FINAL COMPLETION REPORT

SOUTHWEST RESIDENTIAL AREA CONCOURSE PCB CLEANUP

CRAMPTON & MACKIMMIE DORMITORIES



PREPARED FOR:

UNIVERSITY OF MASSACHUSETTS ENVIRONMENTAL HEALTH & SAFETY 118 DRAPER HALL 40 CAMPUS CENTER WAY AMHERST, MASSACHUSETTS 01003

APRIL 27, 2012

PREPARED BY:

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1.0 INTRODUCTION

ATC Associates Inc. (ATC) has prepared this Final Completion Report for polychlorinated biphenyl (PCB) removal and disposal activities conducted at Crampton and MacKimmie Dormitories located at the University of Massachusetts at Amherst ("Site"). This work was performed as part of an amendment to the Southwest Residential Area Concourse PCB Cleanup and Disposal Approval dated May 18, 2011. The approval has been provided in Appendix A of this Report.

Work was performed to support the installation of a new Fire Alarm and Sprinkler System at both buildings. The specific exterior areas affected by the work were as follows:

- <u>Water Main Excavation (East Side of the Crampton Dormitory)</u> Removal of the concrete pad/walkway that butted directly up to the building to facilitate excavation work for the new water main hook-up.
- <u>Masonry Steps at the Stonewall Center (North Side of the MacKimmie Dormitory)</u> Removal of the steps that lead up to the entrance door of the Stonewall Center.
- <u>Brick Pavers at Patio of Stonewall Center (North Side of the MacKimmie Dormitory)</u> Removal of the brick pavers on the patio area.

Investigations of caulking located within the joints of the concrete pad/walkways, masonry steps and brick pavers determined the material to contain PCB >50 ppm. Based upon those findings, abatement specifications for these materials were prepared by ATC which included removal of the source material (caulking), masonry/brick materials and underlying soils as per the procedures outlined by PCB Remediation Plan Amendment dated May 9, 2011 and as approved May 18, 2011. The plan was distributed to the Remediation Contractor (American Environmental Inc.).

This Final Completion Report provides concise documentation of the work completed. This document should be maintained by the building owner until the building is demolished. This report provides:

- Characterization sampling analytical results, accompanying analytical chains of custody, and field and laboratory quality control/quality assurance checks;
- A summary of abatement activities;
- Confirmation sampling analytical results, accompanying analytical chains of custody, and field and laboratory quality control/quality assurance checks; and
- Copies of waste disposal documentation and certificates of disposal issued by the disposer.



It should also be noted that in accordance with 310 CMR 40.0315(1)(2), a release to the environment was indicated by the measurement of PCB's in soil at an amount equal to or greater than the MCP RCS-1 Reportable Concentration at the Stonewall Center Patio area. A Release Abatement Measure (RAM) was developed to continue the excavation which was originally initiated as a Limited Removal Action (LRA) to remove PCB impacted soil. The Response Action Outcome (RAO) Report has been provided under Appendix F of this report.

Prior approval from the United State Environmental Protection Agency (EPA) was required for completion of the work. Refer to Appendix A for the PCB Remediation Plan Amendment approved by the EPA Region I Office dated May 18, 2011.

2.0 CHARACTERIZATION SAMPLING & REMEDIATION REQUIREMENTS

This section provides a summary of Site characterization sampling activities, analytical results, and accompanying laboratory quality control/quality assurance checks.

2.1 Initial Source Sampling

ATC collected bulk samples of the caulking from various joints to determine levels of PCB's present in the caulking. The samples were analyzed by TestAmerica Analytical Laboratory, using EPA SW-846 Method 8082 and Method 3540C.

Refer to Appendix A for the PCB Remediation Plan Amendment that includes the PCB Analytical Reports.

A total of six (6) samples were collected. The following Table 1.0 summarizes the results of ATC's sampling:

TABLE 1.0 – SOURCE SAMPLING						
Sample ID	Date	Description/Location	Result (mg/kg)	Detection Limit		
SW-1	01/19/11	Excavation area, grey caulking between concrete pad and building	100,000	18,000		
SW-2	01/19/11	Stonewall Center, grey caulking at granite steps – South side between steps and building	90,000	14,000		
SW-3	01/19/11	Stonewall Center, grey caulking between brick patio and building	19,000	4,500		
SW-4	01/19/11	Stonewall Center, grey caulking between brick patio and building	14,000	3,900		



TABLE 1.0 – SOURCE SAMPLING (Continued)							
Sample ID	Date	Description/Location	Result (mg/kg)	Detection Limit			
SW-PCB- C-1	03/30/11	Stonewall Center, brown caulking between brick and concrete retaining wall (North Wall)	110,000	6,100			
SW-PCB- C-2	03/30/11	Stonewall Center, brown caulking between brick and concrete retaining wall (West Wall)	60,000	4,700			

Remediation Requirements:

- All samples yielded PCB's at concentrations >50 ppm ranging from 14,000 to 110,000 ppm.
- Based upon these results, all caulking was removed and managed as >50 ppm PCB waste.

2.2 Characterization - Substrates

ATC collected core samples of the concrete pad/walkway and brick pavers where the PCB caulking was present. The samples were analyzed by TestAmerica Analytical Laboratory, using EPA SW-846 Method 8082 and Method 3540C.

Refer to Appendix A for the PCB Remediation Plan Amendment that includes the PCB Analytical Reports.

A total of twenty-two (22) samples were collected. The following Table 2.0 summarizes the results of ATC's sampling:

TABLE 2.0 – INITIAL SUBSTRATE SAMPLING						
Distance from caulking	Sample Depth	Material	Description/Location	Sample ID	Result (mg/kg)	
Direct Contact	0-0.5	Concrete	Crampton Excavation Area, Left Side Joint On Walkway	CM-PCB-1	2,600	
2.0"	0-0.5	Concrete	Crampton Excavation Area, Left Side Joint On Walkway	CM-PCB-2	1.9	
5.0"	0-0.5	Concrete	Crampton Excavation Area, Left Side Joint On Walkway	CM-PCB-3	1.4	



Distance from caulking	Sample Depth	Material	Description/Location	Sample ID	Result (mg/kg)
Direct Contact	0-0.5	Concrete	Crampton Excavation Area, Right Side Joint On Walkway	CM-PCB-4	1.1
2.0"	0-0.5	Concrete	Crampton Excavation Area, Right Side Joint On Walkway	CM-PCB-5	0.64
5.0 "	0-0.5	Concrete	Crampton Excavation Area, Right Side Joint On Walkway	CM-PCB-6	0.46
4.0"	0-0.5	Brick	Stonewall Center Patio, West Corner (First Course Of Brick)	CM-PCB-7	0.58
4.0"	0-0.5	Mortar	Stonewall Center Patio, West Corner (First Course Of Brick)	CM-PCB-8	0.39
8.0"	0-0.5	Brick	Stonewall Center Patio, West Corner (2 nd Course Of Brick)	CM-PCB-9	0.30
8.0"	0-0.5	Mortar	Stonewall Center Patio, West Corner (2 nd Course Of Brick)	CM-PCB-10	0.38
4.0"	0-0.5	Brick	Stonewall Center Patio, East Corner (First Course Of Brick)	CM-PCB-11	0.20
4.0"	0-0.5	Mortar	Stonewall Center Patio, East Corner (First Course Of Brick)	CM-PCB-12	0.21
8.0"	0-0.5	Brick	Stonewall Center Patio, East Corner (2 nd Course Of Brick)	CM-PCB-13	0.15
8.0"	0-0.5	Mortar	Stonewall Center Patio, East Corner (2 nd Course Of Brick)	CM-PCB-14	0.25
2.0"	0-0.5	Brick	Stonewall Center Patio, Center Joint on Patio (1 st Course Of Brick)	SW-PCB-15	0.17
2.0"	0-0.5	Mortar	Stonewall Center Patio, Center Joint on Patio (1 st Course Of Brick)	SW-PCB-16	0.17
5.0"	0-0.5	Brick	Stonewall Center Patio, Center Joint on Patio (2 nd Course Of Brick)	SW-PCB-17	ND
5.0"	0-0.5	Mortar	Stonewall Center Patio, Center Joint on Patio (2 nd Course Of Brick)	SW-PCB-18	ND



	TABLE 2.0 – INITIAL SUBSTRATE SAMPLING (Continued)					
Distance from caulking	Sample Depth	Material	Description/Location	Sample ID	Result (mg/kg)	
2.0"	0-0.5	Brick	Stonewall Center Patio, Center Joint on Patio (1 st Course Of Brick)	SW-PCB-19	ND	
2.0"	0-0.5	Mortar	Stonewall Center Patio, Center Joint on Patio (1 st Course Of Brick)	SW-PCB-20	0.30	
5.0"	0-0.5	Brick	Stonewall Center Patio, Center Joint on Patio (2 nd Course Of Brick)	SW-PCB-21	0.10	
5.0"	0-0.5	Mortar	Stonewall Center Patio, Center Joint on Patio, ½ Inch Core Sample (2 nd Course Of Brick)	SW-PCB-22	ND	

Remediation Requirements:

Concrete Pad/Walkway - Concrete Steps

- The concrete pad/walkway yielded PCB concentrations ranging from 2,600 to 0.46 ppm.
- Due to the limited amount of concrete to be removed, the pad itself (approximately 10' x 15') was removed and disposed of as >50 ppm PCB waste.
- Additionally, the remaining concrete pad/walkway to each side of the excavation was saw-cut 12 inches back from the caulk joint that was removed.
- The underlying soils beneath the concrete pad were removed to a depth of one foot below the top of the concrete pad.
- The concrete steps located at the entrance way to the Stonewall Center was also removed and disposed of as >50 ppm PCB waste along with underlying soil to a depth of one foot below grade.
- All removed concrete and soils was managed as >50 ppm PCB Waste.



Brick Pavers at Patio

- The brick and mortar located at the Stonewall Center Patio yielded PCB concentrations ranging from 0.58 to none detect. Samples were collected from both the initial course of brick that was in direct contact with the caulk as well as the 2nd course of brick.
- The first two rows of brick and associated mortar to each side of the joint was removed and disposed of as >50 ppm PCB waste.
- All removed brick and mortar was managed as >50 ppm PCB Waste.

2.3 Ground Level Building Surfaces Not Scheduled For Removal

PCB caulk was also present within the intersection points of materials that were remediated and building components to remain. Those areas included: (1) the caulk joints at the excavation area for the new water main hook-up at the Crampton; (2) at the building and retaining wall where the stairs were removed at the Stonewall Center; and (3) where the brick patio met the building and retaining wall on the Stonewall Patio. Based upon the data presented under Section 8 of the original Work Plan, it was concluded that these concrete surfaces adjacent to the caulking were impacted by PCB's.

Remediation Requirements:

- Concrete at the building and the retaining wall not scheduled for removal was manually cleaned to remove latent dust, dirt and debris.
- Following caulk removal and surface preparation, two (2) coats of Sikargard 62 colored epoxy were applied over the former location of the caulk joint, to a minimum distance of 12 inches below the caulked joint and to a distance of final finished grade. The concrete located to a distance of 12 inches above the caulk joint or final grade was encapsulated with two (2) coats of Sikagard 670W clear acrylic coating.
- Verification sampling of the encapsulant was performed at an approximate frequency of 1 wipe sample per 100 linear feet of caulked joint.

3.0 CONCRETE PAD/WALKWAY REMOVAL - CONFIRMATORY SAMPLING

This section summarizes the post remediation verification testing performed for removal of the concrete pad/walkways as presented in the approved PCB Remediation Plan Amendment dated May 18, 2011.



Based upon the initial testing activities, a 10' x 15' section of the concrete pad/walkway located at the east side of the Crampton Dormitory was removed to facilitate excavation work associated with the new sprinkler tie in. The section of concrete walkway was removed and disposed of as >50 ppm PCB waste. Additionally, the remaining concrete pad/walkway to each side of the excavation was saw-cut 12 inches back from the caulk joint that was removed.

Confirmatory samples were collected from both the North and South sides of the excavation area at Crampton where the concrete was to remain. There was no caulking located on the joint between the granite curb and concrete pad at the East side of the excavation where it meets the parking lot. The West side of the excavation was opened up all the way to the foundation of the building which was encapsulated as discussed in Section 6.0 of this Report.

Verification samples were collected at a frequency of 1 sample per 10 linear feet of caulking removed.

The following Table 3.0 sur	nmarizes the results of the confirmatory substrate sampling
performed on June 2, 2011.	Refer to Appendix B for the PCB Analytical Results.

TABLE 3.0 POST REMEDIATION CONFIRMATORY SUBSTRATE SAMPLING						
Distance from Original Caulk Joint	Sample Depth	Material	Description/Location	Sample ID	Result (ppm)	
12 "	0.5 "	Concrete	Crampton - South Side of Excavation	PAC-01	0.54	
12 "	0.5 "	Concrete	Crampton - South Side of Excavation	PAC-02	0.27	
12 "	0.5 "	Concrete	Crampton - North Side of Excavation	PAC-03	0.24	
12 "	0.5 "	Concrete	Crampton -North Side of Excavation	PAC-04	0.29	
12 "	0.5 "	Concrete	Stonewall Steps -	PAC-05	ND	
12 "	0.5 "	Concrete	Stonewall Steps	PAC-06	0.12	

ND = None Detect



4.0 SOIL REMOVAL – CONFIRMATORY SAMPLING

This section summarizes the post remediation verification testing performed for removal of underlying soils as presented in the approved PCB Remediation Plan Amendment dated May 18, 2011.

Based upon the initial testing activities, removal of the soils underneath of the concrete pad/walkway at East side of Crampton and the concrete steps at the Stonewall Center was removed to a depth of one foot below grade.

Verification samples were collected at a frequency of 1 sample per 10 linear feet of caulking removed.

The following Table 4.0 summarizes the results of the confirmatory soil sampling performed on June 2, 2011. Refer to Appendix C for the PCB Analytical Results.

TABLE 4.0 CONFIRMATORY SOIL SAMPLING						
Sample ID	Date	Description/Location	Result (ppm)	Detection Limit		
S-01	06/02/11	Crampton Excavation Area – South	ND	0.10		
S-02	06/02/11	Crampton Excavation Area – North	0.63	0.10		
S-03	06/02/11	Crampton Excavation Area – Center	0.22	0.10		
S-04	06/02/11	Crampton Excavation Area – West	ND	0.11		
S-05	06/02/11	Stonewall Center Steps – Lower	5.6	0.49		
S-06	06/02/11	Stonewall Center Steps – To Landing	0.29	0.10		

ND = None Detect

Sample S-05 indicated a PCB result >1.0 ppm. This sample was collected in the lower section of the stairwell where the concrete steps were removed. Additional soil was removed from this area and subsequent confirmatory sampling was performed on June 10, 2011. Results indicated the following:

Sample SS-01 = 0.41 ppm Sample SS-02 = 0.24 ppm



During removal of the brick at the Stonewall Patio, it was discovered that a concrete "ratslab" existed directly underneath the brick in lieu of soil. Ten (10) core samples were collected of the underlying concrete on June 3, 2011 to determine the PCB concentration. Results indicated PCB's present in all ten (10) samples ranging from 1.12 ppm up to 120 ppm. Refer to Appendix B for the PCB Analytical Results.

Removal of the entire concrete slab was completed and all material was disposed of as PCB >50 ppm. Soil was also excavated to one (1) foot below finish grade across the entire footprint of the patio area.

Verification samples were collected at a frequency of 1 sample per 10 linear feet of caulking removed.

A total of thirteen (13) samples were collected on June 29, 2011. Results indicated 3 samples to contain PCB >1 ppm; 7 samples to have detectable PCB \leq 1.0 ppm; and 3 samples to be None Detect. Refer to Appendix C for the PCB Analytical Results.

Based upon those results, further soil removal was required to meet the requirements of the TSCA Cleanup Plan. Additionally, a Release Abatement Measure (RAM) was developed to continue the excavation which was originally initiated as a Limited Removal Action (LRA) to remove PCB impacted soil. The Response Action Outcome (RAO) Report that summarizes the additional soil removal, sampling and analytical data has been provided under Appendix F of this report. Post remediation sample were all less than 1 ppm.

5.0 BUILDING SUBSTRATES TO REMAIN – CONFIRMATOR WIPE SAMPLING

This section summarizes the post remediation verification testing performed on the building substrates to remain that have been impacted by PCB's as presented in the approved PCB Remediation Plan Amendment dated May 18, 2011.

5.1 Confirmatory Wipe Sampling

A total of six (6) wipe samples plus a blank were collected from the concrete building foundations at the Stonewall Center and excavation area at Crampton upon completion of the remediation work.

Wipe samples were collected per standard wipe test protocols in accordance with 40 CFR § 761.123 utilizing the applicable procedures identified in Wipe Sampling and Double Wash/Rinse Cleanup as Recommended by the Environmental Protection Agency PCB Spill Cleanup Policy (June 23, 1987 Revised and Clarified on April 18, 1991). A one-use template was used to delineate the 100 cm² sampling area.



Verification samples were collected at a frequency of 1 sample per 100 linear feet of caulking removed.

The following Table 5.0 summarizes the results of the confirmatory wipe sampling performed on July 29, 2011. Refer to Appendix D for the PCB Analytical Results.

TABLE 5.0 CONFIRMATORY WIPE SAMPLING						
Sample ID	Date	Description/Location	Result (ug/Wipe)	Detection Limit		
SWC-01	07/29/11	Stonewall Center – East End of Building	ND	1.0		
SWC-02	07/29/11	Stonewall Center – Mid Section by Sliding Door	ND	1.0		
SWC-03	07/29/11	Stonewall Center – At Retaining Wall, North	ND	1.0		
SWC-04	07/29/11	Stonewall Center – At Steps/Retaining Wall	ND	1.0		
CRAMPTON-01	07/29/11	Excavation, South Side	4.0	1.0		
CRAMPTON-02	07/29/11	Excavation, North Side	ND	1.0		
CRAMPTON-03	07/29/11	Field Blank	ND	1.0		

ND = None Detect

One sample at the Crampton Excavation area was determined to contain PCB greater than the acceptable limit of 1 ug/wipe. The Contractor then initiated a 2^{nd} cleaning of the joint area and reapplication of the encapsulant.

On August 5, 2011, ATC collected a 2nd set of wipe samples from the area after reapplication of the coating and proper cure time. Results indicated all samples to yield None Detect. Refer to Appendix D for the PCB Analytical Results.

6.0 WASTE DISPOSAL

PCB containing waste generated at the Site included caulking, concrete, brick, mortar, soil and associated materials. Waste was placed into roll-off containers that were double lined with 6 mil polyethylene sheeting and properly labeled in accordance with EPA requirements 40 CRF 761.40 and 761.45.



A total of 148,132 kilograms of PCB containing waste was transported from the site between June 20, 2011 and November 9, 2011. A total of 99,145 kilograms of material (i.e. caulking, soil, concrete, brick, mortar) was transported from the site as PCB >50 ppm on a Uniform Hazardous Waste Manifest to Wayne Disposal Landfill in Beleville, Michigan (EPA approved landfill MID048090633). A total of 48,717 kilograms of PCB soil (<50 ppm) was transported and disposed of as non-hazardous waste to Turnkey Recycling and Environmental Enterprises (TREE) landfill located in Rochester, New Hampshire. The associated shipping and disposal documents are included in Appendix E.

7.0 LONG TERM MONITORING AND MAINTENANCE

UMASS shall include both of these sites with the UMASS Campus Wide "Long-Term Monitoring and Maintenance Implementation Plan" (MMIP) to prevent human exposure to polychlorinated biphenyls (PCB) that might be associated with residual PCB levels. The MMIP shall apply to all maintenance workers and any person that conducts work that could impact the encapsulant.

The monitoring program's overall objective is to ensure that the encapsulant continues to perform as required. This objective will be met through visual inspections by representatives from UMASS or a Designated Representative. The encapsulated caulk joints shall be visually inspected on an annual basis. The first inspection will be performed during the summer of 2012 with subsequent inspections every year thereafter.

Inspections will check the encapsulant for signs of wear, cracking, peeling, flaking or other signs of deterioration. A "Review Checklist" contained in *Appendix H* will be completed after each inspection. It will include a written narrative, sketches and photographs where appropriate.

If inspections or other information indicate that the coating is worn or damaged, corrective action (i.e., recoating) will be performed.

Activities detailed in the MMIP shall continue until such time that plan modifications are proposed by UMASS and approved by the EPA.

8.0. RECORDKEEPING AND DOCUMENTATION

All records pertaining to the work on this project are maintained at the UMASS Environmental Health and Safety (EH&S) Office located at the University of Massachusetts, 117 Draper Hall, 40 Campus Center, Amherst, Massachusetts 01003.

Completed Checklists for the future annual inspection work shall also be kept on file at the UMASS EH&S Office.



All records will be made available for inspection by authorized representatives of the EPA upon request.

9.0 DEED NOTICE

A deed notice will be prepared for the remediation work completed herein. The notice will be finalized for recording with the Hampshire County Registry of Deeds. Once the process is completed, a copy of the recorded deed notice will be provided to the EPA under separate cover.



APPENDIX A

EPA APROVED PCB CLEAN UP AND DISPOSAL PLAN



APPENDIX A

APPENDIX B

PCB ANALYTICAL RESULTS – CONFIRMATORY SUBSTRATE SAMPLING



APPENDIX B

APPENDIX C

PCB ANALYTICAL RESULTS – CONFIRMATORY SOIL SAMPLING



APPENDIX C

APPENDIX D

PCB ANALYTICAL RESULTS – CONFIRMATORY WIPE SAMPLING



APPENDIX D

APPENDIX E

WASTE MANIFESTS



APPENDIX E

APPENDIX F

RELEASE ABATEMENT MEASURE (RAM) COMPLETION & RESPONSE ACTION OUTCOME (RAO) REPORT



APPENDIX F

APPENDIX G

OWNER CERTIFICATION



APPENDIX G

Certification

The undersigned owner of the property where the cleanup site is located and the party conducting the cleanup certify that all sampling plans, sampling collection procedures, sample preparation procedures, extraction procedures and instrumental/chemical analysis procedures used to assess or characterize the PCB contamination at the cleanup site, are on file at the location indicated below and are available for EPA inspection, as set forth below.

PCB Abatement Location:

Southwest Residential Area Concourse (Crampton & MacKimmie Dormitories) PCB Cleanup and Disposal

Document Location:

Environmental Health and Safety 117 Draper Hall University of Massachusetts 40 Campus Center Way Amherst, MA 01003

Property Owner and Party Conducting the Clean-Up

Authorized Signature:

Property Owner:	The University of Massachusetts	
Authorized Signature:	Date	::
Name of Authorized		
Representative (print):	Donald A. Robinson, CSP, P.E., Ph.D.	
	Director, Environmental Health and Safety Speci	al
Title:	Assistant to Vice Chancellor of Administration	and Finance
	for Emergency Management	



APPENDIX H

Long Term Maintenance Checklist



APPENDIX H