/kg (medium level), and $\geq$ 0.01 ug/kg (high level).

Overall, the results indicate that elevated TEQ concentrations were reported frequently in surficial samples throughout the Ferry Creek channel, but infrequently in the northern reaches of Ferry Creek at the boundary of the study area. The higher TEQ concentrations were reported in the south-central extent of Ferry Creek. The one subsurface sample collected at a depth of 2.0 to 4.0 feet in the south-central portion of the study area contained the second highest TEQ concentration. No analysis of dioxins and furans was performed on samples collected from the triangular-shaped property located between East Broadway and Ferry Boulevard, or from depths of over 2.0 feet in the northern reaches of Ferry Creek or the western arm of the wetlands adjacent to the Morgan Francis property.

Surficial and Subsurface Samples. Elevated TEQ concentrations were reported samples collected from the Ferry Creek channel, including: surficial samples at locations RM-SD-MF01 (first round - November 1994), RM-SD-MF02 (all three rounds - August 1994, November 1994, and April 1995), and RM-SD-MF03; and both surficial and subsurface samples at location OU3-A1-SD03. The highest TEQ concentration was reported as 1.185 ug/kg for the surficial sample at location RM-SD-MF03. No other TEQ concentrations exceeded 0.0746 ug/kg. At the northern reaches of Ferry Creek, the TEQ concentration was reported above background in only one of the three surficial samples, 0.0103 ug/kg at location SD-16.

G.1.1.5 Metals

Eighteen sediment samples from eleven locations were submitted for analysis of metals. An additional eight samples from eight locations were screened for lead. Elevated concentrations of metals were detected in all samples. All except one of the twenty-three target analyte list (TAL) metals were detected above background concentrations in at least one sample; no elevated concentrations of sodium were detected. The distribution of

metals was evaluated by grouping the results into the following concentration ranges: ≥ GB classified aquifer mobility criteria in the State of Connecticut (GB) but <2 x GB (low level), ≥2 x GB but <10 x GB (medium level), and ≥10 x GB (high level).

Overall, the results indicate that elevated concentrations of metals were detected frequently at various depths in sediment throughout the study area. Two metals, copper and lead, are considered the most indicative of contamination associated with operations at the Raymark Facility. Elevated concentrations of these metals were detected in over 50 percent of the sediment samples collected in the study area, as follows:

> **Copper** was detected above background concentrations at all locations, except for surficial sediment samples collected along the western arm of the wetlands adjacent to the Morgan Francis property (RM-SD-MF01) in August 1994, November 1994, and (OU3-A1-SD01) in July 1997; two of three surficial samples in the northern reaches of Ferry Creek (SD-17 and SD-18) in September 1992; in the south-central portion of the study area (OU3-A1-SD03) in 1997; and in the triangular-shaped property between East Broadway and Ferry Boulevard (OU3-A1-SD04) in July 1997. Elevated copper concentrations were also detected in the subsurface samples collected at depths of up to 4.0 feet in the south-central portion of the study area (OU3-A1-SD03) and the triangular-shaped property (OU3-A1-SD04) in July 1997. Copper levels more than 20 times the background concentration of 161 mg/kg were detected in surficial samples in the south and south-central portions of the study area (RM-SD-MF03) in April 1995 and (OU3-A1-SD03) July 1997.
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> **Lead** was detected above background concentrations at all locations, except for one of the locations along the western arm of the wetlands adjacent to the Morgan Francis property (RM-SD-MF01) in August 1994. Lead levels more than 10 times the background concentration of 72 mg/kg were detected in samples including two of three surficial samples from the northern reaches of Ferry Creek (SD-16 and SD-18) in September 1992, and surficial samples in the western arm of the wetlands adjacent to the Morgan Francis property RM-SD-MF01 (second round - November 1994) and in the southern and south-central portion of the study area (RM-SD-MF03) in April 1995 and (OU3-A1-SD02 and OU3-A1-SD03) in July 1997; and in the subsurface sample collected at 2.0–4.0 feet in the southern portion of the study area (OU3-A1-SD02) in July 1997.

Surface Samples. Elevated concentrations of metals detected in the fifteen surficial samples included: in 5-25 percent of the samples - antimony, beryllium, mercury, potassium, and selenium; in 25-50 percent of the samples - aluminum, arsenic, chromium, cobalt, iron, magnesium, silver, and vanadium; and in greater than 50 percent of the samples - barium, cadmium, calcium, copper, manganese, nickel, and zinc. Lead was detected above background concentrations in the metals screening data from all eight surficial samples tested.

Six metals were detected at concentrations approximately one to two orders of magnitude greater than the background levels in the surficial samples: barium at locations SD-16, RM-SD-MF03, and OU3-A1-SD03; cadmium at locations RM-SD-MF01 (second round - November 1994), RM-SD-MF02 (second and third rounds - November 1994 and April

1995), and OU3-A1-SD02; chromium at location RM-SD-MF03; copper at location RM-SD-MF03; lead at locations SD-16, SD-18, RM-SD-MF01 (second round - November 1994), RM-SD-MF03, and OU3-A2-SD02; and silver at location RM-SD-MF02 (third round - April 1995).

Lead screening data collected from the Ferry Creek channel indicated all eight surficial samples contained elevated concentrations of lead. Samples collected from locations SLE-CR+100, +200, +460, and +500 contained lead concentrations approximately one to two orders of magnitude above background concentrations.

Subsurface Samples. Elevated concentrations of metals detected in the three subsurface samples included: in 5-25 percent of the samples - none; in 25-50 percent of the samples - beryllium, mercury and silver; and in greater than 50 percent of the samples - aluminum, antimony, arsenic, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, thallium, vanadium, and zinc. Of these metals in greater than 50 percent of the samples, all except aluminum and arsenic were detected at concentrations above background levels in all three subsurface samples.

Six metals were detected at concentrations approximately one to two orders of magnitude greater than the background levels in the subsurface samples: barium at locations OU3-A1-SD02 and OU3-A1-SD03; cadmium at location OU3-A1-SD02; copper at location OU3-A1-SD03; lead at locations OU3-A1-SD02 and OU3-A1-SD03; nickel at location OU3-A1-SD02; and zinc at location OU3-A1-SD02.

In the triangular-shaped property between East Broadway and Ferry Boulevard at location OU3-A1-SD04, elevated concentrations of metals included: in both surficial and subsurface samples at location OU3-A1-SD04 - arsenic, barium, calcium, iron, lead, nickel, vanadium, and zinc; and in the subsurface sample alone, aluminum, antimony, beryllium, chromium, cobalt, copper, magnesium, manganese, and thallium. Four metals, detected at concentration approximately one to two orders of magnitude greater than the background levels, included: arsenic, barium, cadmium, and lead in the subsurface sample only.

G.1.1.6 Asbestos

Sixteen samples from thirteen locations were submitted for analysis of asbestos using optical microscopy, according to EPA Region I standard operating procedures. The distribution of asbestos was evaluated by grouping the results into the following ranges of optically observable asbestos: <1 percent, ≥1 but <5 percent (low level), ≥5 but <10 percent (medium level), and ≥10 percent (high level).

Overall, the results indicate that asbestos concentrations ≥1 percent were detected frequently in both surficial and subsurface sediment throughout the Ferry Creek channel. The higher concentrations were detected in the surficial samples along the central portion of the Ferry Creek channel (SLE-CR+100, +200, +460, and +500) in August 1993, and from subsurface sediment samples collected at depths of up to 4.0 feet from the triangular-shaped property between East Broadway and Ferry Boulevard (OU3-A1-SD04) in July 1997. No asbestos analysis was performed on samples collected from the northern reaches of Ferry Creek at the boundary of the study area or near the bend in Ferry Creek channel in

the northern portion of the study area, or at depths over 2.0 feet from the western arm of the wetlands adjacent to the Morgan Francis Property.

Surficial and Subsurface Samples. Asbestos was detected at concentrations ranging from 1 to 70 percent in fourteen of sixteen samples. Low levels were detected in the surficial samples at locations SLE-CR+400 and +600, and OU3-A1-SD01 through OU3-A1-SD04. Medium levels were detected in the surficial sample at location SLE-CR+640, and the subsurface samples at locations OU3-A1-SD02 and OU3-A1-SD03. High levels were reported for surficial samples collected at locations SLE-CR+100, +200, +460, +500; and the subsurface sample at location OU3-A1-SD04. The highest concentrations were detected at locations SLE-CR+100 and +460, at 70 percent and 60 percent, respectively. No asbestos was detected in surficial samples collected at locations SCT A+138 and SLE-CR+300.

G.1.1.7 Other

In July 1997, eighteen samples from six locations were submitted for analysis of TOC. The distribution of TOC was evaluated by grouping the results into the following concentration ranges: ≤1,000 mg/kg (low level), >1,000 but ≤10,000 mg/kg (medium level), >10,000 mg/kg (high level).

Overall, the results indicate that TOC concentrations varied greatly with depth and location throughout the Ferry Creek channel. The higher concentrations were detected in the samples collected from depths of up to 8.0 feet at location OU3-A1-SD02, up to 4.0 feet at location OU3-A1-SD03, and up to 15.0 feet at location OU3-A1-SD06, each within the central extent of the length of Ferry Creek channel; and from depths of up to 4.0 feet at location OU3-A1-SD04 in the central portion of the triangular-shaped property located between East Broadway and Ferry Boulevard. The lower concentrations were detected in samples collected at depths of 8.0-20.0 feet at location OU3-A1-SD01 in the western arm of the wetlands adjacent to the Morgan Francis property, and from subsurface samples from the northern end of the Ferry Creek channel.

TOC was detected at concentrations ranging from 320 mg/kg to 84,600 mg/kg. Low levels were detected in the 8.0-12.0 foot and 16.0-20.0 foot sample at location OU3-A1-SD01, the 14.0-18.0 foot sample at location OU3-A1-SD02, the 10.0-20.0 foot sample at location OU3-A1-SD03, the 12.0-16.0 foot sample at location OU3-A1-SD05, and the 15.0-19.0 foot sample at location OU3-A1-SD06. Medium levels were detected in the 0.0-2.0 foot sample at location OU3-A1-SD01, 0.0-10.0 foot sample at location OU3-A1-SD03, and the 8.0-12.0 foot sample at location OU3-A1-SD05. High levels were reported for samples collected from 0.0-2.0 feet, 2.0-4.0 feet, and 2.0-8.0 feet at location OU3-A1-SD02; 0.0-2.0 feet and 2.0-4.0 feet at locations OU3-A1-SD03 and OU3-A1-SD04; and 8.0-12.0 feet and 12.0-15.0 feet at location OU3-A1-SD06. The highest concentrations were detected in the 0.0-2.0 foot sample at location OU3-A1-SD02 and the 2.0-4.0 foot sample at location OU3-A1-SD04, at 71,700 mg/kg and 84,600 mg/kg, respectively.

G.1.2 Area A-1: Evaluation of Surface Water Results

B&RE conducted three seasonal rounds of surface water sampling in the Ferry Creek channel from August 1994 through April 1995. Six surface water samples from three locations were obtained from depths of 0.0-0.5 feet. Samples were not obtained from all locations during each round. All samples were submitted for analysis of VOCs, SVOCs, pesticides/PCBs, and metals. An evaluation of the analytical data associated with these surface water samples is presented below. Sample results were compared to background concentrations for all analytes.

G.1.2.1 VOCs

Six surface water samples from three locations were submitted for analysis of VOCs. Elevated concentrations of VOCs were detected in each sample. These VOCs included: carbon disulfide in one sample; 1,1-dichloroethene (1,1-DCE) in three samples; vinyl chloride in four samples; 1,1,1-TCA and trichloroethene (TCE) in five samples; and 1,1-DCA and 1,2-DCE in all samples.

Elevated concentrations of VOCs ranged from 6 ug/kg to 170 ug/kg. The higher levels included: 57 ug/l 1,2-DCE at location RM-SW-MF01 (first round - August 1994); 95 ug/l 1,1-DCE, 110 ug/l 1,2-DCE, and 170 ug/l 1,1,1-TCA at location RM-SW-MF01-01 (second round - November 1994); and 75 ug/l 1,2-DCE and 120 ug/l 1,1,1-TCA at location RM-SW-MF02 (second round - November 1994). No other VOCs exceeded 45 ug/l; therefore, no other VOC concentrations were more than one order of magnitude above background levels.

Overall, the results indicate that elevated concentrations of select VOCs were detected frequently in surface water throughout Area A-1. The higher concentrations were detected in the western arm of the wetlands adjacent to the Morgan Francis property (RM-SW-MF01) in August and November 1994; and in the northern portion of Ferry Creek channel (RM-SW-MF02) in November 1994. Lower values were reported in all locations along the length of Ferry Creek channel in April 1995.

G.1.2.2 SVOCs

Six surface water samples from three locations were submitted for analysis of SVOCs. Low levels of bis(2-ethylhexyl)phthalate, di-n-octylphthalate, diethylphthalate, and dimethylphthalate were detected in several of the samples. However, SVOCs were not detected above background concentrations. The reported detection limits were typically two times the background concentrations, with the exception of an elevated detection limit for di-n-butylphthalate in one of the samples.

Overall, the results indicate that SVOCs were detected infrequently in surface water throughout Area A-1. Phthalates were detected at low concentrations; and, no PAHs were detected.

G.1.2.3 Pesticides/PCBs

Six surface water samples from three locations were submitted for analysis of pesticides/PCBs. Low levels of pesticides included aldrin, alpha-BHC, dieldrin, 4,4'-DDT, delta-BHC, and heptachlor were detected in several of the samples. However, no pesticides were detected above background concentrations. No PCBs were detected. The reported detection limits were typically two times the background concentrations.

Overall, the results indicate that pesticides/PCBs were detected infrequently in surface water throughout Area A-1. Pesticides were detected at low concentrations; and, no PCBs were detected.

G.1.2.4 Metals

Six surface water samples from three locations were submitted for analysis of metals. Elevated concentrations of metals were detected in each sample. These metals included: antimony in one sample; arsenic in two samples; iron in three samples; and barium, manganese, and zinc in all samples. Elevated concentrations of metals ranged from 17.9 ug/l to 1600 ug/l. Four metals were detected at concentrations greater than two times the background concentrations: antimony at location RM-SW-MF03; barium at locations RM-SW-MF01 (first round - August 1994), RM-SW-MF02 (first round - August 1994), and RM-SW-MF03; manganese at all locations; and zinc at locations RM-SW-MF01 (second round - November 1994), RM-SW-MF02 (all three rounds - August 1994, November 1994, and April 1995). Two metals were detected at concentrations approximately one to two orders of magnitude greater than the background levels: antimony at location RM-SW-MF03 and manganese at location RM-SW-MF01 (second round - November 1994).

Overall, the results indicate that elevated concentrations of select metals were detected frequently in surface water throughout Area A-1. Concentrations of barium, iron, and zinc were comparable in the samples collected. Antimony concentrations were higher in the sample collected from the southern portion of Ferry Creek channel (RM-SW-MF03) in April 1995. Arsenic concentrations were slightly higher in the samples collected in the northern portion of Ferry Creek channel (RM-SW-MF02) and the western arm of the wetlands adjacent to the Morgan Francis property (RM-SW-SD01) in August 1994; while manganese concentrations were slightly higher at these same locations in November 1994.

G.1.3 Area A-1: Evaluation of Soil Results

Five hundred ninety-two soil samples were collected from one hundred eighty-one locations during various field investigations conducted by Weston/TAT, Weston ARCS, and B&RE from April 1993 through August 1997. The samples were collected from various locations adjacent to the upper portion of Ferry Creek (from south of the Connecticut Turnpike to East Broadway) at depths of up to 115 feet and from the triangular-shaped property located between East Broadway and Ferry Creek at depths of up to 16.0 feet.

From April through August 1993, Weston/TAT collected samples at depths of 0.0-0.5 feet from numerous locations throughout the southern portion and along the perimeter of the commercial properties in the northern portion of the study area. In April, samples collected from four locations were submitted for analysis of SVOCs, pesticides/PCBs, dioxins and

furans, and metals. In June, samples from eighty-eight locations were collected, screened for lead, and submitted for analysis of asbestos. Samples from six additional locations were submitted for analysis of pesticides/PCBs; samples from four of these locations were also submitted for analysis of metals. In August, samples were collected from thirty locations, screened for lead, and submitted for analysis of asbestos. Samples from four of these locations were also submitted for analysis of pesticides/PCBs and metals.

In October 1993, Weston/TAT and Weston/ARCS collected samples from the surface and at depths of up to 14.8 feet along the southern and southwestern perimeter of the study area. Under the Weston/TAT contract, thirty-three (fourteen surficial and nineteen subsurface) samples were collected from five locations, screened for lead, and submitted for analysis of asbestos. Three (one surficial and two subsurface) samples from one of these locations were also submitted for analysis of VOCs, SVOCs, pesticides/PCBs, dioxins and furans, and metals. Under the Weston/ARCS contract, eighty-two (thirty-one surficial and fifty-one subsurface) samples from fourteen locations were screened for lead and submitted for analysis of asbestos. Nine (three surficial and six subsurface) samples from five of these locations were also submitted for analysis of VOCs, SVOCs, pesticides/PCBs, dioxins and furans, and metals. At another one of the fourteen locations, one sample from a depth of 1.5-2.4 feet was submitted for analysis of VOCs, SVOCs, pesticides/PCBs, and metals, while one sample from a depth of 3.3-3.5 feet was submitted for analysis of dioxins and furans only.

In March and April 1994, B&RE collected samples at depths of up to 115.0 feet during the installation of six monitoring wells (two single wells and two 2-well clusters), 22.0 feet during the advancement of eight soil borings, and 6.0 feet during excavation of four test pits throughout the southern portion of the study area. Surface samples were collected at depths of 0.0-2.0 feet from seven locations (three monitoring wells and four soil boring locations). All samples were screened for copper and lead, and submitted for analysis of asbestos. Twenty-five subsurface samples were obtained from fourteen locations (four monitoring wells, eight soil borings, and two test pit locations) and submitted for analysis of VOCs, SVOCs, pesticides/PCBs, dioxins and furans, metals, and asbestos; one additional sample from one of these locations was analyzed for each of these parameters, except for asbestos. Additional subsurface samples were collected, screened for copper and lead, and submitted for analysis of asbestos, including: one hundred twenty-five samples from four monitoring well locations, sixty-six samples from eight soil boring locations, and four samples from two test pit locations. Of these samples, sixteen samples from three monitoring well locations and twenty-eight samples from six soil boring locations were also screened for PCBs. Furthermore, a few subsurface samples were collected at soil boring locations for limited screening or analysis, including: three samples from three soil boring locations for analysis of asbestos, one sample from one soil boring location for analysis of metals and asbestos, and one sample from one soil boring location for copper and lead screening.

In July and August 1997, B&RE collected samples at sixteen additional locations (ten soil boring locations and six surface soil locations) within Area A-1 in order to fill in existing data gaps and provide data necessary to assess the vertical extent and volume of contaminated soil. Soil boring samples were collected at depths of 0.0-16.0 feet, and surface soil samples were collected from 0.0-2.0 feet and 2.0-4.0 feet. Surficial samples were collected at depths of 0.0-2.0 feet at four soil boring locations and submitted for

analysis of SVOCs, pesticides/PCBs, metals, asbestos, and Synthetic Precipitation Leaching Procedure (SPLP) metals. One of these samples was also submitted for analysis of dioxins and furans. Surficial samples at the remaining six soil boring locations were screened for copper and lead and submitted for analysis of asbestos. Sixteen subsurface samples from the ten soil boring locations were submitted for analysis of SVOCs, pesticides/PCBs, metals, and asbestos. One sample from each of two of these locations was also submitted for analysis of dioxins and furans, while one sample from each of six of these locations were also submitted for analysis of SPLP metals. An additional fifty samples from the ten soil boring locations were screened for copper and lead and submitted for analysis of asbestos. Ten (six surficial and four subsurface) samples from six surface soil locations were submitted for analysis of SVOCs, pesticides/PCBs, metals, and asbestos. Five (three surficial and two subsurface) samples from three of these locations were also submitted for analysis of SPLP metals, and one surficial sample from one of these locations was submitted for analysis of dioxins and furans.

An evaluation of the analytical data associated with these soil samples is presented below. For the purpose of this discussion, soil samples collected from depths of up to 2.0 feet are referred to as surficial samples. Samples obtained below 2.0 feet are considered subsurface samples. Sample results were compared to background concentrations for pesticides/PCBs and metals analytes; all other sample results were evaluated in relation to their detected concentrations.

G.1.3.1 VOCs

Forty-six soil samples from twenty-three locations were submitted for analysis of VOCs. VOCs were detected in twenty-one, or 46 percent, of the samples. The VOCs were primarily comprised of three major groups: aromatic hydrocarbons, chlorinated hydrocarbons, and ketones. The distribution of VOCs was evaluated by grouping the results into the following concentration ranges: <10 ug/kg (low level), ≥10 but <100 ug/kg (medium level), and ≥100 ug/kg (high level).

A total of fifteen VOCs were detected, including: four aromatic hydrocarbons (benzene, ethylbenzene, toluene, and xylenes (total)), eight chlorinated hydrocarbons (chlorobenzene, 1,1-DCA, 1,2-DCE, 1,1,2,2-tetrachloroethane, tetrachloroethene (PCE), 1,1,1-TCA, TCE, and vinyl chloride), two ketones (acetone and 2-butanone), and carbon disulfide.

Overall, the results indicate that elevated concentrations of VOCs were detected infrequently in soil throughout Area A-1. The higher concentrations were detected in selected subsurface soils within the study area, including: along the southwestern border (BP68AC-S535,E172), in the southeastern (MF-SO-SB7) and south-central regions (MF-SO-MW103 and OU3-A1-SB03), and in the northern extent (OU3-A1-SB07) of the study area. No VOCs were detected in samples collected at depths of over 16.0 feet, with the exception of 15 ug/kg 1,2-DCE in the 46.0-48.0 foot sample from the central portion (MF-SO-MW104D). No samples were collected for VOC analysis from the triangular-shaped property between East Broadway and Ferry Boulevard.

Surface Soil Samples

One surficial soil sample was collected from each of seven locations along the southern and southwestern borders and one location in the central region of the study area west of East Broadway. VOCs were detected in three, or 43 percent, of these samples collected along the southwestern border (BP68AC-S535,E172, BP70AC-S528,E172, and BP78AS-S453,E162). Individual VOCs were detected at low concentrations, ranging from 1 ug/kg to 130 ug/kg. Low levels of VOCs included: PCE at location BP68AC-S535,E172, and ethylbenzene and toluene at location BP70AC-S528,E172. The only concentration reported ≥10 ug/kg was 42 ug/kg acetone at location BP78AC-S453,E162.

Subsurface Soil Samples

A total of 39 subsurface soil samples were collected at depths of up to 16.0 feet from twenty locations, and at depths of up to 100.0 feet at three additional locations, throughout the study area west of East Broadway. VOCs were detected in 14, or 36 percent, of the subsurface samples from thirteen locations. The majority of individual VOCs ranged in concentrations from 2 ug/kg to 85 ug/kg, with the exception of higher levels in six samples from five locations.

Low levels of individual VOCs were detected at depths ranging up to: 2.4 to 5.0 feet at three locations along the southwestern border (BP70AC-S485,E160, BP78AC-S453,E162, and BP-96AC-S342,E166), 6.0 feet at one location in the west-southwest region (MP-SO-TP2), and 10.0 feet at one location in the northern region (OU3-A1-SB07).

Low to medium levels of individual VOCs were detected at depths ranging up to: 5.5 feet at one location along the southwestern border (BP68AC-S535,E172), 6.0 to 14.0 feet at three locations in the southwest region (MF-SO-MW102, MF-SO-SB3, and MF-SO-SB4), 10.0 feet at one location in the northern region (OU3-A1-SB06), and 48.0 feet at one location in the central region (MF-SO-MW104D) of the study area.

Low to high levels of individual VOCs were detected at depths ranging up to: 2.4 feet at one location along the southwestern border (BP68AC-S535,E172), 8.0 to 16.0 feet at two locations in the south-central region (MF-SO-MW103 and OU3-A1-SB03), 16.0 feet at one location in the east-southeast region (MF-SO-SB7), and 8.0 feet at one location in the northern region (OU3-A1-SB07) of the study area.

The samples containing the higher concentrations included: 130 ug/kg acetone in the 1.8-2.4 foot sample from location BP68AC-S535,E172 along the southwestern border; 150 ug/kg 1,1-DCA and 120 ug/kg TCE in the 8.0-10.0 foot sample, and 690 ug/kg acetone and 130 ug/kg carbon disulfide in the 14.0-16.0 foot sample, at location MF-SO-MW103 in the south-central region; 810 ug/kg acetone and 250 ug/kg 2-butanone in the 14.0-16.0 foot sample at location MF-SO-SB07 in the east-southeast region; 250 ug/kg toluene and 100 ug/kg xylenes (total) in the 6.0-8.0 foot sample at location OU3-A1-SB03 in the south-central region; and 270 ug/kg acetone in the 6.0-8.0 foot sample at location OU3-A1-SB07 in the northern region of the study area. Elevated concentrations of VOCs may also have been present in the 6.0-8.0 foot sample at location OU3-A1-SB04, and elevated concentrations of additional VOCs may have been present in the 14.0-16.0 foot sample at location MF-SO-MW103, in the east-central and south-central regions of the study area, respectively. However, the presence of VOCs could not be confirmed in these samples due to elevated detection limits associated with high sample dilution required prior to analysis.

G.1.3.2 SVOCs

Seventy-three soil samples from forty locations were submitted for analysis of SVOCs. SVOCs were detected in forty-nine, or 67 percent, of the samples. The SVOCs were primarily comprised of three majors groups: PAHs, phthalates, and phenols. The distribution of SVOCs was evaluated by grouping the results into the following concentration ranges: <1,000 ug/kg (low level), ≥1,000 but <10,000 ug/kg (medium level), and ≥10,000 ug/kg (high level).

A total of thirty-three SVOCs were detected, including: eighteen PAHs (acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene), six phthalates (bis(2-ethylhexyl)phthalate, butylbenzylphthalate, di-n-butylphthalate, di-n-octylphthalate, diethylphthalate, and dimethylphthalate), six phenols (2,4-dimethylphenol, 2-methylphenol, 4-methylphenol, 4-nitrophenol, pentachlorophenol, and phenol), and three other SVOCs (carbazole, 3,3'-dichlorobenzidine, and n-nitroso-diphenylamine).

Overall, the results indicate that elevated concentrations of SVOCs, primarily PAHs and phthalates, were detected frequently in both surficial and subsurface soil throughout Area A-1. The higher levels of PAHs were detected in surficial samples collected in the southeastern region (OU3-A1-SS02) of the study area and the central portion (OU3-A1-SB01) of the triangular-shaped property between East Broadway and Ferry Boulevard; and in subsurface samples from the south-central (MF-SO-TP3), east-central (OU3-A1-SB03), and the northern regions (OU3-A1-SB06) of the study area. The highest concentrations (medium levels) of phthalates were detected in surficial samples collected from the east-central (OU3-A1-SB11) and southwestern (OU3-A1-SS01) regions; and in subsurface samples in the southwestern (MF-SO-MW102 and OU3-A1-SS01), south-central (MF-SO-MW103), and east-central (OU3-A1-SB03) regions of the study area. No PAHs or phthalates were detected in samples from depths of over 16.0 feet, with the exception of low concentrations of phthalates at depths of up to 62.0 feet in the central region (MF-SO-MW104D).

Surface Soil Samples

One surficial soil sample was collected from each of 21 locations throughout the study area.

PAHs. PAHs were detected in 20 of the 21 samples. Individual PAHs were detected at low and medium levels, ranging from 23 ug/kg to 8,300 ug/kg, with the exception of higher levels in two locations.

Low levels were detected at nine locations, including: three locations along the southwestern border (BP68AC-S535,E172, BP70AC-S528,E172, and BP78AC-S453,E162); and one location in the southwestern (OU3-A1-SS01), three locations in the central and east-central (MF-SO-MW104D, MFP-1, and OU3-A1-SB11), and two locations in the east-northeast region (OU3-A1-SB10 and OU3-A1-SS06).

Low to medium levels were detected in eight locations, including: one location along the southern border (EB640AC-N124,E156), and two locations in the southern (MFP-6 and OU3-A1-SS03); three locations in the central (MFP-2, MFP-5, and OU3-A1-SS04), and one location in the northwestern region (OU3-A1-SS05) of the study area; and one location in the northern portion of the triangular-shaped property between East Broadway and Ferry Boulevard (OU3-A1-SB02).

Low to high levels were detected in two locations, including: one location in the southeastern region (OU3-A1-SS02) of the study area, and one location in the central portion (OU3-A1-SB01) of the triangular-shaped property between East Broadway and Ferry Boulevard.

The samples containing the higher concentrations included: 11,000 ug/kg fluoranthene and 10,000 ug/kg pyrene at location OU3-A1-SS02 in the southeastern region of the study area; and 17,000 ug/kg fluoranthene, 12,000 ug/kg phenanthrene, and 14,000 ug/kg pyrene at location OU3-A1-SB01 in the central portion of the triangular-shaped property between East Broadway and Ferry Boulevard.

Phthalates. Phthalates were detected in twelve, or 57 percent, of the 21 samples. Individual phthalates were detected at low levels, ranging from 27 ug/kg to 750 ug/kg, with the exception of medium levels in two locations. The sample locations containing medium levels included: 1,500 ug/kg bis(2-ethylhexyl)phthalate at location OU3-A1-SB11 in the east-central region, and 1,100 ug/kg bis(2-ethylhexyl)phthalate at location OU3-A1-SS01 in the southwestern region of the study area.

Other SVOCs. Other SVOCs, including carbazole, n-nitroso-diphenylamine, and/or phenols, were detected in seventeen, or 81 percent, of the 21 samples. Low levels of carbazole, ranging from 26 ug/kg to 670 ug/kg, were detected in samples from fifteen locations throughout the study area. Low levels of n-nitroso-diphenylamine were detected at two locations: 47 ug/kg at location MFP-1 and 48 ug/kg at location OU3-A1-SB11, in the central region located west of the southern reaches of the Ferry Creek channel. Individual phenols were detected at low levels, ranging from 80 ug/kg to 850 ug/kg, in samples from nine locations throughout the study area. Medium levels were detected at five locations throughout the southern and central regions of the study area, including: 2,200 ug/kg at location MFP-2, 1,900 ug/kg at location MFP-5, 6,100 ug/kg at location MFP-6, 1,600 ug/kg at location OU3-A1-SB11, and 1,100 ug/kg at location OU3-A1-SS01.

Subsurface Soil Samples

A total of 52 subsurface soil samples were collected from depths of up to 16.0 feet from twenty-nine locations, and at depths of up to 100.0 feet at three additional locations, throughout the study area.

PAHs. PAHs were detected in 37, or 71 percent, of the samples from thirty-one locations throughout the study area. Individual PAHs were detected at low and medium levels, ranging from 21 ug/kg to 33,000 ug/kg.

Low levels of individual PAHs were detected at depths ranging up to: 2.4 to 6.3 feet at four locations along the southern and southwestern borders (BP68AC-S535,E172, BP70AC-S485,E160, BP96AC-S352,E166, and EB640AC-N124,E166); and 4.0 to 16.0 feet at six locations in the southwestern (MF-SO-MW102, MF-SO-SB2, MF-SO-SB3, MF-SO-SB4, MF-SO-TP2, OU3-A1-SS01), 12.0 to 16.0 feet at two locations in the east-central (OU3-A1-SB03 and OU3-A1-SB11), 8.0 feet at one location in the eastern (OU3-A1-SB04), 4.0 to 10.0 feet at three locations in the northeastern (OU3-A1-SB05, OU3-A1-SB09, and OU3-A1-SS06), and 10.0 feet at one location in the northern (OU3-A1-SB07) regions of the study area.

Low to medium levels of individual PAHs were detected at depths ranging up to: 2.4 feet at one location along the southern border (EB640AC-S352,E166); 4.0 to 16.0 feet at three locations in the southeastern (MF-SO-MW101D, MF-SO-SB7, and OU3-A1-SS02), 4.0 to 10.0 feet at two locations in the south-central (MF-SO-MW103 and MF-SO-SB6), 8.0 feet at one location in the west-central (MF-SO-SB8), 6.0 feet at one location in the eastern (OU3-A1-SB04), 4.0 to 8.0 feet at two locations in the northern (OU3-A1-SB06 and OU3-A1-SB07), 10.0 feet at one location in the northeastern (OU3-A1-SB10), and 4.0 feet at one location in the northwestern (OU3-A1-SS05) regions of the study area; and 12.0 feet at one location in the central (OU3-A1-SB01) and 10.0 feet at one location in the northern (OU3-A1-SB03) portion of the triangular-shaped property between East Broadway and Ferry Boulevard.

The sample locations containing the higher concentrations included: 10,000 ug/kg benzo(a)anthracene, 13,000 ug/kg benzo(b)fluoranthene, 17,000 ug/kg fluoranthene, 15,000 ug/kg phenanthrene, and 21,000 ug/kg pyrene in the 4.0-5.0 foot sample at location MF-SO-TP3 in the south-central region; 11,000 ug/kg chrysene in the 6.0-8.0 foot sample at location OU3-A1-SB03 in the east-central region; 14,000 ug/kg benzo(a)anthracene, 13,000 ug/kg benzo(a)pyrene, 10,000 ug/kg benzo(b)fluoranthene, 10,000 ug/kg benzo(k)fluoranthene, 14,000 ug/kg chrysene, 33,000 ug/kg fluoranthene, 24,000 ug/kg phenanthrene, and 31,000 ug/kg pyrene in the 8.0-10.0 foot sample at location OU3-A1-SB06 in the northern region of the study area.

Phthalates. Phthalates were detected in twenty-one, or 40 percent, of the 52 samples. Individual phthalates were detected at low levels, ranging from 20 ug/kg to 750 ug/kg, with the exception of medium levels in four locations. The sample locations containing medium levels included: 3,900 ug/kg bis(2-ethylhexyl)phthalate in the 4.0-6.0 foot sample at location MF-SO-MW102 in the southwestern region; 1,100 ug/kg bis(2-ethylhexyl)phthalate in the 8.0-10.0 foot sample at location MF-SO-MW103 in the south-central region; 1,200 ug/kg di-n-butylphthalate in the 6.0-8.0 foot sample at location OU3-A1-SB03 in the east-central region; and 1,400 ug/kg bis(2-ethylhexyl)phthalate in the 2.0-4.0 foot sample at location OU3-A1-SS01 in the southwestern region of the study area.

Other SVOCs. Other SVOCs, including carbazole, n-nitroso-diphenylamine, and/or phenols were detected in twenty-four, or 46 percent, of the 52 samples.

Low levels of carbazole, ranging from 36 ug/kg to 970 ug/kg, were detected in fourteen samples from thirteen locations throughout the study area. A medium level was detected in

one sample, 3,100 ug/kg in the 4.0-5.0 foot sample at location MF-SO-TP3 in the south-central region of the study area.

N-nitroso-diphenylamine was detected in two samples, 190 ug/kg in the 14.0-16.0 foot sample at location MF-SO-SB7 in the east-southeast region and 1,300 ug/kg in the 6.0-8.0 foot samples at location OU3-A1-SB03 in the east-central region of the study area.

Individual phenols were detected at low levels, ranging from 36 ug/kg to 850 ug/kg, in sixteen samples from thirteen locations throughout the study area. Medium levels were detected in one sample at each of nine locations throughout the study area, including: 1,100 ug/kg 4-methylphenol and 2,800 ug/kg phenol in the 4.0-6.0 foot sample at location MF-SO-MW102 in the southwestern region; 2,200 ug/kg 2,4-dimethylphenol, 4,800 ug/kg 4-methylphenol, and 3,800 ug/kg phenol in the 8.0-10.0 foot sample at location MF-SO-MW103 and 1,700 ug/kg phenol in the 2.0-4.0 foot sample at location MF-SO-SB6 in the south-central region; 1,200 ug/kg 4-methylphenol and 1,800 ug/kg phenol in the 14.0-16.0 foot sample at location MF-SO-SB7 in the east-southeast region; 3,800 ug/kg phenol in the 4.0-5.0 foot sample at location MF-SO-TP3 and 7,100 ug/kg in the 2.0-4.0 foot sample at location OU3-A1-SS05 in the southwestern region; 3,800 ug/kg 2,4-dimethylphenol in the 6.0-8.0 foot sample at location OU3-A1-SB03 in the east-central region; and 9,800 ug/kg in the 6.0-8.0 foot sample at location OU3-A1-SB07 in the northern region.

G.1.3.3 Pesticides/PCBs

Eighty-three soil samples from fifty locations were submitted for analysis of pesticides/PCBs. Forty-two samples from nine additional locations were screened for PCBs. Pesticides were detected above background concentrations in thirty-six, or 43 percent, of the samples. PCBs were detected above background concentrations in forty-six, or 55 percent, of the samples. The distribution of pesticides/PCBs was evaluated by grouping the results into the following concentration ranges: ≥ background concentrations (BG) but <2 x BG (low level), ≥2 x BG but <10 x BG (medium level), and ≥10 x BG (high level).

A total of twenty-three pesticides/PCBs were detected, including: eighteen pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, aldrin, alpha-chlordane, beta-BHC, delta-BHC, dieldrin, endosulfan I, endosulfan II, endosulfan sulfate, endrin, endrin aldehyde, endrin ketone, gamma-chlordane, heptachlor, heptachlor epoxide, and methoxychlor); and five PCBs (Aroclor-1248, Aroclor-1254, Aroclor-1260, Aroclor-1262, and Aroclor-1268).

Overall, the results indicate that elevated concentrations of select pesticides and PCBs were detected frequently in both surficial and subsurface soil throughout Area-A1. Approximately half of the samples contained a single pesticide and/or a single PCB. The higher levels of pesticides were detected in surficial samples collected along the southwestern (BP70AC-S528,E172) and eastern (SLE-G2) borders, and in the central region (MFP-5, PP-DDE+100, and PP-EF+100) of the study area; and in subsurface samples in the southeastern (MF-SO-SB7) and west-central (MF-SO-SB8) regions of the study area. The higher levels of PCBs were detected in surficial samples collected along the southern border (EB640AC-N124,E156); in the southern (MFP-6), central (MFP-1, MFP-2, MFP-5, PP-DDE+100, and PP-EF+100), east-central (OU3-A1-SB11), and northeastern (SLE-G7) regions of the study area; and in the northern portion (OU3-A1-SB02) of the triangular-shaped property between East Broadway and Ferry Boulevard; and in subsurface samples

collected along the southern border (EB640AC-N124,E166); and in the southeastern (MF-SO-MW101D and MF-SO-SB7), southwestern (MF-SO-MW102, MF-SO-SB2, and MF-SO-SB6), west-central (MF-SO-SB8), east-central (OU3-A1-SB03), northern (OU3-A1-SB05, OU3-A1-SB06, and OU3-A1-SB07), and northwestern (OU3-A1-SS05) regions of the study area. No pesticides or PCBs were detected in samples from depths of over 16.0 feet.

Surface Soil Samples

One surficial soil sample was collected from each of 31 locations throughout the study area.

Pesticides. One to five pesticides were detected above background concentrations in 21, 68 percent, of the 31 samples. However, approximately 50 percent of these samples contained only a single pesticide. Concentrations of individual pesticides ranged from 2.8 ug/kg to 230 ug/kg.

Low levels were detected at seven locations, including: one location along the southwestern border (BP68AC-S535,E172); at one location in each of the southwestern (MF-A+400), southeastern (MF-C+100), southern (MFP-6), and northeastern (OU3-A1-SS05) regions of the study area; and at one location in each of the central (OU3-A1-SB01) and northern (OU3-A1-SB02) portions of the triangular-shaped property between East Broadway and Ferry Boulevard.

Low to medium levels were detected at eight locations, including: one location along the southern border (EB640AC-N124,E156); one location in each of the southwestern (OU3-A1-SS01), southern (OU3-A1-SS03), east-central (OU3-A1-SB10), and northeastern (SLE-G7) regions; and three locations in the central region (MFP-1, MFP-2, and OU3-A1-SS04), of the study area.

Low to high levels were detected at five locations, including: one location along each of the southwestern (BP70AC-S528,E172) and eastern (SLE-G2) border, and three locations in the central region (MFP-5, PP-DDE+100, and PP-EF+100) of the study area.

The samples containing the higher concentrations included: 71 ug/kg alpha-chlordane at location BP70AC-S528,E172 along the southwestern border; 130 ug/kg gamma-chlordane at location MFP-5, 200 ug/kg endrin ketone at location PP-DDE+100, and 62 ug/kg alpha-chlordane and 66 ug/kg endosulfan I at location PP-EF+100 in the central region; and 230 ug/kg alpha-chlordane, 74 ug/kg gamma-chlordane, and 42 ug/kg heptachlor epoxide at location SLE-G2 along the eastern border of the study area. The highest concentration of a single pesticides was 230 ug/kg alpha-chlordane at location SLE-G2.

PCBs. One to three PCBs were detected above background concentrations in 24 or 77 percent, of the 31 samples. However, approximately 25 percent of these samples contained only a single PCB. Concentrations of individual PCBs ranged from 53 ug/kg to 270,000 ug/kg. Low to high levels of Aroclor-1262 and Aroclor-1268 were detected throughout the study. Aroclor-1248 was detected at a medium level of 190 ug/kg at location OU3-A1-SS01 in the southwestern region of the study area. No other PCBs were detected.

Low levels of Aroclor-1262 and/or Aroclor-1268 were detected at four locations, including: one location along the southwestern border (BP68AC-S535,E172); and one location in each of the southwestern (MF-AZ+300), northwestern (OU3-A1-SS05), and northeastern (OU3-A1-SS06) regions of the study area.

Low to medium levels of Aroclor-1262 and/or Aroclor-1268 were detected at eight locations, including: two locations along the southwestern border (BP70AC-S528,E172 and BP78AC-S453,E162); and two locations in the southwestern (MF-A+400 and OU3-A1-SS01) and three locations in the northwestern (MF-G+200, MF-G1, and MF-G4) region of the study area; and in the central portion (OU3-A1-SB01) of the triangular-shaped property between East Broadway and Ferry Creek.

Low to high levels of Aroclor-1262 and/or Aroclor-1268 were detected at ten locations, including: one location along the southern border (EB640AC-N124,E156); one location in the southern (MFP-6), five locations in the central (MFP-1, MFP-2, MFP-5, PP-DDE+100, and PP-EF+100), one location in the east-central (OU3-A1-SB11), and one location in the northeastern (SLE-G7) regions of the study area; and one location in the northern portion (OU3-A1-SB02) of the triangular-shaped property between East Broadway and Ferry Boulevard.

The samples containing the higher concentrations included: 470 ug/kg Aroclor-1262 at location EB640AC-N124,E156 along the southern border; 1,700 ug/kg Aroclor-1262 and 2,200 ug/kg Aroclor-1268 at location MFP-1, and 1,600 ug/kg Aroclor-1262 and 2,900 ug/kg Aroclor-1268 at location MFP-2 in the central region west of the southern reaches of the Ferry Creek channel; 130,000 ug/kg Aroclor-1262 and 270,000 ug/kg Aroclor-1268 at location MFP, 3,900 ug/kg Aroclor-1268 at location PP-DDE+100, and 600 ug/kg Aroclor-1262 and 510 ug/kg Aroclor-1268 at location PP-EF+100 in the central region; 3,700 ug/kg Aroclor-1262 and 15,000 ug/kg Aroclor-1268 at location MFP-6 in the southern region; 2,000 ug/kg Aroclor-1262 and 2,400 ug/kg Aroclor-1268 at location OU3-A1-SB11 in the east-central region; and 210 ug/kg Aroclor-1262 at location SLE-G7 in the northeastern region of the study area; as well as, 290 ug/kg Aroclor-1262 and 1,800 ug/kg Aroclor-1268 at location OU3-A1-SB02 in the northern portion of the triangular-shaped property between East Broadway and Ferry Boulevard. The highest concentration of a single PCB was 270,000 ug/kg Aroclor-1268 at location MFP-5.

Subsurface Soil Samples

A total of 52 subsurface soils were collected from depths of up to 16.0 feet from thirty-one locations, and at depths of up to 62.0 feet at two additional locations, throughout the study area.

Pesticides. One to six pesticides were detected above background concentrations in 15 or 29 percent, of the samples collected from sixteen locations. However, approximately 50 percent of these samples contained only a single pesticide. Concentrations of individual pesticides ranged from 3.4 ug/kg to 87 ug/kg.

Low levels were detected at depths ranging up to: 2.4 feet at two locations along the western and southwestern border (BP68AC-S535,E172 and BP96AC-S342,E166); and 8.0 feet at one location in the southeastern (MF-SO-MW101D), 6.0 to 14.0 feet at three

locations in the southwestern (MF-SO-102, MF-SO-SB3, and MF-SO4), 16.0 feet at one location in the east-central (OU3-A1-SB03), and 6.0 feet at one location in the eastern (OU3-A1-SB04) regions of the study area.

Low to medium levels were detected at depths ranging up to: 2.4 feet at one location along the southern border (EB640AC-N124,E156); and 4.0 feet at one location in the southwestern (OU3-A1-SS01), 5.0 to 6.0 feet at two locations in the south-central (MF-SO-SB6 and MF-SO-TP3), 8.0 feet at one location in the northern (OU3-A1-SB07), and 4.0 feet at one location in the northwestern (OU3-A1-SS05) region of the study area.

Low to high levels were detected at depths ranging up to: 16.0 feet at one location in the southeastern (MF-SO-SB7) and 8.0 feet at one location in the west-central (MF-SO-SB8) regions of the study area.

The sample location containing the higher concentrations included: 37 ug/kg aldrin, 67 ug/kg gamma-chlordane, and 63 ug/kg heptachlor epoxide in the 14.0-16.0 foot sample at location MF-SO-SB7 in the east-southeast region; and 71 ug/kg alpha-chlordane, 74 ug/kg endosulfan I, and 87 ug/kg gamma-chlordane in the 6.0-8.0 foot sample at location MF-SO-SB8 in the west-central region of the study area. The highest concentration of a single pesticide was 87 ug/kg gamma-chlordane in the 6.0-8.0 foot sample at location MF-SO-SB8.

PCBs. One of five PCBs were detected at elevated concentrations in 24 of 52 subsurface samples. However, approximately 50 percent of these samples contained only a single PCB. Concentrations of individual PCBs ranged from 56 ug/kg to 50,000 ug/kg. Low to high levels of Aroclor-1262 and Aroclor-1268 were detected throughout the study area. Additional PCBs detected included: Aroclor-1248 at a medium level of 190 ug/kg in the 2.0-4.0 foot sample at location OU3-A1-SS01 in the southwestern region and at a high level of 650 ug/kg in the 8.0-10.0 foot sample at location MF-SO-MW103 in the south-central region; Aroclor-1254 at a high level of 8,400 ug/kg in the 14.0-16.0 foot sample at location MF-SO-SB7 in the southeastern region; and Aroclor-1260 at a high level of 640 ug/kg in the 8.0-10.0 foot sample at location MF-SO-MW103 in the south-central region of the study area.

Low levels of Aroclor-1262 and/or Aroclor-1268 were detected at depths ranging up to: 5.0 feet at one location along the southwestern border (BP78AC-S453,E162); 6.0 feet at one location in the eastern (OU3-A1-SB04), 10.0 feet at one location in the northern (OU3-A1-SB07), 10.0 feet at one location in the northeastern (OU3-A1-SB10), and 12.0 feet at one location in the east-central (OU3-A1-SB11) regions of the study area; and 12.0 feet in the central (OU3-A1-SB01) and 10.0 feet in the northern (OU3-A1-SB02) portions of the triangular-shaped property between East Broadway and Ferry Boulevard.

Low to medium levels of Aroclor-1262 and/or Aroclor-1268 were detected at depths ranging up to: 4.0 to 16.0 feet at four locations in the southwestern (MF-SO-SB2, MF-SO-SB3, MF-SO-SB4, and OU3-A1-SS01), 5.0 feet at one location in the south-central (MF-SO-TP3), 16.0 feet at one location in the east-central (OU3-A1-SB03), 10.0 feet at one location in the northern (OU3-A1-SB06), and 10.0 feet at one location in the northeastern (OU3-A1-SB09) regions of the study area.

Low to high levels of Aroclor-1262 and/or Aroclor-1268 were detected at depths ranging up to: 5.0 feet at one location along the southern border (EB640AC-N124,E166); and 16.0 to 50.0 feet at two locations in the southeastern (MF-SO-MW101D and MF-SO-SB7), 6.0 to 8.0 feet at three locations in the southwestern (MF-SO-MW102, MF-SO-SB2, and MF-SO-TP2), 4.0 to 10.0 feet at two locations in the south-central (MF-SO-MW103 and MF-SO-SB6), 8.0 feet at one location in the west-central (MF-SO-SB8), 8.0 feet at one location in the east-central (OU3-A1-SB03), 4.0 to 8.0 feet at three locations in the northern (OU3-A1-SB05, OU3-A1-SB06, and OU3-A1-SB07), and 4.0 feet at one location in the northwestern (OU3-A1-SS05) regions of the study area.

The sample locations containing individual PCBs at concentrations >50 x BG included: 36,000 ug/kg Aroclor-1262 and 50,000 ug/kg Aroclor-1268 in the 14.0 to 16.0 foot sample at location MF-SO-SB7 in the southeastern region; 2,900 ug/kg Aroclor-1262 in the 4.0 to 6.0 foot sample at location MF-SO-MW102 in the southwestern region; 21,000 ug/kg Aroclor-1262, and 9,300 ug/kg Aroclor-1268 in the 8.0 to 10.0 foot sample at location MF-SO-MW103, and 48,000 ug/kg Aroclor-1262 and 49,000 ug/kg Aroclor-1268 in the 2.0 to 4.0 foot sample at location MF-SO-SB6 in the south-central region; 4,500 ug/kg Aroclor-1262 and 26,000 ug/kg Aroclor-1268 in the 6.0 to 8.0 foot sample at location OU3-A1-SB03 in the east-central region; and 3,400 ug/kg Aroclor-1268 in the 6.0 to 8.0 foot sample at location OU3-A1-SB07 in the northern region of the study area. The highest concentration of a single PCB was 50,000 ug/kg Aroclor-1268 at 14.0 to 16.0 feet at location MF-SO-SB7.

G.1.3.4 Dioxins and Furans

Forty-eight soil samples from thirty-two locations were submitted for analysis of dioxins and furans. Individual dioxins and furans were detected in twenty-eight, or 58 percent, of the samples. The most toxic congener (2,3,7,8-TCDD) was detected in only two surficial and two subsurface samples. The 1,2,3,4,6,7,8-HpCDF congener was the most frequently detected furan. The OCDD congener was the most frequently detected dioxin. The sums of the dioxin and furan concentrations was expressed as 2,3,7,8-TCDD Toxicity Equivalency (TEQ) , based on calculations by the analytical laboratory. The distribution of dioxins and furans was evaluated by grouping the results into the following concentration ranges: < 0.001 ug/kg (low level), ≥ 0.001 but < 0.01 ug/kg (medium level), and ≥ 0.01 ug/kg (high level).

Overall, the results indicate that elevated TEQ concentrations were reported frequently in both surficial and subsurface soil throughout Area A-1. The higher TEQ concentrations were reported in surficial samples collected in the central (MFP-1, MFP-2, and MFP-5), east-central (OU3-A1-SB11), and southern (MFP-6) regions of the study area; and in subsurface samples at depths of up to 16.0 feet along the southwestern and southern borders (BP70AC-S484,E160 and EB640AC-N124,E156); and in the southwestern (MF-SO-MW102), southeastern (MF-SO-SB7), south-central (MF-SO-MW103 and MF-SO-SB6), east-central (OU3-A1-SB03), and northern (OU3-A1-SB06) regions of the study area. No elevated TEQ concentrations were reported in samples collected at depths of over 16.0 feet, with the exception of the 78.0-80.0 foot sample at location MF-SO-MW102 in the southwestern region and the 46.0-48.0 foot sample at location MF-SO-MW014D in the central region of the study area. No samples were collected for dioxin and furan analysis from the triangular-shaped property between East Broadway and Ferry Boulevard.

Surface Soil Samples

One surficial soil sample was collected from each of 12 locations throughout the study area. No samples were collected from the triangular-shaped property between East Broadway and Ferry Boulevard.

TEQ concentrations, ranging from 0.00038 ug/kg to 16.8 ug/kg, were reported in nine, or 75 percent, of the samples. The most toxic congener (2,3,7,8-TCDD) was detected in only two samples, from locations OU3-A1-SB11 and MFP-5, in the east-central and central regions of the study area.

Medium TEQ concentrations were reported in four locations, including: three locations along the southern and southwestern borders (BP68AC-S535,E172, BP70AC-S528,E172, and EB640AC-N124,E156), and at one location in the southern region (OU3-A1-SS03) of the study area.

High TEQ concentrations were reported in five locations, including: three locations in the central (MFP-1, MFP-2, and MFP-5), one location in the east-central (OU3-A1-SB11), and one location in the southern (MFP-6) regions of the study area. The highest TEQ concentrations were 16.8 ug/kg at location MFP-5 and 1.82 ug/kg at location MFP-1. No other TEQ concentration exceeded 0.270 ug/kg.

Subsurface Soil Samples

A total of 36 subsurface soil samples were collected from depths of up to 16.0 feet in eighteen location, and at depths of up to 100.0 feet in three additional locations, throughout the study area. No samples were collected from the triangular-shaped property between East Broadway and Ferry Boulevard.

TEQ concentrations, ranging from 0.00022 ug/kg to 9.38 ug/kg, were reported in 19, or 53 percent, of the samples. The most toxic congener (2,3,7,8-TCDD) was detected in only two samples, at 6.0 to 8.0 feet at location OU3-A1-SB03 and 2.0 to 4.0 feet at location OU3-A1-SB06, in the east-central and northern regions of the study area.

Low TEQ concentrations were reported at depths ranging from: 5.5 to 8.0 feet in two locations along the southwestern border (BP68AC-S535,E172 and BP70AC-S485,E160), and 8.0 feet at one location in the southeastern region (MF-SO-MW101D).

Medium TEQ concentrations were reported at depths ranging from: 2.4 feet at one location along the southern border (EB640AC-N124,E156); and 6.0 feet at one location in the southeastern (MF-SO-SB7), 8.0 feet at one location in the west-central (MF-SO-SB8), and 48.0 feet at one location in the central (MF-SO-MW104D) regions of the study area.

High TEQ concentrations were reported at depths ranging from: 3.5 to 5.0 feet at two locations along the southwestern and southern borders (BP70AC-S485,E160 and EB640AC-N124,E156); and 80.0 feet at one location in the southwestern (MF-SO-MW102), 16.0 feet at one location in the southeastern (MF-SO-SB7), 4.0 to 10.0 feet at two locations in the south-central (MW-SO-MW103 and MF-SO-SB6), 8.0 feet at

one location in the east-central (OU3-A1-SB03), and 4.0 feet at one location in the northern (OU3-A1-SB06) regions of the study area.

G.1.3.5 Metals

Eighty-four soil samples from forty-eight locations were submitted for analysis of metals. Two hundred seventy-nine samples from twenty-six locations were screened for both copper and lead, and two hundred twenty-nine samples from one hundred thirty-two locations were screened for lead alone. The distribution of metals was evaluated by grouping the results into the following concentration ranges: ≥ background concentrations (BG) but <2 x BG (low level), ≥2 x BG but <10 x BG (medium level), and ≥10 x BG (high level). In addition, fourteen samples from twelve locations were submitted for analysis extraction and analysis of Synthetic Precipitation Leaching Procedure (SPLP) metals. The distribution of metals was evaluated by grouping the results into the following concentration ranges: ≥ GB classified aquifer mobility criteria in the State of Connecticut (GB) but <2 x GB (low level), ≥2 x GB but <10 x GB (medium level), and ≥10 x GB (high level).

Overall, the results indicate that elevated concentrations of metals were detected frequently in both surficial and subsurface soil throughout Area A-1. Two metals, copper and lead, are considered the most indicative of contamination associated with operations at the Raymark Facility. Elevated concentrations of these metals were detected in over 50 percent of the soil samples collected, as follows:

Copper was detected above background concentrations in all locations, except for the surficial soil samples from the southeastern region (MF-C+100 and OU3-A1-SS02), one of four surficial samples from the northeastern (OU3-A1-SB10) region; and subsurface samples from two of four locations along the southwestern border (BP78AC453,E162 and BP96AC-S342,E166), and one of two samples in the southeastern (OU3-A1-SS02), one of four locations in the east-central (MF-SO-SB5), one of three locations in the south-central (MF-SO-TP3), and two of four locations in the northeastern (OU3-A1-SB09 and OU3-A1-SB10) regions of the study area. Copper levels more than 20 times the background concentration of 28.8 mg/kg were detected in surficial samples in the southwestern region (MF-A+400 and OU3-A1-SS01) and subsurface samples in the southwestern (MF-SO-MW102, MF-SO-SB2, MF-SO-SB4, MF-SO-TP2, and OU3-A1-SS01), southeastern region (MF-SO-SB7), southern (MFP-6), south-central (MF-SO-MW103 and MF-SO-SB6), east-central (OU3-A1-SB03 and OU3-A1-SB11), central (MFP-1, MFP-2, and MFP-5), and northern (OU3-A1-SB07) regions of the study area. No elevated concentrations of copper were detected at depths of over 18.0 feet, except for the 46.0-48.0 foot sample at location MF-SO-MW104D in the central region of the study area.

Lead was detected above background concentrations in all locations, except for one surficial soil samples from the southeastern (MF-C+100 and OU3-A1-SS02), two of five samples from the central (OU3-A1-SS04 and MF-SO-MW104D), and one of four samples from the northeastern (OU3-A1-SB10) regions of the study area; and subsurface samples from the southern (MF-SO-SB1), one of two samples in the southeastern (OU3-A1-SS02), central (MF-SO-MW104D), two of four locations in

the east-central (MF-SO-SB5 and OU3-A1-SB11), one of three locations in the south-central (MF-SO-TP3), and three of four locations in the northeastern (OU3-A1-SB09, OU3-A1-SB10, and OU3-A1-SS06) regions of the study area; and in subsurface sample from the central (OU3-A1-SB01) and northern (OU3-A1-SB02) portions of the triangular-shaped property between East Broadway and Ferry Boulevard. Lead levels more than 20 times the background concentration of 80.8 mg/kg were detected in surficial samples in the southwestern region (MF-A+400 and OU3-A1-SS01); and subsurface samples in the southwestern (MF-SO-MW102, MF-SO-SB4, and OU3-A1-SS01), southeastern (MF-SO-SB7), southern (MFP-6), south-central (MF-SO-MW103 and MF-SO-SB6), east-central (OU3-A1-SB03 and OU3-A1-SB11), central (MFP-1, MFP-2, and MFP-5), and northern (OU3-A1-SB07) regions of the study area. No elevated concentrations of lead were detected at depths of over 18.0 feet.

In the metals screening, elevated concentrations of lead were detected frequently in surficial and subsurface soil samples collected throughout Area A-1. Copper was detected less frequently. No elevated concentrations of copper or lead were detected at depths of over 20.0 feet, with the exception of lead in the 50.0-52.0 foot sample at location MF-SO-MW103 in the south-central region of the study area. Furthermore, no copper was detected in surficial samples collected from the triangular-shaped property between East Broadway and Ferry Boulevard.

Elevated concentrations of leachable lead were detected frequently in surficial and subsurface soil samples collected for SPLP metals analysis from throughout Area A-1. Leachable copper was detected infrequently.

Surface Soil Samples

One surficial soil sample, collected at each of 29 locations, was submitted for metal analysis. One sample collected at each of seventeen locations was screened for both copper and lead, and one hundred fifty-four samples from one hundred thirty-three locations were screened for lead alone. In addition, one sample collected at each of seven locations was submitted for analysis of SPLP metals.

Metals Analysis. Elevated concentrations of metals detected in the twenty-seven samples included: in less than 5 percent of the samples - thallium; in 5-25 percent of the samples - aluminum, antimony, beryllium, selenium, and silver; in 25-50 percent of the samples - cadmium, manganese, mercury, sodium, and vanadium; in greater than 50 percent of the samples - arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, nickel, potassium, and zinc.

Low levels of various metals were detected at each location. Medium levels were detected in all except three locations throughout the study area.

High levels were detected in nine locations, including: cadmium, calcium, and lead at one location along the southwestern border (BP78AC-S528,E172); barium, cadmium, chromium, copper, lead, magnesium, nickel, and zinc at one location (MF-A+400), copper, mercury, and thallium at one location (MF-AZ+300), and barium, copper, and lead at one location (OU3-A1-SS01) in the southwestern region; barium chromium, copper, lead, magnesium, nickel, and zinc at one location (MFP-6) in the southern region; barium, copper,

lead, nickel, and zinc at one location (OU3-A1-SB11) in the east-central region; and barium, copper, lead, magnesium, nickel, and zinc at three locations (MFP-1, MFP-2, and MFP-5), plus chromium at one of location (MFP-1) in the central region of the study area.

Copper and lead were detected above background concentrations in twenty-four (89 percent) and twenty-two (82 percent) of the twenty-seven samples collected, respectively. The concentrations of these metals ranged from: copper - 30.7 mg/kg to 42,000 mg/kg, and lead - 90.0 mg/kg to 24,700 mg/kg. The highest concentrations were detected at location MFP-5 in the central region of the study area. The highest concentrations detected in the triangular-shaped property between East Broadway and Ferry Boulevard were 165 mg/kg copper and 247 mg/kg lead at location OU3-A1-SB02 in the central portion.

Copper and lead were detected above background concentrations in the following locations: southwestern border - low to medium levels of copper/medium to high levels of lead at three locations along the southwestern border (BP68AC-S535,E172, BP70AC-S528,E172 and BP78AC-S453,E162), medium levels of copper/low levels of lead at the one location along the eastern border (SLE-G2), low levels of copper/lead at one location along the southern border (EB640AC-N124,E156), high levels of copper/medium to high levels of lead at three locations in the southwest region (MF-A+400, MF-AZ+300, and OU3-A1-SS01), medium to high levels of copper/low to high levels of lead at two locations in the southern region (MFP-6 and OU3-A1-SS03), low to high levels of copper at five locations (MF-SO-MW104D, MFP-1, MFP-2, MFP-5, and OU3-A1-SS04) and high levels of lead at three locations (MFP-1, MFP-2, and MFP-5) in the central region, low to medium levels of copper/lead at three locations in the northeastern region (OU3-A1-SS02, OU3-A1-SS06, and SLE-G7), and low to medium levels of copper/lead at four locations in the northwestern region (MF-G+200, MF-G1, MF-G2, and OU3-A1-SS05) of the study area; and medium levels of copper/lead in one location in the central (OU3-A1-SB01) and northern (OU3-A1-SB02) portions of the triangular-shaped property between East Broadway and Ferry Boulevard.

Metals Screening. Elevated levels of copper were detected in seven, or 41 percent, of the seventeen samples from seventeen locations. Concentrations ranged from 63 mg/kg to 2700 mg/kg. The highest concentration was detected at location OU3-A1-SB03 in the east-central region of the study area. No copper was detected in samples collected from the triangular-shaped property between East Broadway and Ferry Boulevard.

Elevated levels of lead were detected in one hundred thirty-two, or 77 percent, of one hundred seventy-one samples collected from one hundred twelve of one hundred fifty locations. Concentrations ranged from 81 mg/kg to 45 4514 mg/kg, The highest concentration was detected at location MF A+400 along the southwestern border of the study area. The highest concentration of lead detected in the triangular-shaped property between East Broadway and Ferry Boulevard were 920 mg/kg lead at two locations (EB E+300 and FB W+1700) along the northwestern and northeastern borders.

SPLP Metals Analysis. Elevated concentrations of SPLP metals were detected in five, or 71 percent, of the seven samples collected from seven locations.

Copper was detected in one, or 14 percent, of the seven samples. A high level, 174,000 ug/l, was detected in the sample from location OU3-A1-SB11 in the east-central region of the study area, west of the southern reaches of Ferry Creek.

Lead was detected at five, or 71 percent, of the seven samples. Elevated concentrations ranged from 271 ug/l to 95,500 ug/l. Low levels were detected at location OU3-A1-SB10 in the northeast region. High levels were detected at four locations: one location in the east-central (OU3-A1-SB11) and one location in the northeastern (OU3-A1-SS06) regions of the study area, and one location in the central (OU3-A1-SB01) and one location in the northern (OU3-A1-SB02) portions of the triangular-shaped property between East Broadway and Ferry Boulevard.

Subsurface Soil Samples

Fifty-five samples from thirty-three locations were submitted for analysis of metals. An additional two hundred sixty-two samples from twenty-six locations were screened for both copper and lead, and an additional seventy-five samples from nineteen locations were screened for lead alone.

Metals Analysis. Elevated concentrations of metals detected in the samples included: in less than 5 percent of the samples - thallium; in 5-25 percent of the samples - aluminum, antimony, beryllium, cadmium, manganese, selenium, and vanadium; in 25-50 percent of the samples - arsenic, calcium, cobalt, lead, mercury, silver, sodium, and zinc; greater than 50 percent of the samples - barium, chromium, copper, iron, magnesium, nickel, and potassium.

Low levels of various metals were detected in all except two locations. Medium levels were detected in all except an additional four locations throughout the study area.

High levels were detected in twenty-three samples from eighteen locations, including:

southwestern border - mercury at depths of up to 5.5 feet at one location (BP68AC-S535,E172)

southwestern region - barium, copper, magnesium, mercury, nickel, and zinc at depths of up to 6.0 feet at one location (MF-SO-MW102); arsenic, copper, and mercury at depths of up to 16.0 feet at one location (MF-SO-SB2); arsenic and copper at depths of up to 10.0 feet at one location (MW-SO-SB3); barium, copper, lead, magnesium, nickel, and zinc at depths of up to 14.0 feet at one location (MF-SO-SB4), barium, lead, mercury, and selenium at depths of up to 6.0 feet at one location (MF-SO-TP2), and barium, copper, lead, and mercury at depths up to 4.0 feet at one location (OU3-A1-SS01)

southern region - selenium at depths up to 10.0 feet at one location (MF-SO-SB1)

southeastern region - barium, cadmium, copper, chromium, lead, magnesium, mercury, nickel, and zinc at depths up to 16.0 feet at one location (MF-SO-SB7)

east-central region - barium, copper, lead, magnesium, nickel, and zinc at depths up to 8.0 feet at one location (OU3-A1-SB03); and copper and mercury at depths up to 6.0 feet at one location (OU3-A1-SB04)

south-central region - barium, cadmium, chromium, copper, lead, magnesium, nickel, silver, and zinc at depths up to 10.0 feet at one location (MF-SO-MW103), barium, copper, lead, and zinc at depths up to 4.0 feet at one location (MF-SO-SB6)

central region - sodium at depths up to 18.0 feet at one location (MF-SO-MW104D)

northern region - sodium at depths up to 10.0 feet at one location (OU3-A1-SB06); barium, lead, and sodium at depths up to 8.0 feet at one location (OU3-A1-SB07)

northwestern region - copper and sodium at depths up to 4.0 feet at one location (OU3-A1-SS05)

Copper and lead were detected above background concentrations in thirty-five (61 percent) and twenty-eight (49 percent) of the 55 samples collected from thirty-three locations, respectively. The concentrations of these metals ranged from: copper - 28.9 mg/kg to 97,900 mg/kg, and lead - 86 mg/kg to 25,600 mg/kg. The highest concentrations were detected in the 6.0-8.0 foot sample at location MF-SO-MW103 in the south-central region of the study area. The only elevated concentration detected in the triangular-shaped property between East Broadway and Ferry Boulevard was 106 mg/kg copper in the 10.0-12.0 foot sample at location OU3-A1-SB01 in the central portion.

Copper and lead were detected above background concentrations in the following locations: medium levels of copper/low to high levels of lead at depths of up to 4.0 to 5.5 feet three locations along the southwestern border (BP68AC-S535,E172, BP70AC-S528,E172, and BP78AC-S453,E162), low levels of copper/lead at depths of up to 4.0 feet at one location along the southern border (EB640AC-N124,E156), medium to high levels of copper/lead at depths of up to 4.0 to 16.0 feet at five locations in the southwestern region (MF-SO-MW102, MF-SO-SB2, MF-SO-SB3, MF-SO-SB4, and OU3-A1-SS01), low levels of copper at depths up to 10.0 feet at one location in the southern region (MF-SO-SB1), medium to high levels of copper/high levels of lead at depths up to 16.0 feet at one location in the southeastern region (MF-SO-SB7), low to high levels of copper/medium to high levels of lead at depths of up to 4.0 to 10.0 feet at two locations in the south-central region (MF-SO-MW103 and MF-SO-SB6), medium levels of copper/medium levels of lead at depths of up to 8.0 feet at one location in the west-central region (MF-SO-SB8), low levels of copper at depths up to 48.0 feet in one location in the central region (MF-SO-MW104D), medium to high levels of copper/low to high levels of lead at depths up to 6.0 to 16.0 feet at two locations (OU3-A1-SB03 and OU3-A1-SB04) and low levels of copper at depths up to 12.0 feet at one location (OU3-A1-SB11) in the east-central region; medium levels of copper at depths of up to 4.0 feet at one location in the northeastern region (OU3-A1-SS06), low to medium levels of copper/low to high levels of lead at depths of up to 10.0 feet at three locations in the northern region (OU3-A1-SB05, OU3-A1-SB06, and OU3-A1-SB07), and high levels of copper/medium levels of lead at depths of up to 4.0 feet at one location in the north-western region (OU3-A1-SS05) of the study area; and medium levels of copper at depths of up to 12.0 feet at one location in

the central portion (OU3-A1-SB01) of the triangular-shaped property between East Broadway and Ferry Boulevard.

Metals Screening. Elevated levels of copper were detected in sixty-one, or 23 percent, of two hundred sixty-two samples collected from sixteen of twenty-six locations. Concentrations ranged from 33 mg/kg to 19,000 mg/kg. The highest concentration was detected in the 10.0-12.0 foot sample at location MF-SO-MW103 in the central region of the study area. The highest concentration of copper detected in the triangular-shaped property between East Broadway and Ferry Boulevard was 340 mg/kg in the 6.0-8.0 foot sample at location OU3-A1-SB02 in the northern portion.

Elevated levels of lead were detected in one hundred twenty, or 36 percent, of three hundred thirty-seven samples collected from thirty-eight of forty-five locations. Concentrations ranged from 86 mg/kg to 7,800 mg/kg. The highest concentration was detected in the 10.0-12.0 foot sample at location MF-SO-MW103 in the central region of the study area. The highest concentration of lead detected in the triangular-shaped property between East Broadway and Ferry Boulevard was 580 mg/kg in the 6.0-8.0 foot sample at location OU3-A1-SB02 in the northern portion.

SPLP Metals Analysis. Elevated concentrations of SPLP metals were detected in five, or 71 percent, of the seven samples collected from seven locations. No samples were collected from the triangular-shaped property between East Broadway and Ferry Boulevard.

Barium, copper, and nickel were detected in one, or 14 percent, of the samples. A high level (20,000 ug/l) of barium, a high level (744,000 ug/l) of copper, and a medium level (3560 ug/l) of nickel were detected in the 6.0-8.0 foot sample from location OU3-A1-SB03 in the east-central region of the study area, west of the southern reaches of Ferry Creek.

Lead was detected at five, or 71 percent, of the seven samples. Elevated concentrations ranged from 264 ug/l to 553,500 ug/l. Low levels were detected in the 4.0-6.0 foot sample at one location in the east-central (OU3-A1-SB04) and in the 2.0-4.0 foot sample at one location in each of the northern (OU3-A1-SB05) and northeastern (OU3-A1-SS06) regions of the study area. High levels were detected in the 6.0-8.0 foot sample at one location in the east-central region (OU3-A1-SB11) of the study area.

G.1.3.6 Asbestos

Five hundred sixty-six soil samples from one hundred sixty-eight locations were submitted for analysis of asbestos using optical microscopy, according to EPA Region I standard operating procedures. Asbestos was detected at a concentration ≥1 percent in one hundred fifty-eight, or 28 percent, of the samples. The distribution of asbestos was evaluated by grouping the results into the following ranges of optically observable asbestos: <1 percent; ≥1 but <5 percent (low level); ≥5 but <10 percent (medium level); and ≥10 percent (high level).

Overall, the results indicate that asbestos concentrations ≥1 percent were detected frequently in both surficial and subsurface soil samples. The higher concentrations were detected in surficial samples along the southeastern (PP CD+00), eastern (PP DE+00), and

northeastern (SCT-G4) borders; in the southwestern (MF A+400, MF AZ+300, MF B+425, and OU3-A1-SS01), east-central (MF D+100, MF E+080, OU3-A1-SB03, OU3-A1-SB11, PP DDE+100, PP DDE+110, PP DE+050, PP DE+100, PP DE+110, PP EF+50, and PP EF+110), south-central (MF-SO-SB6), and central (MF F+050) regions of the study area; and in subsurface samples in the southwestern (MF-SO-SB2, MF-SO-SB3, and MF-SO-SB4), southeastern (MF-SO-MW101D and MF-SO-SB7), east-central (OU3-A1-SB03 and OU3-A1-SB11), south-central (MF-SO-MW103 and MF-SO-SB6), and northeastern (OU3-A1-SB06) regions of the study area. No asbestos was detected in samples collected at depths of over 22.0 feet. Low levels of asbestos were detected in surficial samples and at depths of up to 12.0 feet in the northern (OU3-A1-SB02) and the central (OU3-A1-SB01) portions of the triangular-shaped property between East Broadway and Ferry Boulevard.

Surface Soil Samples

One hundred eighty-five surficial soil samples were collected from one hundred sixty-four locations throughout the area of study. Asbestos was detected at concentrations ranging from 1 to 80 percent in fifty-nine, or 32 percent, of the samples.

Low levels were reported at thirty-four locations, including: two locations along the southeastern (MF D+00 and MF E+00), two locations along the eastern (SLE-G4 and EB W+100), and one location along the northeastern (SCT-G5) border; two locations in the southwestern (MF-SO-MW102 and MF-SO-SB3), three locations in the southeastern (MF C+00, MF C+100, and PP CD+100), two locations in the south-central (MF C+200 and OU3-A1-SS03), three locations in the west-central (MF D+335, MF AZ+300, and MF-SO-SB8), two locations in the central (MF F+100 and MF G+100), three locations in the east-central (MF F-010, MF-SO-SB5, and PP DDE+50), one location in the northwestern (MF-G1), nine locations in the northeastern (OU3-A1-SB04, OU3-A1-SB05, OU3-A1-SB06, SCT-G7, SLE-G7, SLE-G8, SLE-G9, SLE-G10, and SLE-G11), and one location in the northern (OU3-A1-SB07) regions of the study area; and one location in each of the central (OU3-A1-SB01) northern (OU3-A1-SB02) portions, and one location along the northeastern border (FB W+1700) of the triangular-shaped property between East Broadway and Ferry Boulevard.

Medium levels were reported at four locations, including: one location along the eastern border (PP DDE+00), and one location in the southern (PP CD+50) and two locations in the east-central (MF E+050 and PP EF+100) regions of the study area.

High levels were reported at twenty-one locations, including: one location along each of the southeastern (PP CD+00), eastern (PP DE+00), and northeastern (SCT-G4) borders; and four locations in the southwestern (MF A+400, MF AZ+300, MF B+425, and OU3-A1-SS01), eleven locations in the east-central (MF D+100, MF E+080, OU3-A1-SB03, OU3-A1-SB11, PP DDE+100, PP DDE+110, PP DE+050, PP DE+100, PP DE+110, PP EF+50, and PP EF+110), and one location in each of the southeastern (MF C+050), south-central (MF-SO-SB6), and central (MF F+050) regions of the study area. The highest asbestos concentrations were 80 percent at locations PP EF+50 and MF A+400.

Subsurface Soil Samples

Three hundred eighty-one subsurface soil samples were collected from forty-nine locations throughout the study area. Asbestos was detected at concentrations ranging from 1 to 85 percent in ninety-nine, or 26 percent, of the samples from twenty-four locations.
Low levels were reported at depths ranging up to: 4.0 feet along the northeastern border (OU3-A1-SS06) and 6.0 to 16.0 feet in the northeastern region (OU3-A1-SB04, OU3-A1-SB05, and OU3-A1-SB09) of the study area; and 12.0 feet in the central (OU3-A1-SB01) and 8.0 feet in the northern (OU3-A1-SB02) portions of the triangular-shaped property between East Broadway and Ferry Boulevard.

Low to medium levels were reported at depths ranging up to: 14.0 feet in the west-central (MF-SO-SB8) and 4.0 feet in the northern (OU3-A1-SB07) regions of the study area.

Low to high levels were reported at depths ranging up to: 12.0 to 18.0 feet in the southwestern (MF-SO-SB2, MF-SO-SB3, and MF-SO-SB4), 8.0 to 22.0 feet in the southeastern (MF-SO-MW101D and MF-SO-SB7), 14.0 to 16.0 feet in the east-central (OU3-A1-SB03 and OU3-A1-SB11), 14.0 to 18.0 feet in the south-central (MF-SO-MW103 and MF-SO-SB6), and 16.0 feet in the northeastern (OU3-A1-SB06) regions of the study area. The highest asbestos concentration was 85 percent in the 10.0-12.0 foot sample at location MF-SO-MW103.

G.1.4 Area A-1: Summary of Contamination

G.1.4.1 VOCs

Elevated concentrations of VOCs were detected in various sediment, surface water, and soil samples collected throughout Area A-1.

In sediment samples, VOCs were detected infrequently. The higher concentrations were detected in surficial samples from the northern reaches of Ferry Creek, the western arm of the wetlands adjacent to the Morgan Francis property, and the area closest to the culvert at the southern-most end of the study area.

Select VOCs, primarily chlorinated hydrocarbons, were detected frequently in the few surface water samples collected. The higher concentrations were detected in the western arm of the wetlands adjacent to the Morgan Francis property and in the northern portion of the Ferry Creek channel.

VOCs were detected infrequently in soil samples. The higher concentrations were detected primarily in subsurface soils at depths of up to 16.0 feet collected along the southwestern border, in the southeastern and south-central regions, and in the northern extent of the study area. No VOCs were detected in soil samples collected from the triangular-shaped property between East Broadway and Ferry Boulevard.

G.1.4.2 SVOCs

Elevated concentrations of SVOCs, primarily PAHs and phthalates, were detected in various sediment, surface water, and soil samples collected throughout Area A-1.

In sediment samples, SVOCs were detected frequently. The higher concentrations of PAHs were detected in surficial samples collected near the bend in the Ferry Creek channel in the northern region, and in subsurface samples collected at depths of up to 4.0 feet from the south-central extent of the Ferry Creek channel and the triangular-shaped property between East Broadway and Ferry Boulevard. The higher concentrations of phthalates were detected in surficial samples from the western arm of the wetlands adjacent to the Morgan Francis property, and both surficial and subsurface samples collected near the bend in the Ferry Creek channel in the northern region.

SVOCs were detected infrequently in the few surface water samples collected. Phthalates were detected at low concentrations in several of the samples; and no PAHs were detected.

SVOCs, primarily PAHs and phthalates, were detected frequently in both surficial and subsurface soil. The higher levels of PAHs were detected in surficial samples in the southeastern region of the study area and in the central portion of the triangular-shaped property between East Broadway and Ferry Boulevard. Subsurface soils containing the higher PAH concentrations were located primarily at depths up to 16.0 feet in the south-central, east-central, and northern regions of the study area. The higher levels of phthalates were detected in surficial samples collected from the east-central and southwestern regions; and in subsurface samples from the southwestern, south-central, and east-central regions, primarily at depths up to 16.0 feet.

G.1.4.3 Pesticides/PCBs

Elevated concentrations of pesticides and PCBs were detected in various sediment, surface water, and soil samples collected throughout Area A-1.

In sediment samples, pesticides and PCBs were detected frequently in both surficial and subsurface samples. Pesticides were detected at relatively comparable concentrations across the study area, with the exception of lower levels in samples collected from the triangular-shaped property between East Broadway and Ferry Boulevard. No pesticides exceeded background concentrations in two of three samples collected from the northern reaches of Ferry Creek and from the central portion along the length of Ferry Creek channel. The PCBs consisted primarily of Aroclor-1262 and Aroclor-1268, with infrequent detections of Aroclor-1248 and Aroclor-1260. The highest PCB concentrations were detected in surficial samples from the southern portion of the Ferry Creek channel. Lower concentrations were detected along the western arm of the wetlands adjacent to the Morgan Francis property.

Pesticides were detected infrequently in the few surface water samples collected. No pesticides were detected above background concentrations. Furthermore, no PCBs were detected.

Select pesticides/PCBs were detected frequently in both surficial and subsurface soil throughout Area A-1. Approximately half of the samples contained a single pesticide and/or a single PCB. The higher levels of pesticides were detected in surficial samples collected along the southwestern border, the central region, and along the eastern border of the study area; and subsurface samples in the southeastern and west-central regions of the

study area. The higher levels of PCBs were detected in surficial samples collected along the southern border, in the southern, central, east-central, and northeastern region of the study area, and in the northern portion of the triangular-shaped property between East Broadway and Ferry Boulevard; and in subsurface samples collected at depths of up to 4.0 feet along the southern border, in the southeastern, southwestern, west-central, east-central, northern, and northwestern regions of the study area. No pesticides/PCBs were detected in samples from depths of over 16.0 feet. The PCBs consisted primarily of Aroclor-1262 and Aroclor-1268, with infrequent detections of Aroclor-1248, Aroclor-1254, Aroclor-1260.

G.1.4.4 Dioxins and Furans

Dioxin and furan concentrations, expressed as TEQ concentrations, were reported in various sediment and soil samples collected throughout Area A-1. No surface water samples were submitted for analysis of dioxins and furans.

Elevated TEQ concentrations were reported frequently in surficial sediment samples throughout the Ferry Creek channel, but infrequently in the northern reaches of Ferry Creek at the boundary of the study area. The higher TEQ concentrations were reported in surficial samples from the south-central extent of Ferry Creek, and in the only subsurface sample collected at a depth of 2.0-4.0 feet from the same region. No dioxin and furan analysis was performed on samples collected from the triangular-shaped property between East Broadway and Ferry Boulevard, or from depths of over 2.0 feet in the northern reaches of Ferry Creek or the western arm of the wetlands adjacent to the Morgan Francis property.

Elevated TEQ concentrations were reported frequently in both surficial and subsurface soils. The higher TEQ concentrations were reported in surficial samples collected in the central, east-central, and the southern regions of the study area; and in subsurface samples along the southwestern and southern border, and in the southwestern, southeastern, south-central, east-central, and the northern regions of the study area. No elevated TEQ concentrations were reported in samples collected at depths of over 16.0 feet, with the exception of the 78.0-80.0 foot sample at one location in the southwestern region and the 46.0-48.0 foot sample at one location in the central region of the study area. No samples were collected for dioxin and furan analysis from the triangular-shaped property between East Broadway and Ferry Boulevard.

G.1.4.5 Metals

Elevated concentrations of metals were detected in various sediment, surface water, and soil samples collected throughout Area A-1. Two metals, copper and lead, are considered the most indicative of contamination associated with operations at the Raymark Facility, and are the focus of this summary.

In sediment samples, elevated levels of copper and lead were detected frequently. Elevated copper concentrations were detected at all locations, except for a few surficial samples collected along the western arm of the wetlands adjacent to the Morgan Francis property, from the northern reaches of Ferry Creek, in the south-central portion of the study area, and in the triangular-shaped property between East Broadway and Ferry Boulevard. In subsurface samples, elevated copper concentrations were detected at depths of up to 4.0

feet in the south-central portion of the study area and the triangular-shaped property between East Broadway and Ferry Boulevard. The highest concentrations were detected in surficial samples in the south and south-central portions of the study area.

Elevated lead concentrations were also detected in sediment samples collected in all locations, except for one along the western arm of the wetlands adjacent to the Morgan Francis property. The higher lead levels were detected in surficial samples from the northern reaches of Ferry Creek, in the western arm of the wetlands adjacent to the Morgan Francis property, and in the southern and south-central portion of the study area; and in the subsurface sample collected at a depth of 2.0-4.0 feet, in the southern portion of the study area.

Elevated concentrations of select metals were detected frequently in surface water samples. These metals included antimony, arsenic, and iron in select samples, and barium, manganese, and zinc in all samples. Copper and lead were not detected above background concentrations.

In soil samples, elevated levels of copper and lead were detected frequently in both surficial and subsurface samples. Elevated copper concentrations were detected in all locations, except for the surficial soil samples collected in the southeastern region and in one location from the northeastern region, and subsurface samples from several locations along the southwestern border, in the southeastern, east-central, south-central, and northeastern regions of the study area. The highest concentrations were detected in surficial samples in the southwestern region, and subsurface samples in the southwestern, southeastern, southern, south-central, east-central, central, and northern regions of the study area. No elevated concentrations of copper were detected at depths of over 18.0 feet, except for the 46.0-48.0 foot sample at one location in the central region of the study area.

Elevated lead concentrations were also detected in soil samples in all locations, except for a few surficial soil samples collected in the southeastern, central, and northeastern regions; and a limited number of subsurface samples collected in the southern, southeastern, central, east-central, south-central, and northeastern region of the study area. No copper was detected at elevated concentrations in subsurface samples from the central and the northern portion of the triangular-shaped property between East Broadway and Ferry Boulevard. The higher lead levels were detected in surficial samples in the southwestern region and subsurface samples in the southwestern, southeastern, southern, south-central, east-central, central, and northern regions of the study area. No elevated concentrations of lead were detected at depths of over 18.0 feet.

In the metals screening, elevated concentrations of lead were detected frequently in surficial and subsurface soil samples collected throughout Area A-1. Copper was detected less frequently; no copper was detected in surficial samples collected from the triangular-shaped property between East Broadway and Ferry Boulevard. No elevated concentrations of copper or lead were detected at depths of over 20.0 feet, with the exception of lead in the 50.0-52.0 foot sample at one location in the south-central region of the study area.

Elevated concentrations of leachable lead were detected frequently in surficial and subsurface soil samples collected throughout Area A-1 for SPLP metals analysis. Leachable copper was detected infrequently.

G.1.4.6 Asbestos

Elevated concentrations of asbestos were detected in various sediment and soil samples collected throughout Area A-1. No surface water samples were analyzed for asbestos.

Asbestos concentrations ≥1 percent were detected frequently in both surficial and subsurface sediment throughout the Ferry Creek channel. The higher concentrations were detected in the surficial samples along the central portion of the Ferry Creek channel, and in subsurface sediment samples collected from depths of up to 4.0 feet from the triangular-shaped property located between East Broadway and Ferry Boulevard. No asbestos analysis was performed on samples collected from the northern reaches of Ferry Creek at the boundary of the study area, near the bend in Ferry Creek channel in the northern portion of the study area, or at depths over 2.0 feet from the western arm of the wetlands adjacent to the Morgan Francis Property.

Elevated asbestos concentrations were detected frequently in both surficial and subsurface soil samples. The higher concentrations were detected in surficial samples along the southeastern, eastern, and northeastern borders, and in the southwestern, east-central, south-central, and central regions of the study area; and in subsurface samples in the southwestern, southeastern, east-central, south-central, and northeastern regions of the study area. No asbestos was detected in samples collected at depths of over 22.0 feet. Low levels of asbestos were detected in surficial samples and at depths of up to 12.0 feet in the northern and central portions of the triangular-shaped property between East Broadway and Ferry Boulevard.

G.1.4.7 TOC

Sediment samples were submitted for TOC analysis. The results indicate that TOC concentrations varied greatly with depth and location throughout the Ferry Creek channel. The higher concentrations were detected in the samples collected from depths of up to 15.0 feet at locations within the central extent of the length of Ferry Creek channel and from depths of up to 4.0 feet in the central portion of the triangular-shaped property between East Broadway and Ferry Boulevard. The lower concentrations were detected in samples collected at depths of up to 20.0 feet in the western arm of the wetlands adjacent to the Morgan Francis property, and the northern end of the Ferry Creek channel.

G.2 Area A-2: Upper Ferry Creek – Commercial Property

The following section presents a discussion of the nature and extent of contamination in Area A-2, located in upper Ferry Creek in the vicinity of the Spada Property, approximately 50 feet east of Area A-1. The evaluation is based on the collection of surficial and subsurface soil samples, and a comparison of the associated analytical data with background concentrations discussed in Section 4.3. The sample locations are depicted in

G.2.1 Area A-2: Summary of Contamination

G.2.1.1 VOCs

Elevated concentrations of VOCs were detected infrequently in surficial and subsurface soil samples collected throughout Area A-2. The higher concentrations were detected at depths of up to 10.0 feet in selected subsurface soils within the study area, including: the northwestern region of 326 Ferry Boulevard, the north-central and southeastern regions of 280 Ferry Boulevard, and the central region of 230 Ferry Boulevard. At each of these properties, high levels of aromatic hydrocarbons were detected. In addition, acetone and chlorinated hydrocarbons (1,2-DCE and TCE) were detected in samples from 280 Ferry Boulevard. High concentrations of a single VOC, either acetone or carbon disulfide, were detected in subsurface samples collected from 250 Ferry Boulevard and the paved parking lot at 170 Ferry Boulevard. No VOCs were detected in samples collected at depths of over 10.0 feet, with the exception of 5 ug/kg chlorobenzene and 24 ug/kg carbon disulfide in the 14.0-16.0 foot sample from the southeastern region (SP-SO-SB3) of 250 Ferry Boulevard. Furthermore, since samples were not collected for VOC analysis from depths of over 10.0 feet from many of these properties, the vertical extent of VOC contamination was not determined throughout Area A-2.

G.2.1.2 SVOCs

Elevated concentrations of SVOCs, primarily PAHs and phthalates, were detected frequently in both surficial and subsurface soil samples collected throughout Area A-2. The higher levels of PAHs were detected in surficial samples collected along the southeastern border of 250 Ferry Boulevard, the eastern border of 230 Ferry Boulevard, and the west-central region of the paved parking lot at 170 Ferry Boulevard; and at depths of up to 28.0 feet in subsurface samples collected in the north-central region of 280 Ferry Boulevard, and the southern and southeastern regions of 250 Ferry Boulevard. The higher levels of phthalates were detected in subsurface samples collected in the northwestern, southern, and southeastern regions of 250 Ferry Boulevard. The vertical extent of elevated PAH and phthalate concentrations was not determined at many of the properties throughout Area A-2, since the greatest depth sampled varied from 4.0 to 28.0 feet.

G.2.1.3 Pesticides/PCBs

Elevated concentrations of pesticides and PCBs were detected frequently in both surficial and subsurface soil samples collected throughout Area A-2. Of the subsurface samples containing pesticides, approximately half contained a single pesticide. The higher levels of pesticides were detected in surficial samples collected from the northeastern region of 300 Ferry Boulevard, from the northwestern region of 280 Ferry Boulevard, along the

southeastern, northern, and northeastern borders of 250 Ferry Boulevard, and along the eastern border of 230 Ferry Boulevard; and in subsurface samples collected from the eastern region of 326 Ferry Boulevard, the south-eastern, north-central, and northwestern regions of 280 Ferry Boulevard, the northwestern region of 250 Ferry Boulevard, and the northern region of the paved parking lot at 170 Ferry Boulevard. The higher levels of PCBs were detected in surficial samples collected from the northeastern region of 300 Ferry Boulevard, from the northwestern region of 280 Ferry Boulevard, along the southeastern, eastern, northern, and northeastern borders and from the southwestern region of 250 Ferry Boulevard, from the northeastern region of 200 Ferry Boulevard, and from the east-central region of the paved parking lot at 170 Ferry Boulevard; and in subsurface samples collected from the northwestern and northeastern regions of 300 Ferry Boulevard, from the south-eastern and north-central regions of 280 Ferry Boulevard, from the southern, southeastern, and northwestern region of 250 Ferry Boulevard, along the eastern border of 230 Ferry Boulevard, and from the northern region of the paved parking lot at 170 Ferry Boulevard. No pesticides or PCBs were detected in samples from depths of over 16.0 feet. The vertical extent of elevated pesticide and PCB concentrations was not determined at many of the properties throughout Area A-2, since the greatest depth sampled varied from 4.0 to 20.0 feet. The PCBs consisted primarily of Aroclor-1262 and Aroclor-1268, with infrequent detections of Aroclor-1242, Aroclor-1248, and Aroclor-1254.

G.2.1.4 Dioxins and Furans

Dioxin and furan concentrations, expressed as TEQ concentrations, were reported frequently in both surficial and subsurface soil samples collected throughout Area A-2. The higher TEQ concentrations were reported in surficial samples collected along the southeastern, eastern, and northern borders of 250 Ferry Boulevard, and the eastern border of 230 Ferry Boulevard; and in subsurface samples collected from the southeastern and north-central regions of 280 Ferry Boulevard, from the southeastern region of 250 Ferry Boulevard, along the eastern border and from the central region of 230 Ferry Boulevard, from the eastern region of 200 Ferry Boulevard, and from the northern region of the paved parking lot at 170 Ferry Boulevard. No elevated TEQ concentrations were reported in samples collected at depths of over 16.0 feet. The vertical extent of elevated TEQ concentrations was not determined at many of the properties throughout Area A-2, since the greatest depths sampled varied from 0.5 to 28.0 feet.

G.2.1.5 Metals

Elevated concentrations of metals were detected frequently in both surficial and subsurface soil samples collected throughout Area A-2. Two metals, copper and lead, are considered the most indicative of contamination associated with operations at the Raymark Facility, and are the focus of this summary.

Elevated levels of copper were detected in all locations, except for surficial soil samples from the west-central region of the paved parking lot at 170 Ferry Boulevard; and subsurface samples from the central region of 230 Ferry Boulevard. The highest concentrations were detected in surficial samples along the southeastern, eastern, and northeastern, and northern borders and in the southwestern region of 250 Ferry Boulevard; and in subsurface samples in the northeastern region of 300 Ferry Boulevard, the southeastern, north-central, and northwestern regions of 280 Ferry Boulevard, the

southwestern, southern, and southeastern regions of 250 Ferry Boulevard, along the eastern border of 230 Ferry Boulevard, and in the eastern region of 200 Ferry Boulevard. No elevated concentrations of copper were detected at depths of over 18.0 feet.

Elevated levels of lead were detected in all locations, except for surficial soil samples from the eastern border of 250 Ferry Boulevard and the west-central region of the paved parking lot at 170 Ferry Boulevard; and subsurface samples from the northwestern region of 326 Ferry Boulevard, the northwestern region of 250 Ferry Boulevard, the central region of 230 Ferry Boulevard, the northern region of 190 Ferry Boulevard, and the west-central region of the paved parking lot at 170 Ferry Boulevard. The highest concentrations were detected in surficial samples along the southeastern and eastern borders and in the southwestern region of 250 Ferry Boulevard; and in subsurface samples in the northeastern region of 300 Ferry Boulevard, the southeastern, north-central, and northwestern regions of 280 Ferry Boulevard, the southwestern and southern regions of 250 Ferry Boulevard. No elevated concentrations of lead were detected at depths of over 18.0 feet.

Elevated concentrations of leachable lead were detected frequently in surficial and subsurface soil samples collected for SPLP metals analysis from throughout Area A-2. Leachable copper was detected in the samples analyzed.

G.2.1.6 Asbestos

Asbestos concentrations ≥1 percent were detected in various soil samples collected throughout Area A-2. The higher concentrations were detected in surficial samples collected along the northern and northeastern borders of 300 Ferry Boulevard, along the southern, southwestern, and northern borders and in the northwestern region of 280 Ferry Boulevard, along the western and northeastern borders and in the northeastern region of 250 Ferry Boulevard, and in the southern region of the paved parking lot at 170 Ferry Boulevard; and in subsurface samples collected in the eastern region of 326 Ferry Boulevard, the northeastern region of 300 Ferry Boulevard, the southeastern, northwestern, and north-central regions of 280 Ferry Boulevard, the southwestern, southern, southeastern, and northwestern regions of 250 Ferry Boulevard, the central region of 230 Ferry Boulevard, and the northern region of 190 Ferry Boulevard. No asbestos was detected in samples collected at depths of over 20.0 feet.

G.2.2 Area A-2: Evaluation of Soil Results

Three hundred four soil samples were collected from one hundred twenty-eight locations during various field investigations conducted by Weston/TAT and B&RE from April 1993 through August 1997. The majority of the samples were collected from various properties east of Ferry Boulevard and adjacent to the upper portions of Ferry Creek, just south of the intersection of East Broadway and Ferry Boulevard at the northern boundary to the intersection of Broad Street and Ferry Boulevard at the southern boundary. These properties included: the Rotary Shopping Center, Housatonic Marine, Dan Perkins Subaru, Veras Motors, Turnpike Spirits, Ink Masters, and a paved parking lot. Soil samples were collected at depths of up to 90 feet. The remainder of the soil samples were collected from the Blue Goose Restaurant property adjacent to Ferry Boulevard and bordering the northern extent of Ferry Creek within Area A-2. Soil samples from this area were collected at depths up to 54 feet.

An evaluation of the analytical data associated with these soil samples is presented below. For the purpose of this discussion, soil samples collected from depths of up to 2.0 feet are referred to as surficial samples. Samples obtained below 2.0 feet are considered subsurface samples. Sample results were compared to background concentrations for pesticides/PCBs and metals analytes; all other sample results were evaluated in relation to their detected concentrations.

G.2.2.1 VOCs

Twenty-four soil samples from seventeen locations were submitted for analysis of VOCs. VOCs were detected in sixteen, or 67 percent, of the samples. The VOCs were primarily comprised of three major groups: aromatic hydrocarbons, chlorinated hydrocarbons, and ketones. The distribution of VOCs was evaluated by grouping the results into the following concentration ranges: <10 ug/kg (low level), ≥10 but <100 ug/kg (medium level), and ≥100 ug/kg (high level).

A total of fifteen VOCs were detected, including: four aromatic hydrocarbons (benzene, ethylbenzene, toluene, and xylenes (total)), six chlorinated hydrocarbons (chlorobenzene, 1,2-DCE, methylene chloride, 1,1,2,2-tetrachloroethane, TCE, and vinyl chloride), four ketones (acetone, 2-butanone, 2-hexanone, and 4-methyl-2-pentanone), and carbon disulfide.

Overall, the results indicate that elevated concentrations of VOCs were detected infrequently in soil throughout Area A-2. The higher concentrations were detected in selected subsurface soils within the study area, including: the northwestern region (SP-SO-SB1) of 326 Ferry Boulevard, the north-central (OU3-A2-SB01) and southeastern (SP-SO-SB2) regions of 280 Ferry Boulevard, and the central region (OU3-A2-SB02) of 230 Ferry Boulevard. At each of these properties, high levels of aromatic hydrocarbons were detected. In addition, acetone and chlorinated hydrocarbons (1,2-DCE and TCE) were detected in samples from 280 Ferry Boulevard. High concentrations of a single VOC, either acetone or carbon disulfide, were detected in subsurface samples collected from 250 Ferry Boulevard and the paved parking lot at 170 Ferry Boulevard. No VOCs were detected in samples collected at depths of over 10.0 feet, with the exception of 5 ug/kg chlorobenzene and 24 ug/kg carbon disulfide in the 14.0-16.0 foot sample from the southeastern region (SP-SO-SB3) of 250 Ferry Boulevard. Furthermore, since samples were not collected for VOC analysis from depths of over 10.0 feet from many of these properties, the vertical extent of VOC contamination was not determined throughout Area A-2.

Surface Soil Samples

One surficial soil sample was collected from each of three locations in the northern half of the study area. VOCs were detected in one, or 33 percent, of these samples. A low concentration (2 ug/kg) of carbon disulfide was detected at one location in the southwestern region (SP-SO-SB8) of 250 Ferry Boulevard. No VOCs were detected in samples collected at 300 and 326 Ferry Boulevard.

Subsurface Soil Samples

A total of twenty-one subsurface soil samples were collected at depths of up to 28.0 feet from sixteen locations throughout the study area. VOCs were detected in fifteen, or 21 percent, of the subsurface samples from twelve locations. The individual VOCs ranged in concentrations from 1 ug/kg to 1,800 ug/kg. The highest concentrations of chlorinated hydrocarbons detected were 730 ug/kg 1,2-DCE and 330 ug/kg TCE in a single sample.

At 326 Ferry Boulevard, medium to high levels of individual VOCs were detected. A medium level of chlorobenzene was detected at depths of up to 6.0 feet at one location in the eastern region (SP-SO-MW110D). No VOCs were detected in the sample collected at 18.0-20.0 feet at this location. High levels of benzene, toluene, and xylenes (total) were detected at depths of up to 6.0 feet in the northwestern region (SP-SO-SB1); no samples were collected at depths over 6.0 feet.

At 300 Ferry Boulevard, medium to high levels of individual VOCs were detected. Medium levels of carbon disulfide, ethylbenzene, methylene chloride, and toluene, and high levels of acetone were detected at depths of up to 8.0 feet at one location in the northeastern region (SP-SO-MW112B). No VOCs were detected in the sample collected at 26.0-28.0 feet at this location. Furthermore, no VOCs were detected at depths of up to 4.0 to 6.0 feet at two locations in the northwestern region (SP-SO-MW111D and OU3-A2-SS01) of the property.

At 280 Ferry Boulevard, medium to high levels of individual VOCs were detected. Medium levels of ethylbenzene, and high levels of acetone, toluene, and xylenes (total) were detected at depths of up to 8.0 feet at one location in the north-central region (OU3-A1-SB01). Medium levels of carbon disulfide, 1,1,2,2-tetrachloroethane, and vinyl chloride, and high levels of 1,2-DCE, ethylbenzene, toluene, TCE, and xylenes (total) were detected at depths up to 4.0 feet at one location in the southeastern region (SP-SO-SB2). No samples were collected at greater depths at either location.

At 250 Ferry Boulevard, low to high levels of VOCs were detected. Low levels of chlorobenzene and carbon disulfide were detected at depths of up to 16.0 feet at one location in the southeastern region (SP-SO-SB3). Low levels of TCE, medium levels of 2-butanone, chlorobenzene, 1,2-DCE, and xylenes (total), and high levels of carbon disulfide were detected at depths of up to 6.0 feet at one location in the southern region (SP-SO-SB4). Low levels of carbon disulfide, medium levels of 2-butanone, and high levels of acetone were detected at depths of up to 10.0 feet at one location in the northwestern region (SP-SO-SB9). No samples were collected at greater depths at any of these locations.

At 230 Ferry Boulevard, medium to high levels of individual VOCs were detected. VOCs were detected at depths of up to 6.0 feet at one location (OU3-A2-SB02) and 4.0 feet at another location (OU3-A2-SB04) in the central region of the property. At location OU3-A2-SB02, the VOCs included medium levels of toluene, and high levels of benzene and xylenes (total). At location OU3-A2-SB04, the VOCs included medium levels of acetone and methylene chloride. No samples were collected at greater depths at either of these locations.

At 200 Ferry Boulevard, low to medium levels of individual VOCs were detected. Low levels of carbon disulfide, ethylbenzene, and 4-methyl-2-pentanone, and low to medium levels of 2-hexanone and xylenes (total) were detected at depths of up to 10.0 feet at one

location in the south-central region (SP-SO-MW113B). No samples were collected from this region at depths over 10.0 feet.

At 190 Ferry Boulevard, no VOCs were detected in the single sample collected, the 12.0-14.0 foot sample from the northern region (SP-SO-SB5).

At the paved parking lot at 170 Ferry Boulevard, low to high levels of VOCs were detected. Low levels of carbon disulfide and 4-methyl-2-pentanone, medium levels of 2-butanone, and high levels of acetone were detected at depths of up to 4.0 feet at one location in the southern region (SP-SO-SB7); no samples were collected at greater depths. Furthermore, no VOCs were detected in the 6.0-8.0 foot sample collected at one location in the northern region (SP-SO-SB6).

Chlorobenzene was detected in two, or 7 percent, of the samples from two locations at low levels, ranging from 5 ug/kg to 94 ug/kg. Low levels were detected in samples collected at depths of up to 6.0 feet at one location in the eastern region (SP-SO-MW110D) of 326 Ferry Boulevard and 6.0 feet at one location in the central region (OU3-A2-SB02) of 230 Ferry Boulevard.

G.2.2.2 SVOCs

Thirty-seven soil samples from twenty-four locations were submitted for analysis of SVOCs. SVOCs were detected in thirty-six, or 97 percent, of the samples at twenty-four locations. The SVOCs were primarily comprised of three majors groups: PAHs, phthalates, and phenols. The distribution of SVOCs was evaluated by grouping the results into the following concentration ranges: <1,000 ug/kg (low level), ≥1,000 but <10,000 ug/kg (medium level), and ≥10,000 ug/kg (high level).

A total of thirty SVOCs were detected, including: eighteen PAHs (acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene), four phthalates bis(2-ethylhexyl)phthalate, butylbenzylphthalate, di-n-butylphthalate, and di-n-octylphthalate), five phenols (2,4-dimethylphenol, 2-methylphenol, 4-chloro-3-methylphenol, 4-methylphenol, and phenol), and three other SVOCs (carbazole, chlorobenzene, and n-nitroso-diphenylamine).

Overall, the results indicate that elevated concentrations of SVOCs, primarily PAHs and phthalates, were detected frequently in both surficial and subsurface soil throughout Area A-2. The higher levels of PAHs were detected in surficial samples collected along the southeastern border (DPS3) of 250 Ferry Boulevard, the eastern border (OU3-A2-SS04) of 230 Ferry Boulevard, and the west-central region (OU3-A2-SS05) of the paved parking lot at 170 Ferry Boulevard; and in subsurface samples collected in the north-central region (OU3-A2-SB01) of 280 Ferry Boulevard, and the southern (SP-SO-SB4) and southeastern (SP-SO-SB3) regions of 250 Ferry Boulevard. The higher levels of phthalates were detected in subsurface samples collected in the northwestern (SP-SO-SB9), southern (SP-SO-SB4), and southeastern (SP-SO-SB3) regions of 250 Ferry Boulevard. The vertical extent of elevated PAH and phthalate concentrations was not determined at many of the properties throughout Area A-2, since the greatest depth sampled varied from 4.0 to 28.0 feet.

Surface Soil Samples

One surficial soil sample was collected from each of ten locations throughout the study area. No surface samples were collected at 200 or 190 Ferry Boulevard.

PAHs. PAHs were detected in all ten samples. Individual PAHs were detected at low to high levels, ranging from 22 ug/kg to 10,000 ug/kg, with the exception of higher levels in three locations.

At 326 Ferry Boulevard, low to medium levels of individual PAHs were detected at one location in the eastern region (SP-SO-MW110D).

At 300 Ferry Boulevard, low to medium levels of individual PAHs were detected at one location in each of the northwestern (OU3-A2-SS01) and the northeastern (OU3-A2-SS02) regions.

At 280 Ferry Boulevard, low to medium levels of individual PAHs were detected at one location in the northwestern region (OU3-A2-SB03).

At 250 Ferry Boulevard, low to high levels of individual PAHs were detected. Low to medium levels were detected at one location along each of the eastern (DPS6) and northern (OU3-A2-SS03) borders, as well as one location in the southwestern region (SP-SO-SB8). Low to high levels were detected at one location along the southeastern border (DPS3).

At 230 Ferry Boulevard, low to high levels of individual PAHs were detected at one location along the eastern border (OU3-A2-SS04).

At the paved parking lot at 170 Ferry Boulevard, low to high levels of individual PAHs were detected at one location in the west-central region (OU3-A2-SS05).

The highest concentration of a single PAH was 32,000 ug/kg fluoranthene at location DPS3.

Phthalates. Phthalates were detected in three, or 30 percent, of the ten samples. Individual phthalates were detected at low levels, ranging from 12 ug/kg to 200 ug/kg, in the following locations: one location in the eastern region (SP-SO-MW110D) of 326 Ferry Boulevard, one location in the northwestern region (OU3-A2-SB03) of 280 Ferry Boulevard, and one location along the eastern border (DPS6) of 250 Ferry Boulevard.

Other SVOCs. Other SVOCs, including carbazole and/or phenols, were detected in all ten samples.

Carbazole was detected in all ten samples at low to medium levels, ranging from 54 ug/kg to 1,900 ug/kg. Low levels were detected in eight of the samples. Medium levels were detected at two locations, including: one location along the eastern border (OU3-A2-SS04) of 230 Ferry Boulevard, and one location in the west-central region (OU3-A2-SS05) of the paved parking lot at 170 Ferry Boulevard.

Phenols were detected in four, or 40 percent, of the samples. Individual phenols were detected at low to medium levels, ranging from 130 ug/kg - 2400 ug/kg. Low levels were detected at two locations: one location in the northeastern region (OU3-A2-SS02) of 300 Ferry Boulevard and one location in the southwestern region (SP-SO-SB8) of 250 Ferry Boulevard. Low to medium levels were detected at two locations: one location in the northwestern region (OU3-A2-SB03) of 280 Ferry Boulevard and one location in the southeastern region (DPS3) of 250 Ferry Boulevard. The highest concentration of a single phenol was 2400 ug/kg of 4-methylphenol at location OU3-A2-SB03.

Subsurface Soil Samples

A total of twenty-seven subsurface soil samples were collected from depths of up to 16.0 feet from eighteen locations, and at depths of up to 28.0 feet at two additional locations, throughout the study area.

PAHs. PAHs were detected in twenty-two, or 81 percent, of the samples from nineteen of twenty locations throughout the study area. Individual PAHs were detected at low and medium levels, ranging from 24 ug/kg to 31,000 ug/kg, with the exception of higher levels at three locations.

At 326 Ferry Boulevard, low to medium levels of individual PAHs were detected at depths ranging up to 6.0 feet at one location in each of the eastern (SP-SO-MW110D) and northwestern (SP-SO-SB1) regions. No PAHs were detected in the 18.0-20.0 foot sample collected in the eastern region. No samples were collected from depths over 6.0 feet in the northwestern region.

At 300 Ferry Boulevard, low to medium levels of individual PAHs were detected. Low levels were detected at depths of up to 8.0 feet at one location in the northeastern region (SP-SO-MW112B). No PAHs were detected in the 26.0-28.0 foot sample from this location. Low to medium levels were detected at depths of up to 10.0 feet at one location in the northwestern region (SP-SO-MW111D). No samples were collected from this region at depths over 6.0 feet. Furthermore, no PAHs were detected in the 2.0-4.0 foot sample collected at an additional location (OU3-A2-SS01) in the northwestern region.

At 280 Ferry Boulevard, low to high levels of individual PAHs were detected. Medium levels were detected at depths up to 4.0 feet at one location in the southeastern region (SP-SO-SB2). Low to high levels were detected at depths up to 16.0 feet at one location in the north-central region (OU3-A2-SB01). No PAHs were detected in the 14.0-16.0 foot sample collected at one location in the northwestern region (OU3-A2-SB03). No samples were collected from either region at depths over 16.0 feet.

At 250 Ferry Boulevard, low to high levels of individual PAHs were detected. Medium to high levels were detected at depth of up to 16.0 feet at one location in the southeastern (SP-SO-SB3), 6.0 feet at one location in the southern (SP-SO-SB4), and 10.0 feet at one location in the northwestern (SP-SO-SB9) regions. No samples were collected at greater depths at any of these locations.

At 230 Ferry Boulevard, low to medium levels of individual PAHs were detected. Low levels were detected at depths up to 14.0 feet at one location in the central region

(OU3-A2-SB04). Low to medium levels were detected at depths of up to 16.0 feet at one location (OU3-A2-SB02) and 4.0 feet at another location (OU3-A2-SB04) in the central region, and at depths of up to 4.0 feet at one location along the eastern border (OU3-A2-SS04). No samples were collected at greater depths at any of these locations.

At 200 Ferry Boulevard, low to medium levels of individual PAHs were detected at depths of up to 6.0 feet at one location in the eastern region (SP-SO-SW113B). No PAHs were detected in the 8.0-10.0 foot sample from this location.

At 190 Ferry Boulevard, low levels of individual PAHs were detected in the 12.0-14.0 foot sample at one location in the northern region (SP-SO-SB5). No samples were collected at a greater depths.

At the paved parking lot at 170 Ferry Boulevard, low to medium levels of individual PAHs were detected. Low levels were detected at depths of up to 4.0 feet at one location in the west-central (OU3-A2-SS05) and 8.0 feet at one location in the northern (SP-SO-SB6) regions. Low to medium levels were detected at depths of up to 4.0 feet at one location in the southern region (SP-SO-SB7). No samples were collected at greater depths at any of these locations.

The highest concentration of a single PAH was 31,000 ug/kg phenanthrene in the 14.0-16.0 foot sample at location SP-SO-SB3.

Phthalates. Phthalates were detected in fourteen, or 52 percent, of the twenty-seven samples from eleven locations. Individual phthalates were detected at low levels, ranging from 30 ug/kg to 910 ug/kg, with the exception of higher levels in four locations.

At 326 Ferry Boulevard, low to medium levels of individual phthalates were detected. Low levels were detected at a depth of up to 20.0 feet at one location in the eastern region (SP-SO-MW110D). A medium level of a single phthalate was detected at a depth of up to 6.0 feet at one location in the northwestern region (SP-SO-SB1). No samples were collected from greater depths at either location.

At 300 Ferry Boulevard, low levels of individual phthalates were detected at depths of up to 8.0 feet in the northeastern region (SP-SO-MW112B). No phthalates were detected in the 26.0-28.0 foot sample from this location. Furthermore, no phthalates were detected in the 2.0-4.0 foot sample collected at one location (OU3-A2-SS01) or the 8.0-10.0 foot sample at another location (SP-SO-MW111D) in the northwestern region.

At 280 Ferry Boulevard, low to medium levels of individual phthalates were detected at depths of up to 16.0 feet in the north-central region (OU3-A2-SB01). No samples were collected at greater depths in this region. Furthermore, no phthalates were detected in the 2.0-4.0 foot sample collected at one location in the southeastern (SP-SO-SB2) or the 14.0-16.0 foot sample collected at one location in the northwestern (OU3-A2-SB03) regions.

At 250 Ferry Boulevard, medium to high levels of individual phthalates were detected. Medium to high levels were detected at depths of up to 16.0 feet at one location in the southeastern region (SP-SO-SB3). A high level of a single phthalate was detected at depths of up to 6.0 feet at one location in the southern (SP-SO-SB4) and 10.0 feet at one location

in the northwestern (SP-SO-SB9) regions. No samples were collected at greater depths at any of these locations.

At 230 Ferry Boulevard, low levels of individual phthalates were detected at depths of up to 16.0 feet at one location in the central region (OU3-A2-SB02). No samples were collected at greater depths. Furthermore, no phthalates were detected in the 2.0-4.0 foot sample collected at one location (OU3-A2-SB04) and the 12.0-14.0 foot samples at another location (OU3-A2-SB04A) in the central region, or in the 2.0-4.0 foot sample at one location along the eastern border (OU3-A2-SS04).

At 200 Ferry Boulevard, a low level of a single phthalate was detected in the 4.0-6.0 foot sample collected one location in the eastern region (SP-SO-SW113B). No phthalates were detected in the 8.0-10.0 foot sample at this location.

At 190 Ferry Boulevard, a low level of a single phthalate was at a depth of up to 14.0 feet at one location in the northern region (SP-SO-SB5). No samples were collected at greater depths.

At the paved parking lot at 170 Ferry Boulevard, low to medium levels of individual phthalates were detected at depths of up to 6.0 feet at one location in the northern region (SP-SO-SB6). No samples were collected at greater depths. Furthermore, no phthalates were detected in the 2.0-4.0 foot samples collected at one location in each of the west-central (OU3-A2-SS05) and southern (SP-SO-SB7) regions.

The highest concentration of a single phthalate was 65,000 ug/kg bis(2-ethylhexyl)phthalate in the 8.0-10.0 foot sample at location SP-SO-SB9.

Other SVOCs. Other SVOCs, including carbazole, chlorobenzene, n-nitroso-diphenylamine, and/or phenols were detected in eighteen, or 67 percent, of the twenty-seven samples from thirteen locations.

Carbazole was detected in fourteen, or 52 percent, of the samples from eleven locations at low to medium levels, ranging from 52 ug/kg to 6,500 ug/kg. Low levels were detected in samples collected at depths of up to 6.0 feet at one location in each of the eastern (SP-SO-MW110D) and northwestern (SP-SO-SB1) regions of 326 Ferry Boulevard, 8.0 feet at one location in the northeastern (SP-SO-MW112B) and 10.0 feet at one location in the northwestern (SP-SO-MW111D) regions of 300 Ferry Boulevard, 6.0 feet at one location in the central region (OU3-A2-SB02) and 4.0 feet at one location along the eastern border (OU3-A1-SS04) of 230 Ferry Boulevard, 6.0 feet at one location in the eastern region (SP-SO-MW113B) of 200 Ferry Boulevard, and 4.0 feet at one location in the southern region (SP-SO-SB7) of the paved parking lot at 170 Ferry Boulevard. Medium levels were detected at depths of up to 16.0 feet at one location in the north-central region (OU3-A1-SB01) of 280 Ferry Boulevard, and 6.0 feet at one location in the south-central (SP-SO-SB4) and 10.0 feet at one location in the northwestern (SP-SO-SB9) regions of 250 Ferry Boulevard. No samples were collected at greater depths in the northwestern region of 326 Ferry Boulevard, the northwestern region of 300 Ferry Boulevard, the north-central region of 280 Ferry Boulevard, the south-central and northwestern regions of 250 Ferry Boulevard, the eastern border of 230 Ferry Boulevard, and the southern region of the paved parking lot at 170 Ferry Boulevard.

N-nitroso-diphenylamine was detected in six, or 22 percent, of the samples from five locations at low to medium levels, ranging from 26 ug/kg to 1,600 ug/kg. Low levels were detected in samples collected at depths of up to 8.0 feet at one location in the northeastern region (SP-SO-MW112B) of 300 Ferry Boulevard, 8.0 feet at one location in the northwestern region (SP-SO-SB9) of 250 Ferry Boulevard, 4.0 feet at one location in the central region (OU3-A2-SB02) of 230 Ferry Boulevard, and 6.0 feet at one location in the eastern region (SP-SO-MW113B) of 200 Ferry Boulevard. Medium levels were detected at depths of up to 16.0 feet at one location in the north-central region (OU3-A1-SB01) of 280 Ferry Boulevard. No samples were collected at greater depths in the north-central region of 280 Ferry Boulevard.

Phenols were detected in fifteen, or 56 percent, of the samples from twelve locations. Individual phenols were detected at low to medium levels, ranging from 33 ug/kg to 7,200 ug/kg. Low levels were detected in samples collected at depths of up to 6.0 feet at one location in the eastern region (SP-SO-MW110D) of 326 Ferry Boulevard; 16.0 feet at one location in the northwestern region (OU3-A2-SB03) of 280 Ferry Boulevard; 8.0 feet at one location in the northwestern region (SP-SO-SB9) of 250 Ferry Boulevard; 6.0 feet at one location (OU3-A2-SB02), 4.0 feet at one location (OU3-A2-SB04), and 14.0 feet at one location (OU3-A2-SB04A) in the central region of 230 Ferry Boulevard; 8.0 feet at one location in the eastern region (SP-SO-MW113B) of 200 Ferry Boulevard; and 4.0 feet at one location in the southern region (SP-SO-SB7) of the paved parking lot at 170 Ferry Boulevard. Low to medium levels were detected at depths of up to 8.0 feet at one location in the northeastern (SP-SO-MW112B) and 10.0 feet at one location in the northwestern (SP-SO-MW111D) regions of 300 Ferry Boulevard. Low to high levels were detected at depths of up to 16.0 feet at one location in the north-central region (OU3-A1-SB01) of 280 Ferry Boulevard. No samples were collected at greater depths in the northwestern region of 300 Ferry Boulevard, the north-central and northwestern regions of 280 Ferry Boulevard, the central region of 230 Ferry Boulevard, the eastern region of 200 Ferry Boulevard, or the southern region of the paved parking lot at 170 Ferry Boulevard.

G.2.2.3 Pesticides/PCBs

Forty-three soil samples from thirty locations were submitted for analysis of pesticides/PCBs. Thirty-five samples from nine additional locations were screened for PCBs. Pesticides were detected above background concentrations in twenty-four, or 56 percent, of the samples. PCBs were detected above background concentrations in thirty, or 70 percent, of the samples. The distribution of pesticides/PCBs was evaluated by grouping the results into the following concentration ranges: ≥ background concentrations (BG) but <2 x BG (low level), ≥2 x BG but <10 x BG (medium level), and ≥10 x BG (high level).

A total of twenty-two pesticides/PCBs were detected, including: seventeen pesticides (4,4'-DDD, 4,4'-DDE, alpha-chlordane, beta-BHC, delta-BHC, gamma-GHC, dieldrin, endosulfan I, endosulfan II, endosulfan sulfate, endrin, endrin aldehyde, endrin ketone, gamma-chlordane, heptachlor, heptachlor epoxide, and methoxychlor); and five PCBs (Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1262, and Aroclor-1268).

Overall, the results indicate that elevated concentrations of select pesticides and PCBs were detected frequently in both surficial and subsurface soil throughout Area-2. Of the

subsurface samples containing pesticides, approximately half contained a single pesticide. The higher levels of pesticides were detected in surficial samples collected in the northeastern region (OU3-A2-SS02) of 300 Ferry Boulevard, in the northwestern region (OU3-A2-SB03) of 280 Ferry Boulevard, along the southeastern (DPS3), northern (OU3-A2-SS03), and northeastern (SPDPS001) borders of 250 Ferry Boulevard, and along the eastern border (OU3-S2-SS04) of 230 Ferry Boulevard; and in subsurface samples collected in the eastern region (SP-SO-MW110D) of 326 Ferry Boulevard, the south-eastern (SP-SO-SB2), north-central (OU3-A2-SB01), and northwestern (SP-SO-SB9) regions of 280 Ferry Boulevard, the northwestern region (SP-SO-SB9) of 250 Ferry Boulevard, and the northern region (SP-SO-SB6) of the paved parking lot at 170 Ferry Boulevard. The higher levels of PCBs were detected in surficial samples collected in the northeastern region (OU3-A2-SS02) of 300 Ferry Boulevard, in the northwestern region (OU3-A2-SB03) of 280 Ferry Boulevard, along the southeastern (DPS3), eastern (DPS6), northern (OU3-A2-SS03), and northeastern (SPDPS001) borders and in the southwestern region (SP-SO-SB8) of 250 Ferry Boulevard, in the northeastern region (SPTS006) region of 200 Ferry Boulevard, and in the west-central region (SPEL-003) of the paved parking lot at 170 Ferry Boulevard; and in subsurface samples collected in the northwestern (SP-SO-MW111D) and northeastern (SP-SO-MW112B) regions of 300 Ferry Boulevard, in the south-eastern (SP-SO-SB2) and north-central (OU3-A2-SB01) regions of 280 Ferry Boulevard, in the southern (SP-SO-SB4), southeastern (SP-SO-SB3), and northwestern region (SP-SO-SB9) of 250 Ferry Boulevard, along the eastern border (OU3-A2-SS04) of 230 Ferry Boulevard, and in the northern region (SP-SO-SB6) of the paved parking lot at 170 Ferry Boulevard. No pesticides or PCBs were detected in samples from depths of over 16.0 feet. The vertical extent of elevated pesticide and PCB concentrations was not determined at many of the properties throughout Area A-2, since the greatest depth sampled varied from 4.0 to 20.0 feet.

Surface Soil Samples

One surficial soil sample was collected from each of sixteen locations throughout the study area. No samples were collected at 190 Ferry Boulevard.

Pesticides. One to three pesticides were detected above background concentrations in eleven, 69 percent, of the sixteen samples. Concentrations of individual pesticides ranged from 4.0 ug/kg to 560 ug/kg.

At 326 Ferry Boulevard, low levels of a single pesticide (4,4'-DDD) were detected at one location in the eastern region (SP-SO-MW110D).

At 300 Ferry Boulevard, low to high levels of individual pesticides were detected. A low level of 4,4'-DDD and a medium level of endrin aldehyde were detected at one location in the northwestern region (OU3-A2-SS01). A high level of endrin aldehyde was detected at one location in the northeastern region (OU3-A2-SS02). No pesticides were detected along the northeastern border (SPSCA + 390).

At 280 Ferry Boulevard, a high level of endrin aldehyde was detected at one location in the northwestern region (OU3-A2-SB03). No pesticides were detected along the southwestern border (SPHMB + 100).

At 250 Ferry Boulevard, low to high levels of individual pesticides were detected. A low level of gamma-chlordane and a medium level of heptachlor epoxide were detected at one location in the southwestern region (SP-SO-SB8). A medium level of alpha-chlordane and high levels of endrin and gamma-chlordane were detected at one location along each of the southeastern border(DPS3). A medium level of gamma-chlordane was detected at one location along the eastern border (DPS6). A medium level gamma-chlordane and a high level of endrin ketone were detected at one location along the northeastern border (SPDPS001). A low level of 4,4'-DDD and a high level of endrin aldehyde was detected at one location along the northern border (OU3-A2-SS03).

At 230 Ferry Boulevard, low levels of 4,4'-DDD and gamma-chlordane and a high level of endrin aldehyde were detected at one location along the eastern border (OU3-A2-SS04). No pesticides were detected along the southeastern border (SPVM007).

At 200 Ferry Boulevard, low levels of endrin ketone and methoxychlor and a medium level of endosulfan II were detected at one location in the northeastern region (SPTS006).

At the paved parking lot at 170 Ferry Boulevard, no pesticides were detected in the east-central (SPEL-003) or west-central (OU3-A2-SS05) regions.

The highest concentration of a single pesticide was 560 ug/kg endrin aldehyde at location OU3-A2-SB03.

PCBs. One to three PCBs were detected above background concentrations in thirteen, or 81 percent, of the sixteen. Concentrations of individual PCBs ranged from 47 ug/kg to 32,000 ug/kg.

At 326 Ferry Boulevard, medium levels of Aroclor-1262 and Aroclor-1268 were detected at one location in the eastern region (SP-SO-MW110D).

At 300 Ferry Boulevard, medium levels of individual PCBs were detected. Medium levels of Aroclor-1262 and Aroclor-1268 were detected at one location in the northwestern region (OU3-A2-SS01). A medium level of Aroclor-1268 was detected at one location along the northeastern border (SPSCA+390). A medium level of Aroclor-1248 and high levels of Aroclor-1262 and Aroclor-1268 were detected at one location in the northeastern region (OU3-A2-SS02).

At 280 Ferry Boulevard, medium to high levels of individual PCBs were detected. Medium levels of Aroclor-1262 and Aroclor-1268 were detected at one location along the southwestern border (SPHMB+100). High levels were detected at one location in the northwestern region (OU3-A2-SB03).

At 250 Ferry Boulevard, low to high levels of individual PCBs were detected. High levels of Aroclor-1262 and Aroclor-1268 were detected at one location along each of the southeastern (DPS3), eastern (DPS6), and northern (OU3-A2-SS03) borders, and one location in the southwestern region (SP-SO-SB8). A low level of Aroclor-1248 was also detected at location OU3-A2-SS03. No PCBs were detected along the northeastern border (SPDPS001).

At 230 Ferry Boulevard, medium levels of Aroclor-1262 and Aroclor-1268 were detected at one location along the eastern border (OU3-A2-SS04). No PCBs were detected along the southeastern border (SPVM007).

At 200 Ferry Boulevard, a high level of Aroclor-1262 was detected at one location in the northeastern region (SPTS006).

At the paved parking lot at 170 Ferry Boulevard, a high level of Aroclor-1268 was detected at one location sampled in the east-central region (SPEL-003). No PCBs were detected in the west-central region (OU3-A2-SS05).

The highest concentration of a single PCB was 32,000 ug/kg Aroclor-1268 at location OU3-A2-SB03.

Subsurface Soil Samples

A total of twenty-seven subsurface soils were collected from depths of up to 20.0 feet from twenty locations throughout the study area.

Pesticides. One to six pesticides were detected above background concentrations in seventeen, or 65 percent, of the samples collected from thirteen locations. However, approximately 50 percent of these samples contained only a single pesticide. Concentrations of individual pesticides ranged from 2.7 ug/kg to 2,000 ug/kg.

At 326 Ferry Boulevard, low to high levels of individual pesticides were detected at depths ranging up to 6.0 feet at one location in the eastern region (SP-SO-MW110D). The pesticides included low levels of delta-BHC and endosulfan II, a medium level of heptachlor epoxide, and high levels of 4,4'-DDD and methoxychlor. No pesticides were detected in the 18.0-20.0 foot sample collected at this location. Furthermore, no pesticides were detected at depths of up to 6.0 feet in the northwestern region (SP-SO-SB1).

At 300 Ferry Boulevard, low to medium levels of individual pesticides were detected. A low level of 4,4'-DDD was detected at depths of up to 4.0 feet at one location (OU3-A2-SS01), and low levels of 4,4'-DDE, endosulfan II, endosulfan sulfate, and endrin aldehyde and a medium level of 4,4'-DDD were detected at depths of up to 10.0 feet at another location (SP-SO-MW111D) in the northwestern region. A low level of beta-BHC and a medium level of endosulfan sulfate were detected at depths of up to 8.0 feet at one location in the northeastern region (SP-SO-MW113B). No samples were collected at greater depths at any of these locations.

At 280 Ferry Boulevard, low to high levels of individual pesticides were detected. A low level of dieldrin, a medium level of endosulfan I, and a high level of gamma-chlordane were detected at depths of up to 4.0 feet at one location in the southeastern region (SP-SO-SB2). A high level of endrin aldehyde was detected at depths of up to 16.0 feet at one location in the north-central region (OU3-A2-SB01). No pesticides were detected in the 14.0-16.0 foot sample collected in the northwestern region (OU3-A2-SB03). No samples were collected at greater depths at any of these locations.

At 250 Ferry Boulevard, low to high levels of individual pesticides were detected. A low level of heptachlor and medium levels of alpha-chlordane, endosulfan I, and gamma-chlordane were detected at depths of up to 6.0 feet at one location (SP-SO-SB4) and a low level of 4,4'-DDD was detected at depths of up to 4.0 feet at another location (SP-SO-SB7) in the southern region. Low to high levels of 4,4'-DDD were detected at depths of up to 10.0 feet at one location in the northwestern region (SP-SO-SB9). No pesticides were detected in the 14.0-16.0 foot sample collected at one location in the southeastern region (SP-SO-SB3). No samples were collected at greater depths at any of these locations.

At 230 Ferry Boulevard, low to medium levels of individual pesticides were detected. A low level of endosulfan II and medium levels of dieldrin and gamma-chlordane were detected at depths of up to 4.0 feet at one location along the eastern border (OU3-A2-SS04). A low level of dieldrin was detected at depths of up to 16.0 feet at one location (OU3-A2-SB02), and low levels of heptachlor and endrin ketone were detected at depths of up to 14.0 feet at another location (OU3-A2-SB04) in the central region. No samples were collected at greater depths at any of these locations.

At 200 Ferry Boulevard, low to medium levels of individual pesticides were detected at depths of up to 6.0 feet one location in the eastern region (SP-SO-MW113B). The pesticides included low levels of 4,4'-DDT and endrin aldehyde; low to medium levels of 4,4'-DDD; and medium levels of beta-BHC, gamma-chlordane, and heptachlor epoxide. No pesticides were detected in the 8.0-10.0 foot sample.

At 190 Ferry Boulevard, no pesticides were detected in the 12.0-14.0 foot sample in the northern region (SP-SO-SB5).

At the paved parking lot at 170 Ferry Boulevard, low to medium levels of individual pesticides were detected. A low level of 4,4'-DDD was detected at depths of up to 4.0 feet at one location in the southern region (SP-SO-SB7). Low levels of endosulfan II, endosulfan sulfate, and endrin, medium levels of gamma-BHC and gamma-chlordane, and a high level of 4,4'-DDD were detected in the 6.0-8.0 foot sample at one location in the northern region (SP-SO-SB6). No pesticides were detected in the 2.0-4.0 foot sample at one location in the west-central region (OU3-A2-SS05). No samples were collected at greater depths at any of these locations.

The highest concentration of a single pesticide was 2,000 ug/kg endrin aldehyde in the 6.0-8.0 foot sample at location OU3-A2-SB01.

PCBs. One to four PCBs were detected above background concentrations in twenty-one, or 78 percent, of the twenty-seven samples from seventeen locations. Concentrations of individual PCBs ranged from 51 ug/kg to 97,000 ug/kg.

At 326 Ferry Boulevard, medium levels of Aroclor-1262 and Aroclor-1268 were detected at depths ranging up to 6.0 feet at one location in the eastern region (SP-SO-MW110D). No PCBs were detected in the 18.0-20.0 foot sample collected at this location. Furthermore, no PCBs were detected at depths of up to 6.0 feet in the northwestern region (SP-SO-SB1).

At 300 Ferry Boulevard, medium to high levels of individual PCBs were detected. Medium levels of Aroclor-1268 was detected at depths of up to 4.0 feet at one location (OU3-A2-SS01). High levels of Aroclor-1262 and Aroclor-1268 were detected at depths of up to 10.0 feet at of one location in the northwestern (SP-SO-MW111D) and 8.0 feet at one location in the northeastern (SP-SO-MW112B) regions. No samples were collected at greater depths at any of these locations.

At 280 Ferry Boulevard, low to high levels of individual PCBs were detected. High levels of Aroclor-1242, Aroclor-1254, Aroclor-1262, and Aroclor-1268 were detected at depths up to 4.0 feet at one location in the southeastern region (SP-SO-SB2). High levels of Aroclor-1262 and Aroclor-1268 were detected at depths of up to 16.0 feet at one location in the north-central region (OU3-A2-SB01). A low level of Aroclor-1268 was detected in the 14.0-16.0 foot sample collected in the northwestern region (OU3-A2-SB03). No samples were collected at greater depths at any of these locations.

At 250 Ferry Boulevard, medium to high levels of individual PCBs were detected. High levels of Aroclor-1262 and Aroclor-1268 were detected at depths of up to 6.0 feet at one location in the southern region (SP-SO-SB4). A high level of Aroclor-1268 was detected in the 14.0-16.0 foot sample at one location in the southeastern region (SP-SO-SB3). Medium to high levels of Aroclor-1262 and medium levels of Aroclor-1268 were detected at depths of up to 10.0 feet at one location in the northwestern region (SP-SO-SB9). No samples were collected at greater depths at any of these locations.

At 230 Ferry Boulevard, medium to high levels of individual PCBs were detected. High levels of Aroclor-1262 and Aroclor-1268 were detected at depths of up to 4.0 feet at one location along the eastern border (OU3-A2-SS04). A medium level of Aroclor-1268 was detected in the 12.0-14.0 foot sample at one location in the central region (OU3-A2-SB04). No samples were collected at greater depths at either of these locations. Medium levels of Aroclor-1262 and Aroclor-1268 were detected at depths of up to 6.0 feet at another location in the central region (OU3-A2-SB02). No PCBs were detected in the 14.0-16.0 foot sample collected at this location.

At 200 Ferry Boulevard, low to medium levels of individual PCBs were detected. Medium levels of Aroclor-1254 were detected at depths of up to 6.0 feet, and low to medium levels of Aroclor-1262, and Aroclor-1268 were detected at depths of up to 10.0 feet at one location in the eastern region (SP-SO-MW113B). No samples were collected at greater depths at this location.

At 190 Ferry Boulevard, low levels of Aroclor-1262 and Aroclor-1268 were detected in the 12.0-14.0 foot sample in the northern region (SP-SO-SB5). No samples were collected at greater depths at this location.

At the paved parking lot at 170 Ferry Boulevard, low to high levels of individual PCBs were detected. Medium levels of Aroclor-1262 and Aroclor-1268 were detected at depths of up to 4.0 feet at one location in the southern region (SP-SO-SB7). A low level of Aroclor-1268, a medium level of Aroclor-1268, and a high level of Aroclor-1254 were detected in the 6.0-8.0 foot sample at one location in the northern region (SP-SO-SB6). No PCBs were detected in the 2.0-4.0 foot sample at one location in the west-central region (OU3-A2-SS05). No samples were collected at greater depths at any of these locations.

The highest concentrations of single PCBs were 97,000 ug/kg Aroclor-1262 and 57,000 ug/kg Aroclor-1268 in the 2.0-4.0 foot sample at location SP-SO-SB2.

G.2.2.4 Dioxins and Furans

Twenty-five soil samples from eighteen locations were submitted for analysis of dioxins and furans. Individual dioxins and/or furans were detected in nineteen, or 76 percent, of the samples. The most toxic congener (2,3,7,8-TCDD) was detected in only three subsurface samples. The Total PeCDF congener was the most frequently detected furan. The OCDD congener was the most frequently detected dioxin. The sums of the dioxin and furan concentrations was expressed as 2,3,7,8-TCDD Toxicity Equivalency (TEQ), based on calculations by the analytical laboratory. The distribution of dioxins and furans was evaluated by grouping the results into the following concentration ranges: < 0.001 ug/kg (low level), ≥ 0.001 but < 0.01 ug/kg (medium level), and ≥ 0.01 ug/kg (high level).

Overall, the results indicate that elevated TEQ concentrations were reported frequently in both surficial and subsurface soil throughout Area A-2. The higher TEQs were reported in surficial samples collected along the southeastern (DPS3), eastern (DPS6), and northern (OU3-A2-SS03) borders of 250 Ferry Boulevard, and the eastern border (OU3-A2-SS04) of 230 Ferry Boulevard; and in subsurface samples collected in the southeastern (SP-SO-SB2) and north-central (OU3-A2-SB01) regions of 280 Ferry Boulevard, in the southeastern region (SP-SO-SB3) of 250 Ferry Boulevard, along the eastern border (OU3-A2-SS04) and in the central region (OU3-A2-SB02) of 230 Ferry Boulevard, in the eastern region (SP-SO-MW113B) of 200 Ferry Boulevard, and in the northern region (SP-SO-SB6) of the paved parking lot at 170 Ferry Boulevard. No elevated TEQ concentrations were reported in samples collected at depths of over 8.0 feet. The vertical extent of elevated TEQ concentrations was not determined at many of the properties throughout Area A-2, since the greatest depths samples varied from 0.5 to 28.0 feet.

Surface Soil Samples

One surficial soil sample was collected from each of six locations in the northern and central portions of the study area. No samples were collected from 300, 280, 200, 190, or 170 Ferry Boulevard.

TEQ concentrations, ranging from 0.00292 ug/kg to 1.08 ug/kg, were reported in the six samples. The most toxic congener (2,3,7,8-TCDD) was not detected in any of the samples.

At 326 Ferry Boulevard, medium TEQ concentrations were reported at one location in the eastern region (SP-SO-MW110D).

At 250 Ferry Boulevard, medium to high TEQ concentrations were reported. Medium levels were reported at one location in the southwestern region (SP-SO-SB8). High levels were reported at one location along each of the southeastern (DPS3), eastern (DPS6), and northern (OU3-A2-SS03) borders.

At 230 Ferry Boulevard, high TEQ concentrations were reported at one location along the eastern border (OU3-A2-SS04).

The highest TEQ concentrations were 1.08 ug/kg at location DPS3 and 0.42 ug/kg at location DPS6. No other TEQ concentration exceeded 0.242 ug/kg.

Subsurface Soil Samples

Nineteen subsurface soil samples were collected from depths of up to 28.0 feet in fourteen locations throughout the study area.

TEQ concentrations, ranging from 0.0015 ug/kg to 3.68 ug/kg, were reported in thirteen, or 68 percent, of the samples. The most toxic congener (2,3,7,8-TCDD) was detected in only three samples, including: the 14.0-16.0 foot sample at one location in the north-central region (OU3-A2-SB01) of 280 Ferry Boulevard, and the 2.0-4.0 foot sample along the eastern border (OU3-A2-SS04) and the 4.0-6.0 foot sample in the central region (OU3-A2-SB02) of 230 Ferry Boulevard.

At 326 Ferry Boulevard, a medium TEQ concentration was reported at depths of up to 6.0 feet in the eastern region (SP-SO-MW110D). No dioxins or furans were detected in the 18.0-20.0 foot sample from this location. Furthermore, no dioxins or furans were detected in the 4.0-6.0 foot sample collected in the northwestern region (SP-SO-SB1).

At 300 Ferry Boulevard, medium to high TEQ concentrations were reported. Medium levels were reported at depths of up to 10.0 feet at one location in the northwestern region (SP-SO-MW111D). No samples were collected at greater depths at this location. A high level was reported at depths of up to 8.0 feet at one location in the northeastern region (SP-SO-MW112B). No dioxins or furans were reported in the 26.0-28.0 foot sample at this location.

At 280 Ferry Boulevard, high TEQ concentrations were reported in the 2.0-4.0 foot sample at one location in the southeastern (SP-SO-SB2) and in the 14.0-16.0 feet at one location in the north-central (OU3-A2-SB01) regions. No samples were collected from greater depths at either location.

At 250 Ferry Boulevard, medium to high TEQ concentrations were reported. A high level was reported in the 14.0-16.0 foot sample at one location in the southeastern region (SP-SO-SB3). No samples were collected at greater depths at this location. A medium level was reported in the 6.0-8.0 foot sample at one location in the northwestern region (SP-SO-SB9). No dioxins or furans were detected in the 8.0-10.0 foot sample collected at this location.

At 230 Ferry Boulevard, high TEQ concentrations were reported in the 4.0-6.0 foot sample at one location in the central region (OU3-A2-SB02), and in the 2.0-4.0 foot sample at one location along the eastern border (OU3-A2-SS04). No samples were collected from greater depths at either location.

At 200 Ferry Boulevard, a high TEQ concentration was reported in the 2.0-4.0 foot sample, and a medium level was reported in the 4.0-6.0 foot sample at one location in the eastern region (SP-SO-MW113B). No dioxins or furans were detected in the 8.0-10.0 foot sample collected at this location.

At 190 Ferry Boulevard, no dioxins or furans were detected in the 12.0-14.0 foot sample at one location in the northern region (SP-SO-SB3).

At the paved parking lot at 170 Ferry Boulevard, medium to high TEQ concentrations were reported. A medium level was reported in the 2.0-4.0 foot sample in the southern region (SP-SO-SB7). A high level was reported in the 6.0-8.0 foot sample in the northern region (SP-SO-SB6). No samples were collected from greater depths at either location.

The highest TEQ concentrations were 3.68 ug/kg in the 14.0-16.0 foot sample at location OU3-A2-SB01 and 0.975 ug/kg in the 14.0-16.0 foot sample at location SP-SO-SB2. No other TEQ concentration exceeded 0.306 ug/kg.

G.2.2.5 Metals

Fifty-two soil samples from thirty-three locations were submitted for analysis of metals. One hundred fifty-seven samples from eighteen locations were screened for both copper and lead, and one sample from each of ninety-two locations were screened for lead alone. The distribution of metals was evaluated by grouping the results into the following concentration ranges: ≥ background concentrations (BG) but <2 x BG (low level), ≥2 x BG but <10 x BG (medium level), and ≥10 x BG (high level). In addition, one sample from each of six locations were submitted for extraction and analysis of Synthetic Precipitation Leaching Procedure (SPLP) metals. The distribution of metals was evaluated by grouping the results into the following concentration ranges: ≥ GB classified aquifer mobility criteria in the State of Connecticut (GB) but < 2 x GB (low level), ≥ 2 x GB but < 10 x GB (medium level), and ≥ 10 x GB (high level).

All of the twenty-three TAL metals, except antimony, were detected above background concentrations in at least one sample.

Overall, the results indicate that elevated concentrations of metals were detected frequently in both surficial and subsurface soil throughout Area A-2. Two metals, copper and lead, are considered the most indicative of contamination associated with operations at the Raymark Facility. Elevated concentrations of these metals were detected in over 50 percent of the soil samples collected, as follows:

> **Copper** was detected above background concentrations at all locations, except for surficial soil samples from the west-central region (OU3-A2-SS05) of the paved parking lot at 170 Ferry Boulevard; and subsurface samples from the central region (OU3-A2-SB02) of 230 Ferry Boulevard. Copper levels more than 20 times the background concentration of 28.8 mg/kg were detected in surficial samples along the southeastern (DPS3), eastern (DPS6 and SPDPS-002), northeastern (SPDPS001), and northern (OU3-A2-SS03) borders and in the southwestern region (SP-SO-SB8) of 250 Ferry Boulevard; and in subsurface samples in the northeastern region (OU3-A2-SS02 and SP-SO-MW112B) of 300 Ferry Boulevard, the southeastern (SP-SO-SB2), north-central (OU3-A2-SB01) and northwestern (OU3-A2-SB03) regions of 280 Ferry Boulevard, the southwestern (SP-SO-SB8), southern (SP-SO-SB4), and southeastern (SP-SO-SB3) regions of 250 Ferry

Boulevard, along the eastern border (OU3-A2-SS04) of 230 Ferry Boulevard, and in the eastern region (SP-SO-MW113B) of 200 Ferry Boulevard. No elevated concentrations of copper were detected at depths of over 18.0 feet.

Lead was detected above background concentrations in all locations, except for surficial soil samples from the eastern border (FBE+1300) of 250 Ferry Boulevard and the west-central region (OU3-A2-SS05) of the paved parking lot at 170 Ferry Boulevard; and subsurface samples from the northwestern region (SP-SO-SB1) of 326 Ferry Boulevard, the northwestern region (OU3-A2-SB03) of 250 Ferry Boulevard, the central region (OU3-A2-SB02) of 230 Ferry Boulevard, the northern region (SP-SO-SB5) of 190 Ferry Boulevard, and the west-central region (OU3-A2-SS05) of the paved parking lot at 170 Ferry Boulevard. Lead levels more than 20 times the background concentration of 80.8 mg/kg were detected in surficial samples along the southeastern (DPS3) and eastern (DPS6) borders and in the southwestern region (SP-SO-SB8) of 250 Ferry Boulevard; and in subsurface samples in the northeastern region (OU3-A2-SS02 and SP-SO-MW112B) of 300 Ferry Boulevard, the southeastern (SP-SO-SB2), north-central (OU3-A2-SB01) and northwestern (OU3-A2-SB03) regions of 280 Ferry Boulevard, the southwestern (SP-SO-SB8) and southern (SP-SO-SB4) regions of 250 Ferry Boulevard. No elevated concentrations of lead were detected at depths of over 18.0 feet.

Elevated concentrations of leachable lead were detected frequently in surficial and subsurface soil samples collected for SPLP metals analysis from throughout Area A-2. Leachable copper was detected in the samples analyzed.

Surface Soil Samples

One surficial soil sample was collected at each of nineteen locations and submitted for metal analysis. One sample collected at each of thirteen locations was screened for both copper and lead, and one sample collected at each of one hundred five locations were screened for lead alone. In addition, one sample from each of two locations was submitted for analysis of SPLP metals.

Metals Analysis and Screening. Elevated concentrations of metals detected in the nineteen samples included: in less than 5 percent of the samples - antimony, silver, and thallium (neither detected in any samples); in 5-25 percent of the samples - aluminum, beryllium, mercury, and selenium; in 25-50 percent of the samples - arsenic, cadmium, manganese, sodium, and vanadium; in greater than 50 percent of the samples - barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, nickel, potassium, and zinc.

At 326 Ferry Boulevard, low to high levels of various metals were detected. A high level of calcium was detected in the single sample collected for metals analysis from one location in the eastern region (SP-SO-MW110D). Elevated levels of copper and lead were also detected in this sample, as well as in additional samples collected for metals screening. A low level of copper was detected in the single sample screened for copper, and low to high levels of lead were detected in six of the seven samples screened for lead. The concentrations of these metals ranged from: copper - 36 mg/kg to 129 mg/kg, and lead - 119 mg/kg to 710 mg/kg. Copper alone was detected at a low level at one location in the northwestern region (SP-SO-SB1), while a medium level of copper/low level of lead was

detected at one location in the eastern (SP-SO-MW110D) region. Lead alone was detected at low levels at one location along each of the southern (SPBG2 A-080), western (SPBG1 A+00), northwestern (SPBG1 B+00), and northern (SPBG1 B+200) borders; medium levels at one location along the southwestern border (SPBG2 A-160); and high levels at one location along the northern border (SPBG1 B+200).

At 300 Ferry Boulevard, low to high levels of various metals were detected. High levels were detected in two, or 67 percent, of the three samples collected for metals analysis, including: barium, copper, and lead at one location in the northeastern (SP-SO-MW110D), and copper at one location in the northwestern (OU3-A2-SS01) regions. High levels were not detected at one location along the northeastern border (SPSCA+390). Elevated levels of copper and lead were detected in all three of these samples, as well in additional samples collected for metals screening. A high level of copper was detected in one of two samples screened for copper, and low to high levels of lead were detected in fifteen of sixteen samples screened for lead. The concentrations of these metals ranged from: copper - 54.5 mg/kg to 5,140 mg/kg, and lead - 120 mg/kg to 5,390 mg/kg. Low levels of copper/medium levels of lead was detected at one location along the northeastern border (SPSCA+390); high levels of copper/medium levels of lead were detected at one location in each of the northeastern (SP-SO-MW112B) and northwestern (OU3-A2-SS01) regions; and high levels of copper and lead were detected at one location in the northeastern region (OU3-A2-SS02). Lead alone was detected at low levels at one location in the northwestern region (SP-SO-MW111D) and one location along the northern border (SPSC A+50); medium levels at one location along each of the southwestern (SPSC-001) and southern (SPSC-002) borders, eight locations along the western border (FB E+1400, FB E+1500, FB E+1600, FB E+1650, FB E+1690, SPSC C+00, SPSC D+00, and SPSC E+00), two locations along the northern border (SPSC A+200 and SPSC A+300), and one location along each of the northwestern (SPSC A+00) and northeastern (SPSC A+350) borders; and high levels at two locations along each of the western (FB E+1550 and SPSC B+00) and northern (SPSC A+150 and SPSC A+250) borders.

At 280 Ferry Boulevard, low to high levels of various metals were detected. High levels detected in one, or 50 percent of two samples collected for metals analysis, including: barium, copper, and lead at one location in the northwestern region (OU3-A2-SB03). High levels were not detected at one location along the eastern border (FBE+1300). Elevated levels of copper and/or lead were also detected in these samples, as well as in additional samples collected for metals screening. High levels of copper were detected in both samples screened for copper, and medium to high levels of lead were detected in nineteen of twenty samples screened for lead. The concentrations of these metals ranged from: copper - 97 mg/kg to 2,640 mg/kg, and lead - 190 mg/kg to 6,225 mg/kg. Medium levels of copper alone were detected at one location along the eastern border (FBE+1300); medium levels of copper/high levels of lead were detected at one location in the northwestern region (OU3-A2-SB03); high levels of copper/medium levels of lead were detected at one location in the southeastern region (SP-SO-SB2); and high levels of copper and lead were detected at one location in the north-central region (OU3-A2-SB01). Lead alone was detected at medium levels at two locations along the southwestern border (SPHM B+00 and SPSC-001), one location along the southern border (SPSC-002), four locations along the western border (SPHM-001, SPSC B+00, SPSC D+00, and SPSC E+00), and one location along the northwestern border (SPHM A+00); and at high levels at two locations along the southern border (SPHM B+200 and SPHM B+300), one

location along each of the southeastern (SPHM B+370) and western (SPSC C+00) borders, and four locations along the northern border (SPHM A+100, SPHM A+175, SPHM AA+200 and SPHM AA+300) borders, and at one location in the east-central region (SPHM-002).

At 250 Ferry Boulevard, low to high levels of various metals were detected. High levels were detected in all six of the samples collected for metals analysis, including: barium, copper, and lead at one location along southeastern border (DPS3), two locations along the eastern border (DPS6 and SPDPS-002), one location along the northern border (OU3-A2-SS03), one location along the northeastern border (SPDPS001), and one location in the southwestern region (SP-SO-SB8). Elevated levels of copper and lead were also detected in additional samples collected for metals screening. High levels of copper were detected in one of two samples screened for copper; and low to high levels of lead were detected in nine of twelve samples screened for lead. The concentrations of these metals ranged from: copper - 970 mg/kg to 10,900 mg/kg, and lead - 140 mg/kg to 6,550 mg/kg. High levels of copper and lead were detected at one location along the southeastern border (DPS3), two locations along the eastern border (DPS6 and SPDPS-002), one location along the northern border (OU3-A2-SS03), one location along the northeastern border (SPDPS001), and one location in each of the southwestern (SP-SO-SB8) and northwestern (SP-SO-SB9) regions. Lead alone was detected at low levels at one location along the southwestern border (FB E+1000); medium levels at one location along each of the southwestern (SDFB-001), western (FB E+1100), and northwestern (SDFB-004) borders, and one location in the southeastern region (SPDPS-004); and high levels at two locations along the western border (SDFB-002 and SDFB-003), and one location in the northeastern region (SPDPS-005).

At 230 Ferry Boulevard, low to medium levels of various metals were detected. High levels were not detected in the two samples collected for metals analysis from one location along each of the southeastern (SPVM007) and eastern (OU3-A2-SS04) borders. Elevated levels of copper and lead were detected in these samples, as well as in additional samples collected for metals screening. Elevated levels of copper were not detected in the two samples screened for copper. Low to medium levels of lead were detected in ten of fourteen samples screened for lead. The concentrations of theses metals ranged from: copper - 40.3 mg/kg to 101 mg/kg, and lead - 85 mg/kg to 430 mg/kg. Low level of copper and lead were detected at one location along the southeastern border (SPVM007); and medium levels of copper/low levels of lead were detected at one location along the eastern border (OU3-A2-SS04). Lead alone was detected at low levels at one location along the southwestern border (FB E+0700), four locations along the western border (FB E+0800, SPVM-002, SPVM-003, and SPVM-004), and one location along the eastern border (SPVM-009); and medium levels at one location along each of the southwestern (SPVM-005), eastern (SPVM-008), northwestern (SPVM-001), and northeastern (SPVM-010) borders.

At 200 Ferry Boulevard, low to medium levels of various metals were detected. High levels were not detected in the single sample collected for metals analysis from one location along the northwestern border (SPTS006). Elevated concentrations of copper and lead were detected in this sample, as well as in additional samples collected for metals screening. A high level of copper was detected in the single sample screened for copper, and low to medium levels of lead were detected in the eight samples screened for lead. The concentrations of these metals ranged from: copper - 81.1 mg/kg to 290 mg/kg, and lead -

90 mg/kg to 370 mg/kg. Medium levels of copper and lead were detected at one location along the northwestern border (SPTS006), and high levels of copper/low levels of lead were detected at one location in the eastern region (SP-SO-MW113B). Lead only was detected at low levels at one location along the western border (FB E+0600); and medium levels at one location along each of the southwestern (SPTS-003), southeastern (SPTS-004), western (SPTS-002), and northwestern (SPTS-001) borders, and at one location in each of the east-central (SPTS-005) and north-central (SPTS-007) regions.

At 190 Ferry Boulevard, low to medium levels of various metals were detected. High levels were not detected in the single sample collected for metals analysis from the western border (FBE+400). Elevated levels of copper and lead were detected in this sample, as well as in additional samples collected for metals screening. An elevated level of copper was not detected in the single sample screened for copper. Low to medium levels of lead were detected in six of ten samples screened for lead. The concentrations of these metals ranged from: copper - 81 mg/kg, and lead - 90 mg/kg to 210 mg/kg. Medium levels of copper and lead were detected at one location along the western border (FBE+400). Lead alone was detected at low levels at three locations along the western (FB E+400, FB E+450, and SPIM-002) and one location along the southern (SPIM-004) borders; and medium levels at one location along each of the southwestern (SPIM-003) and northwestern (SPIM-001) borders.

At the paved parking lot at 170 Ferry Boulevard, low to medium levels of various metals were detected. High levels were not detected in the samples collected for metals analysis from the southern (SPHMB+100) and western (SPEL-003) borders, and the west-central region (OU3-A2-SS05). Elevated levels of copper and lead were detected in two of these samples, as well as in additional samples collected for metals screening. Medium to high levels of copper were detected in the two samples screened for copper, and low to high levels of lead were detected in thirteen of eighteen samples screened for lead. The concentrations of these metals ranged from: copper - 110 mg/kg to 1,100 mg/kg, and lead - 110 mg/kg to 820 mg/kg. Medium levels of copper/low levels of lead were detected at one location along the southern border (SPHMB+100) and one location in the southern region (SP-SO-SB7); medium levels of copper and lead were detected at one location along the western border (SPEL-003); and high levels of copper/medium levels of lead were detected at one location in the northern region (SP-SO-SB6). Lead alone was detected at: low levels at one location along each of the western (FB E+250 and eastern (SPEL-009250 borders; medium levels at two locations along the southwestern border (FB E+00 and SPEL-005), two locations along the western border (SPEL-002 and SPEL-004), two locations along the eastern border (SPEL-007 and SPEL-008), one location along the northwestern border (SPEL-001), and one location along the northeastern border (SPEL-010); and high levels at one location along the southeastern border (SPEL-006).

SPLP Metals Analysis. Elevated concentrations of SPLP metals were detected in one, or 50 percent, of the two samples collected from 280 and 230 Ferry Boulevard.

Lead was detected at a medium level, 945 ug/l, in the sample from one location in the northwestern region (OU3-A2-SB03) of 280 Ferry Boulevard. No metals were detected at elevated concentrations in the sample collected along the eastern border (OU3-A2-SS04) of 230 Ferry Boulevard.

Subsurface Soil Samples

Thirty-three samples from twenty locations were submitted for analysis of metals. An additional one hundred forty-four samples from seventeen locations were screened for both copper and lead. In addition, one sample from each of four locations was submitted for analysis of SPLP metals.

Metals Analysis and Screening. Elevated concentrations of metals detected in the samples included: in less than 5 percent of the samples - antimony (not detected in any samples) and manganese; in 5-25 percent of the samples - aluminum, beryllium, selenium, silver, and thallium; in 25-50 percent of the samples - arsenic, cadmium, copper, lead, mercury, sodium, and vanadium; greater than 50 percent of the samples - barium, calcium, chromium, cobalt, iron, magnesium, nickel, potassium, sodium, and zinc.

At 326 Ferry Boulevard, low to high levels of various metals were detected. High levels of calcium and sodium were detected at depths of up to 20.0 feet in samples collected for metals analysis from one location in the eastern region (SP-SO-MW110D). High levels were not detected in the 4.0-6.0 foot sample from one location in the northwestern region (SP-SO-SB1). No samples were collected at greater depths at either location for metals analysis. Elevated levels of copper and/or lead were also detected at these locations, in samples collected for metals analysis as well as additional samples collected for metals screening. The concentrations of these metals ranged from: copper - 29 mg/kg to 160 mg/kg, and lead - 100 mg/kg to 390 mg/kg. Low to medium levels of copper were detected at depths of up to 12.0 feet, and low to medium levels of lead were detected at depths of up to 16.0 feet at the location in the eastern region (SP-SO-MW110D). Low levels of copper were detected at depths of up to 10.0 feet in the location in the northwestern region (SP-SO-SB1). No samples were collected at greater depths at this location.

At 300 Ferry Boulevard, low to high levels of various metals were detected. High levels of barium were detected in the 2.0-4.0 foot sample at one location in the northwestern region (OU3-A2-SS01). No samples were collected at greater depths for metals analysis from this location. No metals were detected at high levels at depths of up to 12.0 feet at another location in the northwestern region (SP-SO-MW111D). High levels of barium, copper, lead, and zinc were detected at depths of up to 10.0 feet at one location in the northeastern region (SP-SO-MW112B). Elevated levels of copper and lead were also detected at these locations, in samples collected for metals analysis as well as additional samples collected for metals screening. The concentrations of these metals ranged from: copper - 91.8 mg/kg to 19,000 mg/kg, and lead - 120 mg/kg to 21,000 mg/kg. Medium levels of copper and lead were detected in the 2.0-4.0 foot samples from one location in the northwestern region (OU3-A2-SS01). No samples were collected at greater depths at this location. Medium levels of copper and lead were detected at depths of up to 12.0 feet at another location in the northwestern region (SP-SO-MW111D). High levels of copper/medium to high levels of lead were detected at depths of up to 10.0 feet at one location in the northeastern region (SP-SO-MW112B).

At 280 Ferry Boulevard, low to high levels of various metals were detected. High levels of barium, copper, lead, magnesium, nickel, and zinc were detected in the 2.0-4.0 foot sample at one location in the southeastern region (SP-SO-SB2). High levels of barium, copper, lead, magnesium, nickel, and zinc were detected at depths of up to 16.0 feet at one location in

the north-central region (OU3-A2-SB01). High levels of sodium were detected in the 14.0-16.0 foot sample at one location in the northwestern region (OU3-A2-SB03). No samples were collected at greater depths at any of these locations for metals analysis. Elevated levels of copper and lead were detected at these locations, in samples collected for metals analysis as well as additional samples collected for metals screening. The concentrations of these metals ranged from: copper - 39.1 mg/kg to 40,000 mg/kg, and lead - 100 mg/kg to 24,000 mg/kg. Medium to high levels of copper/low to high levels of lead were detected at depths of up to 12.0 feet at one location in the southeastern region (SP-SO-SB2). Low to high levels of copper/low to medium levels of lead were detected at depths of up 12.0 feet at one location in the northwestern region (OU3-A2-SB03); low levels of copper alone were detected in the 14.0-16.0 foot sample. High levels of copper and lead were detected at depths of up to 16.0 feet at one location in the north-central region (OU3-A2-SB01). No samples were collected at greater depths at any of these locations.

At 250 Ferry Boulevard, low to high levels of various metals were detected. High levels of barium, copper, lead, and nickel were detected in the 2.0-4.0 foot sample at one location in the southwestern region (SP-SO-SB8); high levels of barium copper, lead, nickel, and zinc were detected in the 4.0-6.0 foot sample at one location in the southern region (SP-SO-SB4); and high levels of copper and sodium were detected in the 14.0-16.0 foot sample at one location in the southeastern region (SP-SO-SB3). No samples were collected at greater depths from any of these locations for metals analysis. High levels were not detected at depths of up to 10.0 feet at one location in the northwestern region (SP-SO-SB9). Elevated levels of copper and lead were detected at these locations, in samples collected for metals analysis as well as additional samples collected for metals screening. The concentrations of these metals ranged from: copper - 73.3 mg/kg to 14,000 mg/kg, and lead - 110 mg/kg to 11,500 mg/kg. High levels of copper/medium to high levels of lead were detected at depths of up to 18.0 feet at one location in the southeastern region (SP-SO-SB3). High levels of copper and lead were detected at depths of up to 4.0 feet at one location in the southwestern region (SP-SO-SB8) and 14.0 feet at one location in the southern region (SP-SO-SB4). Medium to high levels of copper/low to high levels of lead were detected at depths of up to 10.0 feet at one location in the northwestern region (SP-SO-SB9). No samples were collected at greater depths at locations SP-SO-SB3 and SP-SO-SB4.

At 230 Ferry Boulevard, low to medium levels of various metals were detected. High levels of copper were detected at depths of up to 4.0 feet at one location along the eastern border (OU3-A2-SS04) and one location in the central region (OU3-A2-SB04). High levels of calcium were detected in the 12.0-14.0 foot sample the location in the central region (OU3-A2-SB04), and high levels of sodium were detected in the 14.0-16.0 foot sample at an additional location in the central region (OU3-A2-SB02). No samples were collected at greater depths at any of these locations for metals analysis. Elevated levels of copper and lead were also detected at these locations, in samples collected for metals analysis as well as additional samples collected for metals screening. The concentrations of these metals ranged from: copper - 154 mg/kg to 910 mg/kg, and lead - 106 mg/kg to 900 mg/kg. High levels of copper/medium levels of lead were detected in the 2.0-4.0 foot sample at one location along the eastern border (OU3-A2-SS04); no samples were collected at greater depths at this location. Medium levels of copper were detected at depths of up to 6.0 feet, and low to high levels of lead were detected at depths of up to 12.0 feet at one location in the central region (OU3-A2-SB02). Medium to high levels of copper/low to medium levels

of lead were detected at depths of up to 14.0 feet at one location in the central region (OU3-A2-SB04).

At 200 Ferry Boulevard, low to medium levels of various metals were detected. High levels of chromium and mercury were detected at depths of up to 4.0 feet, high levels of calcium and copper were detected at depths of up to 8.0 feet, and high levels of sodium were detected in the 8.0-10.0 foot sample at one location in the eastern region (SP-SO-MW113B). No samples were collected at greater depths for metals analysis from this location. Elevated levels of copper and lead were also detected in this location, in samples collected for metals analysis as well as additional samples collected for metals screening. The concentrations of these metals ranged from: copper - 33.8 mg/kg to 997 mg/kg, and lead - 90 mg/kg to 215 mg/kg. Low to high levels of copper/low to medium levels of lead were detected at depths of up to 12.0 feet, and low levels of lead alone were detected in the 12.0-14.0 foot sample from one location in the eastern region (SP-SO-MW113B).

At 190 Ferry Boulevard, low to medium levels of various metals were detected. High levels of sodium were detected in the 12.0-14.0 foot sample at one location in the northern region (SP-SO-SB5). Elevated levels of copper and/or lead were also detected at this location, in samples collected for metals analysis as well as additional samples collected for metals screening. The concentrations of these metals ranged from: copper - 63.5 mg/kg, and lead - 110 mg/kg to 130 mg/kg. Medium levels of copper/low levels of lead were detected at depths of up to 14.0 feet at one location in the northern region (SP-SO-SB5).

At the paved parking lot at 170 Ferry Boulevard, low to high levels of various metals were detected. High levels of calcium were detected at depths of up to 4.0 feet at one location in each of the southern (SP-SO-SB7) and west-central (OU3-A2-SS05) regions. High levels of calcium and lead were detected at depths of up to 8.0 feet at one location in the northern region (SP-SO-SB6). No samples were collected at greater depths at either of these locations for metals analysis. Elevated levels of copper and/or lead were detected at these locations, in samples collected for metals analysis as well as additional samples collected for metals screening. The concentrations of these metals ranged from: copper - 30.4 mg/kg to 1,700 mg/kg, and lead - 84 mg/kg to 830 mg/kg. Medium levels of copper were detected at depths of up to 4.0 feet, and low to medium levels of lead were detected at depths of up to 12.0 feet at one location in the southern region (SP-SO-SB7); no samples were collected at greater depths from this location. Low levels of copper were detected in the 2.0-4.0 foot sample at one location in the west-central region (OU3-A2-SS05). No samples were collected at greater depths from this location. High levels of copper/low to medium levels of lead were detected at depths of up to 10.0 feet at one location in the northern region (SP-SO-SB6).

<u>SPLP Metals Analysis.</u> Elevated concentrations of SPLP metals were detected in three, or 75 percent, of the four samples collected from 300, 280, and 230 Ferry Boulevard.

Lead was detected at a medium level, 417 ug/l, in the 2.0-4.0 foot sample from one location in the northwestern region (OU3-A2-SS01) of 300 Ferry Boulevard. No other metals were detected at elevated concentrations in this sample.

Lead was detected at a medium level, 609 ug/l, in the 6.0-8.0 foot sample from one location in the north-central region (OU3-A2-SB01) of 280 Ferry Boulevard. No other metals were detected at elevated concentrations in this sample.

Copper was detected at a medium level, 1,060 ug/l, and lead was detected at a high level, 1,760 ug/l, in the 2.0-4.0 foot sample from the central region (OU3-A2-SB04) of 230 Ferry Boulevard. No other metals were detected at elevated concentrations in this sample. Furthermore, no metals were detected at elevated concentrations in the 4.0-6.0 foot sample collected at another location in the central region (OU3-A2-SB02) of this property.

G.2.2.6 Asbestos

Two hundred eighty-four soil samples from one hundred seventeen locations were submitted for analysis of asbestos using optical microscopy, according to EPA Region I standard operating procedures. Asbestos was detected at a concentration ≥1 percent in one hundred twenty-two, or 43 percent, of the samples. The distribution of asbestos was evaluated by grouping the results into the following ranges of optically observable asbestos: < 1 percent; ≥ 1 but < 5 percent (low level); ≥ 5 but < 10 percent (medium level); and ≥ 10 percent (high level).

Overall, the results indicate that asbestos concentrations ≥ 1 percent were detected frequently in both surficial and subsurface soil samples. The higher concentrations were detected in surficial samples collected along the northern (SPSC A+150, SPSC A+250, and SPSC A+300) and northeastern (SPSC A+350) borders of 300 Ferry Boulevard, along the southern (SPHM B+200 and SPHM B+300), southwestern (SPHM B+00), and northern (SPHM AA+300) borders and in the northwestern region (SPHM A+00) of 280 Ferry Boulevard, along the western (SDFB-002 and SDFB-003) and northeastern (SPDPS-001 and SPDPS-002) borders and in the northeastern region (SPDPS-005) of 250 Ferry Boulevard, and in the southern region (SP-SO-SB7) of the paved parking lot at 170 Ferry Boulevard; and in subsurface samples collected in the eastern region (SP-SO-MW110D) of 326 Ferry Boulevard, the northeastern region (SP-SO-MW112B) of 300 Ferry Boulevard, the southeastern (SP-SO-SB2), northwestern (OU3-A2-SB03), and north-central (OU3-A2-SB01) regions of 280 Ferry Boulevard, the southwestern (SP-SO-SB8), southern (SP-SO-SB4), southeastern (SP-SO-SB3), and northwestern (SP-SO-SP9) regions of 250 Ferry Boulevard, the central region (OU3-A2-SB02 and OU3-A2-SB04) of 230 Ferry Boulevard, and the northern region (SP-SO-SB5) of 190 Ferry Boulevard. No asbestos was detected in samples collected at depths of over 20.0 feet.

Surface Soil Samples

One surficial sample was collected from each of one hundred sixteen locations throughout the area of study. Asbestos was detected at concentrations ranging from 1 to 75 percent in fifty-one, or 44 percent, of the samples.

At 326 Ferry Boulevard, low to medium levels of asbestos were detected. Low levels were detected at one location along each of the southwestern (FBE+1300), southern (SPBG2 A-080), and northwestern (SPBG1 B+00) borders. Medium levels were detected in the eastern region (SP-SO-MW110D).

At 300 Ferry Boulevard, low to high levels of asbestos were detected. Low levels were detected at one location along each of the western (SPSC D+00), northeastern (SPSC A+390), and northern (OU3-A2-SS02) borders, and at two locations in the northwestern region (OU3-A2-SS01 and SP-SO-MW111D). Medium levels were detected at one location along the western border (SPSC B+00) and one location in the northeastern region (SP-SO-MW112B). High levels were detected at one location along the northeastern (SPSC A+350) and three locations along the northern (SPSC A+150, SPSC A+250, and SPSC A+300) borders.

At 280 Ferry Boulevard, low to high levels of asbestos were detected. Low levels were detected at one location along the northwestern border (SPHM AA+370) and one location in each of the southeastern (SP-SO-SB2), north-central (OU3-A2-SB01), and northwestern (OU3-A2-SB03) regions. Medium levels were detected at one location along each of the western (SPHM-001) and northern (SPHM A+175) borders. High levels were detected at one location along the southwestern (SPHM B+00), two locations along the southwestern (SPHM B+200 and SPHM B+300), one location along the northern (SPHM AA+300) borders, and one location in the northwestern region (SPHM A+00).

At 250 Ferry Boulevard, low to high levels of asbestos were detected. Low levels were detected at one location along each of the western (SDFB-001), northwestern (SDFB-004), and northern (OU3-A2-SS03) borders. Medium levels were detected at one location in each of the southwestern (SP-SO-SB8) and northwestern (SP-SO-SP9) regions. High levels were detected at two locations along each of the western (SDFB-002 and SDFB-003) and northeastern (SPDPS-001 and SPDPS-002) borders, and one location in the northeastern region (SPDPS-005).

At 230 Ferry Boulevard, low levels of asbestos were detected at two locations along the eastern (OU3-A2-SS04 and SPVM-009) and one location along the northeastern (SPVM-010) borders, and two locations in the central region (OU3-A2-SB02 and OU3-A2-SB04).

At 200 Ferry Boulevard, low to medium levels of asbestos were detected. Low levels were detected at one location in each of the eastern (SP-SO-MW113B) and east-central (SPTS-005) regions. Medium levels were detected at one location along the southeastern border (SPTS-004).

At 190 Ferry Boulevard, no asbestos was detected in surficial samples at concentrations exceeding 1 percent.

At the paved parking lot at 170 Ferry Boulevard, low to high levels of asbestos were detected. Low levels were detected at one location along each of the western (SPEL-002) and northwestern (SPEL-001) borders, and at one location in the west-central region (OU3-A2-SS05). Medium and high levels were detected at one location along the southwestern border (SPEL-005) and one location in the southern region (SP-SO-SB7), respectively.

The highest asbestos concentration was 75 percent at location SDFB-003.

Subsurface Soil Samples

One hundred sixty-eight subsurface soil samples were collected from twenty-one locations throughout the study area. Asbestos was detected at concentrations ranging from 1 to 75 percent in seventy-one, or 42 percent, of the samples from nineteen of twenty-one locations.

At 326 Ferry Boulevard, low to high levels of asbestos were detected at depths of up to 16.0 feet at one location in the eastern region (SP-SO-MW110D). No elevated concentrations of asbestos were detected at greater depths at this location.

At 300 Ferry Boulevard, low to high levels of asbestos were detected. Low levels were detected in the 2.0-4.0 foot sample collected at one location in the northwestern region (OU3-A2-SS01). No samples were collected at greater depths at this location. Low to medium levels of asbestos were detected at depths of up to 10.0 feet at another location in the northwestern region (SP-SO-MW111D). No elevated concentrations of asbestos were detected at greater depths at this location. High levels of asbestos were detected at depths of up to 10.0 feet at one location in the northeastern region (SP-SO-MW112B). No elevated concentrations of asbestos were detected at greater depths at this location.

At 280 Ferry Boulevard, low to high levels of asbestos were detected. High levels were detected at depths of up to 6.0 feet in the southeastern (SP-SO-SB2) and 16.0 feet in the north-central (OU3-A2-SB01) regions. Low to high levels of asbestos were detected at depths of up to 16.0 feet in the northwestern region (OU3-A2-SB03). No elevated concentrations of asbestos were detected at greater depths at any of these locations.

At 250 Ferry Boulevard, low to high levels of asbestos were detected. Low to high levels were detected at depths of up to 12.0 feet at one location in the southwestern (SP-SO-SB8), 16.0 feet at one location in the southeastern (SP-SO-SB3), and 10.0 at one location in the northwestern (SP-SO-SP9) regions. High levels were detected at depths of up to 14.0 feet at one location in the southern region (SP-SO-SB4). No elevated concentrations of asbestos were detected at greater depths at any of these locations.

At 230 Ferry Boulevard, low to high levels of asbestos were detected. Medium levels were detected in the 2.0-4.0 foot sample at one location along the eastern border (OU3-A2-SS04). No samples were collected at greater depths at this location. Low to high levels were detected at depths of up to 10.0 at one location (OU3-A2-SB02) and 14.0 feet at another location (OU3-A2-SB04) in the central region. No elevated concentrations of asbestos were detected at greater depths at either of these locations.

At 200 Ferry Boulevard, low to medium levels of asbestos were detected at depths of up to 12.0 feet at one location in the eastern region (SP-SO-MW113B). No elevated concentrations of asbestos were detected at greater depths at this location.

At 190 Ferry Boulevard, low to high levels of asbestos were detected at depths of up to 20.0 feet at one location in the northern region (SP-SO-SB5). No elevated concentrations of asbestos were detected at greater depths at this location.

At the paved parking lot at 170 Ferry Boulevard, low to high levels of asbestos were detected. Low levels were detected at depths of up to 6.0 feet at one location in the southern (SP-SO-SB7) and 8.0 feet at one location in the northern (SP-SO-SB6) regions. No elevated concentrations of asbestos were detected at greater depths at either location. Medium levels were detected in the 2.0-4.0 foot sample collected at one location in the west-central region (OU3-A2-SS05). No samples were collected at greater depths at this location.

The highest asbestos concentration was 75 percent in the 10.0-12.0 foot sample collected at location SP-SO-SB4.

Appendix G Section:
G.3 Area A-3: Upper Ferry Creek - Wetlands
(pages 67-116)
are available
in a separate file (size: 6 MB).

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Appendix H:
Supplemental Evaluation of Fate and Transport Processes
(pages 117-158)
are available
in a separate file (size: 3 MB).

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