COMMITMENT & INTEGRITY
DRIVE RESULTS

35 New England Business Center
Suite 180
Andover, Massachusetts 01810
www.woodardcurran.com

T 866.702.6371
T 978.557.8150
F 978.557.7948

June 25, 2010

WOODARD &CURRAN

Ms. Kimberly Tisa
PCB Coordinator
U.S. Environmental Protection Agency Region 1
5 Post Office Square – Suite 100
Boston, Massachusetts 02109-3912

Re: PCB Remediation Plan
Southwest Residential Area Concourse Replacement Project
University of Massachusetts – Amherst Campus

Dear Ms. Tisa:

On behalf of the University of Massachusetts (UMass), please find attached a Remediation Plan prepared in accordance with the requirements for a risk-based cleanup and disposal request per 40 CFR 761.61(c). This plan describes the characterization data collected and details the proposed remedial plans for polychlorinated biphenyl (PCB) bulk product waste (original caulking) and PCB remediation waste (impacted building materials, and certain adjacent ground surfaces) at the Southwest Residential Area on the UMass campus in Amherst, Massachusetts.

This work is being conducted as part of a larger concourse revitalization project within the Southwest Residential Area. The remedial activities associated with PCB impacted soils are also be conducted as a Release Abatement Measure (RAM) under the Massachusetts Contingency Plan (MCP; 310 CMR 40.000).

If you have any comments, questions, or require further information, please do not hesitate to contact me at the number listed above.

Sincerely,

WOODARD & CURRAN INC.

Jeffrey Hamel, LSP, LEP
Senior Vice President

cc: T. Shaw, UMass
T. Bechta, UMass

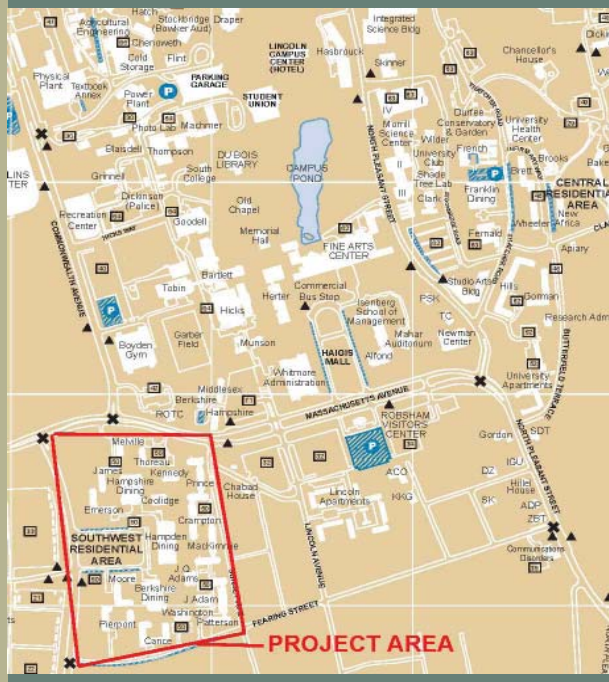
WOODARD &CURRAN

PCB REMEDIATION PLAN

University of Massachusetts

Southwest Concourse

Amherst, Massachusetts



1.866.702.6371
35 New England Business Center
Andover, MA

223505.00
University of Massachusetts

June 2010

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1. INTRODUCTION

Woodard & Curran has prepared this remediation plan on behalf of the University of Massachusetts (UMass) to comply with U.S. Environmental Protection Agency (EPA) requirements for a risk-based clean-up and disposal per 40 CFR Part 761.61(c). This plan describes the characterization data collected and details the proposed remedial plans for polychlorinated biphenyl (PCB) bulk product waste (original caulking) and PCB remediation waste (impacted building materials, and certain adjacent ground surfaces) at the Southwest Residential Area on the UMass campus in Amherst, Massachusetts.

This work is being conducted as part of a larger concourse revitalization project within the Southwest Residential Area. The remedial activities associated with PCB impacted soils are also be conducted as a Release Abatement Measure (RAM) under the Massachusetts Contingency Plan (MCP; 310 CMR 40.000) for Site RTN-1-17872.

1.1 BACKGROUND

The Site is a relatively small portion (approximately 5 acres) of the 184-acre parcel of land associated with the UMass Amherst campus and identified by the Amherst Assessor as Parcel 8C-13B. This portion of the campus is located at 42° 22' 58" N latitude and 72° 31' 46" W longitude. The Site is located at the southwestern end of the UMass campus east of University Drive, south of Massachusetts Avenue, and north of Fearing Street. The properties abutting the Site are all UMass-owned properties. A Site Locus Map is provided as Figure 1-1.

The Site is currently improved with five high-rise towers and eleven low-rise buildings that serve to house approximately 5,500 UMass students. This area is referred to as the Southwest Residential area and was constructed in the mid-1960s. The buildings are constructed of concrete and are surrounded by either grass or hardscapes (paving stones, concrete, or asphalt). Access to the Site is by driveways along Fearing Street, University Drive, and Massachusetts Avenue. A Site Plan is depicted as Figure 1-2.

The Southwest Concourse replacement project is a comprehensive revitalization of the pedestrian core of the Southwest Residential Area. Between May and August of 2010, the southwest concourse is undergoing renovations to paved and unpaved ground surfaces within the Southwest Residence Area. The work within this approximately five-acre site includes, but is not limited to: removal and disposal of existing ground surface coverings (pavement, concrete, etc.); regrading and excavating soils to support new ground surface coverings, landscaping areas, and utilities; removal and replacement of granite staircases; removal and disposal of select retaining walls; and restoring select ground surfaces with concrete, pavement, pavers, etc.

During the initiation of the project, caulking was observed along the ground level joints/seams including retaining walls, granite steps, building foundations, and other paved surfaces. Given the potential for this caulking to contain PCBs (based on the date of construction in the mid-1960s) and that it would be disturbed during the work, samples were collected to assess proper management and disposal requirements. Eighteen caulking samples were collected for PCB analysis from joints between granite steps, various concrete walkways and ground surfaces, and one ceiling joint in a pedestrian underpass tunnel. These samples were reported with detectable concentrations of PCBs ranging between 63 and 130,000 parts per million (ppm).

Upon discovery of PCBs in the joint caulking and given that as part of this project existing soils and other adjacent materials (concrete pads, retaining walls, granite steps, etc.) would be either removed or replaced as part of the construction of the new concourse components, samples of various materials were tested for PCBs to determine whether PCBs had migrated from the caulking into these materials. Samples collected in May and June 2010 detected PCBs at varying concentrations in these materials; samples collected closer to the caulking reported higher PCB concentrations with decreasing concentrations with increasing distance from the caulking.

On June 15, 2010, Ms. Kimberly Tisa of the EPA was notified by telephone of the project and a general overview of the results and plans completed as of the date of the call were communicated to EPA. During the discussion, it was agreed to submit this Remediation Plan to document the current data and proposed remedial plans to remedy this issue.

The Southwest Concourse project is under a fast-track schedule in order to complete the work by the middle of August when approximately 5,000 students will be returning to campus and to the housing that is offered at the Southwest Residential Area. As such, this plan presents the results of site characterization data and removal actions conducted to date as well as plans to continue these activities. Given the nature of the project and conditions, this plan will require amendments as new data is collected and the remediation requirements become integrated into the project concourse replacement requirements. As a matter of work sequencing, the work flow for the concourse project is moving form north to south throughout the concourse; therefore, more data and actions have been conducted on the northern portion of the work area and are progressing in a southerly manner.

1.2 CONCEPTUAL SITE MODEL

Certain joint caulking used as part of standard construction practices for masonry buildings and concrete structures erected between the 1950's and late 1970's is known to have been manufactured with PCBs. PCBs were added to caulking for durability, resistance to degradation, and as a softener/plasticizer for application. Production and approved usage of PCBs was halted in the United States in the late 1970s. As indicated above, the Southwest Residential Area was constructed during this time period.

Due to the porous nature of concrete and other masonry surfaces, PCBs in caulking may penetrate into adjacent building materials during application or over time, may leach or weather, and/or may be disturbed during renovations or other building work. Characterization data indicates that percent level concentrations of PCBs have been detected in original caulking applied to expansion joints and along the horizontal seam between the ground surface covering and a building or structure along the concourse. Lower concentrations of PCBs have also come to be located in adjacent concrete, adjacent ground surface coverings, and soils.

Based on the concentration and distribution of PCBs detected in adjacent materials, it is apparent that the caulking used in original construction was the source of PCBs. In general, concentration gradients identified in the adjacent materials demonstrate a reduction in total PCBs with increasing distance from caulked joints and increasing depth from the ground surface.

1.3 PLAN ORGANIZATION

To facilitate review and maintain consistency with the implementation of the Southwest Concourse replacement project, this plan has been organized into specific material type or activity associated with the concourse work. For example, one task of the project is associated with the repair of 23 different granite stairways that encompass approximately 1,000 individual pieces of granite. At each location, the granite pieces need to be removed, temporarily stored, the underlying concrete foundations repaired, and the granite steps re-set at the location. PCB containing caulking is present in between the granite steps. As such, a separate section has been developed to present the characterization data followed by the proposed remediation and verification for the granite step work. Similar sections have also been developed for each major task or category of work.

This Remediation Plan is organized into the following sections:

Section 2: Sample Collection, Analyses, and Usability

This section provides a description of the sample collection methods, laboratory testing, and data usability evaluation performed for the samples collected in support of this plan development. Specific details on the results, including data tables, figures, and photographs are not presented in this section, but rather in the individual sections that follow.

Section 3: Remediation Plan Overview

This section presents a brief overview of the remedial plans and approaches for the different PCB containing or affected materials encountered during the project.

Section 4: Caulking

This section presents the characterization data associated with the caulking followed by the proposed remediation and verification process.

Section 5: Granite Steps

This section presents the characterization data associated with the granite steps followed by the proposed remediation and verification process. The results from a decontamination pilot test conducted are presented in this section, including data from before and after pilot test implementation.

Section 6: Concrete Pads and Walkways

This section presents the characterization data associated with the concrete pads and walkways followed by the proposed remediation and verification process.

Section 7: Pedestrian Tunnel

This section presents the characterization data associated with the pedestrian tunnel followed by the proposed remediation and verification process.

Section 8: Retaining Walls

This section presents the characterization data associated with the retaining walls to remain in place followed by the proposed remediation and verification process. In addition, select portions of some retaining walls are scheduled for removal as part of the site work.

Section 9: Soils

This section presents the characterization data associated with the soils followed by the proposed remediation and verification process.

Section 10: Waste Storage and Disposal

This section describes the on-site temporary storage of PCBs wastes and lists the disposal facilities selected for transport and disposal of the wastes.

Section 11: Site Restoration

This section includes a brief summary of the concourse replacement that is being completed.

Section 12: Communications and Recordkeeping

This section describes the communications between UMass and associated stakeholders and parties, as well as the project documentation that will be developed as part of the project.

Section 13: Conceptual Monitoring and Maintenance Plan

Given that this plan includes proposed approaches for a manage-in-place via encapsulation remedial action, a conceptual monitoring and maintenance plan is provided in this section.

Section 14: Schedule

This section outlines a general schedule for the proposed remedial activities.

1.4 CERTIFICATION

A copy of the written certification signed by the owner of the property is provided in Appendix A.

1.5 ROLES & RESPONSIBILITIES

The parties involved in the project as described in this plan are identified below:

- UMass Facilities and Campus Planning
- UMass Environmental Health & Safety
- Stephen Stimson Associates Landscape Architects – Architect for the concourse revitalization project
- Nauset Construction – General Contractor on the project
- Triumvirate Environmental, Inc. (TEI) – Remediation Contractor completing the PCB remediation activities
- Woodard & Curran (W&C) – Environmental consultant for the PCB related activities

2. SAMPLE COLLECTION, ANALYSES, AND USABILITY

This section provides a description of the sample collection methods, laboratory testing, and data usability evaluation performed for the samples collected in support of this plan development. Specific details on the results, including data tables, figures, and photographs are not presented in this section, but rather in the individual sections that follow.

During characterization activities, samples were collected from the following media: caulking; concrete walkways, pads, and retaining walls; soils; asphalt; and granite steps, in observance of proper sample collection techniques, analytical methods, and reporting procedures.

2.1 CHARACTERIZATION AND VERIFICATION SAMPLE COLLECTION

Characterization and verification sampling is being conducted to determine the nature and extent of PCBs originating from the exterior caulking and to verify post-removal PCB concentrations in underlying materials. A total of 452 primary samples have been collected and analyzed for PCBs as of June 18, 2010 (excluding QA/QC samples). A breakdown of samples collected by media is provided below:

- Bulk caulking (19 samples; concentrations ranging from 63 to 130,000 parts per million [ppm]);
- Bulk concrete or brick pavers (152 samples; concentrations ranging from < 0.03 to 2,000 ppm);
- Surfaces wipes from granite steps (12 samples from pre- and post-pilot testing; concentrations ranging from < 0.5 to 67 ug/100cm^2);
- Asphalt (5 samples; concentrations ranging from 0.42 to 2.84 ppm);
- Soil (262 samples; concentrations ranging from < 0.1 to 36 ppm); and
- Bedding sand (2 samples; concentrations reported at 11.6 and 581 ppm from beneath granite stairs after removal).

The summary above includes those samples collected to evaluate pilot test effectiveness as well as those samples that have been subsequently removed during excavation activities; the summary does *not* include quality assurance / quality control (QA/QC) samples (field equipment blanks and field duplicates), which were collected at an approximate frequency of one per twenty primary samples. For reference, a sample identification plan describing the sample naming convention for the Site is included as Appendix B.

Caulking samples were collected by cutting and scraping the caulking from the joint with hand tools. If adjacent media (e.g., concrete or a foam backer rod) was inadvertently removed in the process of sample collection, this media was physically removed from the caulking before the sample was placed in its sample container.

Concrete sampling was conducted in accordance with the USEPA Region I Draft Standard Operating Procedure for Sampling Concrete in the Field (December 1997); concrete was ground into dust using a hammer drill to a depth of 0.5 inches into the concrete. After pulverizing the concrete, the material was placed into a sample container using a dedicated spoon at each sample location. Sampling of asphalt paved horizontal surfaces was conducted using a chisel bit to remove the asphalt at the designated sample location.

Soil sampling was conducted in accordance with generally accepted procedures for collecting surface soils for the purpose of environmental analysis. A trowel was used to collect soils from the specified sample depth (e.g., 0 to 3 inches below ground surface [bgs]). Soils were then homogenized and transferred to an appropriate sample container.

Wipe samples were collected in general accordance with the standard wipe test as defined in 40 CFR 761.123. All samples were collected from the prescribed 100 cm^2 area using a laboratory-prepared hexane-soaked gauze pad.

Where samples were collected with hand tools, all reusable sampling equipment was decontaminated between each sampling location by scrubbing with a biodegradable soap and water solution (Alconox) followed by a water rinse. A new pair of clean Nitrile gloves was used at each location where gloves came into contact with sample media, including at each wipe sample location.

2.2 LABORATORY ANALYSIS

All bulk and surface wipe samples were logged on standard Chain-of-Custody (COC) forms and stored on ice for delivery to Analytics Environmental Laboratory of Portsmouth, New Hampshire or Con-test Analytical Laboratory of East Longmeadow, Massachusetts. The original caulking samples were analyzed by Test America of Westfield, Massachusetts. All samples were extracted using USEPA Method 3540C (Soxhlet Extraction) and analyzed for PCBs using USEPA Method 8082.

The complete laboratory analytical reports for the samples are provided in CD format in Appendix C.

2.3 DATA USABILITY ASSESSMENT

A data quality and data usability assessment of all samples collected to date is in the process of being completed as of the date of this report. The data review will be conducted by a third-party validator, Data Check, Inc. of New Durham, New Hampshire, according to a modified Tier II validation procedure. This review will include a completeness check of field documentation including sample collection and preservation methods, a completeness check of the laboratory data and documentation, a review of the internal laboratory QA/QC procedures and results including surrogate recoveries, matrix spike and matrix spike duplicate results, blank results, and laboratory control standard results, and an evaluation of sample holding times, trip blank results, and field duplicate results. The assessment will be performed in general conformance with USEPA Region I Guidelines and the Quality Control Guidelines for the Acquisition.

In the interim, until the third-party data usability assessment is complete, Woodard & Curran has conducted a preliminary review of precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS) parameters. These indicators have been examined in the context of the intended use of the data, and an overall assessment of site conditions. In general, it has been determined that the data is of sufficient quality for use in developing the conceptual site model and remediation plans presented herein.

Upon receiving the data validation summaries, any qualifiers applied to the data will be added to the data summary tables presented in this plan. If any changes or qualifications applied to the data result in a decision to change the remedial approach at any location, these changes will be submitted to EPA as an addendum to this Plan.

3. REMEDIATION PLAN OVERVIEW

This plan has been developed for the remediation of PCB-affected media encountered during the implementation of the Southwest Concourse revitalization project. Throughout the implementation process and upon its completion, each step of the remediation will be evaluated to determine whether any plan modifications should be made prior to continuing with the remedy implementation in other areas. A general overview of the proposed remedial activities is presented below with detailed descriptions of the plan for each of the affected media presented in the following sections.

The remediation plan proposed herein is a combination of a removal and off-site disposal of PCB bulk product waste under 40 CFR 761.62 with a self-implementing cleanup and disposal under 40 CFR 761.61(a) and/or a risk-based cleanup and disposal request prepared in accordance with 40 CFR Part 761.61(c) for PCB Remediation Wastes (soils, concrete, etc.).

In summary, all caulking encountered/disturbed within the work area will be removed and disposed off-site as a > 50 ppm PCB waste (State-listed hazardous waste). Soils and concrete to be removed during the work and in direct contact or immediately adjacent to the caulking and which exhibit concentrations of PCBs > 1 ppm will be excavated and disposed off-site at their respective at-found concentrations. Soils not planned for removal (e.g., those soils that will remain in place) will meet EPA's high occupancy cleanup levels (either $\leq$ 1 ppm for unrestricted use or $\leq$ 10 ppm beneath a cap). At this time, any area within the project work limits has a potential for soil excavation depending on the specific replacement activity planned in that area. Granite steps formerly in direct contact with caulking will be decontaminated with a chemical wash and, upon meeting the high occupancy cleanup levels of 10 µg/100cm^2, will be re-used on site. A site plan depicting the locations of the concrete pads/walkways, granite stairs, and retaining walls to be removed is provided as Figure 3-1.

Residual concentrations of PCBs on concrete retaining walls, building walls, and a pedestrian tunnel ceiling will remain in place and be encapsulated by a protective coating (following caulking removal). These areas of concrete are not scheduled for removal during the project and are not planned to be removed during the remediation phases of the project and instead are proposed to be contained behind a barrier or encapsulant to prevent direct contact with PCBs and/or potential migration effects to other media. The rationale for this decision is that the concrete tunnel ceiling and building foundations are critical to the structural integrity and removal of portions of this concrete is not recommended. A portion of the retaining walls are also proposed to be covered with a barrier/containment given the amount of incremental non-planned disruption that would be generated during the removal. The on-site encapsulation of PCB remediation waste is an interim solution designed to shield impacted materials from the effects of weathering and leaching mechanisms, thereby eliminating potential exposure pathways and mitigating the potential for PCB transfer via direct contact and/or leaching to other media/materials. Accordingly, there will be no resultant exposure to PCBs in the contained concrete, resulting in conditions protective of human health and the environment. Proper disposal of any remaining PCB remediation waste will be required upon removal of the material or at the time of structure demolition.

Through the removal of the source materials (caulking), excavation and off-site disposal of those PCB-containing materials scheduled for removal (soil and concrete), reuse through decontamination (e.g., granite steps) to high occupancy cleanup levels, and the application of an encapsulant on surfaces that contain residual PCBs, the proposed remediation plan removes those PCB containing materials not authorized for continued use and either removes or restricts exposure pathways to residual PCBs, thereby, not posing an unreasonable risk of injury to health or the environment.

4. CAULKING

This section presents the characterization data associated with the caulking followed by the proposed remediation and verification process.

4.1 CHARACTERIZATION

Bulk caulking samples were collected from various joint types in April and May 2010 to determine the levels of PCBs present in the caulking. The sample locations were spatially distributed throughout the work area and collected from different types of joints (e.g., retaining walls, concrete pads, granite steps, etc.). At all sample locations, the caulking appeared visually similar and gray in color. It appears that caulking was used as a sealant in between each granite step, in select expansion joints of the concrete pads/walkways on the ground surface, at the joint where the concrete pad or asphalt intersected a vertical building or retaining wall, and along the vertical joint where a retaining wall intersects a building. A total of 19 samples were collected as presented in the table below.

Table 4-1: Caulking Analytical Data Summary

Notes	Sample ID	Date	Detection Limit	Total PCBs	Units
Tunnel ceiling archway expansion joint	SW-01	4/20/10	15000	120,000	mg/kg
Western curb inside tunnel, 30' from south end of tunnel	CBK-025	5/18/10	24.5	467	mg/kg
Granite stairs west of Kennedy	SW-02	4/20/10	9800	85,000	mg/kg
Granite stairs south of Coolidge and north of Hampden	SW-03	4/20/10	4900	67,000	mg/kg
Granite stairs east of Washington	SW-10	4/20/10	4100	75,000	mg/kg
Granite stairs south of John Quincy Adams	SW-12	4/20/10	7100	100,000	mg/kg
Granite stairs north of Berkshire	SW-13	4/20/10	360	4,300	mg/kg
Granite stairs south of Crampton	SW-17	4/20/10	6500	130,000	mg/kg
Granite stairs west of Mackimme	SW-18	4/20/10	9800	85,000	mg/kg
Concrete pad at granite stairs southeast of Washington	SW-09	4/20/10	7500	120,000	mg/kg
Concrete pad joint north of Hampden	SW-04	4/20/10	190	1,800	mg/kg
Concrete pad joint west of Prince	SW-05	4/20/10	400	3,000	mg/kg
Joint between concrete pad and building wall (Prince)	SW-06	4/20/10	8700	90,000	mg/kg
Concrete pad joint north of Cance	SW-07	4/20/10	400	4,600	mg/kg
Concrete pad joint east of Cance	SW-08	4/20/10	380	5,000	mg/kg
Concrete pad joint south of John Quincy Adams	SW-11	4/20/10	41	63	mg/kg
Concrete pavers joint north of Berkshire	SW-14	4/20/10	840	13,000	mg/kg
Concrete pad joint north of Berkshire	SW-15	4/20/10	160	2,400	mg/kg
Concrete pad joint southeast of Hampden	SW-16	4/20/10	370	4,000	mg/kg

As indicated above, all samples detected PCBs at concentrations > 50 ppm ranging from 63 to 130,000 ppm. Aroclor 1254 was the only Aroclor reported in the samples. In general, the caulking from the granite stairs exhibited higher concentrations than the caulking samples from the concrete pads. Based on these results, all caulking encountered during the project is being managed as > 50 ppm PCB wastes.

A detailed calculation of the amount of caulking in the project work area was not completed prior to removal; however, it is estimated that greater than 9,000 linear feet of caulking was present based on approximately 5,000 l.f. associated with the granite stairs, 3,600 l.f. along building and retaining walls where concrete pads or asphalt on the ground surface intersected the respective wall, and 400 l.f. (assumed) associated with concrete pad expansion joints and/or vertical joints where retaining walls meet buildings.

4.2 REMEDIATION PLAN

The caulking removal task described below includes the removal and off-site disposal of the caulking encountered during the performance of the concourse replacement project.

- Surface preparation for caulking removal will include surficial wetting of visibly dry and/or deteriorating caulking to minimize dust generation.
- At locations where caulking will be removed from vertical joints (e.g., between a retaining wall and a building), polyethylene sheeting will be placed on the ground surface and removal will be conducted using hand tools to achieve caulking removal to the maximum extent practicable while minimizing dust or other airborne particulates generated from caulking or adjacent materials. This will *not* include mechanical grinding / sawcutting any concrete in direct contact with the caulking. As discussed in Section 6, caulking present in joints of the concrete pads was removed by saw cutting 12 inches away from the joint and removing this concrete and caulking together for disposal as > 50 ppm PCB wastes.
- Upon the completion of the initial removal activities, the joints will be visually inspected for the presence of any residual caulking. If residual caulking is observed, it will be removed from the adjacent material to the maximum extent practicable. This may include scraping or chemical means to remove the visible caulking remnants from the concrete (e.g., along a concrete retaining wall).
- Wet wiping and/or vacuuming of all tools and equipment in the work area will be performed at the completion of the work activity.
- During the project, equipment and tools used in the process will be decontaminated through spraying and wet wiping. At the completion of the project, any non-disposable equipment and tools that handled PCB material will be decontaminated following the procedures described in 40 CFR 761.79c.
- Any debris collected on the polyethylene sheeting will be gathered and placed in the > 50 ppm PCB waste containers at the end of each work day. After use, disposable PPE and poly sheeting used to collect debris will placed in the appropriate containers for disposal as PCB remediation waste.
- All removed caulking and associated debris will be transported for off-site disposal as > 50 ppm PCB wastes in accordance with 40 CFR 761 Subpart D requirements (refer to Section 10 of this Plan).

5. GRANITE STEPS

This section presents the characterization data associated with the granite steps followed by the proposed remediation and verification process. The results from a decontamination pilot test are also presented in this section, including data from before and after pilot test implementation.

5.1 CHARACTERIZATION

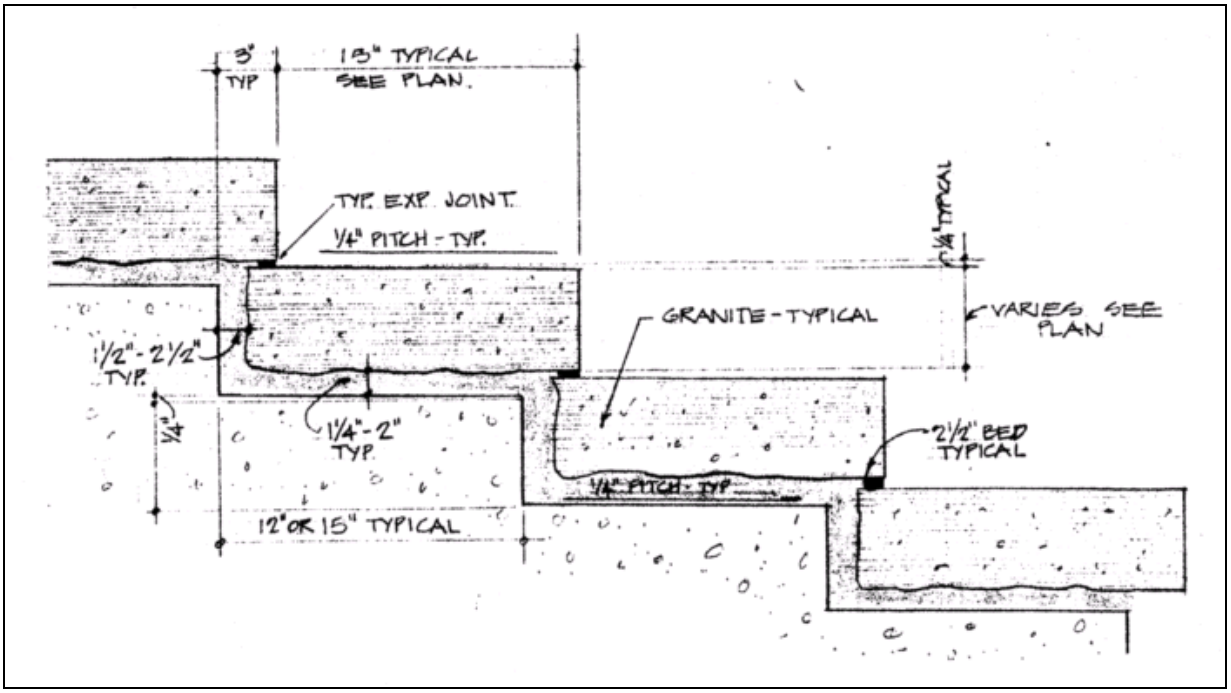
A total of 23 sets of granite stairs are present within the work area (refer to Figure 3-1). An estimated total of 4,800 linear feet of caulking is present within the joints between approximately 1,000 individual granite steps. Many of the stair slabs have loosened and shifted over time since their installation in the 1960s. As a result, the granite staircases are scheduled for removal and replacement so that the underlying concrete foundations can be re-established and the steps can be properly reset.

During the initial assessment, suspect caulking materials were observed at two types of locations associated with granite stairs, as shown below:

Photo above left: Horizontal joints spanning the width of the staircase, beneath the overlap between two consecutive granite slabs; also includes the joint at the top edge of the uppermost stair and the bottom edge of the lowest stair where these stairs abut concrete or another paved surface. Caulking is also present at the horizontal and vertical joints between the edge of the stairs and abutting walls.

Photo above right: Horizontal and vertical joints (the rise and run of each step) at the short edge of each stair where it abuts another slab in a wider staircase (often deteriorated or missing at many locations).

A detail of the granite step construction obtained from the original site construction drawings is provided below:



As shown in the detail above, an expansion joint sealant is present at the overlap between each stair. Other relevant stair details obtained from the original construction drawings were: the caulking used at expansion joints is specified as a polysulfide sealant and the steps were set in mortar over a concrete form (although stair removal at some locations has revealed bedding sand or other repair materials and not mortar over the concrete form).

Initial characterization samples were collected from 3 of the 23 sets of granite stairs at the site. Because building stone, such as granite, is defined as a non-porous surface under 40 CFR 761.3, the samples were collected as hexane-preserved surface wipes in accordance with the standard wipe test as defined in 40 CFR 761.123. A pair of samples was collected from each of the three staircases, where one sample was collected from a granite surface where the caulking had apparently pulled away from the step in the past (not currently present), and one sample from a granite surface where caulking was still intact but was removed using hand tools just prior to sample collection. The results of these samples are summarized below (all PCBs reported as Aroclor 1254; concentrations are reported in ug/100cm^2):

Sample ID	Relative Location	Associated caulking result (ppm)	Detection Limit	Total PCBs
CWG-023 (no caulking currently present)	Crampton West	NA	0.5	7.0
CWG-024 (caulking currently present)	Crampton West		5.0	67
CWG-032 (no caulking currently present)	Crampton South	130,000	0.5	0.24
CWG-033 (no caulking currently present)	Crampton South		0.5	< 0.5
CWG-038 (no caulking currently present)	Berkshire North	4,300	0.5	< 0.5
CWG-039 (caulking currently present)	Berkshire North		0.5	18

As indicated above, concentrations of PCBs were detected in the wipe samples at concentration in excess of EPA's high occupancy cleanup level for non-porous surfaces (10 ug/100cm^2). The data also indicated that samples from locations where caulking was currently present generally exhibited higher concentrations than those locations where caulking was not currently present. There did not appear to be a correlation between caulking concentrations and wipe results.

Based on these results, a remedial plan to decontaminate/remediate all granite steps regardless of caulking concentration or presence was developed.

5.2 DECONTAMIANTION PILOT TEST

A surface decontamination pilot test was conducted to determine if the concentrations of PCBs detected in the granite steps could be reduced to achieve the 10ug/100cm^2 cleanup level for non-porous surfaces. The pilot test was conducted by Triumvirate Environmental as follows:

- All visible traces of caulking were removed from the six steps previously tested by scraping with hand tools (i.e. knives or caulking removal guns);
- Six steps were removed from the staircases, wrapped in polyethylene sheeting, and transported to a temporary on-site decontamination area;
- The decontamination area was lined with polyethylene sheeting in a manner designed to contain all liquids generated from the decontamination process, and the liquids were transferred by submersible pump into a 55-gallon drum for on-site storage pending characterization;
- The granite steps were decontaminated via chemical washing using a chemical decontamination product (CAPSUR, Integrated Chemistries, Inc.), utilized specifically for PCB removal from masonry surfaces;
- CAPSUR was applied following the manufacturer's recommended procedures for hand applications: the product was applied and scrubbed in using hand brushes for the full five minute dwell time; during the agitation, the surface of the granite was kept wet with CAPSUR at all times; following the five minute dwell time, all free liquid was vacuumed from the granite; a layer of rinse water was then applied to the granite and then vacuumed; this procedure was repeated three times followed by a triple water rinse after the final application;
- Surface wipe samples were collected in accordance with the standard wipe test as defined in 40 CFR 761.123 from the same six stairs sampled prior to decontamination. The results of these samples are presented below:

Total PCBs (Pre-CAPSUR)	Total PCBs (Post-CAPSUR)
7.0	6.3
67	5.5
0.24	1.3
< 0.5	< 0.5
< 0.5	< 0.5
18	< 0.5

Because all of the post-decontamination results were reported with PCBs below the 10 ug/100cm^2 cleanup level and the steps tested were believed to represent typical stairs at the site, it was determined that surficial decontamination by CAPSUR can be an effective and efficient approach to meet the cleanup levels for granite. All granite stair sample results are presented in Table 5-1. The product technical specifications for CAPSUR are included in Appendix E.

5.3 REMEDIATION PLAN

The proposed remedial approach for the granite steps at the site is surficial decontamination by CAPSUR washing as presented in the pilot test description above. It is estimated that approximately 1,000 individual granite blocks will be removed, decontaminated, and re-set in their original locations. At some locations, the stairs are not proposed to be replaced (e.g., a different concourse ground surface will be constructed). Decontaminated granite steps that are not scheduled to be replaced in their original location are proposed to be reused on-site in another manner.

The following sections provide details on site preparation and control activities, the remedial approach, and verification process.

Site Preparation and Control Activities

Prior to initiating the granite remediation work, the following controls will be implemented and site preparations made:

- A Contractor Health & Safety Plan will be developed specific to the work activities. All workers will follow applicable Federal and State regulations regarding the work activities, including but not limited to OSHA regulations, respiratory protection, and personal protective equipment (PPE), etc.

- Access to the active work areas and decontamination area will be controlled by the contractor through fencing, posting of signs, or other equivalent means;

- Engineering controls will be implemented to control any dust or debris generated during caulking and stair removal activities. These controls will include the use of HEPA filter-equipped tools and/or wetting the surrounding soils.

- During the project, equipment and tools used in the process will be decontaminated through spraying and wet wiping. Used PPE and decontamination materials will be containerized for off-site disposal. At the completion of the project, any non-disposable equipment and tools that handled PCB material will be decontaminated following the procedures described in 40 CFR 761.79c.

Caulking Removal and Granite Step Relocation

All caulking will be removed from each granite stair prior to its removal from the staircase. The caulking will be removed by cutting or scraping with hand tools, or by using a mechanical caulking removal gun. No grinding or sawcutting (i.e., excessive dust-generating techniques) will be used directly on the caulking. If complete caulking removal cannot be achieved with the stair in its existing location, the stair will be lifted slightly (a few inches) above its location for easier access with hand tools. Once caulking removal is complete, the stair will be lifted and placed on a flat bed truck for transport. Each granite slab will be wrapped in polyethylene sheeting and then transported by flatbed truck to the decontamination area (located at an unoccupied area across University Avenue). All removed caulking will be containerized and disposed as > 50 ppm PCB wastes.

Granite Decontamination and Verification

The decontamination area will be established as a secure location surrounded by a fence to prevent access to the area. Each granite step, which has been labeled to ensure that it will be returned to its original location, will be staged on polyethylene sheeting in the decontamination area. Each step will be decontaminated via chemical washing with a chemical extraction solvent (CAPSUR) following the manufacturer's recommended procedures for hand applications: the product will be applied and scrubbed in using hand brushes for the full five minute dwell time; during the agitation, the surface of the granite will be kept wet with CAPSUR at all times; following the five minute dwell time, all free liquid will be vacuumed from the granite; a layer of rinse water will be applied to the granite and then vacuumed; this procedure will be repeated three times followed by a triple water rinse after the final application.

After the decontamination process, the granite will be inspected and verified that all residual caulking has been removed. Surface wipe samples will be collected from a representative number of steps in accordance with the standard wipe test (40 CFR 761.123) from locations on the granite formerly in direct contact with caulking. Because the pilot test yielded positive results (6 out of 6 steps met cleanup levels), this plan proposes to initially collect verification wipe samples from a minimum of 25% of the decontaminated stairs for the first 100 stairs (25 samples), with a potential to reduce the frequency to 10% of the stairs after this point. If results indicate that the decontamination process consistently meets the cleanup level (10 ug/100cm^2), then a modification to his verification plan will be submitted to EPA. At a minimum, at least one sample will be collected from each staircase; if a staircase has fewer than 10 granite steps (some have as few as 7), the sampling frequency may be temporarily increased to collect at least one sample from a step in each staircase.

If a verification sample is reported with PCBs above 10 ug/100cm^2, this step and any steps counting back to the last sample reported with PCBs below 10 ug/100cm^2 will be re-cleaned if the steps are from the same staircase. For example, if Staircase A consists of 50 granite steps and the verification sample frequency is at 10% of steps, samples will be collected from steps 10, 20, 30, 40, and 50. If the samples from steps 10, 30, 40, and 50 meet cleanup levels but the sample from step 20 is reported with PCBs > 10 ug/100cm^2, steps 11-20 will be re-cleaned and a new sample will be collected from step 20.

All samples will be extracted using USEPA Method 3540C (Soxhlet Extraction) and analyzed for PCBs using USEPA Method 8082.

Staircase Subgrade Management

After the granite stairs are removed, the underlying subgrade materials will require removal and resetting of the concrete foundations so the steps can be properly reset after decontamination. The underlying subgrade material at several locations consists of a shallow layer of bedding sand (2-4 inches) on top of a concrete form staircase. Initial characterization samples collected from this subgrade sand at a staircase west of Kennedy were reported with PCBs > 1 ppm (581 ppm in bedding sand directly beneath a former caulked joint at the retaining wall edge, and 11.6 ppm in the bedding sand two feet from the retaining wall edge). Given the elevated concentration of PCBs, all bedding materials found beneath the granite stairs will be removed and managed as > 50 ppm PCB waste.

The concrete foundation beneath the granite stairs is either scheduled to remain in place at those locations where the stairs will be replaced or removed at locations where the stairs will not be replaced. At the granite staircase west of Kennedy, two samples were collected from the concrete form after removing the bedding sand, and four samples were collected at a staircase east of Hampshire. All six samples reported PCBs < 1 ppm, ranging from 0.24 to 0.95 ppm with an average of 0.44 ppm.

To confirm that the concrete foundation meets the 1 ppm cleanup level at all granite stair locations, characterization samples will be collected from the concrete in accordance with Subpart N requirements after the bedding materials

are removed from its surface. The concrete foundations underlying the granite stairs have dimensions that vary depending on the width of the staircase and the number of stairs; however, each step of the concrete form is approximately 6 inches high and 12 inches long (the tread surface length). To meet Subpart N requirements, the characterization sample grid for each staircase will be developed based on the total concrete surface area. One sample will be collected from a random location in each 10-foot square grid area (i.e., one sample per 100 ft^2). For example, a 12-foot wide staircase consisting of 12 stairs will have an approximate concrete form area of 216 ft^2 (12 feet width x 12 steps x 1.5 foot step height + length); two samples would be collected from this concrete form.

In areas where the granite steps will be replaced, the results of the concrete foundation sampling will be interpreted as follows:

- If results of the concrete foundation characterization samples are reported with PCBs below the unrestricted use cleanup level of 1 ppm, no actions will be taken to remediate the concrete before work is conducted for resetting the stairs (new concrete poured or bedding material, etc.).

- If results of any concrete samples are reported between 1 and 10 ppm, no actions will be taken to remediate the concrete as the replacement of the granite steps exceeds the requirements specified in the definition of a PCB remediation waste cap under 761.61(a)(7). The granite steps will completely cover the underlying concrete beneath at least 6 inches of granite; each step joint and edge will be sealed with mortar to close off any infiltration or exposure pathway to the underlying concrete; and, the steps have sufficient strength and integrity to serve as an effective cap surface for the duration of their use. If any granite stairs are designated as a cap as described herein, a deed restriction will be filed for that location as described in 761.61(a)(8).

- If any concrete foundation samples are reported with PCBs > 10 ppm, a risk-based approach under 761.61(c) will be proposed to apply a containment barrier to the concrete surface. This may include a liquid product (e.g., epoxy) or new concrete foundation or some combination. Baseline surface wipe samples will be collected from the final barrier at the same locations where bulk concrete samples were collected. If the baseline surface wipes are reported with PCBs < 1.0 ug/$100cm^2$, the coating application will be considered complete and the granite stairs replaced; if the samples are reported with PCBs > 1.0 ug/$100cm^2$, another layer of the coating may be applied and the sampling process repeated. If any concrete foundations require encapsulation as described herein, a deed restriction will be filed for that location as required by EPA. Prior to implementing this approach, a specific plan will be submitted to EPA describing the products and methods to be used.

In areas where the granite steps will not be replaced, the concrete foundation will be removed and managed at the as-found concentration of PCBs similar to the approach described in the following section of this Plan for concrete removal.

6. CONCRETE PADS AND WALKWAYS

This section presents the characterization data associated with the concrete pads and walkways followed by the proposed remediation and verification process.

6.1 CHARACTERIZATION AND EXPEDITIED REMEDIATION

The concrete pads and walkways consist of concrete aggregate sections within concrete borders. These concrete pads are located throughout the concourse and are scheduled to be removed and replaced during this project. Caulking was observed where the concrete intersected a vertical structure, either a concrete retaining wall of building. Caulking was also observed in some expansion joints located within the pads, although this caulking was not consistently observed. Photographs of typical pads/walkways and caulking are provided below.

Typical Concrete Pads/Walkways

Caulking present along building wall and pad joint and at a concrete expansion joint within the pad

Caulking not present on joints within pad

Caulking at joint between pad and concrete retaining wall

As part of the initial assessment, concrete samples were collected from two pads/walkways where previous caulking samples were analyzed (west of Prince was 3,000 and 90,000 ppm; and southeast of Hampden was 4,000 ppm). Samples were collected from concrete in direct contact with the caulking (after removal of caulking) and at select distances away from the joint. A summary of the sample results is provided below.

Distance from Caulking	Sample Depth (in)	Notes	Sample ID	Date	Total PCBs	Units
Direct Contact	0-0.5	Concrete in direct contact with caulked joint at western edge of concrete pad above ramp, west of Prince.	CBC-004	5/11/10	2,000	mg/kg
1.0"	0-0.5	Concrete 1" from caulked joint at western edge of concrete pad above ramp entrance, west of Prince.	CBC-007	5/11/10	1.74	mg/kg
3.0"	0-0.5	Concrete 3" from caulked joint at western edge of concrete pad above ramp entrance, west of Prince.	CBC-008	5/11/10	0.224	mg/kg
Direct Contact	0-0.5	Concrete in direct contact with caulked joint near center of concrete pad; within southeastern horseshoe stair south of Hampden.	CBC-017	5/11/10	3.31	mg/kg
1.0"	0-0.5	Concrete 1" from caulked joint near center of concrete pad; within southeastern horseshoe stair south of Hampden.	CBC-018	5/11/10	0.043	mg/kg

As indicated above, concrete in direct contact with the caulking exhibited PCB concentrations ranging from 2,000 to 3.31 ppm with PCB levels decreasing to < 1 ppm within 3 inches of the joint. Given the timing/schedule of the project, certain areas of the work area needed to be "cleared" to allow new construction to initiate in order to meet the overall schedule. A description of work in three such areas is described below.

Coolidge/Hampden Walkway

One of these areas was a concrete pad/walkway located in between the Coolidge and Hampden buildings. Once this pad was removed, additional work including new drainage and retaining walls could be constructed. As such, a focused characterization and remedial measure was implemented within this area following subpart N and O sampling procedures. This walkway was approximately 130 feet in length by 13 feet in width. Caulking was located along one expansion joint along the pad (13 feet) and in an area where the pad intersected a concrete retaining wall and the top of granite stairs, approximately 40 linear feet (although caulking was not currently present at the top of the stairs). Caulking was not observed at any of the other intersections/joints, which were mostly grass or landscapes areas.

In total, 16 concrete samples and 10 soil samples were collected for PCB analyses. A summary table of the sample results is presented as Table 6-1 with the full laboratory reports provided in Appendix C. Initial concrete samples were collected at locations between 6 and 9 inches away from the caulked joints. All four samples (see Table 6-1) were non-detect for PCBs (< 0.33 ppm). In addition, a sample was also collected from concrete integral to a joint where no caulking was present (the majority of the joints on the walkway). This sample was < 0.33 ppm total PCBs. As such, six inches of concrete was removed from either side of the caulked joints by first saw cutting the concrete (in the area of non-detect total PCBs) and then removing the concrete (with the caulking intact) with a mini-excavator.

The underlying soils beneath the removed concrete were also removed to a depth of 2 feet below the top of the concrete pad. All removed concrete and soils were managed as > 50 ppm PCB wastes.

Following concrete and soil removal, additional concrete and soil samples from the remaining concrete and soils were collected along five foot spacings. Two samples of remaining concrete were collected from both sides of the 13 foot long joint and two samples were collected from the underlying soils to this joint. All six samples were non detect (< 0.033 ppm) except one soil sample which reported a concentration of 0.317 ppm. Seven concrete and seven soil samples were also collected along the approximately 40 foot retaining wall and granite stair area. All seven concrete samples were non-detect (<0.033 ppm) and six of the seven soil samples detected PCBs with all concentrations below 1 ppm except one sample location (3 ppm). At this one location, an additional two feet of soils was removed over a 5 foot area and a post-excavation sample collected for analyses. This sample reported PCBs at a concentration of 0.11 ppm. Refer to Figure 9-2 for sample locations.

Based on these results, all concrete and soils identified above were excavated and managed as > 50 ppm wastes. The remaining soils and concrete all exhibited PCB concentrations < 1 ppm and therefore were not identified as having any PCB restriction on their use.

Concrete Pad East of Hampden

Another concrete pad that needed to be removed to allow additional concourse work was located east of the Hampden building. Following a similar approach to the Coolidge-Hampden walkway, a focused characterization and remedial measure was implemented within this area following Subpart N and O sampling procedures. This concrete pad consisted of two rectangular sections, with one measuring approximately 53 by 21 feet and the other measuring approximately 40 by 36 feet. Caulking was located along several expansion joints within the pad and along the building face for a total of approximately 265 linear feet of caulking.

Given the project timing and results from the Coolidge-Hampden walkway, it was conservatively assumed that 12 inches on either side of a caulked joint would contain residual PCBs and would be managed as material with PCBs > 50 ppm. As such, concrete samples were collected at five-foot spacings along the length of all caulked joints at a distance 12 inches from the caulked joint. In total, 82 concrete samples were collected for PCB analyses. A summary table of the sample results is presented as Table 6-2 with the full laboratory reports provided in Appendix C. Of the 82 samples:

- 34 samples were non-detect (generally < 0.1 ppm)
- 44 samples detected PCBs at < 1 ppm (average of 0.23 ppm)
- 4 samples detected PCBs > 1 ppm (1.1, 1.1, 1.2, and 1.2 ppm)

At the four areas with > 1 ppm PCBs, another 12 inches of concrete across a five foot length was marked for removal and sampling at the new 12 inches (or 24 inches from the caulked joint) was conducted. All of these results were non-detect for PCBs (< 0.1 ppm).

Based on these results, the concrete (12 inches in most areas aside from the four areas of 24 inches) was removed from either side of the caulked joints by first saw cutting the concrete (in the area of < 1 ppm PCBs) and then removing the concrete, including the caulking, with a mini-excavator. The underlying soils beneath the removed concrete were also removed to a depth of one foot feet below the top of the concrete pad. All removed concrete and soils were managed as > 50 ppm PCB wastes.

As the date of this plan, all of the verification samples have not been received from the laboratory. However, 23 soil samples have been received and all samples were reported with total PCBs < 1 ppm, except one sample at 1.1 ppm.

Thirteen of the samples were non-detect for PCBs (generally < 0.11 ppm) and the remaining 9 samples were < 1 ppm with an average concentration of 0.35 ppm.

Concrete Pavers East of Hampshire

Another similar area (concrete pavers) that needed to be removed to allow additional concourse work was located east of the Hampshire building. Following a similar approach to the walkways described above, a focused characterization and remedial measure was implemented within this area following Subpart N sampling procedures. This area measured approximately 100 feet in length by 22 feet in width. Caulking was located along the building to paver seam as well as along the pavers to granite stairs, for a total of approximately 265 linear feet of caulking.

Given the project timing and results from the other walkways, it was conservatively assumed that 12 inches from the caulked joint (or 2 brick widths) would contain residual PCBs and would be managed as material with PCBs > 50 ppm. As such, concrete samples were collected at 10-foot spacings along the length of all caulked joints at a distance 12 inches from the caulked joint. In total, 29 concrete samples were collected for PCB analyses following a 10 foot spacing around the caulked joints. A summary table of the sample results is presented as Table 6-3 with the full laboratory reports provided in Appendix C. Of the 29 samples:

- 6 samples were non-detect (generally < 0.1 ppm)
- 20 samples detected PCBs at < 1 ppm (average of 0.46 ppm)
- 3 samples detected PCBs > 1 ppm (1.5, 1.7, and 3.0 ppm)

The three areas with > 1 ppm PCBs were located in the same general area (separated by a < 1 ppm sample in some locations), therefore, another 12 inches of concrete (two rows of pavers) across a 60 foot length (from a sample reported as < 1 ppm at both ends and encompassing all three samples that detected PCBs > 1 ppm) was marked for removal and sampling at the new 12 inches (or 24 inches from the caulked joint) was conducted. Samples from these additional locations have not been received as of the date of this plan submittal.

Based on these results, the concrete pavers will be segregated as > 50 ppm PCB wastes (first two rows of pavers adjacent to the caulked joint), > 1 and < 50 ppm (the area identified above, subsequent to the additional testing), and ≤ 1ppm (all other concrete pavers in the area). Following removal, the underlying bedding sand will be managed the same as the overlying concrete pavers. Underlying the bedding sand is a concrete pad, which will be sampled and managed following the same process as described above.

6.2 REMEDIATION PLAN

Based on the results of the concrete pad/walkway characterization, remediation, and verification completed to date, a remediation plan following a similar approach has been developed for the remaining areas (refer to Figure 3-1 for the locations of the concrete pads/areas scheduled for removal). This approach/plan includes: removal of the existing caulking, removal of concrete and underlying soils on either side of caulked joints from a set distance and depth, and sampling to determine that remaining concrete and underlying soils meets the cleanup levels for the planned activities in this area (e.g., ≤ 1ppm if additional soil removals are required).

Prior to initiating remedial activities, the following site controls will be implemented:

- A Health & Safety Plan will be developed specific to the work activities. All workers will follow applicable Federal and State regulations regarding the work activities, including but not limited to OSHA regulations, respiratory protection, personal protective equipment, etc.;

- Access to the active work areas will be controlled in a manner determined by the contractor to meet project requirements and access needs; currently site access is restricted via chain link fencing and signage;
- All powered tools will be equipped with appropriate tool guards and dust/debris collection systems (i.e., HEPA filters). Wet wiping and water misting will be used as a dust suppressant as appropriate; and
- Air monitoring at the perimeter of the active PCB-impacted removal areas will be conducted during active removal. To reduce dust levels and exposures to dust, a combination of engineering controls and personal protective equipment will be implemented during work activities. A Perimeter Air Monitoring Plan is provided in Appendix D.

The following summarizes the activities to be conducted as part of the removal:

- Concrete and caulking (integral joints to the pad) on either side of the caulked joint to a distance of 12 inches and the full depth of the concrete pad will be removed using standard removal techniques modified as described above (e.g., saw cut concrete at 12 inches and then remove concrete [full depth of the pad] and one foot of soils beneath the 12 inch area). This material will be managed as > 50 ppm wastes.
- Verification sampling of the remaining concrete and underlying soils beyond the extent of removal will be conducted at a frequency of 1 sample per 10 l.f. of caulked joint per media following the sampling and analytical methods described in Section 2.
- All samples will be transported to the laboratory under standard Chain of Custody procedures, extracted using USEPA Method 3540C (Soxhlet extraction), and analyzed for PCBs using USEPA Method 8082.
- Analytical results from the verification samples will be evaluated to determine whether or not this task is complete as follows:
    - Analytical results ≤1 ppm – task complete; no additional clean up required and/or no disposal restrictions will apply to the underlying or adjacent materials.
    - Analytical results > 1 ppm – additional removal and off-site disposal as < 50 ppm PCB remediation wastes (assuming the data is < 50 ppm) will be conducted and sampling process repeated until the levels are met. The only exception to this will be in areas that are not scheduled for any additional soil removals and the data is $\leq$ 10 ppm. Depending on the planned final ground surface covering, this area may meet the definition of a cap per 40 CFR 761.61(a). If this is the case, a submittal to EPA describing the specific areas will be completed.
- During the project, equipment and tools used in the process will be decontaminated through spraying and wet wiping. Used PPE and decontamination materials will be containerized for off-site disposal. At the completion of the project, any non-disposable equipment and tools that handled PCB material will be decontaminated following the procedures described in 40 CFR 761.79c.
- All removed materials will be stored on-site in lined, marked, and covered roll-off containers prior to off-site disposal.

7. PEDESTRIAN TUNNEL

This section presents the characterization data associated with the pedestrian tunnel followed by the proposed remediation and verification process.

7.1 CHARACTERIZATION AND EXPEDITED REMEDIATION

A pedestrian tunnel is located on the northern end of the project work area and consists of an approximately 94 foot long concrete archway tunnel beneath Massachusetts Avenue (see photograph to the right and refer to Figure 1-2). The archway ceiling is approximately 40 linear feet. A caulked expansion joint is located at approximately the mid point of the concrete archway. A sample from this caulking reported total PCBs at 120,000 ppm. On either side of the tunnel a concrete curb is present with a caulked expansion joint approximately every 10 feet along the curbing. A sample of this caulking reported total PCBs at 467 ppm.

The proposed work within the Tunnel as part of the concourse revitalization project includes replacing the concrete slab on the ground surface, painting the archway ceiling (including removing/replacing the expansion joint caulking on the ceiling), and installing other aesthetic features to promote the use of the tunnel as opposed to students using the street surface crossing. This portion of the project was accelerated given that the tunnel use was needed by the end of June for other campus uses over the Summer. Given this schedule, characterization and expedited remediation activities were conducted as described below. A summary of the laboratory data is presented on Table 7-1 with the full laboratory reports provided in Appendix C.

Initially, samples of the concrete on the archway ceiling were collected from locations in direct contact and at specific distances away from the caulked joint. The direct contact sample reported PCBs at 309 ppm with the other samples exhibiting a decreasing PCB concentration with distance from the joint (within 6 inches the concentrations were 5.83 and 6.97 ppm; 1.01 ppm at 12 inches; and 0.204 ppm at 30 feet). In addition, concrete samples from the concrete curb were also collected for PCB analyses from direct contact locations and between 1 and 3 inches from the joint. As indicated on Table 7-1, all samples (five samples) reported non-detect levels of PCBs (< 0.1 ppm or lower). Given the structural limitation of the archway ceiling, extensive concrete removal was not a feasible remedial alternative; therefore, a containment remedial plan was developed incorporating the existing plans to re-paint the ceiling.

The first component of the plan was to remove the caulking. Triumvirate Environmental Inc. (TEI) removed the caulking following the site controls and procedures described in Section 4. All caulking was removed by physical means and containerized for off-site disposal as > 50 ppm PCB wastes. Following removal, the joint was visually inspected to ensure that all caulking was removed to the maximum extent practicable. This process was also repeated for the caulking on the concrete curb.

The second component of the plan involved incorporating the current planned activities into the remediation plan for PCBs - sand blasting the archway ceiling in preparation for repainting. This was accomplished by providing PCB

awareness training for the sandblasting workers (workers used respirators and were already entered into a respirator program), totally encapsulating the tunnel area with polyethylene sheeting (e.g., poly on the tunnel floor and side openings), and collection of all sand blast media and paint residuals with the polyethylene sheeting and managing this material as > 50 ppm PCB wastes.

Prior to pouring a new concrete slab at the base of the Tunnel, three soil samples were collected at locations spatially distributed throughout the tunnel, including one beneath the archway joint. As indicated on Table 7-1, all three samples were non-detect for PCBs (< 0.033 ppm). Subsequently, the new concrete pad was poured at the base of the Tunnel.

In addition to the base samples, two soil samples were collected at the point where the archway caulked joint entered into the rip rap (stone and soil) sides of the tunnel (see photograph to the right). As indicated on Table 7-1, the soil sample on the east side of the Tunnel reported PCBs at 0.78 ppm and the sample from the west side reported PCBs at 8.36 ppm. Based on construction drawings, the archway concrete (and caulked joint) terminates approximately one foot below grade into a concrete thrust block.

Given this data, soils in an approximate two foot area around the joint to a depth of 21 inches feet were removed from the west side and managed as > 50 ppm PCB wastes. Following soil removal, three verification samples were collected from the south, north, and base of the excavation and analyzed for PCBs. As indicated on Table 7-1, all three samples were reported as non-detect for PCBs (< 0.1 ppm).

7.2 REMEDIATION PLAN

Based on the characterization and expedited remedial activities, the remaining remediation activity to be conducted at the Tunnel area is the management of residual concentrations of PCBs on the concrete archway ceiling. Given the description and use of the Tunnel ceiling, the concrete with residual PCBs can be considered a low occupancy area (per 40 CFR 761.3). However, the area that exhibited concentrations > 1 ppm (the high occupancy criteria) is proposed to be contained via encapsulation techniques (note: the entire tunnel ceiling will also be coated as part of the concourse project).

The concrete in former direct contact with the caulking (inside the return of the joint with PCBs at 309 ppm) will be encapsulated with two coats of an epoxy coating, Sikagard 62 or equivalent, followed by new caulking. The Sikagard 62 product has been used on other projects where residual levels of PCBs have been detected in concrete. This product will also bind to the new caulking and existing concrete. A product specification sheet is provided in Appendix E.

The concrete located within 12 inches of the joint will be covered with two coats of contrasting color of an elastomeric acrylic coating (Perma-Crete) or equivalent product to eliminate the direct exposure pathway and leaching transport pathway from residual PCBs. The remaining portions of the ceiling will be coated with this same coating except an underlying coat of contrasting color in areas outside of the 12 inches will not be applied. The product application and coats will follow the manufacturer's specification. A technical specification sheet for this product, including application procedures, is provided in Appendix E.

The elimination of any exposure pathway mitigates both the potential for PCB transfer via direct contact and the material's potential as a source to other media/materials. Accordingly, there will be no resultant exposure to the

residual levels of PCBs in the contained concrete. A periodic monitoring plan, including surface wipe samples, will be implemented to assess potential PCB concentrations on the exposed outer surfaces.

The following describes the proposed remaining remedial activities for the concrete ceiling:

- Prior to application of the protective coating, all surfaces will be prepared so that they are dry, clean and sound (as described above, the ceiling was sand blasted in preparation for the paint application).

- Two coats of the epoxy will be applied to the interior joint and two coats in contrasting colors of an elastomeric acrylic coating will be directly applied to the concrete 12 inches on either side of the joint.

- Baseline bulk samples are not proposed to be collected prior to encapsulation of the adjacent surfaces given the limited amount of material and the existing data.

- All generated waste material (PPE, application tools, etc.) will be containerized in an appropriate waste container for subsequent off-site disposal. Personal protective equipment will be wet wiped and containerized for off-site disposal.

- One baseline verification wipe sample of the encapsulated surface will be collected from a random location along the joint (40 l.f.) and from one location within the 12 inch coated area on either side of the joint.

- Analytical results from the wipe samples of the coated surfaces will be evaluated to determine whether or not this task is complete as follows:

    - Analytical results ≤ 1 µg/100 cm^2 – Task complete.

    - Analytical results > 1 µg/100 cm^2 – Additional application of the coating may be required and additional testing at off-set locations.

Following initial application and baseline sampling, this area will transition into a maintenance and monitoring program. A conceptual maintenance and monitoring plan is described in Section 13 of this plan.

8. RETAINING WALLS AND GROUND LEVEL BUILDING SURFACES

This section presents the characterization data associated with the retaining walls and ground level building surfaces to remain in place followed by the proposed remediation and verification process. In addition, select portions of some retaining walls are scheduled for removal as part of the site work.

8.1 CHARACTERIZATION AND EXPEDITED REMEDIATION

During the initial characterization assessment, suspect caulking materials were observed at three types of locations associated with retaining walls and ground-level building walls:

- Joints between granite stairs and walls (horizontal and vertical seams; see Photo 1)
- Joints between paved ground surfaces and walls (horizontal seams; see Photo 2)
- Joints between a building wall and the end of a retaining wall (vertical seams; see Photo 3)

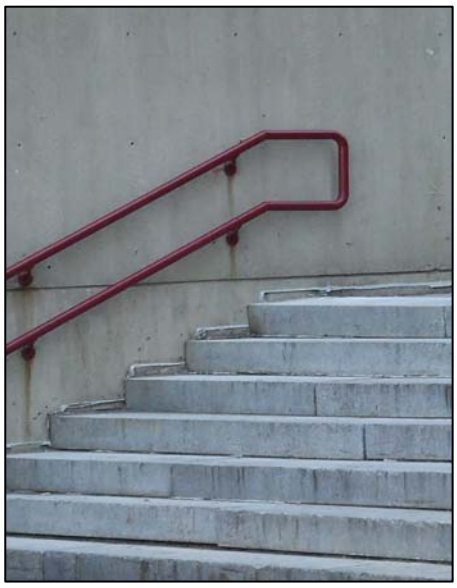


Photo 1 (Top Left): Caulking joints between stairs and walls.

Photo 2 (Top Right): Caulking joints between paved ground surfaces and walls.

Photo 3 (Bottom Left): Caulking joints between a building wall and the end of a retaining wall.

As part of the initial assessment, concrete samples were collected from three retaining walls where previous caulking samples were analyzed (two locations - west of Prince was 3,000 and 90,000 ppm; and Berkshire north stairs 4,300 ppm). Samples were collected from concrete in direct contact with the caulking (after removal of caulking) and at select distances away from the joint. A summary of the sample results is provided in Table 8-1 below.

Table 8-1
Retaining Wall Concrete Analytical Data Summary

Distance from Caulking	Sample Depth (in)	Notes	Sample ID	Date	Total PCBs	Units
Direct Contact	0-0.5	Concrete in direct contact with caulked joint at western edge of concrete pad above ramp, west of Prince.	CBC-004	5/11/10	2,000	mg/kg
3.0”	0-0.5	Concrete on retaining wall 3" above caulked joint at western edge of concrete pad above ramp, west of Prince.	CBC-005	5/11/10	5.01	mg/kg
6.0”	0-0.5	Concrete on retaining wall 6" above caulked joint at western edge of concrete pad above ramp, west of Prince.	CBC-006	5/11/10	253	mg/kg
1.0”	0-0.5	Concrete retaining wall adjacent to granite steps, above caulked joint at stair edge. Central stair in Crampton West area.	CBC-013	5/11/10	5.29	mg/kg
3.0”	0-0.5	Concrete retaining wall adjacent to granite steps, above caulked joint at stair edge. Northernmost stair in Berkshire North area.	CBC-020	5/11/10	<0.033	mg/kg

As indicated above, concrete in direct contact with the caulking exhibited a PCB concentration of 2,000 ppm. PCBs were also detected in three of the four samples collected at distance away from the caulking. Based on this data, it has been concluded that the concrete surfaces adjacent to the caulking have been impacted by PCBs.

Given the timing/schedule of the project, certain areas of the work area needed to be “cleared” to allow new construction to initiate in order to meet the overall schedule. Specific to the retaining walls and ground level building surfaces, the following activities have been and are being performed:

- Caulking around all granite stairs in the work area is being removed and the stairs decontaminated as described in Section 5.
- Caulking adjacent to ground level building surfaces and along retaining walls is being removed along with materials (soils and/or asphalt) approximately 1 foot laterally away from the caulked joint and to a depth of 1 foot below existing grade, as described in Section 9.

All caulking that is being removed is being managed and disposed of as a > 50 ppm PCB waste. As indicated above, residual concentrations of PCBs are expected in the concrete at these locations. At this time, the extent of PCBs in concrete adjacent to this caulking is not known and additional characterization sampling from spatially distributed locations throughout the work area and from the different types of caulked joints is being conducted.

8.2 REMEDIATION PLAN

The proposed remediation can be categorized into two different types of conditions, as follows:

- Portions of retaining walls that are planned to be removed; and
- Retaining walls and building surfaces that are to remain in place.

Retaining Walls to be Removed

Twelve sections of concrete retaining walls at the site are designated for removal and off-site disposal as part of the 2010 renovation work. Of the twelve sections of concrete retaining walls designated for removal, nine are adjacent to granite staircases, two are adjacent to unpaved soils on either side, and one is adjacent to granite stairs (partial length) and unpaved soils (partial length); therefore, 10 of these walls were constructed with caulking (e.g., only the walls that are adjacent to granite stairs). The locations of these 12 walls, as well as other retaining walls within the project work limits, are shown on Figure 3-1.

Characterization samples will be collected at these locations prior to removal in accordance with Subpart N requirements (i.e., 10-foot grid spacing) to determine the extent of PCB impacts > 1 ppm. Based on these findings, the entire wall will either be managed as PCB remediation waste (at the as found concentration) or portions of the wall will be segregated and managed as PCB remediation waste (if > 1 ppm) or concrete without PCB restrictions (if $\leq$ 1 ppm). This decision will be based on a location-specific assessment and dependent on the amount of material and labor involved with cutting the wall vs. managing it all as PCB Remediation Waste. If portions of the wall are to remain in place (subgrade portions), then concrete samples will be collected from the materials scheduled to remain in place to assess residual PCB concentrations, if any, in these materials.

The work procedures described in Section 6 for the concrete pad/walkway removals will be followed for the concrete retaining walls planned to be removed. It is noted that walls adjacent only to unpaved soils with no caulking present will be removed as non-PCB containing construction & demolition (C&D) waste.

Retaining Wall and Ground Level Building Surfaces not Scheduled for Removal

For those concrete retaining walls and ground-level building walls that are not scheduled for removal as part of the 2010 renovation work, additional characterization samples are being collected to determine the extent of PCB impacts and to develop an appropriate remedial approach/plan.

As discussed in Section 3, the current approach is for these residual concentrations of PCBs in concrete to remain in place and be encapsulated by a protective coating following caulking removal. These areas of concrete are not scheduled for removal during the remediation phases of the project and instead are proposed to be contained behind a barrier or encapsulant to prevent direct contact with PCBs and/or potential migration effects to other media. The rationale for this decision is that the concrete of these structures are critical to the structural integrity and removal of portions of this concrete is not recommended.

The on-site encapsulation of PCB remediation waste is an interim solution designed to shield impacted materials from the effects of weathering and leaching mechanisms, thereby eliminating potential exposure pathways and mitigating the potential for PCB transfer via direct contact and/or leaching to other media/materials. Accordingly, there will be no resultant exposure to PCBs in the contained concrete, resulting in conditions protective of human health and the environment. Proper disposal of any remaining PCB remediation waste will be required upon removal of the material or at the time of structure demolition.

As mentioned above, at this time, the specific details and locations for the containment system are not known as additional characterization and pilot testing is needed to determine the specific areas and products to be used for the containment barrier system. These could include an epoxy-type product on the direct contact concrete followed by a clear acrylic coating on the exposed building or retaining walls. In addition, this activity may be separated into areas that: 1) need to be completed as part of the current concourse project and schedule, such as, areas of former direct contact that will be situated beneath the new final grade or areas adjacent to staircases; and 2) areas that will be completed as part of the project, but it is not critical that they be completed as part of the student move-in date schedule, such as, above grade retaining wall concrete surfaces. Following completion of this additional testing, a modification or addendum to this Plan will be prepared and submitted to EPA for review and approval. It is anticipated that following implementation, these areas would transition into the maintenance and monitoring program.

9. SOILS

This section presents the characterization data associated with the soils followed by the proposed remediation and verification process. All soil data received as of June 18, 2010, including characterization and post-excavation verification sample data, is summarized in Table 9-1.

9.1 EXPEDITED ACTIONS

As described in the previous section, this project is on a fast-track schedule given the move-in date for the students back into this residential housing area. As such, some immediate actions were conducted to support the project schedule. These actions are described below.

9.1.1 Asphalt and Sub Base Management

In 2009, portions of the concourse away from the buildings were excavated as part of infrastructure and subsurface utility upgrades. Following this work, new asphalt and sub base materials were installed over a significant portion of the area, including paving over existing concrete pads. This new temporary asphalt and sub base material was scheduled for removal as the first task of the 2010 activities. Prior to removal, samples of the asphalt pavement at select distances away from the building and walls (areas of caulking presence) were collected for PCB analyses. A summary of the results is presented below.

Distance from Caulking	Sample Depth (in)	Notes	Date	Detection Limit	Total PCBs	Units
2.0"	0-0.5	Southwest corner of Coolidge building, south face, 2" from wall with visible caulking at base.	5/18/10	0.16	2.84	mg/kg
6.0"	0-0.5	Southwest corner of Coolidge building, south face, 6" from wall with visible caulking at base.	5/18/10	0.033	0.867	mg/kg
2.0"	0-0.5	Northwest corner of JQ Adams building, west face, 2" from wall with visible caulking at base.	5/18/10	0.17	2.76	mg/kg
6.0"	0-0.5	Northwest corner of JQ Adams building, west face, 6" from wall with visible caulking at base.	5/18/10	0.066	1.15	mg/kg
12"	0-0.5	Northwest corner of JQ Adams building, west face, 12" from wall with visible caulking at base.	5/25/10	0.330	0.417	mg/kg

Based on these results, the General Contractor was instructed to leave the asphalt and sub base soils within 12 inches of the building in place. This material (within 12 inches of the building) is being removed by the Remediation Contractor (TEI) and managed as PCB containing soils.

The asphalt across the majority of the concourse was reclaimed and the sub base materials excavated and stockpiled on-site. Currently, there are two stockpiles of soil with dimensions of approximately 75 feet by 110 feet (Pile A) and 50 feet by 90 feet (Pile B) with both piles approximately 7 feet in height. Samples of the stockpiled area (two stockpiles) were collected to confirm that elevated concentrations of PCBs were not detected in these 2009 installed materials beneath the asphalt. Samples were collected from locations throughout the stockpiles from various depths using an excavator to dig into the soils. During the sample, the soils were observed to be a uniform

dark brown sand and gravel with a trace of asphalt but no caulking remnants. A summary of the sample results is presented below.

Pile	Date	Detection Limit	Total PCBs	Units
Soil Pile A	6/4/10	0.11	0.1	mg/kg
Soil Pile A	6/4/10	0.11	ND	mg/kg
Soil Pile A	6/4/10	0.11	0.16	mg/kg
Soil Pile A	6/4/10	0.11	0.43	mg/kg
Soil Pile A	6/4/10	0.11	ND	mg/kg
Soil Pile B	6/4/10	0.11	0.18	mg/kg
Soil Pile B	6/4/10	0.1	ND	mg/kg
Soil Pile B	6/4/10	0.1	0.27	mg/kg

As indicated above, no samples detected PCBs in excess of 1 ppm.

The asphalt and sub base materials located within 12 inches of the building are being removed along with any soils to an approximate depth of 1 foot below current grade. During removal, any loose caulking located at the ground surface to building or wall seam is being removed and placed into 55-gallon containers. All asphalt and soils removed as part of this task are being containerized in roll-off containers for subsequent off-site disposal as PCB wastes.

9.2 SOIL CHARACTERIZATION AND REMEDIATION ACTIVITIES

As of June 18, 2010, analytical results from 262 soil samples have been received to aid in determining the nature and extent of PCB-affected areas. This sampling was focused on site soils in areas targeted for excavation to install or replace retaining walls, drainage systems, and other project components. Specifically, the following areas have been assessed as of the date of this Plan:

- Coolidge-Hampden concrete walkway;
- Areas surrounding Kennedy, Coolidge, and Hampshire buildings:
    - Drainage area east and south of Coolidge building;
    - Retaining wall west of Kennedy building; and
    - Retaining walls south of Kennedy and north of Coolidge.
- Spatial locations within the concourse.

Given the project timing and conditions, not all areas that are planned to be excavated have been characterized as of the date of this submittal. The above areas are being used as a guide for future characterization and to select appropriate remedial measures. A similar approach for additional characterization sampling and subsequent remedial measure development will be used in the areas scheduled for excavation.

For initial comparison purposes and as guide to required actions, soil characterization data is compared to EPA's unrestricted use clean-up level of 1 ppm under 40 CFR 761.61(a) for PCB remediation waste. In addition, the requirements for soil sampling characterization and verification under 40 CFR 761.61 were also used to guide the frequency of sample collection and removal extents.

In general, higher concentrations of PCBs were detected in soils located closer to the caulking, and demonstrated decreasing concentrations with increasing depth and distance from the caulking. Based on the concentration and distribution of PCBs detected in soils, it is apparent that the caulking is the source of PCBs.

A summary of the work completed in each of the areas listed above is provided below. A drawing depicting soil characterization sample locations collected to date is provided as Figure 9-1 and a drawing depicting soil verification sample locations (e.g., soil samples following a soil removal) is provided as Figure 9-2. A summary of the analytical results is presented as Table 9-1. The analytical laboratory reports are included in Appendix C.

As indicated previously in this Plan, work is progressing from north to south throughout the project area. As such, additional samples and excavation areas are located on the northern portion of the Site. However, some activities have been completed on the southern portions of the work area. The locations of the samples and excavation areas completed as of June 18, 2010 in these areas are depicted on Figures 9-3 and 9-4.

Coolidge-Hampden Concrete Walkway

Based on an assessment of the caulking present on this concrete walkway, 12 inches of concrete on either side of a caulked joint was removed for disposal as > 50 ppm PCB waste. Following concrete removal in this zone, two feet of the underlying soils were removed for disposal as > 50 ppm PCB waste (refer to Section 6 for additional details).

Following removal of these soils, verification soil samples were collected at a 5-foot interval spacing and submitted for PCB analyses (see Figure 9-2). As indicated on Table 3-1, PCBs were reported at the following levels: < 0.033, < 0.04, 0.098, 0.268, 0.317, 0.539, 0.551, 0.733, and 3.0 ppm. In the area of the 3.0 ppm result, additional soils were removed from a 5-foot wide area to a depth of another 2 feet. Following removal, a verification sample was collected and PCBs were detected at 0.11 ppm. Given that all verifications samples were below the 1 ppm unrestricted use cleanup level, no further PCB-related soil remediation was conducted in this area and the area was cleared for General Contractor use.

The approach used to remediate concrete and soils at this walkway is being applied to other similar concrete pads and walkways with caulked joints.

Soils around Kennedy, Coolidge and Hampshire

Soils around these three buildings were being used as the first quadrant to be assessed to develop the release pathway model across the Site. W&C collected 112 soil samples in this area following a grid spacing of 20 foot centers around the buildings with one sample collected adjacent to the building wall and one sample collected 10 feet away from the building. An additional six samples were collected from random locations on a 40 foot grid within a plaza area between the three buildings. The results of the samples indicated:

- Concentrations of PCBs > 1 ppm were detected adjacent (within 1 foot) to buildings and/or structures with caulking along the ground surface/building interface at the 0-3 inch depth interval below the subbase materials. Concentrations ranged up to 36 ppm but were generally in the single digit ppm range.
- PCB concentrations from samples collected 1 foot below the sub base materials from locations adjacent to the buildings were generally non-detect or < 1 ppm with a few isolated detections of single digit PCB concentrations > 1 ppm.
- Upon moving 10 feet away from the building the concentrations decreased to < 1 ppm aside from some isolated detections of single digit PCB concentrations > 1 ppm.
- Concentrations of PCBs from six locations in the plaza between the three buildings were reported as non-detect at four locations and at concentrations well below 1 ppm at the other two locations.

Sample locations are shown on Figure 9-1. These results were used to facilitate the delineation of areas that would require soil removal by the Remediation Contractor prior to work in this area by the General Contractor. Specific areas assessed to date are discussed below:

Drainage work east and south of Coolidge

This area required soil excavation in order to install a new drainage line. PCBs were detected above 1 ppm within the proposed excavation area for the drainage line. Based on a review of the data, an area including a 5-foot perimeter laterally from the building was marked out for the Remediation Contractor to excavate to a depth of one foot prior to any drainage work in this area. Excavation was conducted during the latter part of the June 7th week with all soils being containerized in lined roll-offs for subsequent disposal as PCB waste. Following the initial excavation, 44 verification samples were collected for PCB analyses following a 5 square foot grid spacing. Sample locations are shown on Figure 9-2.

The verification results indicated that PCBs at concentrations > 1 ppm were only detected in two locations (3.0 and 9.9 ppm). These two areas were marked (50 square foot area) and an additional one foot depth of soil was excavated and verification samples collected for analyses (see Figure 9-2). The two verification samples from this area were reported with < 0.11 ppm total PCBs.

Retaining Wall West of Kennedy

This area was identified as an area that would need to be cleared for the General Contractor to install a new retaining wall and ramp system. As such, the Remediation Contractor excavated soils 2.5 feet laterally away from the retaining wall at a 1 foot depth. Following the excavation, 20 verification samples were collected from the base of the excavation at a 5-foot grid spacing (see Figure 9-2). The data indicated that 9 of the 20 samples detected PCBs > 1 ppm (up to 6.8 ppm). This data is being evaluated in the context of the need for additional soil removal in this area to support new construction.

In addition to the samples collected from the base of excavation, nine samples were also collected outside of the excavation area (5 feet from the wall at a 10 foot spacing) to delineate the lateral extent of PCBs (see Figure 9-1). All of these samples were either non-detect or < 1 ppm total PCBs, confirming that the lateral extent of excavation had removed PCBs > 1 ppm.

Retaining Walls South of Kennedy and North of Coolidge

This area was identified as an area where two new retaining walls are to be constructed adjacent to existing walls. The Remediation Contractor excavated 1 foot around the existing wall ends (where it was going to connect to the new wall) given the potential presence of caulking on the existing wall. These soils were managed as PCB wastes. Two soil samples were collected from the excavation area around the Kennedy retaining wall and one sample was collected from the wall north of Coolidge – all samples were ≤ 1 ppm total PCBs (see Figure 9-2).

One sample was also collected from both areas identified for the new wall (not near an existing wall and greater than 10 to 15 feet from any known caulking on a building or wall). The sample near the Coolidge wall was 2.3 ppm and the sample from near the Kennedy wall was 21 ppm (see Figure 9-1). Both areas were not previously excavated by the Remediation Contractor. Subsequently, soils from these areas were excavated and managed as PCB wastes.

Following the excavation (to a depth of 4 feet below grade) and prior to setting the concrete foundations for the new retaining walls, soil samples were collected on a five foot grid spacing within the excavation area. Eleven

soil samples were collected from the Kennedy South retaining wall with all 11 samples reporting < 0.11 ppm total PCBs. Twelve soils samples were collected from the Coolidge north retaining wall with all 12 samples reporting total PCBs either < 0.12 or < 1 ppm (highest result being 0.39 ppm).

Spatial locations within the concourse

An initial subset of soil samples has been collected at spatially distributed locations throughout the concourse work area to aid in developing an assessment of the release pathway and nature and extent of PCBs in soils. A summary of the soil sample results is provided below.

Sample Depth (in)	Notes	Date	Detection Limit	Total PCBs	Units
5.5-8.5	Near southern end of Prince, west of the bottom of the ramp; native beneath 2009 sub base	5/18/10	0.33	3.93	mg/kg
6.0-9.0	Beside exposed steam tunnel east of Hampden main entry; native beneath 2009 sub base	5/18/10	0.036	ND	mg/kg
8.0-11.0	South of main entry, just east of a grass & shrub yard area; native beneath 2009 sub base	5/18/10	0.036	ND	mg/kg
0-3	20' north of Hampden, 10' west of eastern retaining wall	5/18/10	0.040	ND	mg/kg
0-3	32' south of northern sidewalk, 25' east of western retaining wall	5/18/10	0.036	ND	mg/kg
0-3	19' from east retaining wall, 12' from south retaining wall	5/18/10	0.033	0.091	mg/kg
0-3	19' from west retaining wall, 30' from north granite stairs	5/18/10	0.033	0.216	mg/kg

As indicated above, all but one sample of native soils was reported with PCBs < 1 ppm, the only exception being the sample detecting PCBs at 3.93 ppm. Of note, this sample is located near a retaining wall with caulking at the ground surface/wall seam.

Based on the samples collected as of the date of this Plan, future characterization soil samples are proposed to be collected at the following frequency:

- 10 foot square grid in planned excavation areas (following Subpart N methods).
- 20 foot spacing along perimeters of buildings, walls, or similar features.

Sample depths will be based on the depths of the planned excavation areas.

9.3 REMEDIATION PLAN

9.3.1 Objective

The objective of the soil remediation is to properly manage PCB-impacted soils in areas planned for soil excavation in support of new infrastructure and subgrade components as part of the Southwest Concourse replacement project. Following removal, post-excavation samples will be collected to determine the concentration of PCBs remaining in the sub-soils. Given that this project is regulated both under 40 CFR 761 and the MCP, the EPA's high occupancy area cleanup level of ≤ 1 ppm total PCBs will be used as the remedial objective for no further restrictions. If this level

is met, then the soils represented by the characterization data will have unrestricted use and a condition of No Significant Risk can be achieved under the MCP.

In areas not subject to excavation or for the residual concentrations of PCBs following excavation completion, EPA's high occupancy area cleanup level of ≤ 10 ppm total PCBs will be used as the remedial objective with further restrictions. In these areas, the remaining soils must be placed under a cap meeting the requirements of 40 CFR 761.61(a)(7), which would include asphalt, concrete, or other similar material at the required thickness. The objective of the cap will be to prevent or minimize human exposure, infiltration of water, and erosion. If this condition is encountered, it is expected that a modification or addendum to this plan will be prepared and submitted to EPA for Approval. This addendum will describe the specific areas and proposed cap construction details.

9.3.2 Site Preparation and Controls

During soil excavation in PCB impacted soil areas, the following site controls will be implemented:

- All workers will follow applicable Federal and State regulations regarding the work activities, including but not limited to OSHA regulations, respiratory protection, personal protective equipment, etc.
- Prior to any work, the boundaries of the excavation area will be marked and properly secured. The excavation contractor will obtain a permit from Dig Safe.
- Access to the active work areas will be controlled through fencing with controlled access points.
- Water misting will be used as a dust suppressant, as appropriate.
- Air monitoring at the perimeter of the active PCB-impacted soil removal areas will be conducted during active soil removal. To reduce dust levels and exposures to dust, a combination of engineering controls and personal protective equipment will be implemented during work activities. A Perimeter Air Monitoring Plan is provided in Appendix D.

9.3.3 Soil Removal

All soils designated for removal as part of the concourse replacement project that have PCB concentrations in excess of 1 ppm will be excavated and transported off-site for disposal at an approved facility as bulk PCB remediation waste. All excavated soil will be stored in lined, marked, and covered roll-offs or other approved containers in accordance with 40 CFR 761.40 and 761.65. Soil removal activities will be conducted in compliance with 40 CFR 761.61 and in accordance with the MCP regulations (310 CMR 40.000). The remediation goal is to remove all PCB contaminated soils in excess of 10 ppm and verify that remaining soil concentrations are ≤ 10 ppm. If remaining soils are > 1 ppm and ≤ 10 ppm, they will be contained beneath an appropriate cap meeting the requirements of 40 CFR 761.61(a)(7). Post-removal verification sampling will be conducted to demonstrate that the clean-up goals have been achieved.

Equipment, tools, excavator buckets, shovels, etc. will be decontaminated through pressure washing, spraying, or wet wiping following use and/or between uses, as needed. At the completion of the work, non-disposable equipment and tools that handled PCB material will be decontaminated following the procedures described in 40 CFR 761.79(c). Used PPE and decontamination materials will be containerized for off-site disposal. Water generated during decontamination will be containerized, sampled, and disposed of off-site in accordance with 40 CFR 761.79.

The area potentially subject to remediation covers approximately five acres. The final limits of the specific areas for remediation have not been fully developed at this time; however, based on the soil characterization work completed to date, a remedial plan and approach has been developed and will be implemented at each area subject to excavation as part of the concourse replacement project. This approach/plan consists of an area-specific

characterization followed by PCB-impacted soil delineation, excavation and off-site disposal as PCB wastes, verification sampling following initial excavation, and additional soil excavation/verification, as needed, based on the sample results. Only those soil areas confirmed to contain PCBs ≤ 1 ppm will be cleared for use by the General Contractor.

As part of this project, the following soil management areas have been identified:

- All soils within one to two lateral feet and to a one foot depth of an existing building or structure with caulking present along the horizontal seam between the ground surface covering and the respective building or structure will be excavated by the Remediation Contractor. Given the presence of caulking in these areas, no additional characterization samples will be collected from these soils and this material will be disposed off-site as PCB wastes > 50 ppm. Based on a calculation of the linear footage of the buildings and structures and this removal area (approximately 3,600 linear feet of caulking), it is estimated that approximately 320 cubic yards of soils could be managed under this activity (assuming a 20% contingency).
- Soils within planned excavation areas to support new infrastructure (drainage, utility installations, planting beds, etc.) will be characterized and managed at as-found PCB concentrations. Based on the data collected to date, these materials will most likely be disposed off-site as > 1 ppm and < 50 ppm PCB wastes. Based on a review of the planned work representing this activity, it is estimated that approximately 800 cubic yards of material could be managed under this activity.
- In addition, soils within miscellaneous areas within the project work site may require excavation for final subgrades or other miscellaneous project conditions. Based on the data collected to date, these materials will most likely be disposed off-site as > 1 ppm and < 50 ppm PCB wastes. Based on a review of the planned work representing this activity, it is estimated that approximately 80 cubic yards of material could be managed under this activity.

Assuming a 25% volumetric expansion for removed soils, the total volume of PCB impacted soils to be excavated is estimated at 1,500 cubic yards.

9.3.4 Post-Excavation Verification Sampling

Following completion of the initial soil excavations in the areas above, post-excavation samples will be collected in accordance with a modified 40 CFR 761.280 (Subpart O) sampling plan. Based on the conceptual site model for the release and transport pathway, the defined extent of PCB-affected soils and excavation areas, and the existing data, a verification sampling frequency of one sample per 10 linear feet along a building or retaining wall perimeter or within a 10 square foot grid spacing for areas away from a building will be used. As data is collected, this frequency may be refined based on the sample results. If a refinement is proposed, then an addendum, to this plan will be submitted to EPA for Approval.

Additional details regarding the verification sampling plan are provided below:

- Samples will be collected following the procedures described in Section 2.
- All samples will be transported to the laboratory under standard chain of custody procedures, extracted using USEPA Method 3540C (Soxhlet extraction), and analyzed for PCBs using USEPA Method 8082.
- In addition to the primary samples indicated above, duplicate and field equipment blank samples will be collected at a frequency of one per twenty primary samples. These samples will be submitted to the laboratory as part of the QA/QC procedures associated with sample collection.
- Upon receipt of the analytical results, the sample data will be compared to the clean-up levels, as described above.

10. WASTE STORAGE AND DISPOSAL

This section describes the on-site temporary storage of PCBs wastes and lists the disposal facilities selected for transport and disposal of the wastes.

Secure, lined, and covered waste containers (roll-off containers or equivalent) or 55-gallon DOT-approved steel containers will be staged for the collection of PCB wastes generated during the work activities in accordance with 40 CFR 761.65. Initially, the roll-off containers will be staged near the work areas; however, upon filling the container and because of the number of anticipated containers, they will be moved to a central location on the UMass campus for temporary storage prior to off-site transport and disposal. All containers will be properly labeled and marked in accordance with 40 CFR 761.40. Given the anticipated volume of soils to be managed, a constructed stockpile area may be required if enough roll-off containers cannot be obtained. This stockpile area will be constructed to meet the requirements of 40 CFR 761.65.

Upon completion of the waste profiling and acceptance to the respective facilities, soils and concrete will be loaded into transportation vehicles for shipment to the disposal facility.

- Soils, concrete, and all caulking classified as ≥ 50 ppm PCB wastes will be segregated for disposal and transported under a hazardous waste manifest to a hazardous waste landfill (e.g. the EQ- Wayne Disposal chemical waste landfill located in Belleville, MI).

- Soils and concrete classified as non-hazardous (> 1 ppm and < 50 ppm) will be segregated for disposal and transported under an MCP Bill of Lading to a non-hazardous waste disposal facility (e.g. the TREE Turnkey Landfill in Rochester, NH).

- Soils and concrete with PCB concentrations ≤ 1 ppm will be managed without PCB restrictions (e.g., re-used on –site or recycled/disposed off-site).

Any water generated during decontamination (or as part of dust suppression) that is collected on polyethylene sheeting will be containerized on-site, sampled, and designated for off-site disposal in accordance with 40 CFR 761.79. Polyethylene sheeting, PPE, and non-liquid cleaning materials will be managed and disposed of off-site in accordance with 40 CFR 761.61(A)(5)(v).

Copies of all manifests, waste shipment records, and certificates of disposal will be collected and provided as part of the final report to EPA.

11. SITE RESTORATION

As indicated previously, the project that has resulted in the need for a PCB management plan is a landscaping and concourse revitalization project. As such, the site restoration activities will be extensive and include a combination of new infrastructure and ground surface improvements, such as planting areas, walkways, general use areas, etc.

12. COMMUNICATIONS AND RECORDKEEPING

This section describes the communications between UMass and affected parties, as well as the project documentation that will be developed as part of the project.

12.1 COMMUNICATIONS

Upon approval of the Remediation Plan, the Plan and Approval will be posted on UMass' EH&S website with other PCB documentation/information related to projects on campus that have dealt with PCBs. In addition, weekly project meetings are held to brief the team and other stakeholders on the project scope of work, schedule, and points of contact for information relating to the project during the performance of the work. Because the project work area is totally controlled and isolated from non-construction related personnel, communications on work activities and disruptions to non-project personnel is not warranted on a frequent basis.

12.2 RECORDKEEPING AND DOCUMENTATION

Following completion of the work activities, records and documents per 40 CFR Part 761 will be generated and maintained at one location. A final report documenting the completion of the work activities, verification analytical results, volumes of disposed materials, and waste disposal records will be prepared and submitted to EPA. This report will also include any necessary deed notices, if required, as part of the risk-based approach.

Given the context and timing of this submittal in relation to the work schedule and progress, it is anticipated that amendments to this plan will be prepared and submitted to EPA during the continued progress of the project.

13. CONCEPTUAL MONITORING AND MAINTENANCE PLAN

As described in detail in previous sections of this plan, a risk based remedial plan under 40 CFR 761.61(c) is being proposed for portions of the proposed work. This approach consists of a two-prong remedial approach whereby the primary plan is to remove the source material and adjacent soils, concrete, asphalt and other materials impacted by PCBs with a secondary plan of utilizing a physical barrier approach (epoxy coating in joints, elastomeric paint on a concrete ceiling, acrylic clear coating on vertical surfaces, and new caulk installation) to eliminate the direct contact exposure pathway and migration pathways of PCBs remaining on surfaces. Upon completion of the remedial actions, the impacted concrete would not be accessible to direct exposure or migration to surrounding building materials.

Following the completion of the remediation activities described in this plan, a monitoring and maintenance plan (MMP) will be developed and implemented. The main components of the plan are as follows:

- Visual inspections – visual inspections of the encapsulated surfaces will be conducted and reported to the EPA. The inspections will consist of an assessment of the following:
    - Signs of the underlying coating, or excessive pitting, peeling, or breakages in the coating;
    - Signs of weathering or disturbance of the replacement caulking; and
    - A general inspection of the encapsulated surfaces.
- Surface Wipe Sampling – surface wipe samples will be collected from the encapsulated surfaces at a frequency developed based on the final areas to be encapsulated. Initially, wipe samples will be collected at the same frequency as the baseline sampling of encapsulated surfaces, as described above. Wipe samples will be collected following the standard wipe test procedures described in 40 CFR 761.123 and/or an alternate proposed method;
- Reporting – a report documenting the findings of the visual inspections and wipe testing will be prepared and submitted to EPA. This report will include recommendations for modifications to the program based on the collected data within the reporting period;
- Corrective Actions – if results of the sampling indicate that PCB concentrations in excess of the established action levels are present on the surface of the encapsulated areas, corrective measures shall be taken. These measures may include additional monitoring and/or the additional application of the protective coating or barriers; and
- Maintenance Guidelines and Procedures – to prevent potential exposure to maintenance and facility personnel, guidelines and procedures will be developed and implemented for any work being conducted in the respective encapsulated areas. These guidelines and procedures will detail communications procedures, worker protection requirements, and worker training requirements to be conducted for maintenance or other activities in these areas.

The details of the MMP will be developed following completion of the remedial activities described above. The results of the verification testing, baseline sampling, and inspections will be used to develop the details of the plan. The MMP will be provided to EPA under a separate submittal following the completion of the remedial activities.

14. SCHEDULE

Site renovation and remediation work is currently underway. The Southwest Concourse project is under a fast-track schedule in order to complete the work by the middle of August when approximately 5,000 students will be returning to campus and to the housing that is offered at the Southwest Residential Area. In general, work is progressing from north to south through the project work area with an overall approach of "clearing" areas of PCB impacted materials so that the General Contractor can work in the "cleared" area.

APPENDIX A: WRITTEN CERTIFICATION

WOODARD & CURRAN

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.

Document Location

Environmental Health and Safety

Draper Hall

University of Massachusetts

40 Campus Center Way

Amherst, MA 01003-9244

Property Owner and Party Conducting the Cleanup

Donald A. Robinson

Authorized Signature

Date 6·25·2010

Donald A. Robinson

Name of Authorized representative (print)

Dir. Env. Health + Safety

Title

APPENDIX B: SAMPLE IDENTIFICATION PLAN

Sample Identification Program

A four part naming convention will be used to identify all site samples.

(1) Site

The first part of each sample ID will be "SWC" for Southwest Concourse.

(2) Sample Purpose, Type, and Media

The second part of each sample ID will provide three pieces of information:

- Sample purpose (characterization [pre-remediation] or verification [post-remediation]) – letter options are:
    - C: Characterization
    - V: Verification
- Sample type (bulk, wipe, or air) – letter options are:
    - B: Bulk
    - W: Wipe
    - A: Air
- Sample media – letter options are:
    - A: Asphalt
    - B: Brick
    - C: Concrete
    - D: Wood
    - E: Epoxy
    - G: Granite
    - K: Caulking
    - M: Metal
    - N: Sand
    - R: Air
    - S: Soil

For example, "CWE" refers to a characterization wipe of epoxy, and "VBS" refers to a verification bulk soil sample. A data QA/QC sample would be appended with the letter D for a duplicate sample (i.e., VBSD for a verification bulk soil duplicate), or with the letter Q for an aqueous field blank (i.e., VBCQ for a field blank collected after an event where verification bulk concrete samples were collected).

(3) Unique Sample ID

The third part of the sample ID will include a unique three digit sample ID number, beginning with 001. See field notes to determine where the last sampling event left off.

APPENDIX C: LABORATORY ANALYTICAL REPORTS & DATA VALIDATION SUMMARIES (CD)

APPENDIX D: PERIMETER AIR MONITORING PLAN AND LOG SHEET

Airborne particulate matter (PM) consists of many different substances suspended in air in the form of particles (solids or liquid droplets) that vary widely in size. Inhalation hazards are caused if the intake of these particles includes intake of vapors and/or contaminated dust. Particles less than 10 micrometers in diameter (PM-10), which include both respirable fine (less than 2.5 micrometers) and coarse (less than 10 micrometers) dust particles, pose the greatest potential health concern because they can pass through the nose and throat and get into the lungs.

During the performance of the active soil excavation in PCB impacted soil areas, particulate matter in the form of potentially PCB-affected dust may be generated. The greatest potential for the generation of affected dust is during the excavation of soils and during placement of soils into containers for off-site disposal.

As indicated in the plan, the main dust control mechanism to be employed on the project will be the use of engineering controls (e.g. wetting the soils) and personal protective equipment (PPE). In addition, particulate air monitoring will be conducted at the perimeter of the active PCB containing soil excavation areas. Particulate air monitoring will determine if fugitive dust particles are present in the ambient air at the perimeter during active removal activities. A direct-reading particulate meter will be used to monitor airborne particulate concentrations during site activities. Particulate concentrations shall be utilized as an indirect indicator of exposures to on-site receptors.

Dust concentrations will be measured using a suitable real time aerosol particulate monitor capable of determining ambient air fugitive dust concentrations to 0.001 milligrams per cubic meter (mg/m^3). Air monitoring shall be conducted while active removal activities are occurring and at a frequency of one reading per two hours of activities. Air monitoring equipment will be operated by the Site safety officer or by a competent representative under the direction of the Site safety officer. Prior to the active removal actions and at periodic points during the project, air monitoring readings will be recorded to document background particulate matter concentrations. All readings will be recorded on the air monitoring log sheet; example attached.

If visible dust is observed or if total particulate concentrations at the perimeter exceed the action limits (as specified below and incorporating background readings) and are sustained (i.e. greater than 5 minutes), then a temporary work stoppage to employ additional dust suppression techniques to mitigate fugitive dust shall be initiated. If applicable, the dust suppression techniques shall involve the application of a fine mist of water over the area creating the fugitive dust condition. The water shall be applied either by small hand held sprayers, sprinklers, or hose nozzles. The water source for dust suppression activities will be from the building's water supply. In the event that the total of airborne particulate cannot be maintained below the action limit, then work activities shall be ceased until sustained readings are below the action limit or the work zone designation is re-evaluated.

OSHA has published the following permissible exposure limits (8 hour time weighted average) for air contaminants (29 CFR 1910.1000):

Air Contaminant	PEL (8-hour TWA)
Total Dust	15 mg/m^3
Respirable Dust Fraction	5 mg/m^3
PCBs (42% Chlorine)	1 mg/m^3
PCBs (54% Chlorine)	0.5 mg/m^3

In addition, EPA has established a National Ambient Air Quality Standard for PM-10 of 0.150 mg/m^3 (24-hr average).

A total airborne particulate action limit has been established for the PCB soil removal work to be conducted at the Site with consideration of the specific receptors, PCB concentrations, work activities, and OSHA permissible exposure limits. The action limit applies only to air monitoring at the perimeter of the work zone; an action limit has not been set for the active work zones (exclusion zones) as engineering controls will be used within these zones.

Given the campus setting of the project and the anticipated PCB concentration in dust that may be generated during activities, a conservative action limit of 0.1 mg/m^3 above background will be maintained during site work. Air monitoring at a location representative of background air conditions (i.e. a location upwind of the work area) will be conducted at the same frequency as the monitoring to obtain data representative of real-time background conditions. The action limit will be used to determine if and when additional engineered controls and/or work stoppages would be necessary.

Air monitoring equipment will be calibrated according to manufacturer's specifications. Weather and other site conditions will affect the normal operation of the equipment, which will require routine maintenance. Weather conditions will be noted on daily air monitoring logs. It is expected that dust or other particulate matter will not be a concern on rainy or misty days.

AIR MONITORING LOG SHEET
UMASS SOUTHWEST CONCOURSE REMEDIATION PROJECT

Monitoring Location: ______________________________ **Page ____ of ____**

Date	Time	Dust Level mg/m^3	Temperature ^{o}F	Weather Conditions	Current Site Activity	NOTES

APPENDIX E: PRODUCT TECHNICAL SPECIFICATIONS

INTEGRATED CHEMISTRIES, INC.
P.O. Box 10558
White Bear Lake, MN 55110
651-426-3224 Phone 651-426-3114 Fax
www.integratedchemistries.com

Technical Data
CAPSUR ® APPLICATION

CAPSUR® is a patented, aqueous-based solvent with emulsifiers developed for the clean-up of Polychlorinated Biphenyl (PCBs) and other hazardous hydrocarbon based spills on solid surfaces. CAPSUR is most effective when applied with a foamer. Application of non-foamer mixed solutions should be applied using the same application sequence as foamed solutions. U.S. Patent No. 4,792,413, No. 4,844,745 and No. 4,921,628.

Equipment Necessary

Model T Jr. Foamer:
15 gallons

Compressed Air:
Plant compressed air 80 psi at 8 cfm.

Compressed Air Line:
Air supply hose with a connection for an industrial 1/4" interchange quick disconnect nipple.

Industrial Wet Vacuum:
> 100 cfm with shielded (spark proof) motor, grounded at plug.

Water Supply:
Used for dilution of product and rinsing between applications.

Safety Equipment:
Respiratory, Skin and Eye Protection (see MSDS).

Note and Disclaimer:
The Model T Jr. Foamer is the ONLY foam applicator currently endorsed and sold by Integrated Chemistries Incorporated for use with CAPSUR. **SELECTION AND USE OF ANY OTHER FOAMER UNIT IS AT THE SOLE RISK OF THE USER**.

Recommended Application

Surfaces should be dry and free of excess grease, dirt or oil buildup. Application is most effective at surface temperatures between 45^{o}F and 90^{o}F.

NOTE: THE USE OF KEROSENE OR OTHER SOLVENTS IN PCB SPILL CLEAN-UP ACTIVITIES MAY INTERACT WITH THE SUBSTRATE AND INCREASE THE MIGRATION OF PCBS INTO THE CONTAMINATED MEDIA MAKING REMOVAL MORE DIFFICULT.

Step I - CAPSUR:

Product (CAPSUR) is to be mixed one (1) part CAPSUR to four (4) parts water. Mix inside of Model T Jr. Foamer, putting in the water FIRST. (Make sure the tank is not pressurized by opening the pressure relief valve.)

Step II - Model T Jr. Foamer:
(Read Warnings on Label)

1. After mixing the product, close the hatch and pressure relief valve.
2. Pressurize the tank by connecting the air supply hose to the 1/4" industrial interchange quick disconnect nipple.
3. Adjust the Pressure Regulator to 80 psi.

Step III - Application of Foam:

Apply a uniform foam blanket in 10-foot by 10-foot grids. Coverage thickness should be .5 to 1 inch in depth.

1. Foam by opening tank valve and then the nozzle valve.
2. Foam consistency can be made wetter or dryer by adjusting the air and/or product needle valves. (Dryer foam will be required for vertical and overhead surfaces allowing foam to dwell longer).
3. Relieve the tank and hose pressure when not in use by shutting off the air and opening the pressure relief and hose valves.

Step IV - Dwell Time:

Allow the product to dwell for approximately 5 minutes. Agitate surface with stiff bristle industrial broom. Vacuum surface of all possible product and free liquid.

Step V - Rinse:

Apply light coverage of clean rinse water (enough to completely cover the surface); vacuum rinse completely.

Step VI - CAPSUR:

Reapply a uniform foam blanket over entire grid surface; allow 5-minute dwell time; vacuum surface completely.

Step VII - Rinse:

Apply light coverage of clean rinse water (enough to completely cover the surface); vacuum rinse completely.

Step VIII - CAPSUR:

Reapply a uniform foam blanket over entire grid surface; allow 5-minute dwell time; vacuum surface completely.

Step IX - Rinse (Triple):

Triple final rinse (repeat rinse vacuum step three times).

Coverage:

Application coverage rate will vary with surface porosity and operator proficiency.
The following are average coverage rates:

Porous: Concrete = 125 square feet per gallon
Asphalt = 175 square feet per gallon
Non-Porous: Metals = 200 square feet per gallon
Painted surfaces should be patch tested prior to application as paint softening or discoloration might occur.

Non-Foamer Applications:

CAPSUR can be applied without using a Model T Jr. Foamer. After proper dilution of the product, apply the solution and vigorously agitate the surface for the full five-minute dwell cycle. Do not allow the surface to dry out during the dwell time. If so, add more solution. Product consumption will most likely be greater in non-foamer applications and extraction efficiency may be decreased.

Older and High Concentration Spills:

PCBs have shown a propensity to migrate into porous surfaces. If the concentration of PCBs is very high, the spill is old, or in a site with a history of spills, multiple applications of CAPSUR will be necessary to get acceptable readings. It is not uncommon when analyzing before and after the first few treatments to get higher readings due to the product's ability to extract PCBs from solid surfaces. Taking core samples for determination of depth of penetration is strongly recommended in these cases.

Clean-Up:

Because of the chemical activity of CAPSUR, the equipment used for application and vacuuming requires routine inspection and maintenance. Hoses and gaskets will have to be periodically replaced. Washing the foamer, its hoses and gaskets with soap and water and rinsing with water is recommended after each use to extend lifetime.

Disposal:

User is responsible for the proper handling and disposal of waste materials and residues resulting from the use of CAPSUR. Dispose of in accordance with all federal, state and local regulations.

For additional product information, please contact Integrated Chemistries, Incorporated at 651/426-3224. CAPSUR is available in 5- and 55-gallon steel containers.

Emergency information in regards to ingestion, skin contact, eye contact or inhalation is included in the Material Safety Data Sheet. If any of these emergencies occur, the Poison Control Emergency Response number is 1-800-228-5635.

EXTENT OF WARRANTY: To original purchasers of CAPSUR from Integrated Chemistries, Incorporated, this company warrants only that such product shall be of its standard quality at the time of first shipment. Integrated Chemistries, Incorporated makes NO WARRANTY OF MERCHANTABILITY, OF FITNESS FOR PARTICULAR PURPOSE, OR OF ANY OTHER KIND WHATSOEVER, EXPRESS OR IMPLIED. Purchasers and/or users assume all risk and liability for the use of such product whether used singly or in combination with other substances. This product is not to be repackaged without the knowledge and permission of the manufacturer, and without proper warning statements.

Construction

Sikagard® 62

High-build, protective, solvent-free, colored epoxy coating

Description	Sikagard 62 is a 2-component, 100% solids, moisture-tolerant epoxy resin. It produces a high-build, protective, dampproofing and waterproofing vapor-barrier system.
Where to Use	Use as a high build, corrosion-resistant, protective coating, as a protective lining for secondary containment structures or as a seamless flooring system.
Advantages	■ Exceptional tensile strength. ■ Good chemical resistance for long-term protection. ■ Convenient A:B = 1:1 mixing ratio. ■ Easy, paint-like viscosity. ■ Available in 3 standard colors: gray, red, and tan. Special color matches available upon request. ■ Excellent bonding to all common structural substrates. ■ Super abrasion resistance for long-term wear. ■ Sikagard 62 gray, after cure, is approved for contact with potable water. ■ Material is USDA certifiable.
Coverage	Approximately 150-250 sq. ft./gal. depending on condition of substrate.
Packaging	4 gal. units; 1 qt. units, 12/case.

How to Use

Surface Preparation	Surface must be clean and sound. It may be dry or damp, but free of standing water. Remove dust, laitance, grease, curing compounds, impregnations, waxes and any other contaminants. **Preparation Work: Concrete** - Should be cleaned and prepared to achieve a laitance and contaminant free, open textured surface by blastcleaning or equivalent mechanical means. **Steel -** Should be cleaned and prepared thoroughly by blastcleaning.
Mixing	**Pre-mix each component.** Proportion equal parts by volume of Components 'A' and 'B' into a clean mixing container. Mix with a low-speed (400-600 rpm) drill using a Sika paddle for 3 minutes, until uniform in color.
Application	Apply coating using high-quality roller, brush or spray. Two coats are recommended. Apply second coat as soon as the first coat is tack-free and the traffic of application will not damage the first coat. The

Typical Data *(Material and curing conditions @ 73°F (23°C) and 50% R.H.)*

Shelf Life	2 years in original, unopened containers.
Storage Conditions	Store dry at 40°-95°F (4°-35°C). **Condition material to 65°-75°F (18°-24°C) before using.**
Color	Gray, red, tan.
Mixing Ratio	Component 'A' : Component 'B'=1:1 by volume.
Viscosity (Mixed)	Approximately 3,500 cps.
Pot Life	Approximately 35 to 40 minutes. (60 gram mass).
Tack-Free Time	Approximately 4 hours.
Open Time	Light foot traffic: 5-7 hours. Rubber-wheel traffic: 8-10 hours.
Immersion and Chemical Exposure	Minimum cure: 3 days
Tensile Properties (ASTM D-638)	
14 day	Tensile Strength 5,400 psi (37.3 MPa) Elongation at Break 2.7 %
Abrasion (ASTM D-1044) (Taber Abrader)	
7 day	Weight loss, 1,000 cycles (H-22 wheel, 1,000 gm weight) 0.61 gm
Abrasion Resistance (ASTM D-968)	
14 day	Abrasion Coefficient 51 liters/mil.
Adhesion (ASTM D-3359)	
1 day	Adhesion Classification 4A
Water Absorption (ASTM D-570)	
7 day	(24 hour immersion) 0.1%

Construction

second coat, however, **must** be applied within 48 hours since a longer delay will require additional surface preparation.

Do not spray with slip resistant granules mixed into the coating. For use as a seamless flooring system, consult Technical Service.

Limitations

- Minimum substrate and ambient temperature for application 50°F (10°C).
- Do not apply over wet, glistening surface.
- Material is a vapor barrier after cure.
- Do not apply to porous surfaces exhibiting moisture-vapor transmission during the application. Consult Technical Service.
- Minimum age of concrete prior to application is 21-28 days, depending on curing and drying conditions.
- Do not apply to exterior, on-grade substrates.
- Use oven-dried aggregate only.
- Do not thin with solvents.
- Color may alter due to variations in lighting and/or UV exposure.
- On 'green or 'damp' concrete, EpoCem can be used as a pore filler to reduce vapor drive and potential osmotic blistering.

Caution

Component 'A' - Irritant; Sensitizer - Contains epoxy resin. Can cause sensitization after prolonged or repeated contact. Skin and eye irritant. Vapors may cause respiratory irritation. Use only with adequate ventilation. Use of safety goggles and chemical resistant gloves is recommended. In case of high vapor concentrations, use an appropriate NIOSH approved respirator. Remove contaminated clothing.

Component 'B' - Sensitizer - Contains amines. Contact with eyes or skin may cause severe burns. Can cause sensitization after prolonged or repeated contact. Skin and eye irritant. Vapors may cause respiratory irritation. Use only with adequate ventilation. Use of safety goggles and chemical resistant gloves is recommended. In case of high vapor concentrations, use an appropriate NIOSH approved respirator. Remove contaminated clothing.

First Aid

Eyes: Hold eyelids apart and flush thoroughly with water for 15 minutes. **Skin:** Remove contaminated clothing. Wash skin thoroughly for 15 minutes with soap and water. **Inhalation:** Remove person to fresh air. **Ingestion:** Do not induce vomiting.

In all cases, contact a physician immediately if symptoms persist.

Clean Up

Ventilate area. Confine spill. Collect with absorbent material. Dispose of in accordance with current, applicable local, state and federal regulations. Uncured material can be removed with approved solvent. Cured material can only be removed mechanically.

Chemical Resistance

Specimen: Two Coats - 10 mils Total
Cured 10 days
Substrate: asbestos cement

Chemical	Test Temp.	Storage Time and Evaluation				
		1 Day	1 Month	2 Months	6 Months	12 Months
Water	75°F (24°C) 100°F (38°C) 140°F (60°C)	A A A	A A A	A A A	A A A, D	A A A, D
Sodium Chloride Solution (Saturated)	75°F (24°F) 100°F (38°C)	A A	A A	A A	A A	A A
Sodium Hydroxide 30%	75°F (24°C)	A	A	A	A	A
Cement Water (Saturated)	75°F (24°C)	A	A	A	A	A
Detergent Solution (5% Ajax)	75°F (24°C) 140°F (60°C)	A A	A A	A A	A A, D	A A, D
Hydrochloric Acid 10%	75°F (24°C)	A	A	A	A	A
Sulfuric Acid 10%	75°F (24°C)	A	A	A	B	B
Oxalic Acid 10%	75°F (24°C)	A	A, D	A, D	A, D	A, D
Citric Acid 10%	75°F (24°C)	A	A, D	A, D	A, D	A, D
Fuel Oil (Home Heating)	75°F (24°C)	A	A	A	A	A, D
Gasoline (Unleaded)	75°F (24°C)	A	A	A	A	A, D
Iso-Octane	75°F (24°C)	A	A	A	A	A, D
Toluol	75°F (24°C)	A	A	A	A	A, D
Silage	75°F (24°C)	A	A	A, D	A, D	B, D
Synthetic Silage	75°F (24°C)	A	A	B, D	B, D	B, D
Ethyl Alcohol	75°F (24°C)	A	C	-	-	-

A: Resistant in permanent contact
B: Temporary resistance
C: Destroyed
D: Discolored

KEEP CONTAINER TIGHTLY CLOSED
NOT FOR INTERNAL CONSUMPTION
KEEP OUT OF REACH OF CHILDREN
FOR INDUSTRIAL USE ONLY
CONSULT MATERIAL SAFETY DATA SHEET FOR MORE INFORMATION

Sika warrants this product for one year from date of installation to be free from manufacturing defects and to meet the technical properties on the current Technical Data Sheet if used as directed within shelf life. User determines suitability of product for intended use and assumes all risks. Buyer's sole remedy shall be limited to the purchase price or replacement of product exclusive of labor or cost of labor.

NO OTHER WARRANTIES EXPRESS OR IMPLIED SHALL APPLY INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SIKA SHALL NOT BE LIABLE UNDER ANY LEGAL THEORY FOR SPECIAL OR CONSEQUENTIAL DAMAGES. SIKA SHALL NOT BE RESPONSIBLE FOR THE USE OF THIS PRODUCT IN A MANNER TO INFRINGE ON ANY PATENT OR ANY OTHER INTELLECTUAL PROPERTY RIGHTS HELD BY OTHERS.

Visit our website at www.sikaconstruction.com **1-800-933-SIKA NATIONWIDE**

Regional Information and Sales Centers. For the location of your nearest Sika sales office, contact your regional center.

Sika Corporation
201 Polito Avenue
Lyndhurst, NJ 07071
Phone: 800-933-7452
Fax: 201-933-6225

Sika Canada Inc.
601 Delmar Avenue
Pointe Claire
Quebec H9R 4A9
Phone: 514-697-2610
Fax: 514-694-2792

Sika Mexicana S.A. de C.V.
Carretera Libre Celaya Km. 8.5
Corregidora, Queretaro
C.P. 76920 A.P. 136
Phone: 52 42 25 0122
Fax: 52 42 25 0537

QUALITY ISO 9001 9002 ACHIEVEMENT

Quality Certification Numbers: Lyndhurst: FM 69711 (ISO 9000), FM 70421 (QS 9000), Marion: FM 69715, Kansas City: FM 69107, Santa Fe Springs: FM 69408

NORTHEAST PAINTING ASSOCIATES, INC.
881 NORTH KING STREET
NORTHAMPTON, MA 01060
TEL. 413-586-5013 FAX 413-585-0021

April 14, 2010

Nauset Construction
Fax 781-453-2250

Attn: Mica
Re: SW Concourse Replace Phase II
UMass Amherst

Nauset Construction Corporation
Submittal No: 099653-001
Submittal Date: 4/16/10
Reviewed By: CHAPIN JACOB
Date: 4/16/10
Nauset Contruction has reviewed this submittal for conformance with the Contract Documents

Submittals for Section 099653 Elastomeric Coatings

2.02 Crack Fillers

a. PPG 4-1000 Perma-Crete Pitt-Flex Elastomeric Patching Compound

3.07 Coating Schedule

a. Primer Coat: PPG 4-100 Concrete Block and Masonry Surfacer
b. Finish Coats: PPG 4-110 Perma-Crete Pitt-flex Elastomeric Coating

Architectural Coatings

PERMA-CRETE® PITT-FLEX® Elastomeric Coating

GENERAL DESCRIPTION

PERMA-CRETE® PITT-FLEX® Elastomeric Coatings are specifically designed for above grade, masonry substrates requiring long lasting superior elongation properties. This product line is alkali and efflorescence resistant. The 100% acrylic high build formula repels water (passes TT-C-555B, Section 3.3.3 and ASTM D6904-3 for wind-driven rain) yet allows moisture vapor to pass easily out of the surface. PERMA-CRETE Elastomeric coatings are ideal for use on a variety of exterior masonry projects including high-rise apartments and condominiums, warehouses, hospitals, schools, concrete parking garage overheads, hotels, and commercial and residential structures.

RECOMMENDED SUBSTRATES

Concrete	Stucco	Masonry Surfaces
Concrete Block (CMU)	Brick	Fiber Cement Siding
Cinder Block	Tilt-Up	

APPLICATION INFORMATION

Stir or shake thoroughly before applications. If spray applied, must be back-rolled. Read all label and Material Safety Data Sheet (MSDS) information prior to use. MSDS are available through our web site or by calling 1-800-441-9695.

Application Equipment: Apply by airless spray, roller or brush. Apply by brush to small areas only. When applying by roller, the final passes should be completed in a downward direction to ensure a uniform appearance. Maintain a wet edge for sheen uniformity.

Airless Spray: Minimum requirements: Pressure 2000 - 2800 psi, tip 0.019" - 0.027", flow rate 1.5 gal/minute. Spray equipment must be handled with due care and in accordance with manufacturer's recommendations. High pressure injection of coatings into the skin by airless equipment may cause serious injury.

Brush: Polyester/Nylon Brush

Roller: 3/4" - 1" synthetic roller cover

Thinning: Not recommended.

APPLICATION INFORMATION (continued)

Permissible temperatures during application:

Material:	50 to 100°F	10 to 38°C
Ambient:	50 to 100°F	10 to 38°C
Substrate:	50 to 100°F	10 to 38°C

PRODUCT DATA

PRODUCT TYPE:	100% Acrylic
BASE/COLOR:	4-110 White - Smooth
SHEEN:	Flat 1 to 7 (60° Gloss Meter)
CLEAN UP:	Soap and Water
VOLUME SOLIDS:	45% +/- 2%
WEIGHT SOLIDS:	59% +/- 2%
VISCOSITY:	90 to 120 KU
VOC:	.82 lbs./gal. (98 g/L)
COVERAGE:	100 to 135 sq. ft./gal. (9 to 12.5 sq. m/3.78L)
Wet Film Thickness:	12 mils to 16 mils
Wet Microns:	302 to 407
Dry Film Thickness:	5.4 mils to 7.2 mils
Dry Microns:	136 to 183

Does not include variation due to application methods, surface porosity, and/or mixing.

Note: To achieve wind driven rain resistance the product must be applied at 2 coats @ 6.5 mils each (13 mils total DFT).

WEIGHT/GALLON:	11.2 lbs. (5.1 kg) +/- 0.2 lbs. (91 g)
DRYING TIME:	Dry time @70°F (21°C); 50% relative humidity
To Touch:	1 hour
To Handle:	4 hours
To Recoat:	4 hours minimum
To Full Cure:	30 days minimum

Drying times listed may vary depending on temperature, humidity and air movement.

FLASH POINT: Over 200°F (93°C)

FEATURES AND BENEFITS

Features	Benefits
Elongation	Bridges cracks & masks surface imperfections
Resists Wind Driven Rain	Waterproofing requires 2 coats @ 6.5 mils each (13 mils total DFT)
Water Vapor Permeance	Breathability
High Build	Provides extra protection in fewer coats (2 coat)
Two (2) Coat System	Turns jobs faster
Tensile Strength	Film integrity is maintained when expansion & contraction occurs
Excellent Application Properties	Less time for application
Mildew Resistance	Mildew/Fungus/Biological growth resistance
UV Resistance	Looks like new longer
Alkali Resistance	Can apply to fresh concrete at 7 days and/or less than 13 pH
VOC Compliant	Lower than current Federal AIM Regulations
Meets MPI #113, Exterior Flat, Pigmented Elastomeric Coating WB	Allows additional specification opportunites

PERFORMANCE DATA

Property	Test Method	Results
Resistance to Wind Driven Rain	ASTM D6904-3	Passes 2 coats @ 6.5 mils each (13 mils total DFT) Passes 1 coat each 4-100, 4-2, 4-110
Elongation	ASTM D2370	429% 2 coats
Tensile Strength	ASTM D412	406 psi 2 coats
Water Vapor Permeance	ASTM D1653	13 perms dry cup
Flexibility	ASTM D522B	Pass
Mildew Resistance	ASTM D3273/74	No growth

A-CRETE® PITT-FLEX® Elastomeric Coating

Architectural Coatings

GENERAL SURFACE PREPARATION

Surfaces to be coated must be free of dirt, oil, grease, form oil, efflorescence, concrete curing agents, mildew, loose and peeling paint, concrete dust and other surface contaminants. On exterior surfaces, remove and inhibit regrowth of mildew by using PPG MILDEW CHECK® Multi-Purpose Wash 18-1, or 1 part chlorine bleach to 3 parts water. Before use, be sure to read and follow instructions and warnings on label. Chalky and porous masonry surfaces should be primed with PERMA-CRETE Exterior Masonry Surface Sealer, 4-808 (Clear) or 4-809 (Pigmented). Tilt-up concrete and other highly alkaline surfaces should be primed with one coat of PERMA-CRETE High Build Acrylic Primer 4-2 or, one coat of PERMA-CRETE Interior/Exterior Acrylic Latex Alkali Resistant Primer 4-603. Cracks must be filled prior to painting. Treatment of cracks is required to obtain the water resistant protection of the building and to help prevent further cracking and deterioration. Methods of treatment depend upon the size of the crack. Use PERMA-CRETE Elastomeric Patching Compound.

WARNING! If you scrape, sand, or remove old paint, you may release lead dust or fumes. LEAD IS TOXIC. EXPOSURE TO LEAD DUST OR FUMES CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE. Wear a properly fitted NIOSH-approved respirator and prevent skin contact to control lead exposure. Clean up carefully with a HEPA vacuum and a wet mop. Before you start, find out how to protect yourself and your family by contacting the USEPA National Lead Information Hotline at 1-800-424-LEAD or log on to www.epa.gov/lead. In Canada contact a regional Health Canada office. Follow these instructions to control exposure to other hazardous substances that may be released during surface preparation.

CONCRETE BLOCK, CINDER BLOCK, VERTICAL MASONRY: New concrete should cure for at least 7 days (pH less than 13) and preferably 30 days prior to priming. Fill block with PERMA-CRETE LTC Concrete Block/Masonry Surfacer, 4-100. Surfaces previously coated with water thinned cement-base paint must be prepared with extra care. Such coatings must be completely removed for best results. If the coatings appear to be adhering tightly, a masonry sealer may be applied to seal the surface prior to topcoating. One way to check adhesion is by applying a piece of masking tape. If it peels off easily and has loose particles adhering to it, remove all the chalking or crumbling material then seal, prime, and apply product.

LIMITATIONS OF USE

Apply when air, surface and product temperatures are above 50°F (10°C) and surface temperature is at least 5°F (3°C) above the dew point. At temperatures above 100°F (38°C), application will be affected. Avoid exterior application late in the day when dew and condensation are likely to form or if rain is anticipated. Allow to dry at least 8 hours before the first exposure to rain. PROTECT FROM FREEZING. Not recommended for use on surfaces demonstrating hydrostatic or high vapor pressure or for immersion service. Do not use on floors. USE WITH ADEQUATE VENTILATION. KEEP OUT OF REACH OF CHILDREN.

RECOMMENDED PRIMERS

Concrete, Masonry Units, Masonry (Block Fillers)	4-100
Concrete, Masonry (Primers, Sealers)	4-2, 4-603, 4-808, 4-809
Tilt-Up Concrete	4-2, 4-603

PACKAGING

5-Gallon (18.9L)

TINTING AND BASE INFORMATION

Refer to the appropriate PPG color formula book for tinting instructions.

4-110 White and Mixing Base - Smooth

PPG Industries, Inc.
Architectural Coatings
One PPG Place
Pittsburgh, PA 15272
www.ppg.com

Technical Services
1-800-441-9695
1-888-807-5123 fax

Architect/Specifier:
1-888-PPG-IDEA

PPG Architectural Finishes
400 S. 13th Street
Louisville, KY 40203

PPG Canada, Inc.
Architectural Coatings
4 Kenview Blvd
Brampton, ON L6T 5E4

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(Supersedes 9/2005)

PERMA-CRETE® 4-100

Architectural Coatings

PERMA-CRETE® LTC (Low Temperature Cure) Concrete Block & Masonry Surface/Filler

GENERAL DESCRIPTION

PERMA-CRETE® LTC Concrete Block & Masonry Surfacer is a premium interior/exterior, light weight, acrylic latex block filler and surfacer for all types of properly prepared concrete and masonry surfaces. This product provides smoothing, filling, and leveling on all types of masonry and concrete surfaces. PERMA-CRETE LTC Concrete Block & Masonry Surfacer can be topcoated with latex, oil, waterborne epoxy finishes, or solvent borne epoxy finishes that do not contain strong solvents. This PERMA-CRETE product can be applied to new masonry including concrete and stucco that has cured 7 days or more (alkali resistant from 8 to 13 pH). PERMA-CRETE LTC Concrete Block & Masonry Surfacer is ideal for use on a variety of exterior masonry projects including high-rise apartments and condominiums, tilt-up warehouses, hospitals, schools, concrete parking garage overheads, hotels, resorts and residential homes.

RECOMMENDED SUBSTRATES

Brick	Cinder Block	Stucco
Concrete	Fiber Cement Siding	Tilt Up
Concrete Block (CMU)	Masonry Sufaces	

APPLICATION INFORMATION

Stir thoroughly before use. Read all label and Material Safety Data Sheet (MSDS) information prior to use. MSDS are available through our web site or by calling 1-800-441-9695.
Application Equipment: Apply with a high quality brush, roller, paint pad or by spray equipment.

Airless Spray: Minimum requirements: Pressure 2000-2800 psi, tip 0.019" - 0.027", flow rate 1.5 gal/minute.
Spray equipment must be handled with due care and in accordance with manufacturer's recommendations. High pressure injection of coatings into the skin by airless equipment may cause serious injury.

Brush: High Quality Polyester/Nylon Brush
Roller: 3/4" - 1" nap roller cover
Thinning: Not recommended for brush or roller application. Thin only if necessary for proper spray application with clean water up to 1 pint (473 mL) per 5 gallon (18.9L) of this product.

APPLICATION INFORMATION (continued)

Permissible temperatures during application:

Material:	35 to 100°F	2 to 38°C
Ambient:	35 to 100°F	2 to 38°C
Substrate:	35 to 100°F	2 to 38°C

PRODUCT DATA

PRODUCT TYPE:	100% Acrylic
BASE/COLOR:	4-100 White
SHEEN:	Flat
CLEAN UP:	Soap and Water
VOLUME SOLIDS:	58% +/- 2%
WEIGHT SOLIDS:	63% +/- 2%
VISCOSITY:	110 to 120 KU
VOC:	.50 lbs./gal. (60 g/L)
COVERAGE:	80 to 100 sq. ft./gal. (7 to 9 sq. m/3.78L)
Wet Film Thickness:	16 mils to 20 mils
Wet Microns:	406 to 508
Dry Film Thickness:	9.3 mils to 11.6 mils
Dry Microns:	236 to 295

Note: To achieve wind driven rain resistance and maximum elongation, the product must be applied as a 3 coat system: 4-100, 4-2 and any appropriate PERMA-CRETE topcoat as specified on technical data sheet. Does not include variation due to application methods, surface porosity, and/or mixing.

WEIGHT/GALLON: 9.4 lbs. (4.3 kg) +/- 0.2 lbs. (91 g)

DRYING TIME: Dry time @70°F (21°C); 50% relative humidity

To Touch:	1 hour
To Recoat:	24 hours

Drying times listed may vary depending on temperature, humidity and air movement.

FLASH POINT: Over 200°F (93°C)

FEATURES AND BENEFITS

Features	Benefits
Resists Wind Driven Rain	Waterproofing requires 3 coat system @ standard coverage rate: 4-100, 4-2, and either 4-22, 4-50, 4-60, 4-110, 4-210, 4-310
Low Temperature Cure/Application to 35°F (2°C)	Longer painting season and application range
Light Weight	Ergonomically friendly
Excellent Filling	Provides smooth & level surface for subsequent priming & topcoating
Alkali Resistance	Can apply to fresh concrete at 7 days and/or less than 13 pH
Efflorescence Resistance	Minimizes white crusty salt deposits
VOC Compliant	Lower than current Federal AIM Regulations

PERFORMANCE DATA

Property	Test Method	Results
Resistance to Wind Driven Rain	ASTM D6904-3	Waterproofing requires 3 coat system @ standard coverage rate: 4-100, 4-2, and either 4-22, 4-50, 4-60, 4-110, 4-210, 4-310.
Alkali Resistance	TT-P-1511B	Passes: no efflorescence, blistering, saponification
Adhesion	ASTM D3359	Passes

PERMA-CRETE® 4-100

PERMA-CRETE® LTC (Low Temperature Cure) Concrete Block & Masonry Surface/Filler Architectural Coatings

GENERAL SURFACE PREPARATION

Paint only clean, dry sound surfaces. Remove all grease, oil, dirt, and other surface contaminants. Rinse thoroughly with clean water. Clean surfaces per ASTM Standard Practice D4258-83: Standard Practice for Surface Cleaning Concrete for Coating. Vacuum cleaning, water cleaning, detergent water wash, power wash cleaning, steam cleaning, hand tool and mechanical cleaning are acceptable cleaning methods. Remove efflorescence by pressure washing or cleaning with dilute muriatic acid (following manufacturer's instruction). Remove mildew by washing with PPG MILDEW CHECK® Multi-Purpose Wash 18-1, or 1 part chlorine bleach to 3 parts water. Before use, be sure to read and follow instructions and warnings on label. Dry substrate thoroughly to a moisture content under 12% (see ASTM D4263 Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method). NOTE: Pressure leaks in basements and retaining walls should be patched with an appropriate patching product after preparation per the manufacturer's direction. Surfaces that continue to chalk after cleaning should be coated with PERMA-CRETE WB Acrylic Pigmented Sealer 4-809, or Clear Sealer 4-808 prior to application of product.

WARNING! If you scrape, sand, or remove old paint, you may release lead dust or fumes. LEAD IS TOXIC. EXPOSURE TO LEAD DUST OR FUMES CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE. Wear a properly fitted NIOSH-approved respirator and prevent skin contact to control lead exposure. Clean up carefully with a HEPA vacuum and a wet mop. Before you start, find out how to protect yourself and your family by contacting the USEPA National Lead Information Hotline at 1-800-424-LEAD or log on to www.epa.gov/lead. In Canada contact a regional Health Canada office. Follow these instructions to control exposure to other hazardous substances that may be released during surface preparation.

APPLICATION DIRECTIONS:

BRUSH APPLICATION: Apply liberally. Carefully work the material into all pores, voids, reveals, architectural details and depressions. Leave surface uniform. Finish with one or more coats of the selected finish.

ROLLER APPLICATION: Cut in with a brush as above. Apply large areas with roller, using liberal application work the material into pores and voids. Dress off the surface uniformly and keep a wet edge going across the entire section. Finish with one or more coats of the selected finish.

AIRLESS SPRAY APPLICATION: Spray to desired millage (do not overbuild) and backroll to work material into pores and voids. Dress off the surface uniformly per directions for roller application above. Keep a wet edge going across the entire wall section. Finish with one or more coats of the selected finish.

LIMITATIONS OF USE

Apply only when air and surface temperatures are above 35°F (2°C) and surface is at least 5°F (3°C) above the dew point. Air and surface temperatures must remain above 35°F (2°C) for the next 24 hours. For optimum application properties, bring material to at least 50°F (10°C) prior to application. Solventborne epoxies require a 48 hour cure. Surface pH limitation is 8-13. Do not use on floors. Do not over-build product. Remove filter before spraying. Always back roll the surface when applied by spray. PROTECT FROM FREEZING. USE WITH ADEQUATE VENTILATION. KEEP OUT OF REACH OF CHILDREN.

PACKAGING

5-Gallon (18.9L)

RECOMMENDED PRIMERS

New Concrete/Masonry (application over 4-100)	4-2, 4-603

TINTING AND BASE INFORMATION

Refer to the appropriate PPG color formula book for tinting instructions.

4-100 White

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Architectural Coatings
One PPG Place
Pittsburgh, PA 15272
www.ppg.com

Technical Services
1-800-441-9695
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PPG Architectural Finishes
400 S. 13th Street
Louisville, KY 40203

PPG Canada, Inc.
Architectural Coatings
4 Kenview Blvd
Brampton, ON L6T 5E4

B4.1 5/2006
(Supersedes 9/2005)

Architectural Coatings

PERMA-CRETE® PITT-FLEX® Elastomeric Patching Compound

GENERAL DESCRIPTION

PITT-FLEX® Elastomeric Patching Compound is a high technology product formulated for patching larger cracks (1/16" to 1/4") in masonry and stucco surfaces. It seals and waterproofs between masonry, wood, glass, wallboard and brick. Do not use below grade or under water. For expansion joints, control joints, horizontal masonry joints and windows; use acrylic urethane such as Top Gun® 300 Elastomeric Caulk or a part urethane sealant.

RECOMMENDED SUBSTRATES

Concrete
Masonry
Stucco

APPLICATION INFORMATION

Application Equipment: Apply by knife, trowel or brush.

Brush: Polyester/Nylon Brush

Thinning: Apply as received.

Permissible temperatures during application:

Material:	20 to 90°F	-6 to 32°C
Ambient:	20 to 90°F	-6 to 32°C
Substrate:	20 to 90°F	-6 to 32°C

FEATURES AND BENEFITS

High Technology
Acrylic Terpolymer
Repairs Hairline Cracks Above Grade

PRODUCT DATA

GLOSS: Not Applicable

VOC*: 0.61 lbs./gal (72.80 g/L)
*Product data calculated on product 4-1000.

CLEAN UP: Soap and Water

DRYING TIME: Allow to dry 24 hours before applying finish coats. Do not apply when relative humidity is above 90%.

Drying times listed may vary depending on temperature, humidity, film build, color, and air movement.

FLASH POINT: Over 200°F (93°C)

Architectural Coatings

PERMA-CRETE® PITT-FLEX® Elastomeric Patching Compound

GENERAL SURFACE PREPARATION

All surfaces must be firm and free of dirt, oil, grease, efflorescence, mildew, and loose material. Unsound masonry must be wire brushed or blasted for a firm surface. Dirt, loose contaminants and chalk are best removed by high pressure chemical and water blasting. Any chalk or porous coating not removed by pressure washing must first be sealed with an alkali resistant surface conditioner such as PERMA-CRETE Exterior Acrylic Masonry Surface Sealer, 4-808 (Clear) or 4-809 (Pigmented). Remove mildew by washing with PPG MILDEW CHECK®, 18-1, or with a mixture of 1 part chlorine bleach to 3 parts water. Before use, be sure to read and follow the instructions on the label. WARNING! If you scrape, sand, or remove old paint, you may release lead dust or fumes. LEAD IS TOXIC. EXPOSURE TO LEAD DUST OR FUMES CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE. Wear a properly fitted NIOSH-approved respirator and prevent skin contact to control lead exposure. Clean up carefully with a HEPA vacuum and a wet mop. Before you start, find out how to protect yourself and your family by contacting the USEPA National Lead Information Hotline at 1-800-424-LEAD or log on to www.epa.gov/lead. In Canada contact a regional Health Canada office. Follow these instructions to control exposure to other hazardous substances that may be released during surface preparation.

APPLICATION: SMALL CRACKS: It is not necessary to cut out a crack measuring 1/64" to 1/32". Apply PITT-FLEX Elastomeric Patching Compound over the center of the crack at a wet film thickness of 1/16". Then with a wet putty knife, a trowel or brush, "feather" the material to either side of the crack, going from 1/16" at the crack down to a zero over a 2" area.

LARGE CRACKS: All voids and joints which exceed 1/32" should be routed out to 1/4" wide by 1/4" deep. Joint should be flushed out with water and checked to see that surface is sound and free of grinding dust. If dust is still evident after flushing, seal surface with PERMA-CRETE Exterior Acrylic Masonry Surface Sealer, 4-808 (Clear) or 4-809 (Pigmented) to bind the dust to the surface. Once the joint is sound, the use of a bond breaker tape is recommended.
Stage 1: Fill the joint allowing a small crest to remain. This will compensate for any shrinkage that might occur.
Stage 2: After a minimum of 4 hours cure time, a feather cap of PITT-FLEX Elastomeric Patching Compound should be applied at a wet film thickness of 1/16". This should be placed over the center of the filled joint and "feathered" down to zero over a 2" area.

LIMITATIONS OF USE

Apply only when air and surface temperatures are above 50°F (10°C) or above for a 24 hour period. If rain or threatening weather is expected within 8 hours, delay application until dry conditions exist. Do not apply when relative humidity is above 90%. Do not use below grade or under water. For expansion joints, control joints, horizontal masonry joints and windows, use an acrylic urethane such as Top Gun® 300 Elastomeric Caulk or a one part urethane sealant. PROTECT FROM FREEZING. USE WITH ADEQUATE VENTILATION. KEEP OUT OF REACH OF CHILDREN. Read all label and Material Safety Data Sheet (MSDS) information prior to use. MSDS are available through our website or by calling 1-800-441-9695.

RECOMMENDED PRIMERS

Concrete Masonry Units, Masonry (Block Fillers)	4-100
Concrete, Masonry (Primers, Sealers)	4-2, 4-603, 4-808, 4-809
Tilt-Up Concrete	4-2, 4-603

PACKAGING

1-Gallon (3.78L)
Quart (946 mL)

Not all products are available in all sizes.

BASE INFORMATION

4-1000	Knife Grade - Textured
4-1001	Knife Grade - Smooth
4-1002	Brush Grade - Smooth
4-1003	Brush Grade - Textured

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1-888-PPG-IDEA

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4 Kenview Blvd
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