Close File

RMT

Technical Memorandum

Use Page Up/Page Down keys to navigate through file.

Date: July 27, 2009

To: Ed Waddles, MTD Products Inc.

cc: Karen Crawford
RMT Project Team

From: Mark Miesfeldt, P.G., RMT, Inc.
Britney C. Barnes, RMT, Inc.

Project No.: 00-71360.27

Subject: Soil Interim Corrective Measures (ICM) 2008 through 2009
Columbia Manufacturing Company (CMC), Westfield, Massachusetts

This document provides a description of the ICM conducted at the CMC facility in Westfield, Massachusetts (site) between January 2008 and April, 2009. This ICM addressed affected soil underlying buildings that were demolished in 2008. This soil had previously been inaccessible because of the buildings.

Scope of ICM

The scope of this ICM was to excavate, stabilize and solidify affected soils in the specified areas of the site. To better advance the site toward final closure and facilitate addressing the remaining solid waste management units (SWMUs) and areas of concern (AOCs), MTD Products Inc (MTD) had coordinated relocation of CMC's manufacturing operations from the buildings that were formerly occupied at the site. Following relocation of the manufacturing equipment and plant infrastructure, most of the buildings on the site were deconstructed, recyclable materials were removed, and the debris was cleared. Over the site, approximately 170,000 square feet of building were deconstructed. MTD's removal of buildings has enabled direct access to affected soils that may pose a direct contact risk or a continuing source of constituents of concern to groundwater. A total of 13 AOCs were affected by the excavations conducted for this ICM. A summary of these AOCs is provided in Table 1 (Attachment 1), and their locations are shown on Figure 1, 2009 Soil ICM Areas (Attachment 2).

The focus of this ICM was to remove affected soil in the immediate areas of the AOCs listed on the previous that were previously inaccessible by buildings and to provide barriers to migration for constituents remaining in place. Some locations within the planned excavation areas of this ICM had elevated concentrations of site metals (*i.e.*, copper, nickel, cadmium, chromium, and zinc) and some locations had volatile organic compounds (VOCs) (*i.e.*, trichloroethene [TCE] and tetrachloroethene [PCE]) that exceed target concentrations. Additionally, all areas addressed by this ICM had elevated concentrations of total petroleum hydrocarbons (TPH). Table 2 (Attachment 1) lists the target concentrations for constituents of concern addressed by this ICM. The table sets forth the site-specific

Close File

constituents of concern (COCs) that have been identified at the site, along with their respective State of Massachusetts target concentrations for soil. Target concentrations are expressed both as total constituent in untreated soil and as constituent concentration in leachate by the Toxicity Characteristic Leaching Procedure (TCLP) method for treated soil. The total constituent concentrations are based on 310 CMR 40.975 values for soil category S-2 (industrial with potential direct contact) and groundwater category GW-2 (potential migration of volatile constituents to indoor air). Leachate targets were developed using site-specific groundwater target concentrations from both categories GW-2 and GW-3, with an applied standard dilution attenuation factor (DAF) of 20. Leachate targets for groundwater category GW-2 were applied for the volatile constituents and 310 CMR 40.974 groundwater category GW-3 (potential migration to surface water) have been applied for the non-volatile constituents. Site-specific groundwater target concentrations were calculated for volatile constituents per 310 CMR 40.09.82(3)(c). Where the calculated leachate target exceeds the toxicity characteristic limit (40 CFR 261.24), the toxicity characteristic limit has been applied instead. The target concentrations for copper were calculated by the method described in 310 CMR 40.0983 and 310 CMR 40.0984.

Bench-scale treatability tests were conducted on representative soil samples collected from the ICM areas to evaluate and demonstrate the effectiveness of stabilization and solidification (S/S) as a suitable means for treating these soils. A *Treatability Study Report (RMT, February 13, 2009)* concluded that a 5 percent mixture of Type 1 Portland cement would provide an appropriate level of treatment to sufficiently stabilize COCs within the treated matrix, reduce the leachate potential of the treated matrix, and solidify the treated matrix to a compressive strength in excess of United States Environmental Protection Agency (USEPA)-recommended treatment guideline (50 psi).

The ICMs included the following activities.

Preliminary Activities

Prior to initiating this ICM, a supplier was contracted for slurried Type 1 Portland cement for use as the stabilization and solidification (S/S) treatment agent. Equipment and equipment operators were also contracted for mixing the soil and cement. Storm water controls were established around the excavation areas to minimize storm water runoff and accumulation within the excavation area. Clean brick and concrete from prior site deconstruction activities were crushed and characterized as suitable for use as base fill and top cover within the various excavation areas. These crushed materials were staged on paved areas of the site in a manner that minimized loss/runoff by wind and water.

Soil Excavation and Treatment

In general, site soil from the affected area was excavated and treated in grids that measured approximately 40 feet by 40 feet. Excavation was conducted using a tracked excavator. The actual dimensions of each excavation cell were influenced by the building dimensions of the work area and site-specific field conditions encountered at the time of excavation. Excavation and treatment extended to the top of the water table, which was typically encountered approximately 8 feet below ground surface (bgs). The actual dimensions of each treatment cell were recorded and are documented on Table 3 (Attachment 1). Figure 1 (Attachment 2) shows the approximate location of the excavations.

Close File

Some groundwater monitoring wells were located within the anticipated excavation areas were properly abandoned.

Cement slurry in an amount that equates to a 5 percent (by weight) ratio of dry cement to soil was mixed with affected soil within each grid cell. During the mixing process, soil from each grid area receiving treatment was removed and replaced in a manner that the treated soil remained within the overall footprint from which it was initially derived. This approach provided consistency with USEPA guidance regarding corrective action management units (CAMUs).

Before replacing the treated soils, a layer of crushed concrete was be placed at the bottom of each excavation. This crushed concrete was derived from prior site demolition activities and had been previously screened and characterized as suitable for fill material. Concrete debris that exhibited evidence of elevated constituents of concern was segregated and incorporated into the S/S matrix in the same manner as affected site soils. During the building demolition activities, concrete flooring was initially cleaned and decontaminated with industrial floor sweeping equipment using commercial grade cleaners.

As S/S treatment was completed and confirmation/record samples were collected (as appropriate), treated soil was replaced into each cell up to a level of approximately 18 to 24 inches below the surrounding ground surface. As the treated soils were replaced and mixed with the Portland slurry, they were tamped down to remove air pockets or voids using the heavy equipment also used for moving the material. Since S/S treatment was involved and the soil cement cures and hardens over time, a particular degree of compaction has not been specified for these backfill activities. Test cylinders from each cell were be retained for archival purposes to demonstrate that the treated soil materials meet the ICM objectives. The final 18 to 24 inches to level ground surface was filled with clean crushed concrete and brick previously derived from the demolition of site structures.

The ICM for the storm (AOC 17) sanitary (AOC 18) sewers consisted of digging down to the sewer pipes that had been abandoned in place and capped at the ends.

Verification and Record Sampling

Samples were collected from the sidewalls and excavation bottoms and treated soil to evaluate the effectiveness of this ICM. Verification samples were analyzed to verify that target concentrations were met in the treated soil. Record samples were collected in areas where obstructions limited continued excavation and were analyzed to document soil quality where affected soil remained in place following the ICM.

- ***Verification Samples:*** A verification sample was collected from within the treated soil in each excavation grid. The samples were cured for at least 4 days before being tested. All verification samples were field tested for strength using a pocket penetrometer. The verification samples were tested by the TCLP method for the following constituents:
  - TPH
  - Cadmium, chromium, copper, nickel, and zinc

Close File

- TCE, PCE, 1,2-dichloroethene (1,2,-DCE), and vinyl chloride

Treatment was considered verified for a cell if the TCLP results were less than the leachability limits listed on the Table 2 (Attachment 1). Pocket penetrometer compressive strength testing was conducted for record purposes.

- ***Record Samples:*** Record samples were collected and analyzed by the TCLP method for the following constituents:
  - TPH
  - Cadmium, chromium, copper, nickel, and zinc
  - TCE, PCE, 1,2-DCE, and vinyl chloride

The purpose of record sample analyses was to assess the extent to which the soil they represent may continue to act as a source of constituents to groundwater.

Confirmation samples were not collected during excavation activities because sidewall instabilities made it impossible to safely collect appropriately representative samples. However, a photoionization detector (PID) was used to monitor progress of the excavation. The soil being field tested was placed in a small plastic bag and taken to an indoor area away from the excavation. Once it is warmed to room temperature (about 30 minutes), the probe of the PID was used to puncture the plastic bag and read the level of organic vapors at equilibrium with the soil inside the bag. The PID readings were will be recorded for each sample and are provided on Table 3 (Attachment 1).

Placement of Soil Cover

Upon completion of the S/S treatment and confirmation/record sampling, a soil cover was placed across the site where the buildings had stood. The grade of the ground surface was leveled where necessary and sloped to provide positive storm water runoff. Once the final cover was placed at its necessary grade, the cover was seeded with grass for further stabilization.

Results and Conclusions

Six treatment cells were excavated and treated in two locations – the old plating room (Excavation A) and the old boiler room (Excavation B). Excavation A measured approximately 40 feet by 120 feet and Excavation B measured approximately 20 feet by 60 feet. Table 4 through Table 10 (Attachment 1) present the verification and record sampling results for these locations. One cell, AA-1, initially failed the verification criteria. As the S/S treatment is time dependent and the work was conducted during winter weather, the samples were tested again after an additional week of curing. Ultimately, all verification samples met the completion criteria. Therefore, soil in these ICM areas no longer poses a potential threat for direct contact by industrial or construction workers nor is it a potential source of continuing release to groundwater.

Close File

Attachment 1
Tables

Close File

Table 1
List of AOCs Affected by ICM

AOC NUMBER	GENERAL DESCRIPTION/LOCATION
AOC 10 [1]	Nickel Filter/South of Building 3
AOC 11 [1]	pH Adjustment Tank (old)/South of Building 3
AOC 14	Hazardous Waste Drum Storage/South of Building 4
AOC 17	Storm Sewer/Northern Portion of Site
AOC 18	Sanitary Sewer/Northern Portion of Site
AOC 36	Abandoned UST/Building 1
AOC 37	Fuel Storage Area/South of Building 5 and Building 6
AOC 39	Old Trenches and Sumps/ Building 3
AOC 41[1]	Zinc Plating Line Trench and Sump/ Building 3
AOC 42[1]	Nickel and Chrome Plating Line Sump/ Building 3
AOC 44	Rim Room/Building 4
AOC 50	UST/Building 1
AOC 51	UST/Alley between Building 3 and Building 4

[1] – Tanks and lines associated with the former chromium and zinc plating operations were removed during a focused removal action conducted in 2000.

Close File

Table 2
Preliminary Soil Remediation Target Concentrations

CONSTITUENT	SOIL TARGET[1] (mg/kg)	LEACHATE TARGET[2] (mg/L)
Cadmium	30	0.08
Chromium	200	5[3]
Copper	30,000 [4]	180[4]
Nickel	700	4
Zinc	3,000	18
TPH[5]	3,000	100
PCE	10	0.7[3]
TCE	2	0.5[3]
cis-1,2-DCE	0.4	14[6]
Vinyl chloride	0.7	0.2[3]

(1) Soil targets based on 310 CMR 40.975 values for soil category S-2 (industrial with potential direct contact) and groundwater category GW-2 (potential migration of vapor to indoor air)
(2) Leachate targets are the lower of either toxicity characteristic limit or site-specific category GW-2 concentrations for volatile constituents and category GW-3 concentrations for non-volatile constituents multiplied by a DAF of 20.
(3) Toxicity characteristic regulatory limit, per 40 CFR 261.24
(4) Target concentrations for copper calculated by the method described in 310 CMR 40.0983 and .0984
(5) TPH is a target constituent for excavations in the vicinity of AOCs 36, 50, and 51.
(6) Target concentrations for volatile organic constituents in groundwater calculated as described in Development of MPS VOCs and Site Metals in Groundwater.

Close File

Table 3
Dimensions of Treatment Cells and Field Measurement Results

EXCAVATION CELL NAME	DIMENSIONS	POCKET PENETROMETER RESULT	SAMPLE NAME	PID READING (ppm)
AA01	20 feet x 25 feet	>4.5	AA01-HRE	113
			AA01-HRN	30
			AA01-V	8.6
			AA01-HRE	170
			AA01-HRE*	289
			AA01-V	180
			AA01-HRS	293
AB01	20 feet x 25 feet	>4.5	AB01-HRN	241
			AB01-V	65.4
			AB01-HRW	248
AC01	20 feet x 25 feet	>4.5	AC01-HRN	306
			AC01-V	4.2
BA01	22 feet x 21 feet	Not sampled	BA01-HRE	229
			BA01-HRS	13.3
			BA01-V	71.7
			BA01-HRW	144
BB01	20 feet by 20 feet	Not sampled	Not sampled	--
BC01	20 feet by 20 feet	Not sampled	Not sampled	--

Close File

Table 4
Summary of Treatment Verification Leachability Results – Old Plating Room

PARAMETER [1]	TARGET CONC	AA01 T-01 NW 03/04/09	AA01[2] T-01 NWRE 03/04/09	AA01 T-01 SE 03/03/09	AA01[2] T-01 SERE 03/03/09	AA01 T-01 SW 03/06/09	AA01 T-01 02/25/09	AA01[2] T-01RE1 02/25/09	AA01[2] T-01RE2 02/25/09	AB01 T-01 NW 03/05/09	AB01 T-01 SE 03/10/09	AB01 T-01 02/26/09	AC01 T-01 02/27/09
Arsenic	5	NA	NA	NA	NA	NA	<0.0120	NA	NA	NA	NA	<0.0120	<0.0120
Barium	100	NA	NA	NA	NA	NA	0.680	NA	NA	NA	NA	0.706	0.684
Cadmium	0.08	0.0599	0.0558	0.0375	0.0371	0.0104	**0.0907**	<0.0050	<0.0080	0.0400	0.0296	**0.0873**	0.0221
Chromium	5	**12.0**	4.06	**6.41**	3.05	1.62	**5.18**	1.13	1.49	2.57	0.730	1.30	0.730
Copper	180	1.33	0.441	1.88	1.01	0.481	1.00	0.0464	0.0284	1.57	0.492	0.877	0.586
Lead	5	NA	NA	NA	NA	NA	0.0887	NA	NA	NA	NA	0.0452	<0.0150
Mercury	0.2	NA	NA	NA	NA	NA	<0.0002	NA	NA	NA	NA	<0.0002	<0.0002
Nickel	4	2.65	1.63	**4.14**	2.68	1.56	2.06	0.0369	0.0510	2.43	1.20	2.38	2.96
Selenium	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0300	<0.0300
Silver	5	NA	NA	NA	NA	NA	<0.0100	NA	NA	NA	NA	<0.0100	<0.0100
Zinc	18	5.02	2.11	3.00	1.88	2.45	3.42	<0.0175	<0.0230	3.82	3.07	2.80	2.66
TPH	100	0.2	NA	0.4	NA	0.3	<0.2	NA	NA	<0.2	NA	<0.2	<0.2
PCE	0.7	<0.005	NA	<0.005	NA	<0.005	<0.005	NA	NA	<0.005	<0.005	<0.005	<0.005
TCE	0.5	<0.005	NA	<0.005	NA	<0.005	<0.005	NA	NA	<0.005	<0.005	<0.005	<0.005
Vinyl chloride	0.2	<0.005	NA	<0.005	NA	<0.005	<0.005	NA	NA	<0.005	<0.005	<0.005	<0.005
cis-1,2-DCE	14	<0.005	NA	<0.005	NA	<0.005	<0.005	NA	NA	<0.005	<0.005	<0.005	<0.005

NA Not analyzed
(1) Analysis by TCLP; results expressed in mg/L
(2) Reanalyses conducted - AA01-T-01NWRE and AA01-T-01 SERE March 26, 2009; AA01-T-01RE1 March 10, 2009; AA01-T-01RE2 March 12, 2009
Bold results exceed target concentration

Close File

Table 5
Summary of Treatment Verification Leachability Results – Old Boiler Room

PARAMETER[1]	TARGET CONC	BA01 T-01 SE 03/06/09	BA01 T-01 02/27/09	BB01 T-01 SE 03/06/09	BB01 T-01 SW 03/03/09	BC01 T-01 SE 03/06/09	BC01 T-01 SW 03/05/09
Arsenic	5	NA	NA	NA	NA	NA	NA
Barium	100	NA	NA	NA	NA	NA	NA
Cadmium	0.08	<0.0050	0.0454	<0.0050	0.0087	<0.0050	<0.0050
Chromium	5	0.456	0.970	0.209	0.273	0.186	0.271
Copper	180	0.295	1.30	0.0535	0.263	0.0778	0.193
Lead	5	NA	NA	NA	NA	NA	NA
Mercury	0.2	NA	NA	NA	NA	NA	NA
Nickel	4	1.10	2.03	0.875	0.476	0.863	0.636
Selenium	1	NA	NA	NA	NA	NA	NA
Silver	5	NA	NA	NA	NA	NA	NA
Zinc	18	1.81	2.94	2.02	2.08	0.938	2.15
TPH	100	0.2	<0.2	0.7	<0.2	0.5	0.8
PCE	0.7	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
TCE	0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Vinyl chloride	0.2	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
cis-1,2-DCE	14	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

NA Not analyzed
(1) Analysis by TCLP; results expressed in mg/L

Close File

Table 6
Summary of Record Sample Leachability Results – Old Plating Room

PARAMETER[1]	TARGET CONC	AA01-HRE 02/25/09	AA01-HRE 03/3/09	AA01-V 02/25/09	AB01-HRN 02/26/09	AB01-V 02/26/09	AC01-HRN 02/27/09	DU-AC01-HRN 02/27/09	AC01-V 02/27/09
Arsenic	5	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	0.0091
Barium	100	1.10	0.210	0.254	0.208	0.194	0.332	0.324	0.180
Cadmium	0.08	0.0070	<0.0050	<0.0050	0.0100	0.0072	<0.0140	0.0146	<0.0140
Chromium	5	<0.0100	0.0637	0.412	0.0223	0.0732	0.0232	0.0235	0.0257
Copper	180	0.491	0.122	0.0550	0.109	0.105	0.112	0.124	0.0546
Lead	5	0.114	0.0186	0.0343	<0.0150	<0.0150	<0.0150	<0.0150	<0.0150
Mercury	0.2	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	4	0.0255	4.41	0.182	0.817	0.672	0.810	0.904	0.112
Selenium	1	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300
Silver	5	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Zinc	18	1.33	<0.140	<0.0750	0.164	0.179	0.0914	0.0936	<0.0810
TPH	100	<0.2	1.0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
PCE	0.7	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
TCE	0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Vinyl chloride	0.2	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
cis-1,2-DCE	14	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

[1] Analysis by TCLP; results expressed in mg/L

Close File

Table 7
Summary of Compositional Record Sample Results – Old Plating Room

PARAMETER [1]	TARGET CONC	AA01-HRE 02/25/09	AA01-HRE 03/03/09	AA01-HRN 02/25/09	AA01-V 02/25/09	AB01-HRN 02/26/09	AB01-V 02/26/09	AC01-HRN 02/27/09	DU-AC01-HRN 02/27/09	AC01-V 02/27/09
Cadmium	30	<0.641	<0.639	<0.721	<0.653	1.49	<0.761	<0.626	2.89	<0.639
Chromium	200	**1,990**	**1,180**	**2,550**	**1,570**	**286**	**994**	78.1	**294**	77.7
Copper [2]	30,000	159	46.8	73.2	116	90.1	200	39.9	157	28.2
Nickel	700	208	**1,460**	279	144	192	278	70.1	199	95.2
Zinc	3,000	39.0	43.5	46.1	32.4	89.2	95.1	29.8	89.6	30.6
TPH	3,000	1910	2,340	2890	<36.6	342	265	193	141	<34.4
PCE	10	<0.234	<0.0798	<0.0558	<0.0547	<0.0839	<0.171	<0.0792	<0.0774	<0.0772
TCE	2	<0.234	<0.0798	<0.0558	<0.0547	<0.0839	<0.171	<0.0792	<0.0774	<0.0772
Vinyl chloride	0.7	<0.234	<0.0798	<0.0558	<0.0547	<0.0839	<0.171	<0.0792	<0.0774	<0.0772
cis-1,2-DCE	0.4	<0.234	<0.0798	<0.0558	<0.0547	<0.0839	<0.171	<0.0792	<0.0774	<0.0772

(1) Results expressed in mg/kg
(2) Target concentrations for copper calculated by the method described in 310 CMR 40.0983 and .0984
Bold results exceed target concentration

Close File

Table 8
Summary of Record Sample Leachability Results – Old Boiler Room

PARAMETER[1]	TARGET CONC	BA01-HCW 03/02/09	BA01-HRS 02/27/09	BA01-HRW 02/27/09	BA01-V 02/27/09
Arsenic	5	<0.0080	<0.0080	0.0088	<0.0080
Barium	100	0.123	0.556	0.122	0.133
Cadmium	0.08	<0.0050	<0.0140	<0.0140	<0.0140
Chromium	5	0.127	0.0149	0.0466	0.0250
Copper	180	0.156	0.0308	2.94	0.369
Lead	5	<0.0150	0.0173	0.0494	<0.0150
Mercury	0.2	<0.00020	<0.00020	<0.00020	<0.00020
Nickel	4	0.0889	0.612	0.0847	0.558
Selenium	1	<0.0300	<0.0300	<0.0300	<0.0300
Silver	5	<0.0100	<0.0100	<0.0100	<0.0100
Zinc	18	0.317	<0.0810	0.100	<0.0810
TPH	100	<0.2	<0.2	<0.2	<0.2
PCE	0.7	<0.005	<0.005	<0.005	<0.005
TCE	0.5	<0.005	<0.005	<0.005	<0.005
Vinyl chloride	0.2	<0.005	<0.005	<0.005	<0.005
cis-1,2-DCE	14	<0.005	<0.005	<0.005	<0.005

(1) Analysis by TCLP; results expressed in mg/L

Close File

Table 9
Summary of Compositional Record Sample Results – Old Boiler Room

PARAMETER [1]	TARGET CONC	BA01-HCW 03/02/09	BA01-HRS 02/27/09	BA01-HRW 02/27/09	BA01-V 02/27/09
Cadmium	30	<0.643	<0.507	<0.628	<0.607
Chromium	200	23.6	24.2	158	80.7
Copper [2]	30,000	10.1	27.8	585	75.2
Nickel	700	21.1	116	70.4	291
Zinc	3,000	34.4	20.2	49.1	30.7
TPH	3,000	<35.1	340	1,020	138
PCE	10	<0.0878	<0.0481	<0.0785	<0.0689
TCE	2	0.212	<0.0481	0.204	0.0951
Vinyl chloride	0.7	<0.0878	<0.0481	<0.0785	<0.0689
cis-1,2-DCE	0.4	<0.0878	<0.0481	<0.0785	<0.0689

(1) Results expressed in mg/kg
(2) Target concentrations for copper calculated by the method described in 310 CMR 40.0983 and .0984
Bold results exceed target concentration

Close File

Table 10
Summary of Record Samples Leachability Results – Debris Fill

PARAMETER [1]	TARGET CONC	CCB-01 02/24/09	CCB-02 02/24/09	CCF-01 02/24/09	CCF-02 02/25/09	CCF-03 02/25/09	CCF-04 02/25/09	CZF-01 02/24/09
Arsenic	5	<0.0100	<0.0100	<0.0100	<0.0080	<0.0080	<0.0080	<0.0100
Barium	100	0.368	0.224	0.390	0.706	0.383	0.429	0.615
Cadmium	0.08	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.166**
Chromium	5	0.0277	0.0568	<0.0100	0.0169	0.0156	0.0125	0.0376
Copper	180	<0.0100	0.0121	0.0599	0.0164	<0.0100	<0.0100	0.337
Lead	5	<0.0150	<0.0150	<0.0150	<0.0150	<0.0150	<0.0150	0.0406
Mercury	0.2	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Nickel	4	0.0869	0.0620	0.0509	0.0544	0.108	<0.0100	3.03
Selenium	1	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300
Silver	5	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Zinc	18	<0.0800	<0.0800	<0.0800	<0.0750	<0.0750	<0.0750	2.13
TPH	100	0.9	1.1	1.1	0.8	<0.2	0.9	0.8
PCE	0.7	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
TCE	0.5	<0.005	<0.005	0.0055	0.0075	0.005	0.0122	<0.005
Vinyl chloride	0.2	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
cis-1,2-DCE	14	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

[1] Analysis by TCLP; results expressed in mg/L

Close File

Attachment 2
Figure

Close File

LEGEND

- Approximate Location of AOC (A)
- Approximate Excavation and/or Stabilization Areas

NOTES

Excavations anticipated to be conducted in areas formerly covered by buildings. Building demolition was completed in November 2008.

0 100 200
Feet

CORRECTIVE MEASURES STUDY
COLUMBIA MANUFACTURING COMPANY
RESTORATION PROJECT
WESTFIELD, MASSACHUSETS

FIGURE 1
2009 SOIL ICM AREAS

DRAWN BY: BCB	SCALE AS NOTED	PROJECT NO.: 71360.31
CHECKED BY: JEP	APPROVED BY: SWW	DATE: 2009

RMT

Patewood Plaza One, Suite 100
30 Patewood Drive
Greenville, SC 29615-3535
Phone: 864-281-0030
FAX: 864-281-0288

Map Document: (P:\Hydro\71360\ArcGIS9\July2009Reports\2009 Soil ICM Areas.mxd)
8/13/2009 -- 3:40:09 PM