ATTACHMENT G:

HERRERA SITE REPORT AND PCB PLAN 2010

PCB SITE CHARACTERIZATION REPORT AND DISPOSAL AND CLEANUP PLAN

Youth Service Center
Seattle, Washington

Prepared for

King County Facilities Management Division

October 2010

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PCB SITE CHARACTERIZATION REPORT AND DISPOSAL AND CLEANUP PLAN

Youth Service Center
Seattle, Washington

Prepared for

King County Real Estate Services Section
King County Administration Building
500 Fourth Avenue, Room 500
Seattle, WA 98104

Prepared by

Herrera Environmental Consultants
2200 Sixth Avenue, Suite 1100
Seattle, Washington 98121
Telephone: 206.441.9080

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1.1 Introduction

During a Hazardous Building Materials Survey (HBMS) of the King County Youth Service Center (YSC) in March 2010, a sample of window caulk collected from the exterior side of an Alder Tower window was found to contain polychlorinated biphenyls (PCBs) at a level of 150,000 parts per million (ppm). Additional sampling was then conducted using a phased approach to determine the extent of contaminated caulk across the building, and to determine if PCBs were present in surrounding materials and surfaces. A total of 255 samples were collected from interior surfaces, exterior building surfaces, and soil and solids along drainage pathways. Sampling results indicated that weathering of exterior caulk has resulted in contamination of dust that has migrated both indoors and outdoors to surrounding soil. This document describes the building characterization process and provides a plan for PCB abatement in the following sections:

1. Site Characterization
2. Interim PCB Cleanup Plan
3. Waste Disposal Plan
4. Documentation
5. Window Caulk Maintenance
6. Schedule

1.2 Setting

The YSC is located at 1211 East Alder Street in Seattle, Washington (Figure 1), and is used by King County for juvenile court and detention operations. Prior to development as the YSC, the subject property was developed as single family and apartment housing. The first YSC buildings were erected in 1951, with additions made in 1971 and 1990. Most, if not all, of the original structures were demolished. Currently, there are three building groups on the site, including the Alder Tower, the Alder Wing, and the Spruce Wing. The YSC has historically been surrounded by single family houses, apartments, and small commercial businesses.

1.2.1 Site

The YSC property consists of two parcels covering at total of 8.59 acres (Figure 2). Buildings cover approximately 35 percent of the property, and the remainder is covered by parking lots, paved walkways, and lawn/landscaped areas. Catch basins in the paved areas drain surface water to the City of Seattle stormwater system. The site is bordered by residential and commercial/industrial properties on all sides.

1.2.2 Alder Tower

The Alder Tower is a five floor building covering 64,500 square feet (Figure 3). It was constructed in 1971 as office and courtroom building. The tower is a concrete building on a concrete foundation with concrete walls, floors, and ceilings. Four floors extend above grade at the front of the building (facing north), with the sub-grade floor exposed from the downward sloping terrain to the south. It has a flat roof, with built-up roofing and gravel ballast. A mechanical room (called the "penthouse") is situated on top of the tower, with a footprint of approximately 1,800 square feet. It also is constructed of concrete.

The building is connected to neighboring two-story structures by internal hallways that lead to the Alder Annex (west) and the Spruce Wing (south) from the first (basement) floor (Figure 2).

The basement and main (first and second) floors have a larger footprint than floors 3, 4, and 5, and extend eastward and westward from the second floor of the tower, along approximately two-thirds the tower length. The second floor roofs are flat and covered with a hot tar finish; the east roof is covered with aggregate (Figure 4), the west roof is not (Figure 5). Both roof extensions include drains that direct rainfall runoff to the south of the building. Areas surrounding the tower not covered by building extensions are covered either by pavement or soil and vegetation (primarily grass).

The tower includes a glass entryway with doors and side lights set in aluminum frames. The third, fourth, and fifth floor walls include 282 windows with aluminum frames set into concrete openings and sealed with caulk.

A sealant that covers most of the exterior concrete face of the building was observed, though it appeared to have been worn away along edges and corners. The sealant provided a smooth surface compared to slightly rougher weathered areas.

The building includes four air handling systems providing ventilation separately to 1) the first floor, 2) the second floor, 3) part of the third floor, and 4) the remainder of the third floor and the fourth and fifth floors together. In each case, ductwork delivers a mixture of fresh and filtered return air through vents in most rooms (Figure 6), while return air enters portions of the dropped ceiling space (Figure 7) and is routed to fresh air mixing spaces before being recirculated again. Vertical ductwork at the north end of the Alder Tower directs return air from the third, fourth, and fifth floors to the mechanical room on the roof for mixing and filtering (Figure 8). The first, second, and part of the third floor systems do not exchange air between floors. Fresh air is brought into separate mechanical rooms for each system independently. Some of the ductwork is lined with what appears to be fiberglass.

1.2.3 Contaminant Discovery

A Hazardous Building Material Survey was conducted in anticipation of the eventual demolition of the Alder Tower and wings for replacement with an updated facility (Med-Tox 2010). During sampling of building materials, it was discovered that grey caulk used around one of the Alder

Tower windows contained polychlorinated biphenyls (PCBs) at a concentration of 150,000 parts per million (ppm). Of the nine other caulk samples collected at various locations around the Alder Tower and wings, four contained PCBs ranging from 1.3 to 16 ppm and no PCBs were detected in the remaining five. The U.S. Environmental Protection Agency (EPA) regulates materials containing PCBs; caulk containing PCBs at concentrations ≥50 ppm is no longer authorized for use and must be removed.

PCBs were manufactured in the U.S. from 1929 until banned in 1979. Due to their non-flammability, chemical stability, high boiling point, and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications including electrical, heat transfer, and hydraulic equipment; as plasticizers in paints, plastics, caulk, and rubber products; in pigments, dyes, and carbonless copy paper; and many other industrial applications. Once in the environment, PCBs do not readily break down and may remain for long periods of time cycling between air, water, and soil.

Aroclor is a PCB mixture produced from approximately 1930 to 1979. It is one of the most commonly known trade names for PCB mixtures. There are many types of Aroclors and each has a distinguishing suffix number that indicates the degree of chlorination. The first two digits generally refer to the number of carbon atoms in the phenyl rings (for PCBs this is 12) and the second two numbers indicate the percentage of chlorine by mass in the mixture. For example, the name Aroclor 1254 means that the mixture contains approximately 54 percent chlorine by weight. Aroclor 1254 is the only type of PCBs found in caulk at the YSC.

1.3 Sampling and Analysis Approach

The presence of PCBs initially found in grey window caulk indicated the need for additional assessment to determine whether contaminated caulk could be found at other window locations and whether other building materials had been affected. Two concerns about building materials were that 1) PCBs may have leached out of the caulk and into the surrounding concrete and 2) that the caulk may have weathered and been incorporated into dust on the exterior of the building. Because most of the windows on the third, fourth and fifth floors can be opened for ventilation, an additional concern was that if dust was contaminated by small particles of caulk, it may enter the building, posing a potential public health risk.

To address these concerns, sampling and analysis was conducted using a phased approach, with analytical results from each sampling event supporting the direction of the next sampling event. Windows on the 3rd, 4th, and 5th floors of the tower were surveyed, and all but three (located on the third floor) appeared to have the same grey caulk of concern. Samples were eventually collected and analyzed from the following locations:

Building interior

- Dust on interior window sills
- Dust on various interior surfaces

- Dust in carpets
- Dust in the ventilation system
- Ambient air.

Building exterior

- Additional window caulk
- Dust on exterior window frames
- Concrete in contact with window caulk
- Concrete on the building face beneath windows
- Sealant on concrete beneath windows
- Dust on concrete beneath windows
- Solids along drainage pathways
- Soil at the base of the building.

Interior samples were collected from 20 rooms located along the perimeter of the building, all with opening windows. The following rooms were selected by King County on floors 2 through 5 to provide samples representing a variety of uses:

- 2nd Floor – 228, 244
- 3rd Floor – 302, 307/308, 316, 332, 336, 358
- 4th Floor – 402, 412, 413, 420, 427, 434
- 5th Floor – 503, 508, 517, 528, 533, 534.

Additional carpet dust samples were collected from interior rooms (without windows) on all floors.

Samples were collected from the ventilation system in the 4th and 5th floor dropped ceiling spaces, and filters and return air duct lining in mechanical rooms on both the 2nd floor and in the penthouse.

Samples of the following were also collected:

- Caulk from the exterior window frame of the 20 rooms sampled inside the building (Figure 9)

- Concrete and concrete sealant at selected locations (Figure 10)

- Surface dust at selected locations (Figure 11)

- Solids from drainage pathways at two roof locations and two ground locations (Figures 12 and 13)

- Soil from seven distinct areas adjacent to the building (Figure 14).

Ambient air samples were also collected to determine whether dust in building air posed a public health concern.

Initial sampling was conducted for the HBMS in April 2010 and follow up PCB characterization sampling was conducted between June and September 2010 (specific sample dates are provided in laboratory reports provided in Appendix E).

1.3.1 Sampling Methods

Sampling was performed on media with porous surfaces (caulk, concrete, carpet, ceiling tiles, ventilation system filters, drain solids, and soil) and media with non-porous surfaces (window sills and frames, desks, file cabinets, radiators, door jambs, vinyl flooring, and ventilation duct covers). Ambient air samples also were collected. An important sampling objective for porous media was to collect adequate quantities to meet detection limit requirements for laboratory data. Non-porous media sampling was performed to determine concentrations of PCBs within a standard surface area of 100 square centimeters (cm^2). Sampling and analytical methods used are discussed below.

1.3.1.1 Bulk Caulk

Caulk was sampled using a knife to cut along the base of selected windows. A strip of caulk was removed and the underlying concrete surface scraped with a stiff wire brush. The caulk was then transferred directly into glass sample jars, which were labeled and stored in a cooler for later delivery to the laboratory. A new knife and wire brush was used at each sample location to prevent cross-contamination of subsequent samples. Wire brushing of residual caulk from the concrete surface was performed to prepare the concrete for further sampling.

1.3.1.2 Concrete

Concrete was sampled based on the EPA Region 1 approach, using a power drill (Appendix A). The method was modified by using smaller diameter drill bits for samples collected from greater depths and instead of using a vacuum pump and sample trap apparatus, concrete dust was allowed to accumulate around the drill holes and then brushed onto hard card stock before transfer to sample containers.

Destructive concrete samples were obtained by drilling 20 to 30 holes into the concrete surface to a depth of 1/8 inch using a 3/8-inch-diameter masonry drill bit driven with a rotary-percussion power drill or a standard electric drill (multiple holes were required to obtain adequate sample volume for analysis). Concrete material from the 1/8- to 1/4-inch-deep sample was obtained by drilling in the center of each previously drilled hole using a 1/4-inch-diameter masonry bit. Dust collected from or adjacent to the face of the building either fell onto or was brushed onto a clean piece of card stock placed against the concrete beneath the drilled area. This material was then transferred directly into glass sample jars, which were labeled and stored in a cooler for later delivery to the laboratory. New drill bits, brushes, and card stock were used at each sample location to prevent cross-contamination of subsequent samples.

Samples at the first four locations were collected using a rotary-percussion power drill with the windows closed. A sill protruding out from the base of each window frame required drilling at an angle. Even though the exterior bead of caulk had been removed from the concrete surface, some caulk remained recessed in the gap beneath the window frame and the concrete jamb. After review of initial results, it was determined that this residual caulk may have been nicked by the drill bit being advanced at an angle and the high PCB concentrations in very small amounts may have affected concrete sample results. A fifth set of samples was collected using a standard electric drill at an open window, allowing a vertical drill bit orientation and less of a chance to touch the residual caulk (the window was sealed with plastic to keep dust from entering the building).

1.3.1.3 Concrete Sealant

Concrete sealant was sampled using a wire brush after removing dust adhered to the concrete surface using either a soft-bristle brush or vacuum cleaner. A clean piece of card stock was placed against the concrete beneath the brushed/vacuumed area extending out from the building to catch powdered concrete created by scrubbing the area with a wire brush. This material was then transferred directly into sample jars, which were labeled and placed into a cooler for storage before delivery to the laboratory. New soft-bristle brushes, wire brushes, and card stock were used at each sample location to prevent cross-contamination of subsequent samples.

1.3.1.4 Dust

Dust was sampled from the building exterior, carpets, ceiling tiles, and ventilation system surfaces using a vacuum cleaner. Carpet sampling was conducted according to a method developed by the Agency for Toxic Substances and Disease Registry (**ATSDR**) and the University of Washington (see Appendix B). The method proscribes a specific vacuum model and accessories used over a stipulated area depending on floor covering (e.g., bare, <1 inch pile height, >1 inch pile height). All carpet was a low-pile type, requiring collection over 6 square meters. Dust sampling of exterior building walls was conducted using the same protocol over either 6 or 8 square meters (depending on whether adequate volume was collected after 6 square meters) and then conducting a second pass using a brush attachment to help dislodge remaining dust from the rough surface. Dust sampling of dropped ceiling horizontal surfaces (e.g., ceiling tiles, light fixtures, ductwork) was conducted over an estimated area of 2¼ square meters. The two ventilation system filter and frame assemblies and return air duct surfaces sampled were not measured, but were adequate to retrieve enough material for laboratory analysis (each of these locations provided bulk dust samples prior to being filtered for supplied air distribution).

1.3.1.5 Drain Solids and Soil

Solids were sampled near roof drains by removing gravel ballast (if present), brushing accumulated drain solids onto clean card stock, and directly transferring the solids into pre-cleaned 8 oz. glass sampling jars. Drainage solids were sampled from the ground surface by:

- Removing all rocks, gravel, and organics from identified surface water pathway sample locations
- Collecting drain solids with a dedicated stainless steel spoon placed directly into the jar.

Each sample was labeled and placed in a cooler for delivery to the laboratory. All spoons were decontaminated before use by washing with a non-phosphate soap and tap water.

Soil was sampled at each drip line location by first digging a hole with a shovel to approximately 13 inches deep. A stainless steel spoon was used to collect the deepest sample from the sidewall 11 to 13 inches deep, which was placed into a stainless steel bowl. The soil was homogenized and gravel and other deleterious material were removed. An appropriate volume of soil was then placed in a container, which was labeled and placed in a cooler for delivery to the laboratory. A second sample was collected from the sidewall 5 to 7 inches deep and a third sample was collected from the sidewall 0 to 3 inches deep; both were processed in the same manner as the deepest sample.

Surface soil was sampled at locations extending away from the drip line, collected directly with stainless steel spoons from 0 to 3 inches deep and then processed in the same manner as the other samples. A new spoon and bowl were used for each sample. All spoons and bowls were decontaminated before use by washing with a non-phosphate soap and tap water.

1.3.1.6 Non-porous Surfaces

Dust was collected from non-porous surfaces using a piece of gauze soaked in hexane, according to EPA standard methodology (Appendix C). The standard approach using a 10 cm by 10 cm template was modified when surface boundaries dictated use of a different shape to provide the required 100 cm^2 sample area (Figure 15).

1.3.1.7 Air

Ambient air samples were collected according to National Institute for Occupational Safety and Health (NIOSH) method 5503 (Appendix D) using a Buck Libra Model L-4 low-flow air pump system. The flow rate was set at approximately 0.2 liters per minute over approximately 4 hours, for total sample sizes of 38 to 51 liters. The glass fiber filters were transferred to 7 milliliter vials and the Florisil tubes sealed with plastic caps and packed in sealed plastic bags for shipment.

1.3.2 Analytical Methods

All bulk and wipe samples were analyzed according to EPA method 8082 by gas chromatograph (EPA 1996). Air samples were analyzed according to NIOSH method 5503, also by gas chromatograph (Appendix D). Results were reported according to Aroclor number.

No field blanks, duplicate samples, or background samples were collected for this project. All laboratory data and a data validation report is provided in Appendix E.

1.4 Sampling Results

1.4.1 Building Interior Samples

As described in Section 1.3, samples were collected at several locations within perimeter rooms to track potential migration of dust containing caulk particles from windows to doors, leading to other parts of the building. Samples were collected from window sills, horizontal surfaces in the rooms (e.g., table tops, file cabinet tops), vinyl floor tiles, carpet, door jamb tops, and ventilation system components (all non-porous surfaces, except for carpet and some ventilation system components). Types of horizontal surfaces and the presence of vinyl floor tiles varied in each room. Sample results are summarized in Table 1 and shown in Figures 16 through 21.

1.4.1.1 Non-porous Surfaces

All non-porous surfaces were sampled using wipes.

1.4.1.1.1 Window Sills

Windows in the Alder Tower may be opened by releasing the latch, located approximately half way up one side, and swinging the window inward. Twenty wipe samples were collected using a modified 100 cm^2 template on each metal window sill (two half templates were used, due to the narrow sill). PCBs were detected at 2.0, 2.7, and 9.6 µg/100 cm^2 at three locations, with no PCBs detected in 17 of the 20 samples (detection limit of 2.0 µg/100 cm^2). All samples met the EPA surface standard for high occupancy areas of 10 µg/100 cm^2.

1.4.1.1.2 Horizontal Surfaces

Wipe samples were collected in 11 rooms from three desk tops, three radiators, one refrigerator, two file cabinets, one shelving unit, and one storage cabinet. No PCBs were detected in any sample.

1.4.1.1.3 Door Jamb Tops

Wipe samples were collected from all 20 rooms. No PCBs were detected in any sample.

Table 1. Interior building sample results, Youth Service Center

Sample Type	**Vacuum**		**Wipe**				
Location	Carpet Dust	Ventilation System Dust	Ventilation System Dust	Vinyl Flooring Dust	Window Dust	Horizontal Surface Dust	Door Top Dust
Units	ppm	ppm	$ug/100cm^2$	$ug/100cm^2$	$ug/100cm^2$	$ug/100cm^2$	$ug/100cm^2$
ALDER TOWER							
1st Floor							
1-MUSTER-CARPET	0.44						
1-MUSTER-WIPE						2 U CT	
1-HALL-CARPET	0.43						
1SA-WIPE-VF				2 U			
1SB-WIPE-VF				2 U			
2nd Floor							
228	**9.7**			2 U	2 U		2 U
244	**1.2**			2 U	2 U		2 U
2N-CARPET	0.35						
2S-CARPET	**1.2**						
MEZZ-SUPPLY-DUST		**2.1**					
MEZZ-RETURN-DUST		**4.8**					
3rd Floor							
302	**4.3**				2 U	2 U HT	2 U
307/308	0.98			2 U	2 U	2 U FR	2 U
316	**2.7**				2 U		2 U
332	**3.6**				2 U		2 U
336	**3.4**				2		2 U
358	**2.7**				2 U	2 U DS	2 U
WN-WIPE					9.6		
WS-WIPE					2 U		
3S-RETURN-WIPE			2 U				
3E-RETURN-WIPE			2 U				
3N-RETURN-WIPE			2 U				
3W-RETURN-WIPE			2 U				
3N-CARPET	**1.5**						
3S-CARPET	**2.2**						
4th Floor							
402	**1.5**				2 U		2 U
412	**2.3**				2 U		2 U
413	**3.6**				2 U	2 U FC	2 U
420				2 U	2 U		2 U
434				2 U	2 U	2 U FC	2 U
427				2 U	2 U		2 U
4N-CARPET	**1.2**						
4S-CARPET	**1.3** J						
4N-UCP-WIPE			2 U				
4NE-RETURN-WIPE			2 U				
4NW-RETURN-WIPE			2 U				
4SW-RETURN-WIPE			2 U				
4SE-RETURN-WIPE			2 U				
4N-SUPPLY-WIPE			2 U SD				
4N-UCP-DUST		0.33 U					
4N-RETURN-DUST		0.46					
5th Floor							
503	**5.7**				2.7	2 U DS	2 U
508	**4.3**				2 U	2 U DS	2 U
517	**3.4**				2 U	2 U RA	2 U
528	**3.4**				2 U		2 U
533	**4.3**				2 U	2 U HT	2 U
534	**5.2**				2 U	2 U FT	2 U
5N-CARPET	1.0						
5S-CARPET	**2.2**						
5S-UCP-WIPE			2 U				
5SE-RETURN-WIPE			2 U				
5SW-RETURN-WIPE			2 U				
5NW-RETURN-WIPE			2 U				
5NE-RETURN-WIPE			2 U				
5S-SUPPLY-WIPE			2 U SD				
5S-UCP-DUST		**1.4**					
5S-RETURN-DUST		**1.8**					
Penthouse							
PH-SUPPLY-DUST		**6.2**					
PH-RETURN-DUST		**8.1**					
PH-POSTSUPPLY-WIPE			2 U SL				

ppm - parts per million

ug/100cm2 - micrograms per 100 square centimeters

U- The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

J- The analyte was positively identified; the associated numerical value is an estimate of the concentration of the analyte in the sample.

Bold values exceed TSCA cleanup level of 1 ppm (no wipe sample exceeded the TSCA level of 10 ug/100^2)

CT - Top of storage cabinet

DS - Desk surface

HT/RA - Top of heater / radiator

FR - Top of refrigerator

FC - Top of file cabinet

FT - Top of file tray shelf

SD-Supply duct faceplate (HVAC system)

SL-Supply duct louvers (HVAC system)

1.4.1.1.4 Vinyl Floor Tiles

One wipe sample was collected from each of six of the 20 perimeter rooms that had vinyl floor tiles, and two wipe samples were collected from the 1st floor Spruce Wing Detention hallway waiting area. No PCBs were detected in any sample.

1.4.1.2 Carpet Dust

Carpet dust samples were collected from 17 of the 20 perimeter rooms and 10 interior rooms. Sample mass ranged between 13 and 201 grams. All 27 samples detected PCBs, ranging from 0.35 to 9.7 ppm. Twenty-two of the 27 samples exceeded the TSCA cleanup level of 1 ppm in a high occupancy area.

1.4.1.3 Ventilation System

Eight bulk dust samples were collected from the ventilation system by vacuuming the:

- Tops of four sets of ceiling tiles and other horizontal surfaces in the dropped ceiling space on the 4th and 5th floors
- Penthouse mechanical room fresh air supply filter/frame
- Penthouse mechanical room return air supply duct interior (lined with fiberglass-type material)
- 2nd floor mechanical room fresh air supply filter/frame
- 2nd floor mechanical room return air return duct interior (lined with fiberglass-type material).

Seventeen wipe samples were collected from non-porous surfaces:

- one from the flow control louver located downstream of the supply filter in the penthouse mechanical room
- two from covers of air supply vents in rooms on the 4th and 5th floors
- 14 from ductwork and light ballasts in the dropped ceiling space across the 4th and 5th floor.

PCBs were found in seven of the eight vacuum dust samples, but were not detected in the 17 wipe samples.

Bulk dust on horizontal surfaces in the dropped ceiling space contained PCBs at 0.46, 1.4, and 1.8 ppm (no PCBs were detected in the fourth sample). Dust on the supply system filter and frame and in the return air duct in the penthouse mechanical room contained PCBs at 6.2 and 8.1 ppm, respectively. Dust on the supply system filter and frame and in the return air duct in the 2nd floor mechanical room contained PCBs at 2.1 and 4.8 ppm, respectively.

Two of the bulk dust samples were collected from areas also sampled using wipes. Whereas neither wipe sample indicated the presence of PCBs (detection limit of 2 µg/100 cm^2), one bulk sample identified PCB presence at 1.4 mg/kg (the other bulk sample did not detect PCBs, at a detection limit of 0.33 mg/kg).

1.4.1.4 Building Interior Sampling Results Summary

PCB concentrations greater than 1 ppm were found in dust associated with carpeting and ventilation system components (filter, louver flow regulator, duct lining, and tops of ceiling tiles). All ventilation system bulk dust samples were collected from surfaces associated with the return air system, prior to being filtered for supplied air distribution; there was not enough dust observed in supply air ducts to collect bulk samples after filtering (wipe samples were collected from two air supply vent covers where dust was noted). PCBs were detected in all carpet samples, including perimeter offices with windows and interior rooms located on all five floors.

Interior material surface sampling using the wipe test procedure contained PCBs on three window sills below the cleanup level of 10 µg/100 cm^2. PCBs were not detected in samples from any of the following:

- 19 window sills
- 12 horizontal surfaces
- 20 door jamb tops
- 8 vinyl floors
- 14 non-porous surfaces in the dropped ceiling space
- 2 air supply vent covers.

No significant buildup of dust was observed on non-porous office surfaces, other than air supply vent covers.

1.4.2 Building Exterior Samples

Samples were collected from several locations on the building surface to track potential migration of PCBs from caulk into the underlying concrete and in dust migrating across the face of the building and along drainage pathways. Concrete directly in contact with caulk and concrete from beneath windows on the face of the building were sampled (destructive); window frame dust was sampled (wipe); concrete sealant was sampled (destructive), and building surface dust was sampled (vacuum). Bulk material, vacuum dust, and wipe dust sample results are summarized in Table 2 and shown in Figures 22 and 23. Drain solids and soil sample results are summarized in Table 3 and shown on Figure 24.

Table 2. Exterior building sample results, Youth Service Center

Sample Type	Wipe	Bulk Material				Vacuum
Location	Window Dust	Window Caulk	Concrete Sealant	Concrete	Concrete	Building Dust
Units	$ug/100cm^2$	ppm	ppm	ppm	ppm	ppm
ALDER TOWER						
2nd Floor						
228	**3.4**	97,000				
244	**9.4**	89,000				
3rd Floor						
302	**8.9**	110,000				
307/308	**17**	70,000				
316	**19**	76,000				
332	**11**	92,000				
336	**9.9**	78,000				
358	**39**	110,000				
East Wall						
CONC-E-1/8				**22,000**		
CONC-E-1/4					**12,000**	
CONC-EN-1/8				**12,000**		
CONC-EN-1/4					**7,700**	
E-CONCFACE-Sealant			0.33 U			
CONCRETE SEALANT			**1.4**			
E-CONCFACE-DUST						**21**
ENE-CONC-FACE-1/8				0.11		
ENE-CONC-FACE-1/4					0.14 U	
ENE-CONC-1/8				**5,700**		
ENE-CONC-1/4					**1,200**	
West Wall						
CONC-WN-1/8				**700**		
CONC-WN-1/4					**740**	
CONC-FACE-WN				**1.2**		
CONC-WS-1/8				**9,200**		
CONC-WS-1/4					**6,800**	
CONC-FACE-WS				**11**		
W-CONCFACE-Sealant			0.33 U			
W-CONCFACE-DUST						**18**
4th Floor						
402	**18**	100,000				
412	**15**	160,000				
413	**10**	120,000				
420	**6.4**	120,000				
434	**180**	120,000				
427	**10**	120,000				
5th Floor						
503	**38**	150,000				
508	**17**	110,000				
517	**8.8**	96,000				
528	**28**	110,000				
533	**29**	85,000				
534	**77**	120,000				
ALDER WING						
Courtyard Exterior						
W-CRTYRD-CAULK		1.4				
WSW-CRTYRD-CAULK		0.7				
E-CRTYRD-CAULK		1.1 U				

ppm - parts per million
ug/100cm2 - micrograms per 100 square centimeters
U- The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
Bold values exceed TSCA bulk cleanup level of 1 ppm or wipe cleanup level of 10 ug/100 cm2.

Table 3. Drain solids and soil sample results, Youth Service Center

Location	Sample ID	Distance from Building Dripline	Depth	Soil		Drain Solids
Units		feet	inches	ppm		ppm
Sample Area 1 (Northwest corner of the Alder Tower)						
	W-SS-0-4	0	0	**1.4**		
	SA1-00-SS46-00	0	0	0.072	U	
	SA1-00-SS47-06	0	6	0.058	U	
	SA1-00-SS48-12	0	12	0.058	U	
	SA1-02-SS49-00	2	0	0.071	U	
	SA1-04-SS50-00	4	0	0.14	U	
	SA1-00-SS51-00	0	0	**1.3**		
	SA1-00-SS52-06	0	6	0.19		
	SA1-00-SS53-12	0	12	0.17		
	SA1-02-SS54-00	2	0	0.11		
	SA1-04-SS55-00	4	0	0.11		
Sample Area 2 (North side of the Alder Tower)						
	N-SS-0-4	0	0	0.071	U	
	SA2-00-SS41-00	0	0	0.068	U	
	SA2-00-SS42-06	0	6	0.065	U	
	SA2-00-SS43-12	0	12	0.064	U	
	SA2-02-SS44-00	2	0	0.074	U	
	SA2-04-SS45-00	4	0	0.083	U	
	RD-N-SD02-01	1	0			0.82
Sample Area 3 (Northeast Corner of the Alder Tower)						
	E-SS-0-4	0	0	0.41		
	SA3-00-SS36-00	0	0	0.057	U	
	SA3-00-SS37-06	0	6	0.06	U	
	SA3-00-SS38-12	0	12	0.065	U	
	SA3-02-SS39-00	2	0	0.06	U	
	SA3-04-SS40-00	4	0	0.057	U	
Sample Area 4 (East courtyard of the Alder Tower)						
	SA4-00-SS01-00	0	0	**1.5**		
	SA4-00-SS02-06	0	6	0.35		
	SA4-00-SS03-12	0	12	0.27		
	SA4-02-SS04-00	2	0	0.26		
	SA4-04-SS05-00	4	0	0.16		
	SA4-00-SS06-00	0	0	0.97		
	SA4-00-SS07-06	0	6	**1.9**		
	SA4-00-SS08-12	0	12	0.44		
	SA4-02-SS09-00	2	0	**2.4**		
	SA4-04-SS10-00	4	0	0.16		

Table 3. Drain solids and soil sample results, Youth Service Center

Location	Sample ID	Distance from Building Dripline	Depth	Soil	Drain Solids
Units		feet	inches	ppm	ppm
Sample Area 5 (East side south end of the Alder Tower)					
	SA5-00-SS11-00	0	0	0.051 U	
	SA5-00-SS12-06	0	6	0.053 U	
	SA5-00-SS13-12	0	12	0.054 U	
	SA5-02-SS14-00	2	0	0.051 U	
	SA5-04-SS15-00	4	0	0.13	
	SA5-00-SS16-00	0	0	0.051 U	
	SA5-00-SS17-06	0	6	0.052 U	
	SA5-00-SS18-12	0	12	0.051 U	
	SA5-02-SS19-00	2	0	0.071	
	SA5-04-SS20-00	4	0	0.077	
Sample Area 6 (Southeast corner of Alder Tower)					
	SA6-00-SS21-00	0	0	0.092	
	SA6-00-SS22-06	0	6	0.089	
	SA6-00-SS23-12	0	12	0.15	
	SA6-02-SS24-00	2	0	0.051 U	
	SA6-04-SS25-00	4	0	0.051 U	
	SA6-00-SS26-00	0	0	0.087	
	SA6-00-SS27-06	0	6	0.051 U	
	SA6-00-SS28-12	0	12	0.1	
	SA6-02-SS29-00	2	0	0.14	
	SA6-04-SS30-00	4	0	0.068	
	DP-S-SD04-40	40	0		0.069
Sample Area 7 (Southwest corner of Alder Tower)					
	SA7-00-SS31-00	0	0	0.13	
	SA7-00-SS32-06	0	6	0.056 U	
	SA7-00-SS33-12	0	12	0.11	
	SA7-02-SS34-00	2	0	0.13	
	SA7-04-SS35-00	4	0	0.1	
Roof-top Samples					
(West side - 2nd Floor)	RD-W-SD01-02	2	0		**2.4**
(East side - 3rd Floor)	RP-E-SD03-00	0	0		**7**

Notes:

ppm - parts per million

U- The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

Bold values exceed TSCA cleanup level of 1 ppm

1.4.2.1 Caulk

Caulk samples were collected from window openings outside each of the 20 perimeter rooms tested on the inside, plus three other windows. All samples contained PCBs, with concentrations ranging from 70,000 to 160,000 ppm. Additionally, the three unique window caulk types identified on Alder Wing windows were sampled; PCBs were detected in two of the three samples at concentrations of 0.7 and 1.4 ppm.

1.4.2.2 Window Frames

Exterior window frames include a metal channel around the perimeter that can catch dust. Twenty wipe samples were collected using a modified 100 cm^2 template along the bottom channel of each window frame. All samples contained PCBs, with concentrations ranging from 3.2 to 180 µg/100 cm^2. Twelve of the 20 samples exceeded the EPA cleanup level for high occupancy areas of 10 µg/100 cm^2.

1.4.2.3 Building Surfaces

Three types of building surface samples were collected: 1) surface dust, sampled by vacuuming, 2) concrete sealant, sampled using a wire brush to create dust, and 3) concrete, sampled using a power drill to create dust for analysis.

1.4.2.3.1 Surface Dust

Surface dust was collected at two locations, one each from the east and west walls of the tower. The samples were collected using a modified carpet sampling protocol over either 6 or 8 square meters, depending on whether an adequate volume of dust was collected after 6 square meters were vacuumed. The samples contained PCBs at 21 and 18 ppm, respectively.

1.4.2.3.2 Concrete Sealant

Three concrete sealant samples were collected. An initial sample was collected after first removing surface dust with a soft bristle brush, and then two other samples were collected following rigorous vacuuming. The initial sample contained PCBs at 1.4 ppm; no PCBs were detected in the later samples. It is believed that the initial sample included some surface dust left after the soft brush cleaning. The more rigorous vacuuming appeared to remove this dust, indicating no PCBs associated with the sealant (or immediately beneath the sealant).

1.4.2.3.3 Concrete Window Jambs

Destructive concrete samples were collected from five window jambs following caulk removal. Samples were collected from 1/8- and 1/4-inch deep holes. The deeper sample was collected by using a smaller diameter drill bit advanced within the shallower sample drill hole. The first four sets of samples were collected by angling the rotary-percussion power drill bit to bypass the sill;

the fifth set of samples was collected with the standard electric drill bit oriented vertically. Analytical results are provided in Table 4.

Both sampling techniques indicate concentrations that exceed the EPA cleanup level for bulk remediation waste in high occupancy areas (1 ppm) and low occupancy areas (25 ppm).

Table 4. PCB concentrations in concrete window jambs.

Shallow (1/8 inch deep)	Deep (1/4 inch deep)
22,000 ppm	12,000 ppm
12,000 ppm	7,700 ppm
9,200 ppm	6,800 ppm
700 ppm	740 ppm
5,700 ppm	1,200 ppm

1.4.2.3.4 Concrete Building Walls

Destructive concrete samples were collected from 1/8-inch deep at two locations approximately 2 feet below windows on the west face of the tower and samples and were collected at 1/8-inch and 1/4-inch depths from approximately 2 feet below a window on the east face of the tower. Before sampling the west face, surface dust was removed using a soft-bristle brush (the vacuum had not been acquired at the time of sampling) and the sealant layer was not removed. PCBs were detected in the north sample at 1.2 ppm and in the south sample at 11 ppm. Before sampling the east face, surface dust was removed by vacuuming and sealant was removed with a wire brush. PCBs were detected in the shallow sample at 0.11 ppm and no PCBs were detected in the deep sample. It appears likely that the higher concentrations found on the west wall reflect residual surface dust that was not removed using the hand brush technique; the east wall vacuuming used an upholstery attachment, not a brush attachment that likely would be more effective in removing dust).

1.4.2.4 Drain Solids

Drain solids were sampled from the following areas:

- Areas of accumulation near drains installed on the tower's first floor west side roof and second floor east side roof
- The base of a downspout discharging from the canopy at the entrance of the building
- Adjacent to a catch basin at the rear of the building (the catch basin itself was not sampled, due to the buildup of significant organic matter – see Figure 25).

The two roof samples indicated PCB concentrations of 2.4 and 7.0 ppm, and the two samples collected at the ground surface indicated PCBs at 0.069 and 0.82 ppm. Both rooftop samples exceeded the TSCA cleanup level of 1 ppm.

1.4.2.5 Soil

A total of 58 soil samples were collected at the site. Thirty-six surface samples were collected from seven areas surrounding the Alder Tower along the drip line and extending approximately 4 feet away from the building. Twenty-two subsurface samples were collected from the seven areas at 6-inch and 12-inch depths along the drip line. PCBs were present in 31 of the 58 samples collected. Five samples exceeded the TSCA cleanup level of 1 ppm – two surface samples collected near the main building entrance at two different times from adjacent locations in Area 1 (1.3 and 1.4 ppm) and two surface and one subsurface samples collected from Area 4 in the courtyard on the east side of the tower (1.5, 1.9, and 2.4 ppm, respectively). The sample collected from 6 inches deep was associated with a surface sample measuring 0.97 ppm PCBs, very close to the cleanup level.

1.4.2.6 Building Exterior Sampling Results Summary

Twenty-four of 25 window caulk samples collected from the exterior of the Alder Tower contained PCBs at concentrations indicating that the caulk is no longer authorized for use according to TSCA and must be removed. A window survey determined that 279 of the 282 accessible windows were sealed with the same grey caulk (caulk on the first and second floor windows that do not open were not surveyed). Four other caulk samples collected at various locations around the Alder Tower were found to contain PCBs ranging from 1.3 to 16 ppm; no PCBs were detected in five other samples.

Ten bulk samples collected from concrete in direct contact with caulk had PCB concentrations ranging between 700 and 22,000 ppm. Four concrete samples were collected from the face of the building at locations not in direct contact with caulk. Removing surface dust prior to sampling with a vacuum cleaner proved more effective than using a soft-bristle brush, resulting in a residual PCB concentration of 0.11 ppm in the 1/8 inch deep sample and no PCBs detected in the 1/4 inch deep sample. Based on these results and professional judgment of the sampling team, it does not appear that PCBs have been incorporated into building concrete, other than on surfaces in direct contact with contaminated caulk. It is likely that combining use of a vacuum system with a brush will most effectively remove dust from the building surface.

It does not appear that concrete sealant applied to the building exterior contains PCBs or has trapped PCBs beneath its surface.

It appears that window caulk has weathered such that fine particles have mixed with atmospheric deposition that covers the building beneath the windows. Dust collected in wipe samples on all 20 exterior window frames tested confirm PCBs found on the 2nd, 3rd, 4th, and 5th floors of the tower.

Two drain solids samples collected from roofs adjoining the tower to the east and west indicated PCBs greater than the TSCA cleanup level of 1 ppm. Both roofs are level and constructed using hot tar. The eastern roof has approximately 2-inch diameter rounded gravel ballast spread evenly across the entire area at very close spacing; the western roof has no gravel. Drain solids were observed as a thin coating with accumulations near the drains, probably built up due to standing water that ponds before moving through the opening.

Two land surface drainage pathways were sampled; one on the north side of the building (collecting water from the front entrance awning) and one near a catch basin approximately 40 feet from the south side of the building (collecting water from the south end of the building). Both sample results were below the TSCA cleanup level of 1 ppm.

Soil contamination appears to be limited to two small areas, one west of the entrance on the north side of the building in a landscaped area immediately adjacent to the elevator bump out, the other adjacent to the east courtyard wall. Two surface samples collected adjacent to each other near the front entrance confirm PCB concentrations slightly above the TSCA cleanup level of 1 ppm. Two surface samples and one subsurface sample collected at different locations near the east courtyard wall indicate initial contamination at the drip line surface and at 6 inches deep, also extending 2 feet away from the drip line at the surface.

1.4.3 Ambient Air Samples

Six ambient air samples were collected from five building perimeter rooms (2nd floor courtroom, 302, 306, 417, and 525) and at one outdoor location on the roof of the west wing. Samples were collected on a weekend, when the building was unoccupied. No PCBs were detected in any sample, with detection limits ranging between 0.00097 and 0.0013 milligrams per cubic meter. The NIOSH recommended exposure limit (REL) time weighted average (TWA) concentration that applies to a 10-hour workday during a 40-hour workweek is 0.001 milligram per cubic meter.

2.0 PCB Disposal and Cleanup Plan

2.1 Disposal and Cleanup Approach

This interim cleanup plan addresses disposal of PCB bulk product waste (caulk) and PCB remediation waste in accordance with 40 CFR 761.62 and 40 CFR 761.61, respectively.

PCB contamination of materials at the Alder Tower has resulted as a consequence of two processes. The first process is from PCB leaching from window caulk into immediately adjacent concrete. The second is weathering of window caulk such that fine particles have apparently mixed with atmospheric dust. This dust has subsequently entered the building through window openings and has also accumulated on the sides and roof of the building and in shallow soil below.

Eight PCB waste products are anticipated to be generated at the Alder Tower as part of disposal and cleanup activities. These products will be managed in accordance with the following provisions Title 40 CFR, Part 761:

761.62 Bulk Product Waste

- Caulk

761.61 PCB Remediation Waste

761.61(a) Self-implementing on-site cleanup and disposal of PCB remediation waste

- *Soil*

761.61(c) Risk-based disposal approval

- Dust incorporated into carpet
- Dust associated with ventilation system components
- Dust adhering to the building exterior
- Roof drain solids
- Roof ballast gravel
- Concrete immediately adjacent to caulk

PCB removal, cleanup, and disposal methods are described in the following sections for each of the materials above. In general, cleanup and disposal practices will be in accordance with EPA recommendations and guidance, including but not limited to: *Steps to Safe Renovation and Abatement of Buildings that Have PCB-Containing Caulk, Steps to Safe PCB Abatement Activities, and Contractors Handling PCB in Caulk During Renovation.*

2.2 Interior Cleanup

As described in Section 2.1, weathering of PCB containing caulk into small fragments, and the subsequent mixing of these fragments with atmospheric dust, has resulted in detectable levels of PCBs in dust samples collected from the interior and exterior of the Alder Tower. In the building's interior, PCBs were detected in bulk dust samples collected from carpet and from the buildings ventilation system components (including lowered ceiling spaces) at levels ranging from 0.46 ppm to 9.7 ppm. PCBs were either not detected or present only at very low levels (<10 ug/100 cm2) in wipe samples collected from interior surfaces.

A Risk-based disposal approval under 761.61(c) is proposed to address PCB containing dust in the building's interior. Under this approach, all affected bulk carpet and ventilation system duct insulation will be removed for disposal since it is not practicable to remove the PCB–containing dust from those materials. PCB containing dust will be removed from other affected porous and solid non-porous ventilation system surfaces by vacuuming and wiping. As virtually all identifiable dust will be removed, no clean-up level or verification sampling is proposed and verification of dust removal will be accomplished through visual inspection methods. This approach is believed to be appropriate based on three primary factors:

- Removal of carpets will effectively remove all entrained carpet dust.

- In affected areas of the ventilation system, the volume of dust is very small and it is anticipated that insufficient dust will remain for analysis following removal (approximately 10 grams). This approach is based on the observation during site characterization sampling that no dust remained on ventilation system surfaces following sampling collection (i.e. vacuuming). On non-porous surfaces in the air handling system, some visible dust was present and sampled, but dust volumes and PCB concentrations were sufficiently low that no PCBs were detected over a 100 cm^2 area using standard wipe sampling methods.

- A *Letter Health Consultation* was prepared by the Washington State Department of Health (DOH, Appendix F), under a cooperative agreement and oversight of the Agency for Toxic Substances and Disease Registry (ATSDR). Results of the draft *Letter Health Consultation* concluded that touching, breathing, or ingesting the PCB containing dust in the Alder tower is not expected to harm peoples health.

2.2.1 Ventilation System

Affected ventilation system components include dropped ceiling spaces, return air plenums, and filters.

2.2.1.2 Methods

PCB containing dust will be removed from ventilation system components using vacuuming and damp-cloth wiping methods. Ceiling tiles will be removed and the upper sides vacuumed. Dust will also be vacuumed from all other solid porous and non-porous surfaces in the exposed dropped ceiling space, and from unlined ductwork. The vacuum will be equipped with a HEPA filter and the cleaning process based on NADCA cleaning guidelines. Any ceiling tiles that cannot be replaced due to damage will be disposed of with the dust collected from vacuuming. In addition to vacuuming, all non-porous surfaces in the dropped-ceiling space (sprinkler piping, metal light fixtures, sheet metal ductwork, etc) will be wipe cleaned. Fiberglass insulation lining air handing duct work will be removed and disposed.

Vacuum-removal of dust from air handling system components will be in accordance with National Air Duct Cleaners Association (NADCA) standards for Assessment, Cleaning, and Restoration of HVAC systems (Appendix G). These standards require that collection devices of sufficient capacity are used to create a consistent pressure differential between the surface being cleaned and the surrounding area. The equipment must be operated continuously such that it does not allow cross migration of dislodged particulates during the cleaning process. Collection velocity ranges are recommended for retrieval of different particle sizes to keep loosened particulate entrained and prevent settling while it is conveyed to the vacuum collection device, as shown in Table 5. A minimum of 4,000 feet per minute will be specified for dust removal at the Alder Tower.

Table 5. Velocity Requirements for Contaminant Removal.

Nature of Contaminant	Examples	Design Velocity (feet per minute)
Very fine light dust	Cotton lint, wood flour, litho powder	2,500 – 3,000
Dry dusts and powders	Fine rubber dust, Bakelite molding powder dust, jute lint, cotton dust, shavings (light), soap dust, leather shavings	3,000 - 4,000
Average industrial dust	Grinding dust, buffing lint (dry), wool jute dust, shoe dust, granite dust, silica flour, general material handling, brick cutting, clay dust, foundry (general), limestone dust, packaging and weighing asbestos dust in textile industries	3,500 – 4,000
Heavy dusts	Sawdust (heavy & wet), metal turnings, foundry tumbling barrels and shake out, sand blast dust, wood blocks, hog waste, brass turnings, cast iron boring dust, lead dust	4,000 – 4,500

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Dislodging dust from surfaces is accomplished through mechanical agitation techniques. Agitation devices may include cable driven brush systems, pneumatic and electric driven brushes, and hand tools such as contact vacuum brushes. Cleaning is conducted until no visible dust is left on the surface. The vacuum system must be equipped with a high efficiency particulate air (HEPA) filter. Care must be taken to prevent placement of the vacuum system such that exhaust air does not blow onto surfaces to be cleaned.

NADCA verification of dust removal from porous surfaces is based on visual methods. According to Method 1, a surface is considered visibly clean when it is free from non-adhered substances and debris. This is the method to be used when evaluating dust removal performance on interior surfaces.

2.2.1.2 Dust Removal Verification

A visual assessment of exposed surfaces will be performed using appropriate lighting verify dust removal. Significant dust presence will identified for further vacuuming or wiping with moist rags.

2.2.2 Carpet

All carpet will be removed from floors 2 through 5 of the Alder Tower. The first floor carpet will not be removed (windows on the first floor do not open, reducing the potential for distribution of PCB-contaminated dust – two samples collected from the first floor indicated PCBs at 0.43 and 0.44 ppm).

2.2.2.1 Removal

Carpet will be removed by standard industry methods. Carpet pieces will be wrapped in plastic and sealed such that dust cannot escape. The plastic wrapping will be wiped clean within the Decontamination Zone and transferred to a waste accumulation area prior to offsite disposal.

2.2.2.2 Removal Verification

A visual assessment will be conducted to verify that all carpet has been removed.

2.3.2 Windows and Walls

Sampling performed to date indicates that dust on surfaces across rooms with windows that open is not contaminated by PCBs (except dust that has accumulated in carpet). The negative pressure enclosure system to be installed prior to cleanup may or may not include lining of individual rooms with plastic (they may be enclosed as a group). If plastic is not installed on interior walls, the potential for dust to be mobilized and attach to walls must be addressed.

2.3.2.1 Decontamination

If Abatement Zone enclosures are constructed for each room by lining the walls with plastic, then window frames will be cleaned using a damp cloth prior to enclosure set up. If the walls are not lined with plastic as part of setting up the negative pressure enclosure system, then all interior wall and window surfaces will be vacuumed and wiped with damp cloth following removal of the enclosure system.

2.3.2.2 Decontamination Verification

A visual assessment of exposed surfaces will be performed using appropriate lighting prior to disassembling of the containment system. Significant dust presence will identified for further vacuuming or wiping with moist rags.

2.4 Exterior Cleanup

PCB cleanup of the building exterior will include the following:

- Removal and disposal of caulk under 761.62 *Disposal of PCB bulk product waste*,
- Removal and disposal of PCB containing dust on the building exterior as remediation waste under 761.61(c) *Risk-based disposal approval*
- Removal and disposal of soil as a remediation waste under 761.61(a) Self-implementing on-site cleanup and disposal of PCB remediation waste, and
- Temporary encapsulation of concrete that has been in contact with caulk with an epoxy coating as an interim disposal measure of PCB remediation waste under 761.61(c) *Risk-based disposal approval.* At such time as the Alder Tower is to be demolished (anticipated to occur within the next two to five years) the affected concrete will be saw cut, or otherwise removed from unaffected concrete, and disposed of at a chemical waste landfill that has been approved under 40 CFR 761.75.

2.4.1 Caulk

Window caulk will be removed from all windows on the Alder Tower. Removal of caulk will be performed in negative pressure enclosures.

Concrete in contact with the caulk will not be removed until the building is demolished in the next 1 to 4 years.

2.4.1.1 Removal

It is expected that caulk extends approximately 0.5 inch into the gap between the window frame and concrete jamb. Caulk will be removed using a thin-blade knife. Low levels of heat may be used to make the caulk more pliable. Abrasion will be used to remove the small amount of residue likely to remain on surfaces and prepare the concrete for encapsulation.

Following caulk removal, the concrete will be roughened to allow proper adhesion of an epoxy encapsulant. The epoxy will be applied as a base coat and final coat across the concrete surface previously in contact with caulk. The epoxy will be allowed to cure adequately prior to application of a replacement caulk. The epoxy will not be applied with the typical two-color system, since it will be covered with caulk and no wear is expected prior to building demolition.

2.4.1.2 Removal Verification

Caulk removal will be considered complete based on visual inspection; no testing will be conducted.

2.4.2 Roof-Top Gravel

Roof-top gravel has not been directly tested for contamination; however, it is expected to be coated by dust accumulated on roof tops that has been found to contain PCBs in two samples at 2.4 and 7.0 ppm.

2.4.2.1 Removal

Gravel will be removed from roof top surfaces using a vactor truck. The conveyance system will be set up such that no visible dust will be allowed to escape at hose connections.

2.4.2.2 Removal Verification

Removal will be verified when no visible gravel remains on roof tops. Air monitoring will be conducted during gravel removal operations to document air quality.

2.4.3 Soil

Soil will be removed from two areas found to contain PCBs at concentrations greater than 1 ppm, including a 5 foot by 5 foot area (2.3 square meters) adjacent to the elevator at the front of the building and a 5 foot by 50 foot area (23.2 square meters) in the east courtyard adjacent to the building wall. Soil will be removed from both areas to a depth of 1 foot.

2.4.3.1 Removal

Soil will be removed with shovels or a small excavator and placed directly into drums or other sealed container. Removal will be conducted under dry conditions and no free water will be produced. Removal will begin at the building wall and extend 5 feet away.

2.4.3.2 Removal Verification

Three verification samples will be collected from the front of the building, including one sample from the base of the excavation and two samples from sidewalls. Ten verification samples will be collected from the east courtyard, including five samples from the base of the excavation (every 10 feet) and five from the side wall (every 10 feet, but staggered with the bottom samples). Samples will be collected from the bottom of the excavated area in accordance wit the procedures described in section 1.3.1.5., and analyzed using EPA method 8082. If a soil sample result exceed 1 mg/Kg, an additional one-foot lift will be removed from the sample area and the area will be resampled.

2.4.4 Building Wall Dust

2.4.4.1 Decontamination

Non-porous window glass and aluminum window sills will be cleaned using water and soap. Dust will then be removed from the building exterior walls using a vacuum equipped with a HEPA filter. Standard vacuum brush attachments will be used to facilitate removal. The vacuum process will be cleaned based on NADCA cleaning guidelines.

2.4.4.2 Decontamination Verification

2.4.4.2.1 Exterior Concrete Surfaces

Scaffolding will be required to access much of the building walls. It is expected that the contractor will address each window bank that includes 5 windows and covers approximately 3.3 by 6.7 meters (22.1 square meters). Following vacuuming of each window bank, a dust sample will be collected from the concrete surface using a separate high powered sampling vacuum system across the same area. If enough sample volume can be collected, it will be submitted for laboratory analysis. If analysis indicated the presence of PCBs above 1 ppm, the concrete area will be recleaned and resampled.

2.4.4.2.1 Windows and Window Sills

Following cleaning, one wipe sample will be collected from a single window and a single window sill in each window bank. If a wipe sample exceeds 10 µg/100 cm^2 PCBs, the window and sill will be re-cleaned and re-sampled. Samples will be collected using the procedures described in section 1.3.1.6 and analyzed using EPA method 8020.

2.4.5 Roof Dust and Roof Drain Solids

2.4.5.1 Decontamination

Following removal of ballast gravel, dust and drain solids will be removed from the building roof tops using a vacuum equipped with a HEPA filter. Standard vacuum brush attachments will be used to facilitate removal. The vacuum cleaning process will be based on NADCA cleaning guidelines.

2.4.5.2 Decontamination Verification

Following vacuuming of each 20 square meter area (similar to building walls), a sample will be collected using a separate high powered vacuum system across the same area. If enough sample volume can be collected (approximately 10 grams), it will be submitted for laboratory analysis using EPA method 8020. If insufficient dust is collected for analysis, the area will be considered clean.

2.5 Building Use Requirements

2.5.1 Operations

The building will remain in operation and be partly occupied during cleanup activities. Interior cleanup will occur in two phases. The first phase will include floor five and roughly one-half of floor two. Occupants in those two areas will be moved to other locations during cleanup. Once the first phase is complete, occupants will be moved to the cleaned areas of floor two and floor five. The second phase will include abatement of the remaining half of the second floor and floors 3 and 4, All interior PCB removal work will be conducted in negative air pressure enclosures.

Materials and equipment used in the removal process will be stored and staged in enclosures outside of the building. The contractor will be required to coordinate removal activities with the building operations staff to prevent interference with normal building operations on the 1st and 2nd floors. The maintenance room is not accessible to building tenants; remedial activities in this area will not impact tenant use.

2.5.2 Ventilation

Ventilation controls will be required to protect both workers and building tenants. The contractor will construct negative pressure enclosures in the work areas. HEPA filters will be connected to the air discharge system implemented by the contractor to remove dust emissions prior to discharge to the atmosphere. Depleted filters will be disposed of with other personal protective equipment, as discussed in Section 3.

The building ventilation system will be controlled to selectively seal off areas undergoing active dust removal. An evaluation of the system will be conducted by a mechanical engineer to determine appropriate ventilation system modifications and operation for each portion of the work performed. The system will be managed to prevent building occupants from exposure to contaminated dust mobilized during the removal process.

3.0 Waste Disposal Plan

TSCA defines waste disposal requirements first on waste classification (i.e., bulk product waste, remediation waste, decontamination waste) and then according to options for each classification.

3.1 Waste Staging Onsite

All waste generated during the removal process will be staged outside the Alder Tower in a clearly marked fenced area. All material will be placed in sealed containers to prevent distribution by wind or rain. All dust collected will be contained in vacuum bags, combined into larger plastic bags, and placed into sealed transport containers. Bulk materials (e.g., carpet, ceiling tiles, rags, personal protective equipment, enclosure materials) will be wrapped in plastic and placed in sealed transport containers. Roof-top gravel will be placed directly into vactor trucks and transported to the disposal facility.

3.2 Bulk Product Waste

The disposal of *PCB bulk product waste* is regulated under 40 CFR § 761.62. Under this provision, *PCB bulk product waste* must be disposed of in one of three ways: performance-based disposal; disposal in solid waste landfills; or risk-based disposal approval.

Performance-based disposal. The performance-based option allows for disposal of *PCB bulk product waste* in a TSCA incinerator, a TSCA chemical waste landfill, a RCRA hazardous waste landfill, under a TSCA approved alternate disposal method, under the TSCA regulated decontamination procedures; or in a facility with a coordinated approval issued under TSCA. Disposal under this option does not require you to obtain approval from EPA.

Disposal in solid waste landfills. Certain *PCB bulk product waste*, such as PCB-containing caulk, even if the concentration of PCBs in the caulk is $\geq$ 50 ppm, may be disposed of in non-hazardous waste landfills permitted by States. Disposal under this option does not require you to obtain approval from EPA, but does require notification of the landfill prior to the first shipment.

Risk-based option. The risk-based option allows for a site-specific, risk-based evaluation of whether *PCB bulk product waste* may be disposed of in a manner other than under the performance based disposal option or the solid waste disposal landfill option. Disposal of *PCB bulk product waste* under this option requires you to obtain approval from EPA based on a finding that the disposal will not present an unreasonable risk of injury to health or the environment.

Caulk will be disposed of at TSCA-approved landfill, per 40 CFR 761.62(b)(1)(i); all of this waste contains PCBs at concentrations greater than 500 ppm.

3.3 Remediation Waste

The disposal of *PCB remediation waste* is regulated under 40 CFR § 761.61. There are three options for management of *PCB remediation waste*:

Self-implementing cleanup and disposal. The self-implementing option links cleanup levels with the expected occupancy rates of the area or building where the contaminated materials are present. The disposal requirements for the self-implementing regulatory option vary based, among other things, on the type of contaminated material and concentration of PCBs in the materials. Cleanup and disposal under this option, while it requires you to notify your Regional PCB Coordinator, does not require you to obtain approval from EPA.

Performance-based disposal. The performance-based option allows for disposal of the contaminated materials in either a TSCA chemical waste landfill or TSCA incinerator, through a TSCA approved alternate disposal method, under the TSCA regulated decontamination procedures, or in a facility with a coordinated approval issued under TSCA. Disposal under this option does not require you to obtain approval from EPA.

Risk-based cleanup and disposal. The risk-based option allows for a site-specific evaluation of whether PCB remediation waste may be cleaned up or disposed of in a manner other than the alternatives provided under the self-implementing or the performance-based disposal options. Disposal of *PCB remediation waste* under this option requires you to obtain an approval from EPA based on a finding that the disposal will not present an unreasonable risk of injury to health or the environment.

Soil will be disposed of at a Subtitle D landfill, per 761.61(a)(5)(v)(A); all of this waste contains PCBs at concentrations less than 50 ppm.

4.0 Documentation

Documentation of the field activities will be performed on a daily basis during the abatement project. Following completion of the remedial action, an abatement report will be produced.

4.1 Field Notes

A daily log of on-site activities will be maintained, documenting:

- Daily health and safety meetings
- Personnel and equipment on site
- Field procedures and observations
- Removal, abatement, containment, and decontamination progress
- Sample locations with selection criteria, samples collected, analyses performed, and sample handling
- Health and safety issues
- Health and safety monitoring data, including dust monitoring outside containments
- Estimate of wastes generated and stored
- Waste transporter information

4.2 Photographs

Daily photographs will be taken of representative activities, such as removal and abatement work, containment structures, decontamination, sampling, and waste handling and storage. Copies of selected photographs with appropriate captions will be included in the abatement report.

4.3 Transport and Treatment/Disposal Certifications

Manifests and/or bills of lading for the transportation and disposal of regulated waste materials will be obtained from the transporter and from the disposal facility. Copies of these forms will be included in the abatement report, and records will be maintained in accordance with the requirements as specified in 40 CFR 761 Subpart K – PCB Waste Disposal Records and Reports.

4.4 Abatement Report

An abatement report will be prepared upon completion of all remedial activities, including the following information:

- Site description
- A description of field procedures
- Confirmation of sample locations and analytical results for all characterization and verification samples collected
- A photographic record of the removal and abatement, containment structures, and decontamination
- Dust monitoring data
- Waste transport and treatment disposal information
- Copies of waste manifests and bills of lading

The abatement report and accompanying backup information will be kept on file for a period of three years from the date that the abatement activities are completed, according to the provisions of 40 CFR 761.62(b)(5). No documentation is stipulated for risk-based disposal per 40 CFR 761.61(c).

5.0 Window Caulk Maintenance

5.1 Inspections and Maintenance

Newly encapsulated window jamb surfaces will be coated with two layers of an epoxy coating system, overlaid by a new layer of caulk. If any wear is noted in the caulk layer, it shall be re-applied to maintain consistent coverage. The caulk will be visually inspected for cracking, chipping, and peeling semi annually until the building is demolished.

5.2 Documentation

Inspection and maintenance records will be prepared to document activities performed. Records will be maintained at the Youth Service Center and King County Facilities Management Offices.

Copies of the PCB Site Characterization Report will be maintained at the Youth Service Center and King County Facilities Management Offices to document residual window jamb concrete contamination. This document will be used to support PCB cleanup prior to building demolition, expected to take place in the next 4 years.

6.0 Schedule

The interim PCB cleanup described in this document will be conducted on the Alder Tower beginning in November 2010 and is expected to be completed in January 2011. Final cleanup will be conducted on window jamb concrete immediately prior to building demolition, planned to take place in the next 4 years, depending on funding availability. A separate Final PCB Cleanup Plan will be developed for the work at that time.

7.0 References

ACGIH (American Conference of Governmental Industrial Hygienists). 1998. Industrial Ventilation: A Manual of Recommended Practice, 23rd Ed., publication #2092CD.

EPA. 1986. SW-846 Test Methods for Evaluation Solid Waste, Physical/Chemical Methods. Third Edition. http://www.epa.gov/SW-846/main.htm. U.S. Environmental Protection Agency, Office of Water. March 2001.

Herrera Environmental Consultants. 2010. PCB Site Characterization Report – Youth Service Center, Seattle Washington, prepared for King County Facilities Management Division, Department of Executive Services.

Med-Tox Northwest. 2010. Hazardous Building Materials Survey, Alder Wing and Alder Tower, Youth Services Center, 1211 East Alder Street, Seattle Washington, 98122. Prepared for King County June 3, 2010

NADCA (National Air Duct Cleaners Association). 2006. Assessment, Cleaning and Restoration of HVAC Systems – ACR 2006. An Industry Standard Developed by the National Air Duct Cleaners Association, NADCA National Air Duct Cleaners Association, Washington, DC.

Washington State Department of Health. 2010. Draft Letter Health Consultation – King County Alder Tower, Polychlorinated Biphenyls (PCBs) Caulking Contamination, prepared under Cooperative Agreement with the U.S. Department of Health and Human Services Agency for Toxic Substances and Disease Registry.

FIGURES

Figure 1.
Vicinity map, Youth Service Center, Seattle, Washington.

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K:\Projects\09-04193-002\Project\youth_service_center-vicinity.mxd

Legend

Subject property

Figure 2.
Site map, Youth Service Center, Seattle, Washington.

N

0 50 100 200 Feet

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Aerial photograph: City of Seattle, 2002

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Figure 3. Alder Tower - north view.

Figure 4. East wing roof.

Figure 5. West wing roof.

Figure 6. Ventilation cover.

Figure 7. Dropped ceiling space.

Figure 8. HVAC filter.

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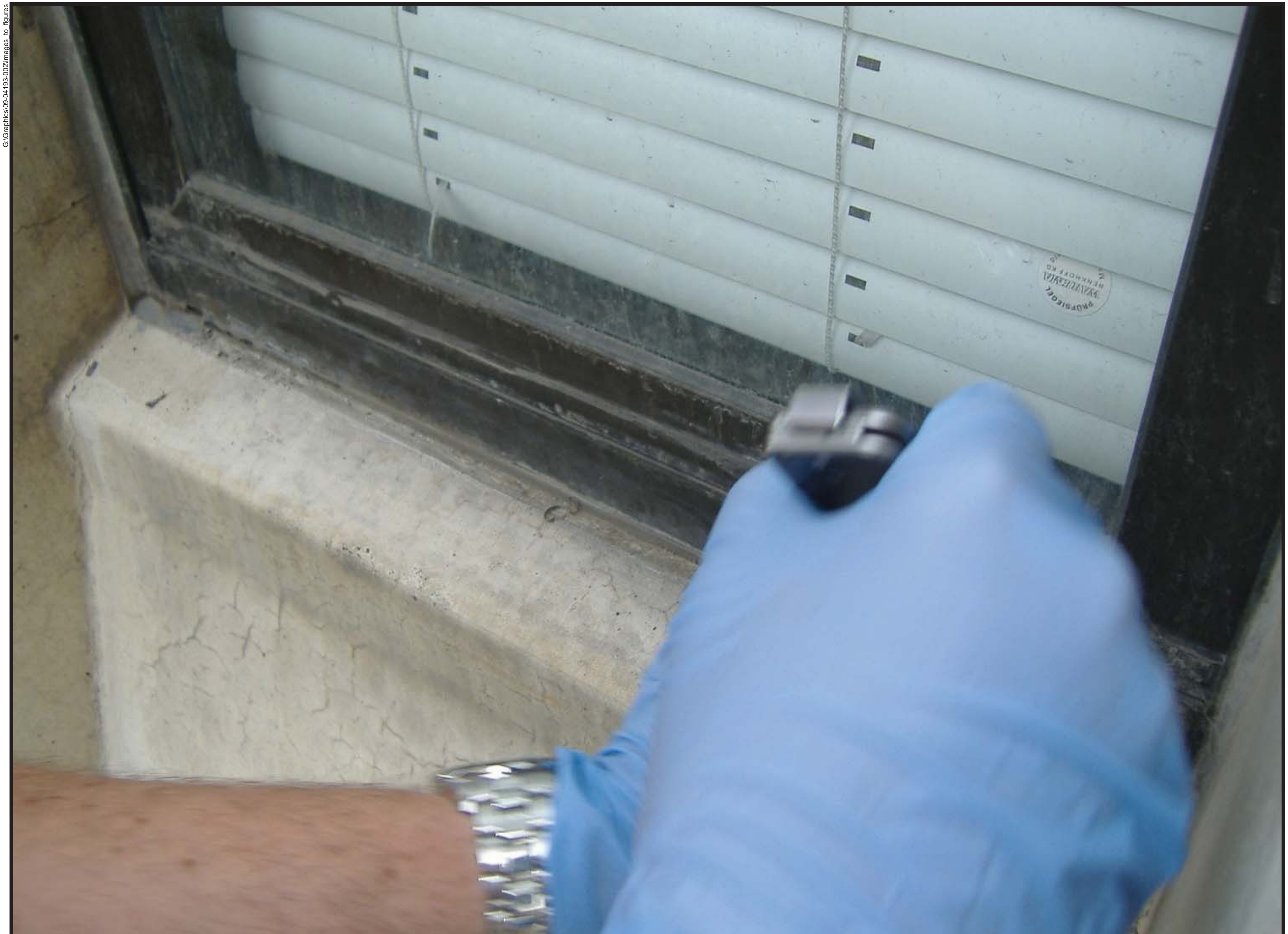

Figure 9. Caulk sampling.

Figure 10. Sealant adjacent to worn area.

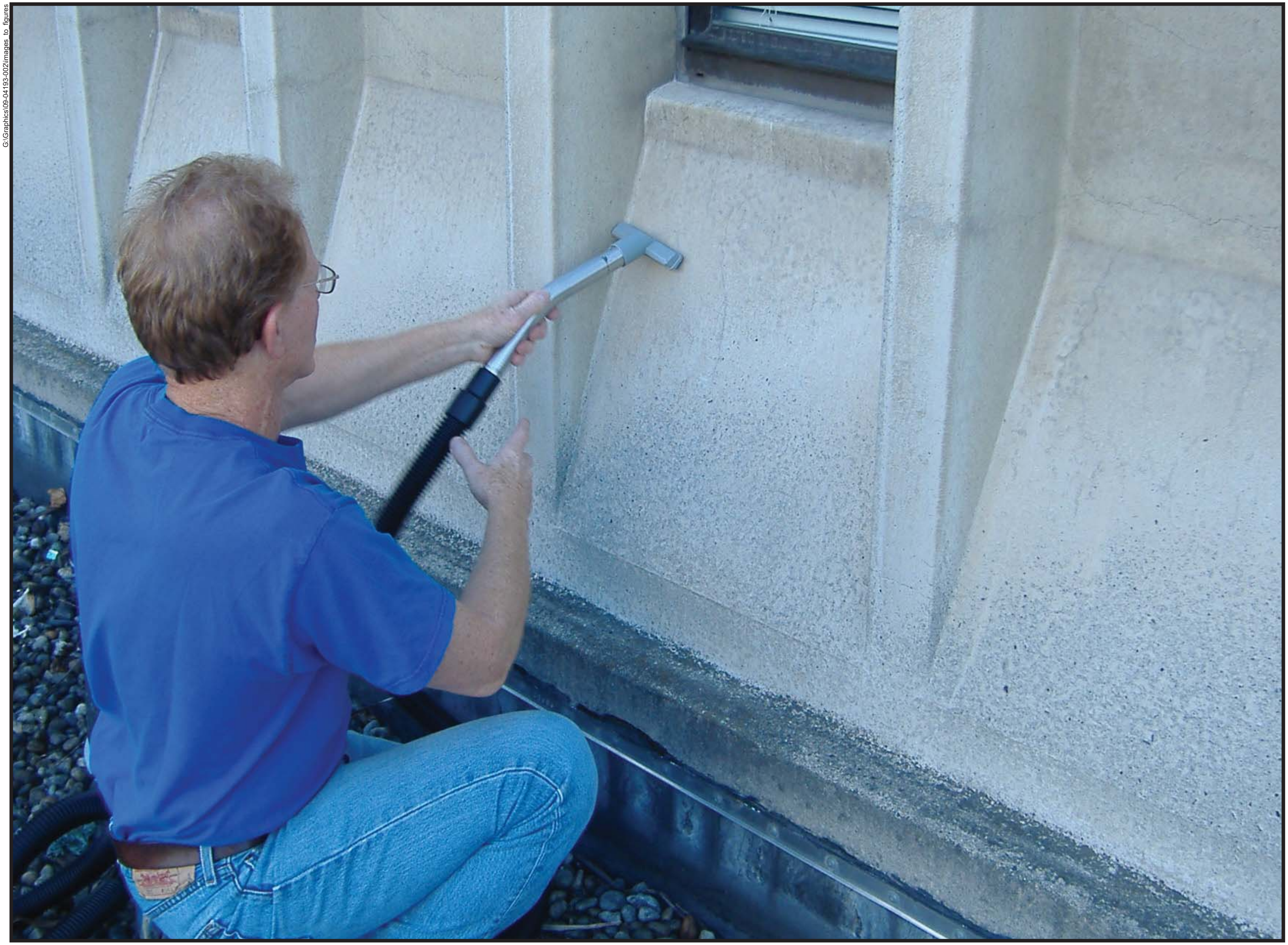

Figure 11. Surface dust sampling.

Figure 12. Rooftop drain solids sampling.

Figure 13. Stormdrain solids sampling.

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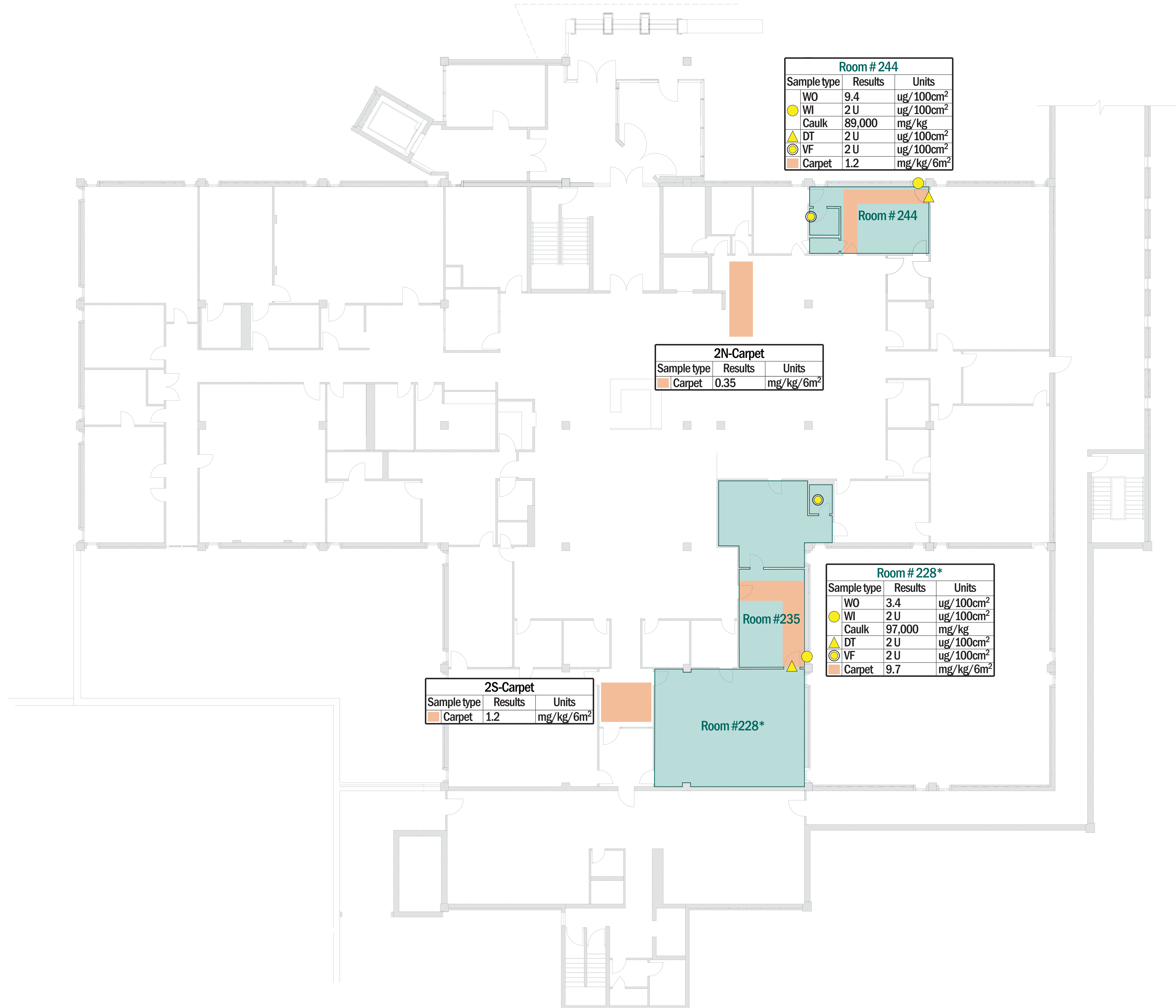
Figure 14. Soil sampling.

Figure 15. Modified wipe template.

Figure 16.
Interior sample locations, Alder Tower 2nd Floor, Youth Services Center, Seattle, Washington.



Room # 244

Sample type	Results	Units
WO	9.4	ug/100cm^2
WI	2 U	ug/100cm^2
Caulk	89,000	mg/kg
DT	2 U	ug/100cm^2
VF	2 U	ug/100cm^2
Carpet	1.2	mg/kg/6m^2

2N-Carpet

Sample type	Results	Units
Carpet	0.35	mg/kg/6m^2

Room # 228*

Sample type	Results	Units
WO	3.4	ug/100cm^2
WI	2 U	ug/100cm^2
Caulk	97,000	mg/kg
DT	2 U	ug/100cm^2
VF	2 U	ug/100cm^2
Carpet	9.7	mg/kg/6m^2

2S-Carpet

Sample type	Results	Units
Carpet	1.2	mg/kg/6m^2

Legend

- Wipe sample from window frame exterior (WO), Wipe sample from window sill interior (WI), Caulk sample
- Wipe sample from top of door frame (DT)
- Wipe sample from vinyl flooring (VF)
- Carpet sample area
- Sampled room

* Actual samples collected from room #235 because this was the closest opening window location.

N

Not to scale

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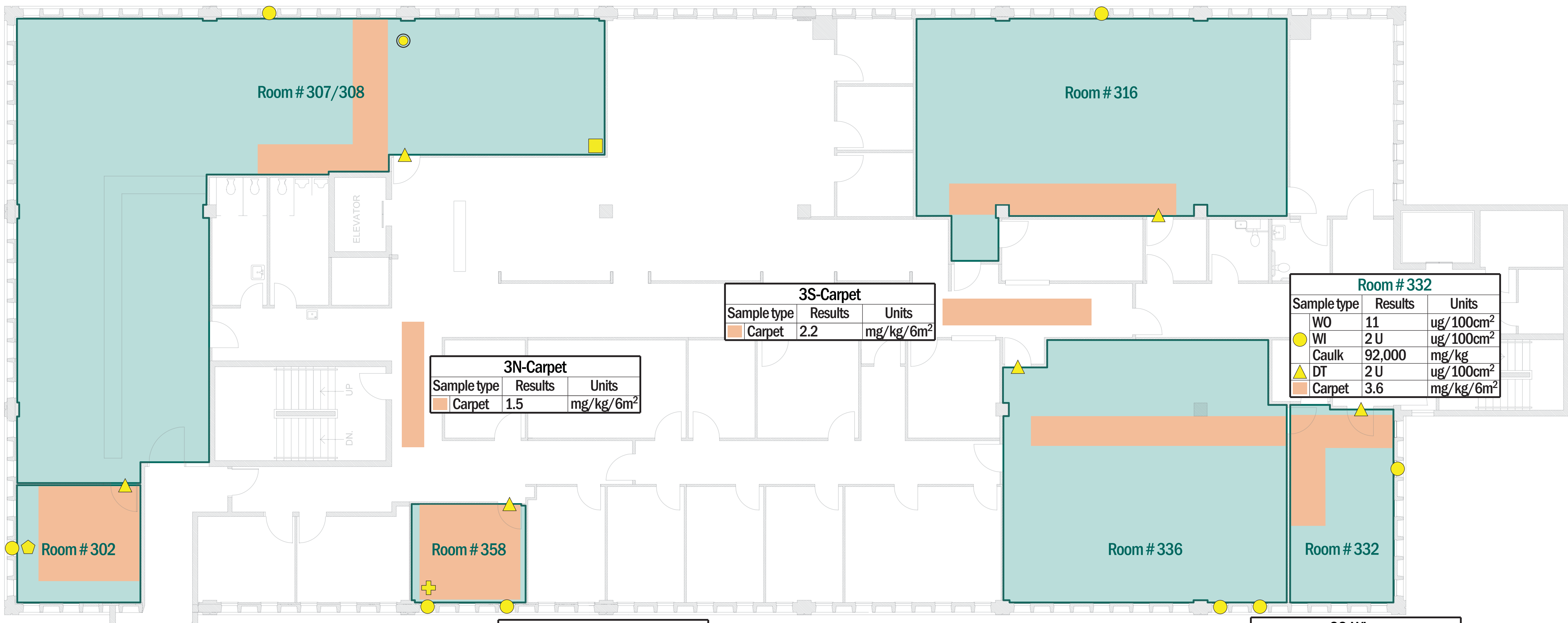
Figure 17.
Interior sample locations, Alder Tower 3rd Floor, Youth Services Center, Seattle, Washington.



Room # 307/308

Sample type	Results	Units
WO	17	ug/100cm^2
WI	2 U	ug/100cm^2
Caulk	70,000	mg/kg
DT	2 U	ug/100cm^2
VF	2 U	ug/100cm^2
FR	2 U	ug/100cm^2
Carpet	0.98	mg/kg/6m^2

Room # 316

Sample type	Results	Units
WO	19	ug/100cm^2
WI	2 U	ug/100cm^2
Caulk	76,000	mg/kg
DT	2 U	ug/100cm^2
Carpet	2.7	mg/kg/6m^2

3S-Carpet

Sample type	Results	Units
Carpet	2.2	mg/kg/6m^2

3N-Carpet

Sample type	Results	Units
Carpet	1.5	mg/kg/6m^2

Room # 332

Sample type	Results	Units
WO	11	ug/100cm^2
WI	2 U	ug/100cm^2
Caulk	92,000	mg/kg
DT	2 U	ug/100cm^2
Carpet	3.6	mg/kg/6m^2

Room # 302

Sample type	Results	Units
WO	8.9	ug/100cm^2
WI	2 U	ug/100cm^2
Caulk	110,000	mg/kg
DT	2 U	ug/100cm^2
HT	2 U	ug/100cm^2
Carpet	4.3	mg/kg/6m^2

Room # 358

Sample type	Results	Units
WO	39	ug/100cm^2
WI	2 U	ug/100cm^2
Caulk	110,000	mg/kg
DT	2 U	ug/100cm^2
DS	2 U	ug/100cm^2
Carpet	2.7	mg/kg/6m^2

3N-Wipe

Sample type	Results	Units
WI	9.6	ug/100cm^2

Room # 336

Sample type	Results	Units
WO	9.9	ug/100cm^2
WI	2	ug/100cm^2
Caulk	78,000	mg/kg
DT	2 U	ug/100cm^2
Carpet	3.4	mg/kg/6m^2

3S-Wipe

Sample type	Results	Units
WI	2 U	ug/100cm^2

Legend

- Wipe sample from window frame exterior (WO), Wipe sample from window sill interior (WI), Caulk sample
- Wipe sample from top of door frame (DT)
- Wipe sample from vinyl flooring (VF)
- Wipe sample from top of refrigerator (FR)
- Wipe sample from top of heater (HT)
- Wipe sample from desk top surface (DS)
- Carpet sample area
- Sampled room

N

Not to scale

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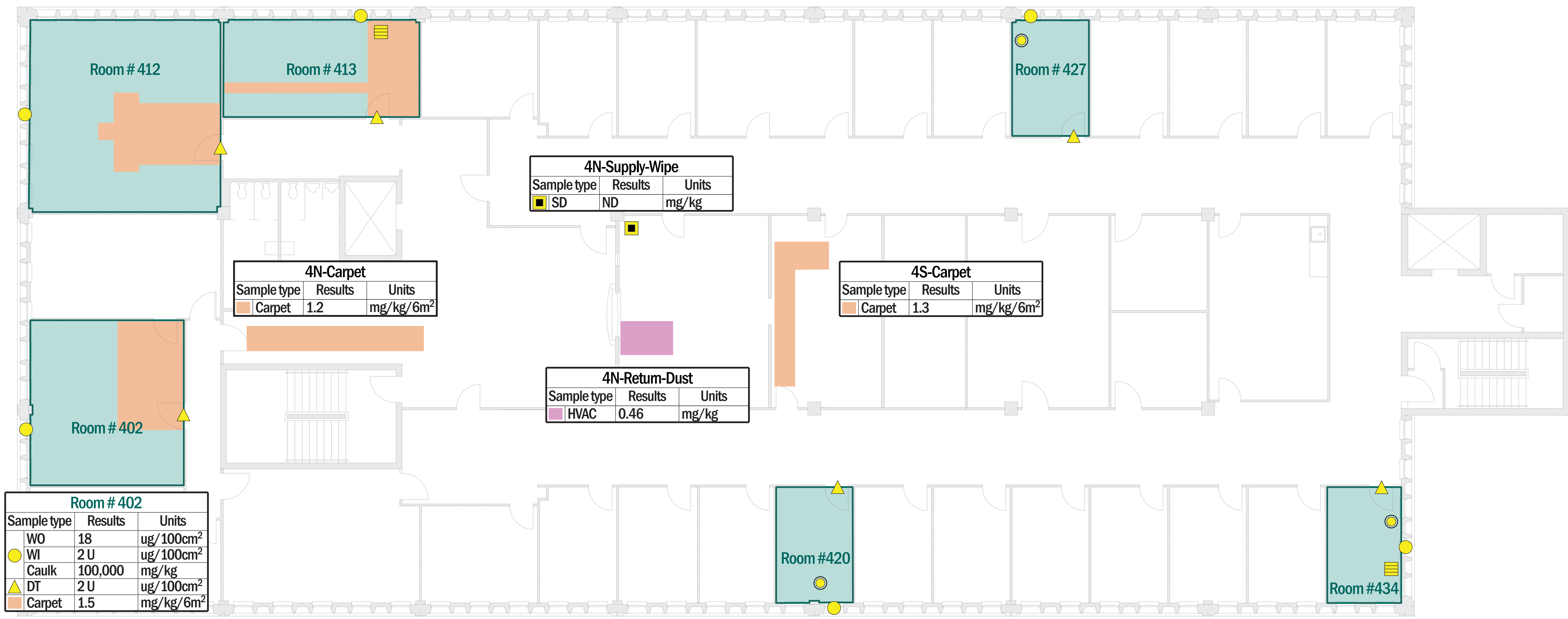
Figure 18.
Interior sample locations, Alder Tower 4th Floor, Youth Services Center, Seattle, Washington.



Room # 412

Sample type	Results	Units
WO	15	ug/100cm²
WI	2 U	ug/100cm²
Caulk	160,000	mg/kg
DT	2 U	ug/100cm²
Carpet	2.3	mg/kg/6m²

Room # 413

Sample type	Results	Units
WO	10	ug/100cm²
WI	2 U	ug/100cm²
Caulk	120,000	mg/kg
DT	2 U	ug/100cm²
FC	2 U	ug/100cm²
Carpet	3.6	mg/kg/6m²

Room # 427

Sample type	Results	Units
WO	10	ug/100cm²
WI	2 U	ug/100cm²
Caulk	120,000	mg/kg
DT	2 U	ug/100cm²
VF	2 U	ug/100cm²

4N-Supply-Wipe

Sample type	Results	Units
SD	ND	mg/kg

4N-Carpet

Sample type	Results	Units
Carpet	1.2	mg/kg/6m²

4S-Carpet

Sample type	Results	Units
Carpet	1.3	mg/kg/6m²

4N-Return-Dust

Sample type	Results	Units
HVAC	0.46	mg/kg

Room # 402

Sample type	Results	Units
WO	18	ug/100cm²
WI	2 U	ug/100cm²
Caulk	100,000	mg/kg
DT	2 U	ug/100cm²
Carpet	1.5	mg/kg/6m²

Room #420

Sample type	Results	Units
WO	6.4	ug/100cm²
WI	2 U	ug/100cm²
Caulk	120,000	mg/kg
DT	2 U	ug/100cm²
VF	2 U	ug/100cm²

Room #434

Sample type	Results	Units
WO	180	ug/100cm²
WI	2 U	ug/100cm²
Caulk	120,000	mg/kg
DT	2 U	ug/100cm²
VF	2 U	ug/100cm²
FC	2 U	ug/100cm²

Legend

- Wipe sample from window frame exterior (WO), Wipe sample from window sill interior (WI), Caulk sample
- Wipe sample from top of door frame (DT)
- Wipe sample from vinyl flooring (VF)
- Wipe sample from top of file cabinet (FC)
- Wipe sample from HVAC supply vent cover (SD)
- HVAC return sample area
- Carpet sample area
- Sampled room

N

Not to scale

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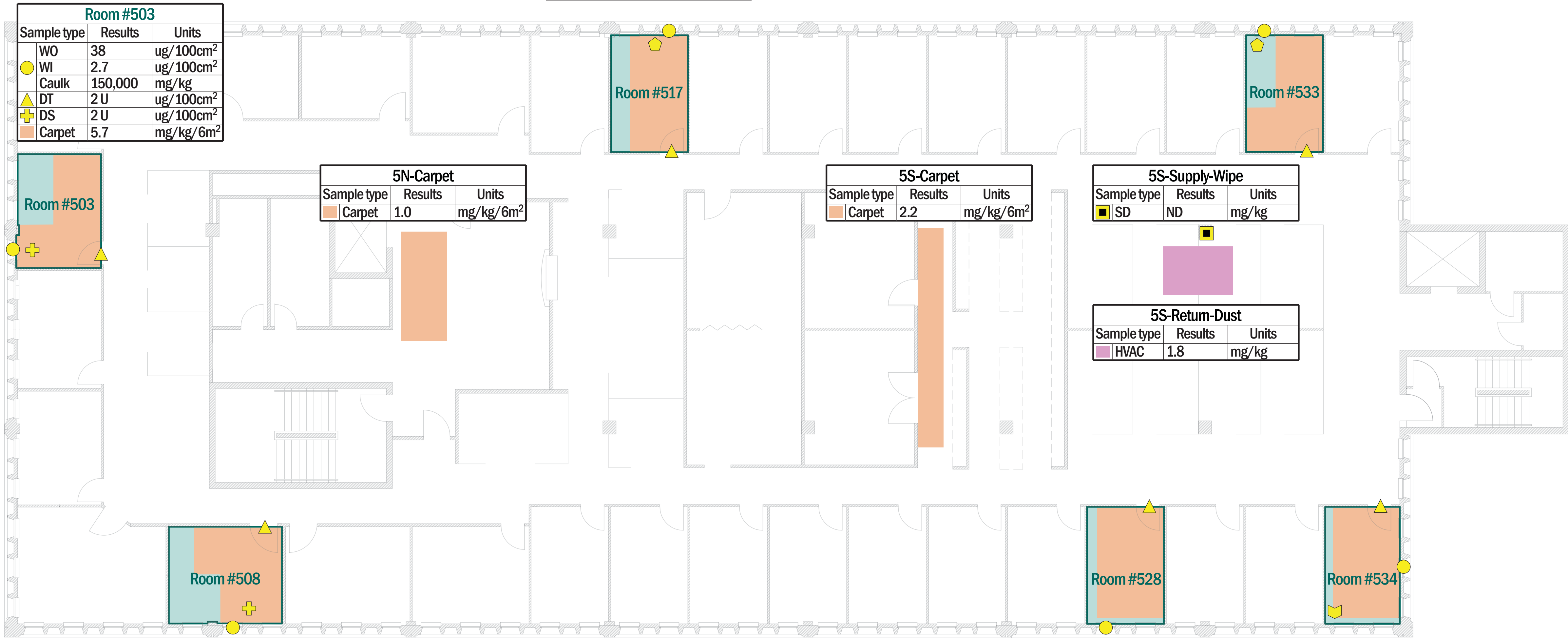
Figure 19.
Interior sample locations, Alder Tower 5th Floor, Youth Services Center, Seattle, Washington.



Room #517

Sample type	Results	Units
WO	8.8	ug/100cm^2
WI	2 U	ug/100cm^2
Caulk	96,000	mg/kg
DT	2 U	ug/100cm^2
RA	2 U	ug/100cm^2
Carpet	3.4	mg/kg/6m^2

Room #533

Sample type	Results	Units
WO	29	ug/100cm^2
WI	2 U	ug/100cm^2
Caulk	85,000	mg/kg
DT	2 U	ug/100cm^2
HT	2 U	ug/100cm^2
Carpet	4.3	mg/kg/6m^2

Room #503

Sample type	Results	Units
WO	38	ug/100cm^2
WI	2.7	ug/100cm^2
Caulk	150,000	mg/kg
DT	2 U	ug/100cm^2
DS	2 U	ug/100cm^2
Carpet	5.7	mg/kg/6m^2

5N-Carpet

Sample type	Results	Units
Carpet	1.0	mg/kg/6m^2

5S-Carpet

Sample type	Results	Units
Carpet	2.2	mg/kg/6m^2

5S-Supply-Wipe

Sample type	Results	Units
SD	ND	mg/kg

5S-Return-Dust

Sample type	Results	Units
HVAC	1.8	mg/kg

Room #508

Sample type	Results	Units
WO	17	ug/100cm^2
WI	2 U	ug/100cm^2
Caulk	110,000	mg/kg
DT	2 U	ug/100cm^2
DS	2 U	ug/100cm^2
Carpet	4.3	mg/kg/6m^2

Room #528

Sample type	Results	Units
WO	28	ug/100cm^2
WI	2 U	ug/100cm^2
Caulk	110,000	mg/kg
DT	2 U	ug/100cm^2
Carpet	3.4	mg/kg/6m^2

Room #534

Sample type	Results	Units
WO	77	ug/100cm^2
WI	2 U	ug/100cm^2
Caulk	120,000	mg/kg
DT	2 U	ug/100cm^2
FT	2 U	ug/100cm^2
Carpet	5.2	mg/kg/6m^2

Legend

- Wipe sample from window frame exterior (WO), Wipe sample from window sill interior (WI), Caulk sample
- Wipe sample from top of door frame (DT)
- Wipe sample from top of heater/radiator (HT/RA)
- Wipe sample from desk top surface (DS)
- Wipe sample from shelf in file tray (FT)
- Wipe sample from HVAC supply vent cover (SD)
- HVAC return sample area
- Carpet sample area
- Sampled room

N

Not to scale

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G:\Graphics\09-04193-002\Tower 5

Figure 20.
Interior sample locations, Alder Tower Basement, Youth Services Center, Seattle, Washington.

1-Muster-Carpet

Sample type	Results	Units
Carpet	0.44	$mg/kg/6m^2$

1-Muster-Wipe

Sample type	Results	Units
CT	2 U	$ug/100cm^2$

1-Hall-Carpet

Sample type	Results	Units
Carpet	0.43	$mg/kg/6m^2$

1SA-Wipe-VF

Sample type	Results	Units
VF	2 U	$ug/100cm^2$

1SB-Wipe-VF

Sample type	Results	Units
VF	2 U	$ug/100cm^2$

Legend

- Wipe sample from top of cabinet (CT)
- Wipe sample from vinyl flooring (VF)
- Carpet sample area

N

Not to scale

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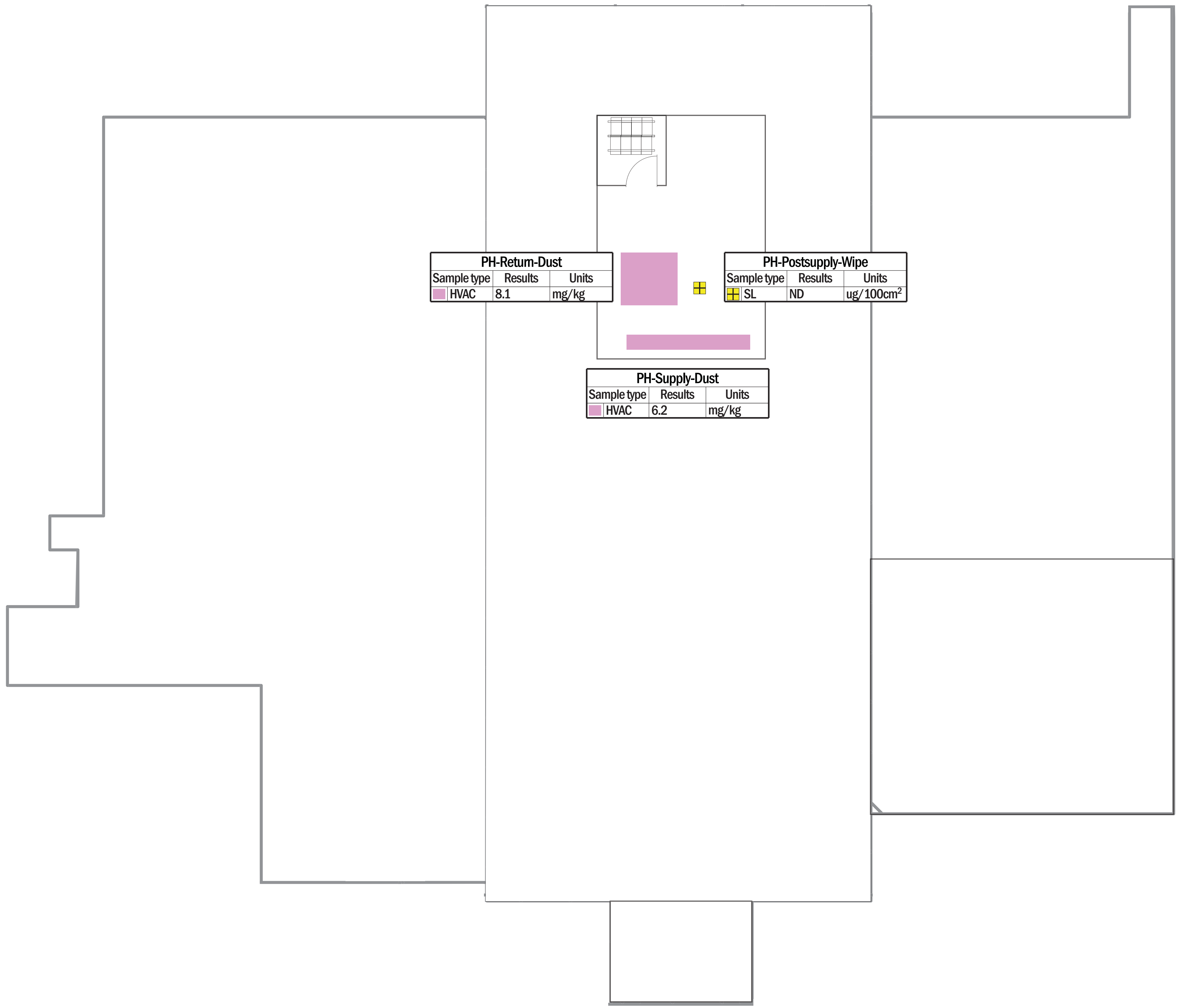
Figure 21.
Interior sample locations, Alder Tower Penthouse, Youth Services Center, Seattle, Washington.



Legend

Wipe sample from HVAC louver (SL)

HVAC return sample area

N

Not to scale

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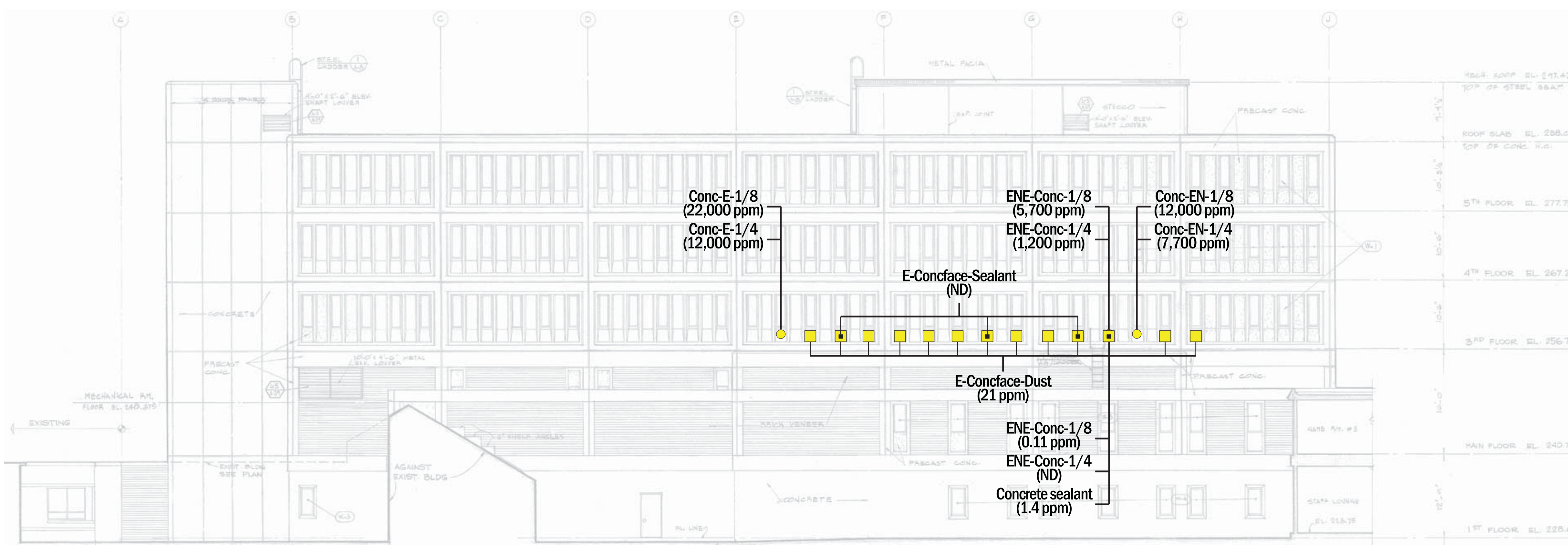
G:\Graphics\09-04193-002\Roof

Figure 22.
Exterior sample locations, east wall, Youth Services Center, Seattle, Washington.



Legend

- Exterior building dust sample (composite comprised of 12 aliquots)
- Concrete sealant sample (composite comrpised of 3 aliquots)
- Concrete sample

Not to scale

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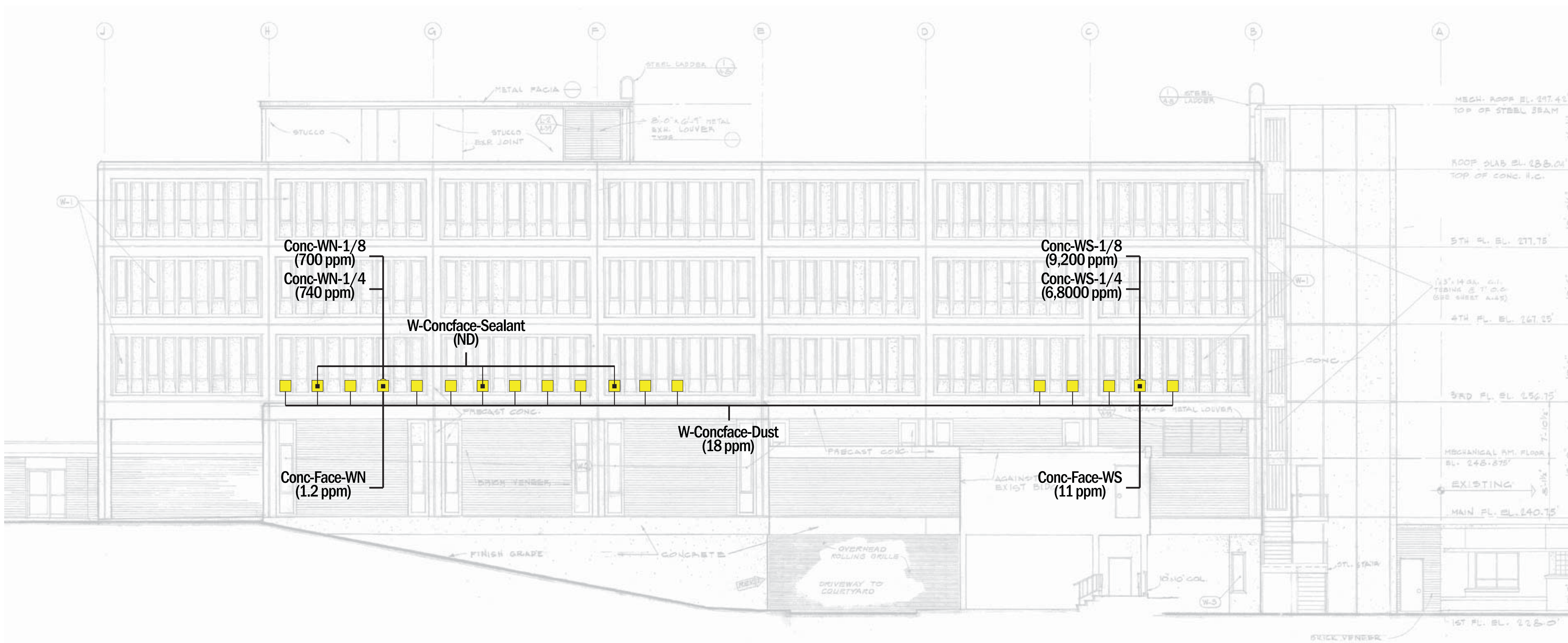
G:\Graphics\09-04193-002\Tower Exterior

Figure 23.
Exterior sample locations, west wall, Youth Services Center, Seattle, Washington.



Legend

- Exterior building dust sample (composite comprised of 16 aliquots)
- Concrete sealant sample (composite comrpised of 3 aliquots)
- Concrete sample

Not to scale

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G:\Graphics\09-04193-002\Tower Exterior

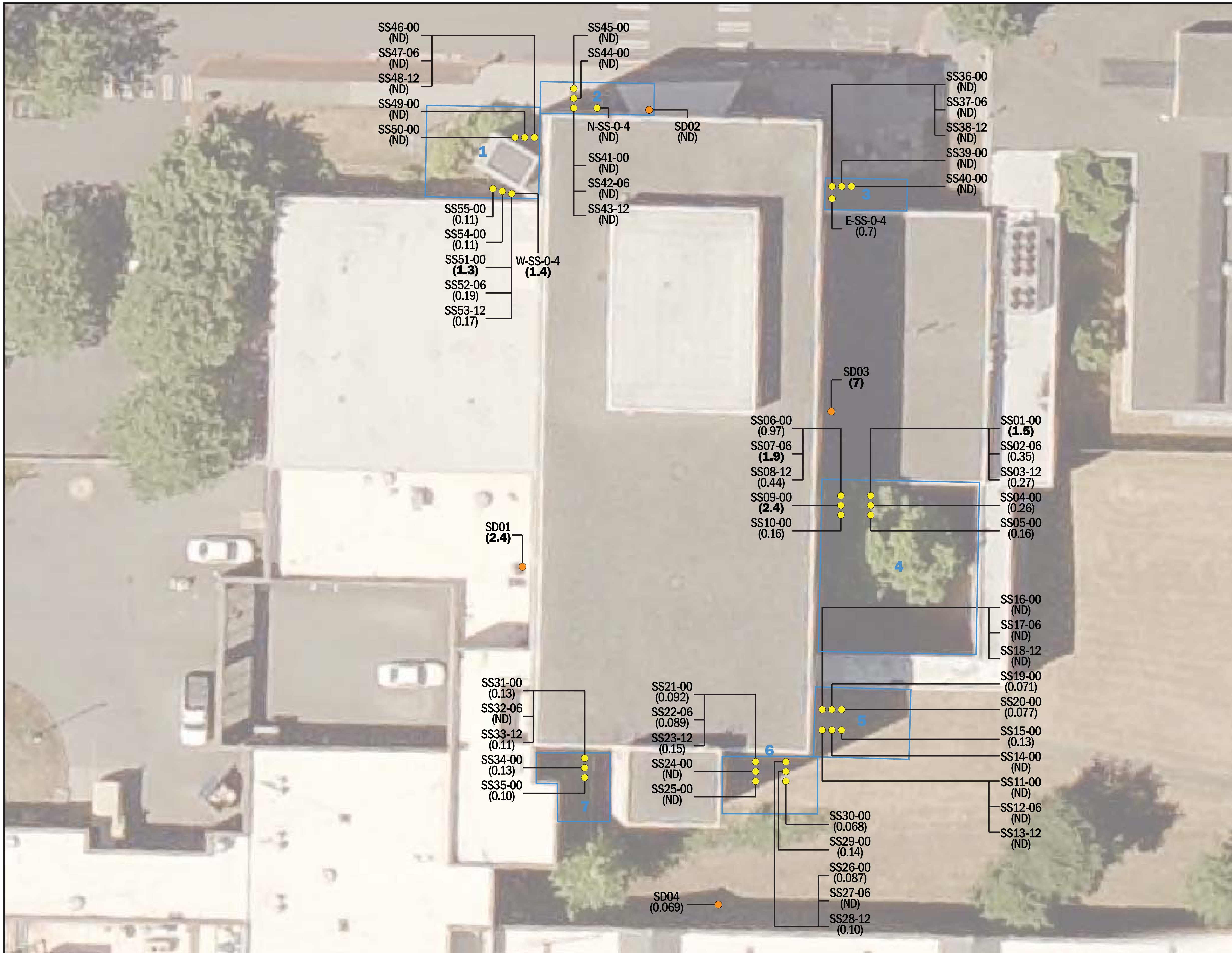

Figure 24.
Soil and drain solids sample locations, Youth Services Center, Seattle, Washington.

Legend

- Drain solids sample location
- Soil sample location
- (ND) PCBs were not detected above the reported sample quantitation limit range of 0.051 mg/kg - 0.083 mg/kg (milligrams per kilogram)
- (0.19) PCB concentrations detected in mg/kg. Bolded values indicate PCB concentrations above Model Toxics Control Act (MTCA) residential cleanup level of 1.0 mg/kg
- Sample area

Note: Complete sample IDs are shown in Table 3 include the sample area prefix - distance from the building dripline in feet - soil sample number - depth of sample in inches below ground surface.

N

0 12.5 25 50

Approximate scale in feet

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Aerial photograph: King County, 2007

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Figure 25. Stormdrain.

APPENDIX A

Concrete Sampling Protocol

OPPT-2004-0123-

November 2005

Polychlorinated Biphenyl (PCB) Site Revitalization Guidance Under the Toxic Substances Control Act (TSCA)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

This policy addresses cleanup and disposal requirements for polychlorinated biphenyls (PCBs) only. This document is intended to be used as an informal reference, and as such, is not a complete statement of all of the applicable PCB requirements. This document does not replace nor supplant the requirements of the Toxic Substances Control Act (TSCA) PCB regulations. Please refer to the regulations at 40 CFR Part 761 for specific regulatory and legal requirements.

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

This document was developed as a guide for complying with the Toxic Substances Control Act (TSCA) regulations for the cleanup and disposal of polychlorinated biphenyl (PCB) contamination. The purpose of the document is to provide assistance in navigating the TSCA PCB regulations in Title 40 of the Code of Federal Regulations at Part 761 (40 CFR Part 761).[1] The primary focus of this guidance is the *PCB Remediation Waste* provision at 40 CFR 761.61 which governs the management of PCB waste generated as the result of PCB spills and associated cleanup activities (e.g., contaminated environmental media, rags, debris). Additional PCB requirements that may apply also are mentioned.

This document may be useful to Brownfields grant recipients and other individuals involved in PCB cleanups under TSCA. The document discusses the factors that must be taken into consideration when determining appropriate cleanup levels (e.g., intended use and type of PCB waste). Prescriptive procedures on how to achieve the cleanup levels however are generally not addressed. The requirements for verifying that the cleanup standard has been met and for establishing deed restrictions (where necessary), and the options available for disposing of PCB wastes are discussed. In addition, other relevant TSCA PCB requirements, such as caps, waste storage, marking, manifesting, and recordkeeping requirements, are mentioned. All PCB concentrations are based on total PCBs, rather than individual PCB Aroclors.[2]

Examples are provided on how the "typical" and "worst case" PCB waste cleanup situations may be addressed. Additional examples in the form of a matrix on various PCB contamination and reuse scenarios and applicable TSCA PCB requirements are provided at the end of the document (see Table 7). Finally, the appendices offer guidance on sampling concrete in the field (Appendix A) and excerpts of relevant self-implementing provisions of the PCB regulations for the cleanup and disposal of PCB waste (Appendix B). Appendix A is not a substitute for Subpart O of Part 761 where the regulations require compliance with Subpart O. The cleanup and reuse of property previously contaminated with PCBs may vary widely and will be specific to each site. Therefore, this document is not intended to provide the answer to every question that could surface during the remediation of the site. The reader is encouraged to consult the statute, regulations and the Regional PCB Coordinator whenever questions concerning acceptable remediation practices arise.

This document does not replace or supplant the requirements of the TSCA PCB regulations. Use of this document does not establish a presumption against enforcement should violations of the cleanup and disposal requirements or the PCB use authorizations be discovered. Please refer to the regulations at 40 CFR Part 761 for specific regulatory and legal requirements. The entire text of the Code of Federal Regulations for 40 CFR Part 761 can be found on the U.S. Government Printing Office's website at www.gpo.gov, under "Legislative Resources" and on the PCB website at www.epa.gov/pcb under "Laws and Regulations." Additional assistance on the

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[1] Unless otherwise provided, the terms and abbreviations used herein have the meanings as defined in the PCB regulations at 40 CFR §761.3.

[2] See the definition of PCBs in 40 CFR §761.3 and "Response to Comments Document on the Proposed Rule – Disposal of PCBs; OPPTS Docket #66009A," May 1998, p. 11, Response #5.

TSCA PCB waste requirements is available from the Regional PCB Coordinators. The phone numbers and addresses for each Regional office are provided in this document (see Section VI), and a current listing of the Regional PCB Coordinators is available from the PCB website at www.epa.gov/pcb under "EPA Regional Contacts."

Polychlorinated Biphenyl (PCB) Site Revitalization Guidance Under the Toxic Substances Control Act (TSCA)

Introduction

This Polychlorinated Biphenyl (PCB) Site Revitalization Guidance (the Guidance) provides information on characterizing, cleaning up, containing, and disposing of PCB waste (e.g., soil and other debris generated as a result of any PCB spill cleanup). It has been developed as a guide to assist individuals engaging in PCB remediation efforts in complying with the Toxic Substances Control Act (TSCA) PCB regulations at 40 CFR Part 761. Individuals should contact the Regional PCB Coordinator for additional guidance on the regulatory requirements for site-specific situations or scenarios (see Section VI, pages 28-31).

Some cleanup sites may contain lead-based paint or asbestos which has been contaminated with other compounds such as PCBs, pesticides or mercury. In order to reduce exposure at these sites, it is generally recommended that a balance be struck between a manage-in-place strategy for lead-based paint and asbestos and the removal of other contaminants. Guidance and/or links to information for managing lead-based paints and asbestos contamination are available at EPA's websites at www.epa.gov/lead for lead, and www.epa.gov/asbestos for asbestos. In addition, several States have cleanup requirements that, in conjunction with the requirements addressed in 40 CFR Part 761, must be followed when undertaking a voluntary cleanup under a State response program. Therefore, individuals also are encouraged to consult with their State environmental officials regarding any additional State cleanup requirements.

PCB waste management at properties that have been contaminated with PCBs as a result of a spill, release or other unauthorized disposal requires compliance with the requirements for *PCB remediation waste* as specified in the TSCA PCB regulations at 40 CFR 761.50(b)(3) and 761.61. Refer to those regulations for specific regulatory and legal requirements regarding *PCB remediation waste*. An electronic version of the PCB regulations at 40 CFR Part 761 can be found on the PCB website at www.epa.gov/pcb under "Laws and Regulations." Many of the cleanup examples discussed in this Guidance are based on information regarding known federal Brownfields grant application scenarios available at the time of its development.

Background

Real property contaminated with PCBs may be sold or transferred by a current owner to another party. The transfer is not a release of any obligations of either the seller or the purchaser regarding proper handling, cleanup, or disposal of contaminated material. See August 14, 2003 Memo from Robert Fabricant and Susan Hazen to Barry Breen, John Peter Suarez and the Regional Administrators on the PCB website at www.epa.gov/pcb under "Interpretive Guidance," Policy Statements and Letters. The responsibility for the initial PCB contamination (e.g., spill or other release) resides with the person(s) who caused the contamination or who owned or operated the PCBs or PCB-containing equipment at the time of the contamination. However, after the property transfer, the new owner becomes responsible for controlling and mitigating any continuing and/or future releases of PCBs. In addition, because the use of contaminated portions of real property constitutes the use of PCBs on it, such use is prohibited under section 6(e)(2)(A) of TSCA, unless the owner of the property contaminated with PCBs complies with all applicable use authorizations. In general, this means that the owner must first clean up the property or decontaminate it before it can be used (see 40 CFR §761.30(u)). As previously mentioned, the individual who caused the PCB contamination, which may or may not be the seller of the property, can generally be held liable for violations of the PCB disposal requirements.

I. Overview of TSCA's Waste Management Approach for PCB Wastes

This Guidance was developed by EPA to assist individuals who are planning or are engaged in PCB remediation activities (e.g., the redevelopment of a Brownfields site with PCB contamination), as well as State officials who are implementing state response programs, in complying with the PCB waste management requirements promulgated under the TSCA PCB regulations.

This Guidance describes the TSCA cleanup and disposal requirements for *PCB remediation waste* as specified under 40 CFR §761.61. Section 761.61 provides several options for cleaning up and disposing of PCB remediation wastes: 40 CFR §761.61(a) establishes requirements for self-implementing cleanups and disposal; 40 CFR §761.61(b) establishes requirements for performance-based disposal; and 40 CFR §761.61(c) establishes a procedure for applying for a risk-based cleanup or disposal approval where an individual wishes to conduct PCB cleanup or disposal in a manner other than prescribed in either 40 CFR §761.61(a) or (b). This guidance is primarily intended to assist individuals in complying with the self-implementing requirements in 40 CFR §761.61(a).

This Guidance also provides information on an activity that has been found to be acceptable to the Agency when PCB cleanup and related activities were conducted in a manner other than prescribed at 40 CFR §761.61(a) or (b); i.e., a risk-based disposal approval for the sampling, cleanup or disposal of PCB remediation waste (see 40 CFR §761.61(c)). Section 761.61(c) requires individuals to submit to the Regional Administrator an application which provides a risk-based demonstration that other procedures or cleanup standards will result in a commensurate level of protection for human health and the environment. In the example at Section III.A. of this guidance, the contaminated site was to be used for industrial purposes after the cleanup. In this particular industrial use scenario, the Agency determined that the proposed sampling procedures, cleanup standards, and engineering and institutional controls were sufficient to protect against an unreasonable risk of injury to health or the environment. EPA expects that these sampling procedures, cleanup standards, and engineering and institutional controls would likely be appropriate for other sites presenting comparable exposure scenarios, although each risk-based application will be evaluated on its merits and approved or disapproved on a site-specific basis.

Waste materials contaminated with PCBs as the result of a spill, an intentional or accidental release or uncontrolled discharges of PCBs, or other unauthorized disposal of PCBs are called *PCB remediation waste*. There are four types of *PCB remediation waste*: *bulk PCB remediation waste*, *porous surfaces*, *non-porous surfaces*, and *liquid PCBs*. Cleanup levels for an area contaminated with PCBs depend upon the degree of exposure to an area with residual contamination. Exposure is measured by the amount of time that people will be spending in the area, and the type of PCB contamination that will remain in place after remediation. The length of occupancy (or how long a person is expected to be exposed to an area of contamination) is generally dependent upon the intended use of the area. Areas that are in continuous or semi-continuous use, such as residences or schools, are generally classified as "high occupancy areas." Under the self-implementing provisions of Section 761.61(a), areas that are used to a limited extent, such as an electrical substation, are considered to be "low occupancy areas." These terms are defined in 40 CFR 761.3 and discussed in Section II.

To further illustrate how these factors relate, this Guidance provides: 1) examples to illustrate how these variables are applied; and 2) a matrix that provides cleanup levels by waste type and occupancy level (see Table 2, p. 22).

II. What are the Appropriate Cleanup Levels for Self-Implementing Cleanups?

The extent of cleanup required for a property contaminated with PCBs will depend primarily upon two factors: 1) the use of the property (characterized by the length of occupancy); and 2) the type of waste material that is contaminated with the PCBs. The self-implementing procedures may not be used to clean up: surface or ground waters, sediments in marine and fresh water ecosystems, sewers or sewage treatment systems, any private or public drinking water sources or distribution systems, grazing lands, and vegetable gardens (see 40 CFR §761.61(a)(1)(i)). As described below, the required cleanup level for self-implementing cleanups is determined by the type of occupancy after the cleanup is completed. All PCB concentrations are based on total PCBs, rather than individual PCB Aroclors. Within each occupancy group, cleanup levels are supplied for the different types of waste materials. The intended reuse scenarios for a facility or property may result in a cleanup which utilizes a combination of cleanup standards (e.g., high occupancy and/or low occupancy area), depending on whether certain conditions are met (e.g., access is limited in duration; entry is secured, for example, by a key or combination lock). Therefore, consultation with the Regional PCB Coordinator is encouraged. Post-cleanup sampling is also required; sampling requirements are discussed in paragraph D of this Section. The process for determining the applicable PCB cleanup level can generally be broken down into three basic steps:

- Step 1 – How will the contaminated property be used?
- Step 2 – What is the type of waste material that is contaminated with PCBs?
- Step 3 – What are the appropriate cleanup levels?

Step 1: <u>How will the contaminated property be used?</u>

The new use of a property is classified as a high or low occupancy area under the self-implementing cleanup provisions of 40 CFR §761.61(a). The requirements for both the high occupancy and low occupancy area can be found at 40 CFR §761.61(a).

> **High occupancy area** is generally defined as any area where *PCB remediation waste* has been disposed of on site (including but not limited to any building, any floor/wall of the building, any enclosed space within the building), and where annual occupancy for any individual not wearing dermal and respiratory protection is 840 hours or more (an average of 16.8 hours or more per week) for non-porous surfaces and 335 hours or more (an average of 6.7 hours or more per week) for *bulk PCB remediation waste*. Examples include a residence,

school, day care center, sleeping quarters, a single or multiple occupancy 40 hours-per-week work station, a school classroom, a cafeteria in an industrial facility, a control room, and a work station at an assembly line.

Low occupancy area is generally defined as any area where *PCB remediation waste* has been disposed of on site (including but not limited to any building, any floor/wall of the building, any enclosed space within the building), and where annual occupancy for any individual not wearing dermal and respiratory protection is less than 840 hours (an average of 16.8 hours per week) for non-porous surfaces and less than 335 hours (an average of 6.7 hours per week) for *bulk PCB remediation waste.* Examples include an electrical substation or a location in an industrial facility where a worker spends small amounts of time per week (such as an unoccupied area outside a building, an electrical equipment vault, or in the non-office space in a warehouse where occupancy is transitory).

Step 2: What is the type of waste material that is contaminated with PCBs?

Waste materials contaminated with PCBs as the result of a spill, an intentional or accidental release or uncontrolled discharges of PCBs, or other unauthorized disposal of PCBs are called *PCB remediation waste. PCB remediation waste* is managed at its "as-found" PCB concentration and includes, but is not limited to: soil, rags, and other debris generated during a cleanup; environmental media containing PCBs, such as soil and gravel; buildings and other man-made structures contaminated with PCBs; and *porous* and *non-porous surfaces* upon which PCBs were spilled or released (see the definition at 40 CFR §761.3). *PCB remediation waste* sampling should be based on in-situ characterization data (i.e., "as found" per 40 CFR §761.61) rather than post-excavation or demolition composite samples collected from waste piles and roll-off containers.

The four classes of *PCB remediation waste* commonly found at PCB remediation sites include:

- **bulk PCB remediation waste** including, but not limited to, existing piles of soil, in-situ soil, sediments, dredged materials, muds, PCB sewage sludge, and industrial sludge;

- **porous surfaces** including, but not limited to, **non-coated (e.g., unpainted) or coated** structural surfaces such as floors, walls, and ceilings made of concrete, brick, wood, plaster, plasterboard, etc., that have been subsequently contaminated by spills from PCB liquids. Porous surfaces also include paints or coatings that have been applied to a non-porous surface such as metal.

- **non-porous surfaces** including smooth unpainted solid surfaces that limit penetration of liquid containing PCBs beyond the immediate surface (e.g., smooth uncorroded metal, natural gas pipe with a thin porous coating originally applied to inhibit corrosion, smooth glass, smooth glazed ceramics, impermeable polished building stone such as marble or granite, and high density plastics such as polycarbonates and melamines that do not absorb organic solvents).

- **liquid PCBs**, a homogenous flowable material containing PCBs and no more than 0.5 percent by weight non-dissolved material.

The PCB regulations also contain a provision for the disposal of *PCB bulk product wastes*; i.e., wastes derived from manufactured products containing PCBs in a non-liquid state (see the definition for *PCB bulk product waste* at 40 CFR §761.3). Materials such as debris from the demolition of buildings and other man-made structures manufactured, coated, or serviced with PCBs may be found at sites contaminated with PCBs and are subject to the TSCA PCB disposal requirements at 40 CFR §761.62.

Step 3: <u>What are the appropriate clean-up levels?</u>

The information developed in steps 1 and 2 is used to determine the cleanup levels for *PCB remediation waste* for the two categories of intended use (e.g., high occupancy and low occupancy areas). The required cleanup levels are described in detail in paragraphs A through C of this section; paragraph D provides information on post-cleanup sampling and deed restriction requirements.

<u>IMPORTANT NOTE:</u> For PCB waste management involving porous structural surfaces, such as floors, walls, or ceilings made of concrete, brick, wood, plaster, plasterboard, etc., "clean" is defined by a bulk PCB concentration, e.g., weight/weight or volume/volume, such as a core sample, and not a surface PCB concentration, such as a wipe sample. In characterizing the property, established EPA sampling procedures or guidance such as 40 CFR 761, Subpart N (40 CFR §761.260 et al.), or CERCLA site characterization guidance should be used to determine the appropriate number and location of samples. The attached Appendix A contains a core sampling procedure developed by EPA Region 1 that may be appropriate for use in conjunction with Subpart N to determine the extent of the contamination in concrete. Other reliable and effective methods for collecting a core sample also may be used. *PCB remediation waste* verification sampling must be based on in-situ characterization data (i.e., "as found" per 40 CFR §761.61) rather than post-excavation or demolition composite samples collected from waste piles and roll-off containers. (63 FR 35409, June 29, 1998.) For guidance on sampling and disposing of existing piles or containers, see 40 CFR Part 761, Subpart R, or contact the Regional PCB Coordinator. The discussion of cleanup levels below is based on in-situ sampling.

A. PCB Cleanup Levels for High Occupancy Areas

For PCB waste management involving *bulk PCB remediation waste*, *porous surfaces* and *non-porous surfaces* in **high occupancy areas,** the PCB cleanup levels listed below apply. When a cleanup activity includes the use of a cap, the owner of the site must maintain the cap in perpetuity and an institutional control, such as a deed restriction, must be implemented. The deed restriction requirements at 40 CFR §761.61(a)(8) include a notation in perpetuity so that potential purchasers receive a disclosure about: the PCB waste that was disposed of on site, the use restrictions that apply to all future owners, the PCB cleanup levels under the cap, and the owner's obligation to maintain the cap.

Bulk Remediation Waste & Porous Surfaces

- **Less than or equal to 1 part per million (≤1 ppm) PCBs** in the soils, other residual waste or porous surfaces, without further conditions (see 40 CFR §761.61(a)(4)(i)(A)). To verify the completion of cleanup and on-site disposal of *bulk PCB remediation wastes* and porous surfaces, follow the procedures in Subpart O of 40 CFR 761, or a risk-based sampling plan that has been approved by EPA pursuant to 40 CFR §761.61(c).

- **Greater than 1 ppm but less than or equal to 10 ppm (>1 to ≤10 ppm)** if the area is covered with an appropriate cap (see 40 CFR §761.61(a)(4)(i)(A)) as specified at 40 CFR §761.61(a)(7); i.e., when referring to on-site cleanup and disposal of *PCB remediation waste*, a cap means a uniform placement of concrete, asphalt, or similar material of minimum thickness spread over the area where remediation waste was removed or left in place in order to prevent or minimize human exposure, infiltration of water, and erosion. (See the specific requirements at 40 CFR 761.61(a)(7).) To verify the completion of cleanup and on-site disposal of *bulk PCB remediation wastes* and *porous surfaces*, use Subpart O at 40 CFR 761, or a risk-based sampling plan that has been approved by EPA pursuant to 40 CFR §761.61(c).

- **Porous surfaces contaminated by an old spill**[3] of liquid PCBs where the concentration of PCBs in the spill was ≥50 ppm and where the surface concentration of PCBs on the **porous surface is currently greater than**

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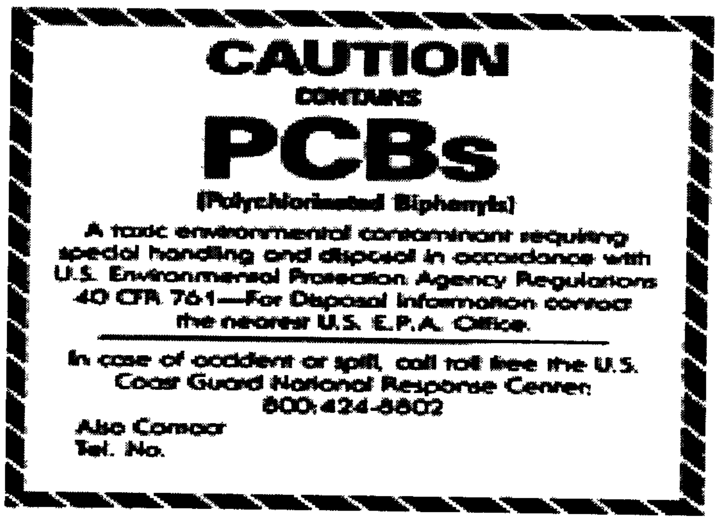
[3] Section 6(e)(2)(A) of the Toxic Substances Control Act (TSCA) banned the use of PCBs after January 1, 1978, unless the PCBs are used in a totally enclosed manner or the use is authorized by rule. In 1998, EPA amended the PCB regulations, in part by authorizing continued use of porous surfaces contaminated by old spills of liquid PCBs (see 40 CFR §761.30(p)). As promulgated, the use authorization for porous surfaces contained a technical error which EPA sought to correct in a subsequent final rule promulgated without notice and comment on June 24, 1999 (see 64 FR 33755). The technical amendment was challenged and set aside in Utility Solid Waste Activities Group v. EPA, 236 F.3d 749 (D.C. Cir. 2001) (USWAG). EPA interprets the authorization as originally promulgated such that individuals who comply with the conditions of the authorization may continue to use porous surfaces that have been contaminated by old spills of liquid PCBs where the concentration of PCBs in the liquid was ≥50 ppm and where the surface concentration of PCBs on the porous surface is currently >10μg/100 cm². Porous surfaces contaminated by old spills of liquid PCBs where the concentration of PCBs in the liquid was ≥50 ppm and where the surface concentration of PCBs on the porous surface is currently ≤10μg/100 cm² are implicitly authorized for use under 40 CFR §761.30(p) without further conditions.

10 micrograms per 100 square centimeters (>10 μg/100 cm²) may continue in their original use or location provided: (1) the source of contamination has been removed; (2) accessible porous surfaces have been cleaned and completely covered with two solvent resistant and water repellent coatings of contrasting colors, or a solid barrier has been fastened to the surface to cover the contaminated area or all accessible parts of the contaminated area; and (3) the PCB M_L mark (see Figure 1) has been placed in a location where it is visible (see 40 CFR §761.30(p)). Post-verification sampling is not required. Porous surfaces contaminated by old spills of liquid PCBs where the concentration of PCBs in the liquid was ≥50 ppm and where the surface concentration of PCBs on the **porous surface is currently ≤10μg/100 cm²**, are authorized for use under 40 CFR §761.30(p) without further conditions. Although such surfaces may be used without complying with the conditions in §761.30(p), the prohibition on use of contaminated porous surfaces applies if the surface at any time measures >10μg/100 cm², even if it previously measured ≤10μg/100 cm². Therefore, efforts should be initiated on a site-specific, as needed basis to ensure that the PCB contamination of the porous surface remains at levels ≤10μg/100 cm².

If the PCB containing equipment is removed and the subsequent use of the contaminated surface is to change, for example, a former transformer vault is intended to be reused as office space, then all contaminated porous surfaces must be cleaned to ≤1 ppm or a standard meeting the requirements of a §761.61(a) approval.

Figure 1: PCB M_L Mark



Non-Porous Surfaces

- **Less than or equal to 10 micrograms per 100 square centimeters ($\leq$10 µg/100 cm^2)**, without further conditions (see 40 CFR §761.61(a)(4)(ii)). Use one of the decontamination procedures listed at 40 CFR §761.79(b) to remove or separate PCBs from non-porous surfaces (e.g., chopping, scraping, scarification or the use of abrasives or solvents) or another appropriate procedure as specified in §761.61(a)(5)(ii). Sampling locations must be selected in accordance with 40 CFR Part 761, Subpart P for non-porous surfaces, or a risk-based sampling plan that has been approved by EPA pursuant to 40 CFR §761.61(c). (40 CFR §761.61(a)(4)(ii)).

Example 1: Renovation of an Old Warehouse to Artists Studios – Use of the Self-Implementing Provision at 40 CFR §761.61(a)

An old warehouse constructed of concrete walls and floors is being renovated and will be subdivided into artists studios. The new owners also plan to install a child-care facility for the children of the artists. The concrete floor which is contaminated with PCBs must be cleaned up in compliance with the appropriate cleanup standard prior to use. What clean-up level is required?

Answer: The converted warehouse will be used as a *high occupancy area*, i.e., the artists and/or children will be occupying the building for 6.7 hours per week or more. The flooring is a *porous surface*, therefore, the standard applicable for *bulk PCB remediation waste* applies. The concrete floor must be removed, at least in part, and replaced if it cannot be decontaminated to required levels (i.e., cleaned up to $\leq$1 ppm PCBs). The material contaminated with PCBs must be disposed of as *PCB remediation waste*. Disposal options for non-liquid cleanup wastes at any concentration (e.g., cleaning materials, personal protective equipment, non-porous surfaces, etc.) and *bulk PCB remediation wastes* including *porous surfaces* at <50 ppm include: an approved PCB disposal facility, a permitted municipal solid waste or non-municipal non-hazardous waste facility pursuant to §761.61(a) or (c), or a RCRA Sec. 3004 or 3006 permitted hazardous waste landfill (40 CFR §§761.61(a)(5)(i)(B)(2)(ii) and 761.61(a)(5)(v)(A)). Disposal of $\geq$50 ppm *PCB remediation waste* is limited to an approved PCB disposal facility or a RCRA Sec. 3004 or 3006 permitted hazardous waste landfill (40 CFR §761.61(a)(5)(i)(B)(2)(iii)); also see Section IV. A different combination of cleanup, engineering and institutional controls can be approved and implemented under 40 CFR §761.61(c). For more specific guidance, contact the Regional PCB Coordinator.

B. PCB Cleanup Levels for Low Occupancy Areas

For PCB waste management involving *bulk PCB remediation waste*, *porous surfaces* and *non-porous surfaces* in **low occupancy areas**, the PCB cleanup levels listed below apply. Also, when the procedures and requirements for a low occupancy area are used (e.g., a fence or cap is used), an institutional control such as a deed restriction must be implemented. The deed restriction requirements include a notation in perpetuity so that potential purchasers receive a disclosure about: the PCB waste that was disposed of on site, the use restrictions that apply to all future owners, the PCB cleanup levels inside the fence or under the cap, and the owner's obligation to maintain the fence/cap. (See 40 CFR §761.61(a)(8) for the specific requirements.)

Bulk Remediation Waste & Porous Surfaces

- **Less than or equal to 25 ppm (≤25 ppm)** in the soils, other residual waste or porous surfaces (see 40 CFR §761.61(a)(4)(i)(B)), and an institutional control (i.e., deed restriction; see 40 CFR §761.61(a)(8)). To verify the completion of cleanup and on-site disposal of *bulk PCB remediation wastes* and *porous surfaces*, use Subpart O at 40 CFR 761, or a risk-based sampling plan that has been approved by EPA pursuant to 40 CFR §761.61(c).

- **Greater than 25 ppm, but less than or equal to 50 ppm (>25 ppm to ≤50 ppm)** in the soils, other residual waste or porous surfaces (see 40 CFR §761.61(a)(4)(i)(B)) provided the site is secured by a fence, marked with a sign that includes the PCB M_L mark (see Figure 1, p. 7) and an institutional control (i.e., deed restriction; see 40 CFR 761.61(a)(8)) is implemented. To verify the completion of cleanup and on-site disposal of *bulk PCB remediation wastes* and *porous surfaces*, use Subpart O at 40 CFR 761, or a risk-based sampling plan that has been approved by EPA pursuant to 40 CFR §761.61(c).

- **Greater than 25 ppm, but less than or equal to 100 ppm (>25 ppm to ≤100 ppm)** provided the site is covered with an appropriate cap (i.e., a uniform placement of concrete, asphalt, or similar material of minimum thickness spread over the area where *PCB remediation waste* was removed or left in place in order to prevent or minimize human exposure, infiltration of water, and erosion) and an institutional control (i.e., deed restriction) is implemented. (See specific requirements at 40 CFR §§761.61(a)(4)(i)(B) and 761.61(a)(7) and (a)(8).) To verify the completion of cleanup and on-site disposal of *bulk PCB remediation wastes* and *porous surfaces*, use Subpart O at 40 CFR 761, or a risk-based sampling plan that has been approved by EPA pursuant to 40 CFR §761.61(c).

- **Porous surfaces contaminated by an old spill** of liquid PCBs where the concentration of PCBs in the spill was ≥50 ppm and where the surface concentration of PCBs on the **porous surface is currently greater than 10 micrograms per 100 square centimeters (>10 μg/100 cm²)** may continue in their original use or location provided: (1) the source of contamination has been removed; (2) accessible porous surfaces have been cleaned and completely covered with two solvent resistant and water repellent coatings of contrasting colors, or a solid barrier has been fastened to the surface to cover the contaminated area or all accessible parts of the contaminated area; and (3) the PCB M_L mark (see Figure 1) has been placed in a location where it is visible (see 40 CFR §761.30(p)). Post-verification sampling is not required.

  Porous surfaces contaminated by old spills of liquid PCBs where the concentration of PCBs in the liquid was ≥50 ppm and where the surface concentration of PCBs on the **porous surface is currently less than or equal to 10 micrograms per 100 square centimeters (≤10μg/100 cm²)**, are authorized for use under 40 CFR §761.30(p) without further conditions. Although such surfaces may be used without complying with the conditions in §761.30(p), the prohibition on use of contaminated porous surfaces applies if the surface at any time measures >10μg/100 cm², even if it previously measured ≤10μg/100 cm². Therefore, precaution should be taken to ensure that the PCB contamination of the porous surface remains at levels ≤10μg/100 cm². (See Footnote #3 on page 6.)

  If the PCB containing equipment is removed and the subsequent use of the contaminated surface is to change, for example, a former transformer vault is intended to be reused as office space, then all contaminated porous surfaces must be cleaned to ≤1 ppm or a standard meeting the requirements of a §761.61 approval.

Non-Porous Surfaces

- **Less than 100 μg/100 cm² (<100 μg/100 cm²)** and an institutional control must be implemented (see 40 CFR §§761.61(a)(4)(ii) and 761.61(a)(8)). Use one of the decontamination procedures listed at 40 CFR §761.79(b) to remove or separate PCBs from *non-porous surfaces* (e.g., chopping, scraping, scarification or the use of abrasives or solvents). Sampling locations should be selected in accordance with 40 CFR Part 761, Subpart P or a risk-based sampling plan that has been approved by EPA pursuant to 40 CFR §761.61(c).

Example 2: Conversion of an Abandoned Building to Condominiums – Use of the Self-Implementing Provision at 40 CFR §761.61(a)

An abandoned building containing walls and floors contaminated with PCBs will be converted into condominiums. The basement will be used for storage only and thus will only be accessed by the tenants occasionally. What are the clean-up requirements for the building? Does the fact that the basement will be used much less than the remainder of the building factor into the requirements?

Answer: Ideally, the entire building would be cleaned up as a *high occupancy area* (i.e., all PCB contamination in/on the walls and floors would be decontaminated to ≤1 ppm or the walls/floors would be removed and replaced – see Example 1). However, the basement may be cleaned up as a *low occupancy area* (i.e., a lower standard) provided individual access is restricted to occupying the basement for less than 6.7 hours per week. Consultation with the Regional PCB Coordinator is advisable to ensure all issues regarding potential exposure pathways have been addressed.

C. *Cleanup Levels for Liquid PCBs*

Liquid PCB wastes not in compliance with the decontamination levels below must be disposed of in an approved incinerator in accordance with 40 CFR §761.60(a) or by an alternative disposal technology in accordance with 40 CFR §761.60(e). In both high and low occupancy areas, the decontamination standards (e.g., cleanup levels) for liquid PCBs at 40 CFR §761.61(a)(4)(iv) are as follows:

(a) For water containing PCBs: (i) **less than 200 micrograms per liter (<200 µg/L, or approximately<200 ppb PCBs) for non-contact use in a closed system** where there are no releases; (ii) for water **discharged to a treatment works or to navigable waters, less than 3 µg/L (<3 µg/L, or approximately 3 ppb)** or a PCB discharge limit included in a permit issued under Sec. 307(b) or 402 of the Clean Water Act; or (iii) **less than or equal to 0.5 µg/L (approximately ≤0.5 ppb PCBs) for unrestricted use**. (See 40 CFR §761.79(b)(1).)

(b) The decontamination standard for **organic liquids and non-aqueous inorganic liquids containing PCBs is less than 2 milligrams per kilogram (<2 ppm PCBs)**. (See 40 CFR §761.79(b)(2).)

Liquid samples may consist of a single liquid phase, multi-phasic liquids, or a combination of liquid and non-liquid material. The sampling requirements at 40 CFR §761.269 and the extraction and analytical procedures provided at 40 CFR §761.272 may be used to sample liquid PCB remediation wastes. (40 CFR §761.61(a)(2) and Subpart N.) When separating liquid and non-liquid phases of waste, you may sample the non-liquid phase in accordance with 40 CFR §761.265. (40 CFR §761.61(a)(2) and Subpart N.) Decontamination waste and residues are required to be disposed of at their existing PCB concentration, unless otherwise specified (see 40 CFR §761.79(g)).

D. Post-cleanup Sampling and Deed Restriction Requirements

The following post-cleanup sampling procedures and deed restriction requirements also apply for PCB waste management activities addressed under Sections A through C above (for a summary of these requirements, see Table 1, p. 14).

(1) Sampling and Analysis.

Post-cleanup sampling and analysis to verify cleanup must be conducted in accordance with the applicable **Cleanup Verification** requirements at 40 CFR §761.61(a)(6) and 40 CFR Part 761, Subpart O for bulk remediation waste and porous materials, and 40 CFR §761.61(a)(6) and 40 CFR Part 761, Subpart P for non-porous materials. Contact the Regional PCB Coordinator for guidance regarding a risk-based approval (see 40 CFR §761.61(c)) to use Appendix A or some other appropriate sampling procedure in conjunction with, or in lieu of, Subpart O for determining sample size and sample collection procedures for concrete and other similar porous surfaces.

To Sample and Analyze PCB Waste Use:

- 40 CFR §761.61(a)(2) and Subpart N: to adequately characterize the site; also, the Appendix A sampling procedures for concrete (or other reliable and effective methods) may be appropriate for use to determine the appropriate number and location of samples;
- 40 CFR §761.61(a)(6) and Subpart O: to verify cleanup and on-site disposal of *bulk PCB remediation wastes* and *porous surfaces*;
- 40 CFR §761.61(a)(6) and §761.269: to sample *liquid PCB* remediation wastes for verification of cleanup, and when separating liquid and non-liquid phases of a waste, sample the non-liquid phase in accordance with 40 CFR §761.265; and
- 40 CFR §761.61(a)(6) and Subpart P: to sample, analyze and interpret results of *non-porous surfaces*.

(2) Deed Restriction Requirements.

The **deed restriction requirements** at 40 CFR §761.61(a)(8) must be implemented for any site where PCBs remain at concentrations above the specified high occupancy "walk-away" level of ≤ 1 ppm for bulk remediation waste and porous surfaces, and ≤ 10 μg/100 cm^2 for non-porous surfaces. Deed restriction requirements for cleanups that result in the installation of a cap or fence, and cleanups following the procedures and requirements for low occupancy areas include a notation in perpetuity so that potential purchasers receive a disclosure about: the PCB waste that has been disposed of on site, the use restrictions that apply to all future owners, the PCB cleanup levels inside the fence or under the cap, and the owner's obligation to maintain the fence or cap. (See 40 CFR §761.61(a)(8) for the specific requirements.) Deed restrictions may also apply to the reuse of properties cleaned up according to a risk-based disposal approval. Such restrictions may require, among other things, a disclosure in perpetuity that PCB waste has been disposed of on site, that all future owners must maintain the protective coating or barrier when one is required, and that the use of the property is limited to a particular use, e.g., industrial use only.

Required PCB Institutional Control

The only institutional control that is required under the PCB regulations is a deed restriction. A deed restriction is essentially a permanent notice executed in accordance with state law and recorded on the deed or some other instrument normally examined during a title search which indicates contained contamination remains at the site. Deed restrictions are required for any PCB cleanup in an area that is designated as a low occupancy area, and in high occupancy areas whenever a cap is installed. (See 40 CFR §761.61(a)(8)). The Agency has also approved the use of deed restrictions for site-specific, risk-based approvals where cleanup activities were conducted to establish the property as an industrial area. The deed notation was required to include language that limits the future use of the property to industrial use only (i.e., no children under the age of six may have access to the property).

Table 1. Post-Cleanup Sampling Procedures and Deed Restriction Requirements

Cleanup Action	Applicable Regulations/ Specific Requirements
(A) **Bulk PCB remediation waste cleanup requirements**	Cleanup Verification: 40 CFR §761.61 (a)(6) & Subpart O, or a risk-based sampling plan that has been approved by EPA pursuant to 40 CFR §761.61(c).
Porous surface cleanup requirements	Cleanup Verification: 40 CFR §761.61(a)(6) & Subpart O, or a risk-based sampling plan that has been approved by EPA pursuant to 40 CFR §761.61(c).
Non-porous surface cleanup requirements	Cleanup Verification: 40 CFR §761.61(a)(6) & Subpart P, or a risk-based sampling plan that has been approved by EPA pursuant to 40 CFR §761.61(c).
PCB Liquids	Confirmatory sampling: 40 CFR §761.269.
(B) **High Occupancy Areas for Bulk PCB Remediation Waste & Porous Surfaces:** implement deed restrictions if PCB concentrations are >1 ppm but ≤10 ppm. **Low Occupancy Areas for Bulk PCB Remediation Waste & Porous Surfaces:** implement deed restrictions if PCB concentrations are either >25 ppm but ≤50 ppm, or >25 ppm but ≤100 ppm. **Other Reuse Scenarios:** deed restrictions may vary depending on cleanup proposed.	Deed Restriction: 40 CFR §761.61(a)(8)

III. Cleanup Levels for Other Re-Use Scenarios

A risk-based disposal approval (see §761.61(c)) is available for cleanup, storage and disposal when the self-implementing cleanup and disposal standards of §761.61(a), or the performance-based disposal requirements of §761.61(b), are not the remedy of choice. Individuals must submit a written application to the EPA Regional Administrator in the Region where the sampling, cleanup, disposal or storage site is located when those activities will occur in a single EPA Region; or to the Director of the National Program Chemicals Division when the activities occur in more than one EPA Region. Each application must contain the information required for the notification under the self-implementing procedures (see the TSCA PCB regulations at §761.61(a)(3)(i)). EPA may request other information necessary to evaluate the application. EPA may use the OSWER guidance for superfund risk assessment (issued in 1989 and amended in 2003)[4] as well as the superfund PCB guidance (issued in

[4]"Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A), Interim Final," EPA/540/1-89/002, December 1989. This guidance pertains to the selection of human health toxicity values, data necessary in developing PCB cleanup levels.

1990)[5] as a reference when reviewing any request for a risk-based approval submitted under the provisions of 40 CFR §761.61(c) and deciding on an appropriate risk-based method for the cleanup and disposal of PCB remediation wastes. EPA will issue a written decision on each application and will approve an application only when a finding can be made that the method will not pose an unreasonable risk of injury to health or the environment. However, no person may conduct cleanup and/or related activities prior to obtaining written approval from EPA. Unlike the self-implementing process, the risk-based disposal approval process does not contain automatic triggers for an approval from EPA.

A. *Example of Risk-Based PCB Cleanup Levels for an Industrial Area*

The following cleanup scenario is an example of a risk-based cleanup that EPA approved for a site that would be used as an *"industrial area"* after the cleanup was completed. The sampling procedures, cleanup standards, and engineering and institutional controls were based on a site-specific risk assessment which assumed no children under the age of six would occupy the space at any time. In this reuse scenario, the *"industrial area"* was not to house a day care center, school, or any other place where children under the age of six may be found. For PCB waste management involving porous structural surfaces, such as floors, walls, or ceilings made of concrete in this **industrial area**, the following considerations were applied when the bulk PCB concentrations fell in the ranges indicated below.

The averaging of individual samples was based on a uniform depth of concrete, rather than compositing various sample depths (e.g., all samples were taken at a uniform depth of no more than 2 inches, for example). Also, when the procedures for this *"industrial area"* were used, an institutional control (i.e., deed restriction) was implemented. The deed restriction requirements include a notation in perpetuity so that potential purchasers would receive a disclosure about: the PCB waste that was disposed of on site, the use restrictions that apply to all future owners, and the owner's obligation to maintain the coating or barrier, where required. (See 40 CFR §761.61(a)(8) for the specific requirements.)

(a) Where the average PCB concentration in the concrete was **greater than 5 ppm, but less than or equal to 10 ppm (>5 ppm to ≤10 ppm), with a maximum concentration of 25 ppm in any sample,** at a maximum depth of contamination of no more than 15 centimeters (6 inches): two coats of paint or epoxy of contrasting colors were applied (or a solid barrier installed) and had to be maintained; the contaminated surface was marked with the PCB M_L mark in a location easily visible to individuals present in the area; and the coating or barrier had to be maintained through a

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The 1989 guidance was updated in 2003. This guidance, on a hierarchy for the selection of human health toxicity values, can be found on the following web site http://www.epa.gov/superfund/programs/risk/hhmemo.pdf.

[5]"Guidance on Remedial Actions for Superfund Sites with PCB Contamination" EPA/540/G-90/007, August 1990, which can be found at the following link http://www.epa.gov/superfund/resources/remedy/pdf/540g-90007-s.pdf.

deed restriction for the site specifically **limiting the property to industrial use only**.

(b) Where the average PCB concentration in the concrete was **less than or equal to 5 ppm (≤5 ppm), with a maximum concentration of 10 ppm in any sample**, at a maximum depth of contamination of no more than 5 centimeters (2 inches), a deed restriction was established for the site, specifically **limiting the property to industrial use only.**

(c) The self-implementing requirements of 40 CFR §761.61(a) for a high occupancy area cleanup (see Section II.A.) would also have been appropriate for this scenario. If the high occupancy area cleanup standard was used (i.e., less than or equal to 1 ppm (≤1 ppm)), a deed restriction would not have been required, and the restriction on the presence of children under the age of six would not have applied.

Example 3: Renovating An Old Warehouse to Include Both Office and Warehouse Space – Use of Risk-Based Provision at 40 CFR §761.61(c)

An old warehouse is being converted into a distribution center, which will include both office space and warehouse space. The floor is contaminated with PCBs. What are the clean-up requirements?

Answer: This is an example of a reuse scenario in which the cleanup standards and other protective measures described in the "industrial use" example in section III.A. might be appropriate. A risk-based application would have to be submitted to the Regional Administrator, ATTN: Regional PCB Coordinator, to obtain approval for cleanup of this site under §761.61(c). As described in the "industrial use" scenario, occupation restrictions on children and engineering or institutional controls such as a deed restriction limiting the property to "industrial use" only might be necessary. Using the attached guidance (see Appendix A) or other appropriate procedures for sampling concrete, the PCB concentration in the cement would need to be determined to assess whether additional cleanup activities must be initiated. If this cleanup was being conducted under the self-implementing procedures in 40 CFR §761.61(a), the cleanup standards for a *high occupancy area* would likely apply.

B. Additional Cleanup Examples

In a multi-level building where the area of PCB remediation is confined to the basement of the building, there are no restrictions on the use of the upper levels of the building. Prior to occupying the building, the cleanup requirements for the basement must be determined based on the intended new use of the basement, and the PCB waste must be properly managed. PCB contamination occupying a limited portion of the property would not otherwise affect the use of portions of the property that are not contaminated. The tables and examples in this Guidance summarize relevant information concerning the management of PCB waste. All PCB concentrations are based on total PCBs, rather than individual PCB Aroclors. Although the tables and examples may be used as informal references, they ***should not*** be used as "stand-alone documents" (i.e., the tables and examples may not contain a complete statement of all of the applicable requirements and do not replace nor supplant the requirements of the PCB regulations at 40 CFR Part 761). For instance, Table 2 provides a summary of the cleanup standards for high and low occupancy use categories (see p. 22). It also summarizes the cleanup standards for the industrial use example described in Section III.A. of this document. In addition, examples are presented in Section VII regarding the various types of PCB contamination that may be found at a site and the potential reuse scenarios for the property (see Table 7, p. 39). Consultation with the EPA Regional PCB Coordinator may be appropriate for determining the applicable cleanup standards.

Example 4: Multi-story Building Intended for A Combination of Uses – Use of the Self-Implementing Provision at 40 CFR §761.61(a)

A multi-story building with concrete floors and walls once housed PCB liquids that were stored in the basement where evidence of liquid spills to the basement floor was found. Data indicate the PCBs have migrated through the basement floor into the subsurface soil. No other source(s) of PCBs are present or are known to have been used at the site. Potential plans for the future use of the building would likely make it a high occupancy area and would include a shopping mall, residential townhouses, or a public facility; i.e., a medical facility, school, or a recreational center. How should the contamination in the basement and soil be managed; how would the cleanup requirements differ if the basement was used as a low occupancy area?

Answer: The cleanup requirements are based on the type of waste material and the intended use of the property. In this example, the waste materials include a *porous surface* and subsurface soil (i.e., *bulk PCB remediation waste*). No cleanup is required of the upper floors where there is no PCB contamination. There are no restrictions regarding the use of the upper floors since the PCBs are known to have not been transferred to those areas. The self-implementing procedures at 40 CFR §761.61(a) can be applied.

For use of the basement as a *high occupancy area*, the basement floor and subsurface soil have to be cleaned to 1 part per million or less (≤1 ppm), without further conditions (40 CFR §761.61(a)(4)(i)(A)). Post-cleanup sampling is required. Use of the basement in a residential setting or as public access areas generally requires compliance with the most stringent cleanup standard.

- Decontamination of the *porous surface* (basement floor) is not an option because the spill is more than 72 hours old.
- In addition, the PCB concentration in the subsurface soil must be determined.
- If the decision is made to remove and replace all or part of the concrete floor, the PCB concentration of the subsurface soil must be 10 ppm or less, and the new concrete floor must be at least 6 inches deep (i.e., the equivalent of the cap requirements at §761.61(a)(7)).
- The cap must be maintained in perpetuity, and an institutional control; i.e., a deed restriction, must be implemented.
- If the subsurface soil is cleaned to ≤1 ppm, the new concrete floor is not required to meet the 6 inch cap requirement, and the deed restriction is not necessary.

For a *low occupancy area*, the cleanup process would be the same, although the cleanup standard is 25 ppm or less (≤25 ppm) in both the concrete and the subsurface soil, and a deed restriction is required (40 CFR §761.61(a)(4)(i)(B)(1)). Use as a boiler room, electrical room, etc. would be likely uses of the basement for a *low occupancy use.*

Example 5: Multi-story Building Intended for A Combination of Uses – Use of the Risk-Based Provision at 40 CFR §761.61(c)

Same scenario as *Example 4*, except the basement is intended for use as an industrial area.

Answer: This scenario provides another example of when cleanup standards similar to those approved for the industrial area scenario described in this section might apply. A risk-based application would have to be submitted to the Regional Administrator, ATTN: Regional PCB Coordinator, to obtain approval for cleanup of this site under 761.61(c). EPA may use the OSWER guidance for superfund risk assessment (issued in 1989 and amended in 2003; see Footnote #4, page 14) as well as the superfund PCB guidance (issued in 1990; see Footnote #5, page 15) as a reference when reviewing any request for a risk-based approval and deciding on an appropriate risk-based method for the cleanup and disposal of PCB remediation waste. The following cleanup standards which rely on the maximum PCB concentration found in samples taken at depths of 15 or 5 centimeters might be appropriate. Other limitations might apply such as occupation restrictions on children or engineering or institutional controls such as a deed restriction.

1. Maximum PCB concentration of 25 ppm in any sample, at a maximum uniform depth for each sample of no more than 15 centimeters (≤15 cm) where the average of all samples taken is greater than 5 ppm, but less than or equal to 10 ppm (>5 ppm to ≤10 ppm). Two coats of paint or epoxy of contrasting colors would be applied (or a solid barrier might be installed over the accessible areas of the contaminated surface); the surface would be marked with the PCB M_L mark in a location easily visible to individuals present in the area; and the intact coating or barrier would be maintained through a deed restriction for the site specifically limiting the property to industrial use only. ***OR***

2. Maximum PCB concentration of 10 ppm in any sample, at a maximum uniform depth for each sample of no more than 5 centimeters (≤5 cm) where the average of all samples taken is less than or equal to 5 ppm (≤5 ppm), and a deed restriction would be implemented for the site specifically limiting the property to industrial use only.

Although these cleanup standards and protective measures might be appropriate for this reuse scenario, different combinations of cleanup, engineering and institutional controls may also be submitted to the Regional Administrator in the request for an approval under 40 CFR §761.61(c). For additional guidance, contact the Regional PCB Coordinator.

Example #6: Multi-parcel, Commercial, Light Industrial, and Residential Mixed Use Property – Use of the Self-Implementing Provision at 40 CFR §761.61(a)

A municipality has purchased several adjoining parcels of land and intends to redevelop the combined property for a variety of uses, including retail, condominiums, office space, a park, and a parking facility. The project's primary parcel includes a former textile mill where there is evidence of PCB contamination. None of the other parcels has been contaminated with PCBs. The mill building has a concrete (i.e., porous) floor in the basement where there is evidence of spills of liquid PCBs. There is no evidence of PCB contamination in any other part of the building. The municipality plans to preserve the facade and basic structure of the mill building. The redevelopment plan includes putting retail and office space on the first two floors of the building and condominiums on upper floors. The basement of the building will be used for parking and building utilities. What level of cleanup is required to implement this mixed-use scenario?

Answer: From the details provided above, it appears that the textile mill will be redeveloped for both high (retail and office space, condominiums) and low (parking and building utilities) occupancy use. In this scenario, the assumption is that test results confirm the PCB contamination is limited to the basement floor, and that no cleanup of PCBs is required of the upper floors. However, use of the upper floors, if contaminated with PCBs, is not authorized unless those areas are in compliance with an EPA cleanup standard (see 40 CFR §761.30(u)). To determine that cleanup is required only in the basement, it is recommended that random sampling for PCBs be conducted of the entire building to ensure there has been no transfer of the contamination in the basement to other portions of the building, and that no PCB-containing coatings have been applied and/or used in any portion of the mill. Based on the results of that sampling, a determination can then be made regarding PCB contamination in other parts of the building.

It is also logical to assume that spills of liquid PCBs were from PCB-containing equipment. Certain PCB-containing equipment that may have been abandoned on site must be drained of all free-flowing liquids prior to disposition of it (40 CFR §761.60(b)). The liquids must be tested to determine their PCB concentration unless they are disposed of in an incinerator that complies with 40 CFR §761.70. Used oil at concentrations of less than 50 ppm may be marketed and burned for energy recovery (see the TSCA requirements at 40 CFR §761.20(e)). Liquids containing PCBs at concentrations of 50 ppm or greater must be disposed in accordance with 40 CFR §761.60(a) (e.g., via a TSCA permitted incinerator or a high efficiency boiler, if appropriate) or §761.60(e). The equipment (e.g., transformer carcass) must be disposed of in accordance with its classification; see 40 CFR §761.60(b)).

The concrete floor in the basement of the mill must be cleaned up for low occupancy use. Under the self-implementing provisions, the cleanup standard is 25 ppm or less with an institutional control such as a deed restriction (see 40 CFR §§761.61(a)(4)(i)(B) and

Example #6: Multi-parcel, Commercial, Light Industrial, and Residential Mixed Use Property – Use of the Self-Implementing Provision at 40 CFR §761.61(a) (Continued)

761.61(a)(8)). The written notification and certification requirements of 40 CFR §761.61(a)(3) also apply (see Section V. of this Guidance (p. 27) for information concerning the notification and EPA's review of the information). Individual occupancy of the remediated area is limited to less than 6.7 hours a week. Verification of the cleanup standard is required using Subpart O of 40 CFR 761 (see 40 CFR §761.61(a)(6)(i)), or a risk-based sampling plan that has been approved by EPA (see 40 CFR §761.61(c)).

A different set of cleanup standards, engineering and institutional controls may be proposed to the Regional Administrator in a written request for a site-specific, risk-based approval under 40 CFR 761.61(c). Each application must contain the information required for the notification under the self-implementing procedures (see 40 CFR §761.61(a)(3)(i)). (See Section III.A. and Example 5 for an illustration of where the risk-based approach has been used for concrete flooring in an industrial setting.) EPA may use the OSWER guidance for the superfund risk assessment (issued in 1989 and amended in 2003; see Footnote #4, page 14) as well as the superfund PCB guidance (issued in 1990; see Footnote #5, page 15) as a reference when reviewing any request for a risk-based approval submitted under the provisions of 40 CFR §761.61(c) and deciding on an appropriate risk-based method for the cleanup and disposal of PCB remediation wastes. EPA may request other information necessary to evaluate the application and will issue a written decision on each application. EPA will approve an application if a finding can be made that the cleanup method and associated controls will not pose an unreasonable risk of injury to health or the environment. Unlike the self-implementing process, the risk-based disposal approval process does not contain automatic triggers signaling EPA approval. No person may conduct cleanup and/or related activities *prior* to obtaining written approval from EPA. For additional guidance, contact the Regional PCB Coordinator.

Table 2. ***TSCA PCB Waste Management Options*** (***NOTE:*** All PCB concentrations are total PCBs.)

Waste Type	**Redevelopment Goal**		
	High Occupancy	***Low Occupancy***	***Industrial Area*** [1]
Bulk PCB Remediation Waste[2] **including Porous Surfaces**	<u>**Definition**</u> *≥6.7 hrs/wk without dermal or respiratory protection* (see 40 CFR 761.3 for the complete definition) <u>**Cleanup standards**</u> ≤ 1 ppm in residual waste or porous surface w/o further conditions > 1 to ≤ 10 ppm if site covered w/appropriate cap & institutional control implemented (deed restriction)	<u>**Definition**</u> *< 6.7 hrs/wk without dermal or respiratory protection* (see 40 CFR 761.3 for the complete definition) <u>**Cleanup standards**</u> ≤ 25 ppm in residual waste or porous surface, unless otherwise specified in 40 CFR 761.61(a)(4)(i)(B) & institutional control implemented (deed restriction) > 25 ppm to ≤ 50 ppm if secured by fence, marked per 40 CFR 761.45 & institutional control implemented (deed restriction) >25 ppm to ≤ 100 ppm w/appropriate cap & institutional control implemented (deed restriction)	*Reuse scenario assumed no access by children under age 6 at any time.* <u>**Cleanup standards**</u> > 5 ppm to ≤ 10 ppm avg. in concrete w/max. concentration 25 ppm at max. depth 15cm : two contrasting colors of solvent resistant/ water repellent paint or epoxy were to be applied (or a solid barrier over accessible areas), the location was marked and maintained by implementing a deed restriction ***limiting property to industrial use only*** ≤ 5 ppm avg. in concrete w/max conc. 10 ppm at max. depth 5 cm: a deed restriction was implemented ***limiting property to industrial use only***
PCB Spills to Porous Surfaces[3]	<u>**Cleanup standards**</u> ≤ 10 µg/100 cm^2 for spills to concrete **<72 hours old** (unrestricted use) [4] **Continued Use of Porous Surfaces From Old Spills**[5]**:** If use/location are not changed: remove the source of contamination; clean accessible porous surfaces and completely cover with two solvent resistant and water repellent coatings of contrasting colors, or fasten a solid barrier to the surface to cover the contaminated area or all accessible parts of the contaminated area; and place PCB M_L mark where visible (§761.30(p)). However, if the use of the contaminated surface is to change, decontaminate ≤1 ppm or remove and dispose of all contaminated surfaces. ***All Other Scenarios Involving Porous Surfaces***: Consult with Regional PCB Coordinator.	<u>**Cleanup standards**</u> ≤ 10 µg/100 cm^2 for spills to concrete **<72 hours old** (unrestricted use) [4] **Continued Use of Porous Surfaces From Old Spills**[5]**:** If use/location are not changed: remove the source of contamination; clean accessible porous surfaces and completely cover with two solvent resistant and water repellent coatings of contrasting colors, or fasten a solid barrier to the surface to cover the contaminated area or all accessible parts of the contaminated area; and place PCB M_L mark where visible (§761.30(p)). However, if the use of the contaminated surface is to change, decontaminate to ≤1 ppm or remove and dispose of all contaminated surfaces. ***All Other Scenarios Involving Porous Surfaces***: Consult with Regional PCB Coordinator.	<u>**Cleanup standards**</u> > 5 ppm to ≤ 10 ppm avg. in concrete w/max. concentration 25 ppm at max. depth 15cm : two contrasting colors of solvent resistant/ water repellent paint or epoxy were to be applied (or solid barrier over accessible areas), the location was marked and maintain by implementing a deed restriction ***limiting property to industrial use only*** ≤ 5 ppm avg. in concrete w/max conc. 10 ppm at max. depth 5 cm: a deed restriction was implemented ***limiting property to industrial use only***

Waste Type	Redevelopment Goal		
	High Occupancy	***Low Occupancy***	***Industrial Area*** [1]
Non-porous Surfaces[6] Contaminated by PCB Spills	**Definition** *≥16.8 hrs/wk without dermal or respiratory protection* (see 40 CFR 761.3 for the complete definition) **Cleanup standards** ≤ 10 μg/100 cm^2 w/o further conditions	**Definition** *< 16.8 hrs/wk without dermal or respiratory protection* (see 40 CFR 761.3 for the complete definition) **Cleanup standards** <100 μg/100 cm^2 with institutional control implemented (deed restriction)	*Reuse scenario assumes no access by children under age 6 at any time.* **Cleanup standards** ≤ 10 μg/100 cm^2 w/o further conditions for high occupancy <100 μg/100 cm^2 with institutional control implemented (deed restriction) for low occupancy
Liquid PCBs	**Cleanup standards** Water: <200 ppb PCBs for non-contact use in a closed system; or <3 ppb PCBs for discharges to treatment works or navigable waters or PCB discharge limit in CWA Sec. 307(b) or 402 permit; or ≤0.5 ppb PCBs for unrestricted use. Organic liquids & non-aqueous inorganic liquids: <2 ppm PCBs.	**Cleanup standards** Water: <200 ppb PCBs for non-contact use in a closed system; or <3 ppb PCBs for discharges to treatment works or navigable waters or PCB discharge limit in CWA Sec. 307(b) or 402 permit; or ≤0.5 ppb PCBs for unrestricted use. Organic liquids & non-aqueous inorganic liquids: <2 ppm PCBs.	**Cleanup standards** Water: <200 ppb PCBs for non-contact use in a closed system; or <3 ppb PCBs for discharges to treatment works or navigable waters or PCB discharge limit in CWA Sec. 307(b) or 402 permit; or ≤0.5 ppb PCBs for unrestricted use. Organic liquids & non-aqueous inorganic liquids: <2 ppm PCBs.

[1] These cleanup standards are an example of standards used for a risk-based cleanup which required approval from the Regional Administrator. These procedures, standards, and controls may be appropriate for other sites presenting comparable exposure scenarios, although each risk-based application will be evaluated on its merits and approved or disapproved on a site-specific basis.
[2] Including but not limited to: environmental media containing PCBs, such as soil, sediment, dredged materials, muds, PCB sewage sludge, industrial sludge and gravel; and soil, rags and other debris generated as a result of a PCB spill; see full definition for *PCB remediation waste* at 40 CFR §761.3.
[3] Including but not limited to: floors, walls, and ceilings, made of concrete, brick, wood, plaster, etc.; see full definition for *Porous surface* at 40 CFR §761.3.
[4] Spill cleanup requirements for recent spills (<72 hours old) to porous surfaces which may occur during PCB remediation activities are managed differently than old spills (see 40 CFR §761.79(b)(4), and §761.125(b) or (c)).
[5] This is an authorization for the continued use of contaminated surfaces (40 CFR §761.30(p)). Conditions apply when spills of liquid PCBs were at concentrations of ≥50 ppm which resulted in porous surface contamination at levels of >10μg/100cm^2. While contaminated porous surfaces of ≤10μg/100cm^2 may continue to be used without complying with the conditions of 40 CFR §761.30(p), PCB contamination of the porous surface must remain at levels of ≤10μg/100cm^2.
[6] Including but not limited to: smooth surfaces of metal, glass, glazed ceramic; marble, granite; see full definition for *Non-porous surface* at 40 CFR §761.3.

IV. What are the Appropriate Disposal Requirements?

A. Disposal Requirements for PCB Remediation Waste

PCB remediation wastes must be disposed of using one (or a combination, if appropriate) of the approved disposal options (see Table 3, p. 25, for a summary of these options). Non-liquid cleanup waste (e.g., non-liquid cleaning materials, personal equipment) at any concentration and *bulk PCB remediation wastes* at concentrations of less than 50 ppm (<50 ppm) may be disposed of at: an approved PCB disposal facility; or when disposed pursuant to Sec. 761.61(a) or (c), a permitted municipal solid waste or non-municipal non-hazardous waste facility; or a RCRA Sec. 3004 or Sec. 3006 permitted hazardous waste landfill. Manifesting and recordkeeping requirements do not apply (40 CFR §§761.61(a)(5)(i)(B)(2)(ii) and 761.61(a)(5)(v)(A)). *Bulk PCB remediation waste* at concentrations of 50 ppm or greater (≥50 ppm) must be disposed of in a RCRA Sec. 3004 or 3006 permitted hazardous waste landfill or an approved PCB disposal facility (e.g., incinerator, chemical waste landfill; via an approved alternate disposal method or coordinated approval; a brief description is provided below). (40 CFR §761.61(a)(5)(i)(B)(2)(iii).) A current listing of EPA approved TSCA PCB disposal facilities can be found on the EPA's PCB website at www.epa.gov/pcb under "PCB Waste Handlers."

(1) In an **incinerator** approved by an EPA Regional Administrator or the Director, National Program Chemicals Division in the Office of Pollution Prevention and Toxics in accordance with technical specifications and procedural requirements at 40 CFR §761.70.

(2) In a **chemical waste landfill** approved by an EPA Regional Administrator in accordance with the technical specifications and procedural requirements at 40 CFR §761.75 (non-liquid PCB waste only).

(3) In a **hazardous waste landfill** that has been permitted by EPA under section 3004 of RCRA, or by a State authorized under section 3006 of RCRA (non-liquid PCB waste only).

(4) Using an **alternate disposal technology** (e.g., chemical dechlorination) that has been approved by an EPA Regional Administrator or the Director, National Program Chemicals Division in the Office of Pollution Prevention and Toxics as achieving a level of performance equivalent to an incinerator. This disposal option is only available for wastes such as PCB liquids, PCB articles, PCB transformers, PCB capacitors, PCB hydraulic machines, PCB-contaminated electrical equipment. (Specific requirements are located at 40 CFR §761.60(e).)

(5) In accordance with a **TSCA PCB Coordinated Approval** issued by an EPA Regional Administrator for the Region in which the PCB activity is located pursuant to the requirements specified at 40 CFR §761.77. Under a Coordinated Approval, the Regional Administrator may accept, with or without additional conditions, PCB cleanup requirements which are implemented under a different authority.

(6) In accordance with a **TSCA PCB risk-based disposal approval** issued by an EPA Regional Administrator for the Region in which the PCB activity is located in response to a written request to sample, cleanup or dispose of *PCB remediation waste* in a manner which is not provided for in the regulations. (Specific requirements are located at 40 CFR §761.61(c).)

Individuals who generate PCB wastes at concentrations of 50 ppm or greater must use a **manifest** (e.g., a Uniform Hazardous Waste Manifest) to ship that waste off-site, except as provided at 40 CFR §§761.61(a)(5)(i)(B)(2)(ii) and 761.61(a)(5)(v)(A). A signed copy of each manifest must be retained for a period of three years (40 CFR §761.209(a)). The generic PCB identification number (i.e., "40 CFR Part 761") is required to be used on the manifest by individuals who do not have a waste storage facility on site; i.e., only those generators of PCB waste who are exempt from the notification requirements at 40 CFR §761.205. However, individuals may prefer to have a unique EPA identification number which is obtained by submitting a Notification of PCB Activity using EPA Form 7710-53 in accordance with the PCB requirements at 40 CFR §§761.202 and 761.205; this form is available on the PCB website at www.epa.gov/pcb under "Databases and Forms." This Guidance does not authorize the re-disposal of PCB waste on site without obtaining the necessary PCB disposal approvals.

Table 3. Disposal Options for PCB Remediation Waste

Disposal Option	Applicable Regulations/Specifications
(A) **Approved incinerator**	40 CFR §761.70
(B) **Approved chemical waste landfill**	40 CFR §761.75
(C) **RCRA permitted landfill**	RCRA Sec. 3004 or State authorized under RCRA Sec. 3006
(D) **Alternate disposal approval**	Issued in accordance with 40 CFR §761.60 (e)
(E) **TSCA PCB Coordinated Approval**	Issued under 40 CFR §761.77
(F) **TSCA PCB risk-based disposal approval**	Issued under 40 CFR §761.61(c) for on-site disposal only

B. Disposal Requirements for Other PCB Wastes

For other types of PCB waste, the specific PCB requirements are listed below and summarized in Table 4, p. 26.

(1) Dispose of **PCB containing electrical equipment** (e.g., transformers, mining equipment, heat transfer systems, hydraulic systems, electromagnets, switches, voltage regulators) and **PCB containers** in an incinerator, chemical waste landfill or as otherwise specified in accordance with 40 CFR §§761.60(b) and (c).

(2) Dispose of **PCB bulk product waste** (i.e., items originally manufactured with PCBs as a component or contaminant in a non-liquid state at PCB concentrations of 50 ppm or greater – dried paint, caulking, etc.) in an incinerator, chemical waste landfill, or as otherwise specified in accordance with 40 CFR §761.62.

Table 4. Other PCB Wastes

Other Types of PCB Waste Requiring Disposal	Applicable Regulations/Specifications
(A) **PCB containing electrical equipment** (e.g. transformers, mining equipment, heat transfer systems, hydraulic systems, electromagnets, switches, voltage regulators) and **PCB containers**	40 CFR §§761.60(b) & (c)
(B) **PCB Bulk Product Waste** (i.e. items originally manufactured with PCBs as a component or contaminant in a non-liquid state at PCB concentrations ≥ 50 ppm -- dried paint, caulking, etc.)	40 CFR §761.62

C. Other Applicable Requirements in the TSCA PCB Regulations

To appropriately address PCB wastes at sites of contamination and comply with Part 761, the following TSCA PCB regulations must be followed where applicable. A summary of these requirements is provided in Table 5 (see p. 27).

(1) **Cap requirements** which limit exposure to PCBs that have been disposed of by means of land containment pursuant to 40 CFR §761.61(a)(7);

(2) **Recordkeeping requirements** which document the various aspects of the cleanup, such as the source of the contamination, estimated or actual date of contamination, completion date of the cleanup, location and description of the contamination, pre-cleanup sampling data, description of solid surfaces that were cleaned, approximate depth of soil excavation and the amount of soil removed, and post-cleanup verification sampling data (see 40 CFR §§761.61(a)(9) and 761.79(f));

(3) **Storage of PCB waste** which is in compliance with the technical requirements for a PCB facility (e.g., adequate roof, walls and floors; no drains or other openings, floors and curbing of Portland cement or other acceptable materials; and not located below the 100-year flood water elevation). Subject to certain conditions (see the provision at 40 CFR §761.65(c)(9)), bulk PCB remediation waste may be stored at the cleanup site or site of generation for 180 days. PCB wastes also may be stored in compliance with RCRA Sec. 3004 and Sec. 3005, or in a State authorized Sec. 3006 unit permitted for hazardous waste (for specific storage options, see 40 CFR §761.65);

(4) **Notification and manifesting requirements** for off-site movement of PCB waste

for purposes of storage and/or disposal pursuant to 40 CFR Part 761, Subpart K;

(5) **Marking requirements for the disposal of PCBs** when residual waste is left on site (see 40 CFR §761.61(a)(4)(B)) and when PCB wastes are being stored or transported (see 40 CFR §761.40(h));

(6) **PCB use authorizations** for contaminated equipment, structures, other non-liquid or liquid materials that have been decontaminated pursuant to the applicable decontamination procedures (see 40 CFR §761.30(u)); and

(7) **Spill cleanup requirements for recent spills (<72 hours old)** to porous surfaces which may occur during PCB remediation activities are managed differently than old spills. The cleanup standard is less than or equal to 10 micrograms per 100 square centimeters ($\leq 10\ \mu g/100\ cm^2$). (See 40 CFR §§761.79(b)(4) and 761.125(b) or (c).)

Table 5. Other Applicable Requirements in the TSCA PCB Regulations

Activity	Applicable Regulations/Specifications
Caps	40 CFR §761.61 (a)(7)
Recordkeeping	40 CFR §761.61 (a) (9)
Storage	40 CFR §761.65
Notification and Manifesting	40 CFR 761 Subpart K
Marking for Disposal	40 CFR §761.61(a)(4)(B) on site residual; 40 CFR §761.40(h) storage and/or transport
Use of Decontaminated Equipment, Structures, or Other Non-liquid and Liquid Materials	40 CFR §761.30(u)
Cleanup of Recent Spills (<72 hours old) to Concrete	40 CFR §§761.79(b)(4) and 761.125(b) or (c)

V. Notification and Review

Written notification as described in the *PCB remediation waste* provision at 40 CFR §761.61(a)(3)(i)(A) - (E) must be provided at least 30 days prior to the date that the cleanup of a site begins. Notification must be sent to the EPA Regional Administrator (ATTN: Regional PCB Coordinator), the Director of the State or Tribal environmental protection agency, and the Director of the county or local environmental protection agency where the cleanup will be conducted. If the EPA Regional Administrator does not respond within 30 calendar days of receiving the notice, the person submitting the notification may assume that it is complete and acceptable and proceed with the cleanup according to the information that was provided to the EPA Regional Administrator (see 40 CFR

§761.61(a)(3)(ii)). Applicants for EPA Brownfields grants may eliminate any duplication of effort in complying with the notification requirement at 40 CFR §761.61(a)(3)(i)(A)-(E) by submitting the Brownfields grant application (or appropriate portion(s) of the application) provided it contains the information that is required for the notification. A copy of the relevant portion(s) of the grant application plus any supplemental information that may be needed to satisfy the notification requirement may be forwarded to the Regional PCB Coordinator under a cover letter which identifies the portions of the grant application materials that respond to each of the requirements at 40 CFR §761.61(a)(3)(i)(A)-(D). Remember to include the written certification required by 40 CFR §761.61(a)(3)(i)(E).

Once cleanup is underway, the person conducting the cleanup must provide any proposed changes from the notification to the EPA Regional Administrator (ATTN: Regional PCB Coordinator) in writing no less than 14 calendar days prior to the proposed implementation of the change. The EPA Regional Administrator will determine whether to accept the change and will respond verbally within 7 calendar days and in writing within 14 calendar days of receiving the notification. If the EPA Regional Administrator does not respond within these time frames, the change notice may be deemed to be acceptable and the cleanup may proceed according to the information that was provided to the EPA Regional Administrator (see 40 CFR §761.61(a)(3)(ii)). A summary of the notification requirements is provided in Table 6 below.

Table 6. Notification and Review for Sites with PCB Contamination

Specific Requirements	Notice Recipients	Time Frame	Action
40 CFR §§761.61 (a)(3)(i)(A)-(E) and 40 CFR 761.61(a)(3)(ii)	– U.S. EPA Regional Administrator (ATTN: Regional PCB Coordinator), – Director of State or Tribal environmental agency, and – Director of County or Local environmental agency.	Submit notice 30 days prior to start of cleanup. Once the cleanup is underway, submit notice to the EPA Regional Administrator (ATTN: Regional PCB Coordinator) 14 days prior to implementing any changes to an approved cleanup plan.	If EPA does not respond within 30 days of receipt of the notification, cleanup may proceed. If EPA does not respond (within 7 days verbally and 14 days in writing) to the change notification, the change may be implemented.

VI. Consultation with USEPA Regional PCB Coordinators and State Officials

There may be occasions when this Guidance does not fully address a specific cleanup scenario, e.g., a large cleanup site for which the guidance may be inappropriate; alternative risk-based sampling approaches which require EPA approval under the TSCA PCB regulations at 40 CFR §761.61(c). An application for a risk-based approval is required whenever the proposed cleanup and disposal practices would fail to satisfy the requirements of the TSCA PCB regulations (i.e., the self-implementing provision at §761.61(a) or the performance-based requirements at §761.61(b)). In those situations, owners of sites contaminated with PCBs are encouraged to contact the Regional PCB Coordinator. A listing of the Regional PCB Coordinators follows. The most current listing of the Regional PCB Coordinators can always be found on the EPA's PCB website at www.epa.gov/pcb under "EPA Regional Contacts."

Finally, EPA cannot emphasize too strongly the importance of ensuring that cleanup activities adequately address the requirements of both Federal and State environmental programs. Individuals are encouraged to discuss their PCB issues with the appropriate USEPA and State environmental official to ensure the cleanup is accomplished in a manner which satisfies the cleanup requirements and goals of both programs.

USEPA Region 1, Boston, MA: (Covering CT, MA, ME, NH, RI, and VT)

Telephone: 617-918-1527
Address:
EPA-New England Regional Administrator
ATTN: PCB Coordinator (Mail Code: CPT)
U.S. Environmental Protection Agency-New England
1 Congress Street, Suite 1100
Boston, MA 02114-2023

USEPA Region 2, Edison, NJ: (Covering NJ, NY, PR, and VI)

Telephone: 732-906-6179
Address:
Regional Administrator
ATTN: PCB Coordinator (Mail Code: MS105)
U.S. Environmental Protection Agency Region 2
2890 Woodbridge Avenue
Edison, NJ 08837

USEPA Region 3, Philadelphia, PA: (Covering DE, DC MD, PA, VA, and WV)

Telephone: 215-814-2177
Address:
Regional Administrator
ATTN: PCB Coordinator (Mail Code: 3WC33)
U.S. Environmental Protection Agency Region 3
1650 Arch Street
Philadelphia, PA 19103-2029

USEPA Region 4, Atlanta, GA: (Covering AL, FL, GA, KY, MS, NC, SC, and TN)

Telephone: 404-562-8990

Address: Regional Administrator
ATTN: PCB Coordinator
U.S. Environmental Protection Agency Region 4
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-8960

USEPA Region 5, Chicago, IL: (Covering IL, IN, MI, MN, OH, and WI)

Telephone: 312-353-2291
Address: Regional Administrator
ATTN: PCB Coordinator (Mail Code: DT-8J)
U.S. Environmental Protection Agency Region 5
77 W. Jackson Boulevard
Chicago, IL 60604

USEPA Region 6, Dallas, TX: (Covering AR, LA, NM, OK, and TX)

Telephone: 214-665-7579
Address: Regional Administrator
ATTN: PCB Coordinator (Mail Code: 6EN-AT)
U.S. Environmental Protection Agency Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

USEPA Region 7, Kansas City, KS: (Covering IA, KS, MO, and NE)

Telephone: 913-551-7395
Address: Regional Administrator
ATTN: PCB Coordinator (Mail Code: ARTD/CRIB)
U.S. Environmental Protection Agency Region 7
901 North 5th Street
Kansas City, KS 66101

USEPA Region 8, Denver, CO: (Covering CO, MT, ND, SD, UT, and WY)

Telephone: 303-312-6027
Address: Regional Administrator
ATTN: PCB Coordinator (Mail Code: 8P-P3T)
U. S. Environmental Protection Agency Region 8
999 18th Street
Denver, CO 80202-2466

USEPA Region 9, San Francisco, CA: (Covering AZ, CA, HI, NV, AS, and GU)

Telephone: 415-947-4163
Address: Regional Administrator
ATTN: PCB Coordinator (Mail Code: CMD-4)
U.S. Environmental Protection Agency Region 9
75 Hawthorne Street
San Francisco, CA 94105

USEPA Region 10, Seattle, WA: (Covering AK, ID, OR, and WA)

Telephone: 206-553-6693
Address: Regional Administrator
ATTN: PCB Program Manager (Mail Code: AWT-128)
U.S. Environmental Protection Agency Region 10
1200 Sixth Avenue
Seattle, WA 98101-1128

VII. Typical and Worst Case Scenarios for the Management of PCB Wastes

EPA does not have prescriptive procedures for cleaning porous surfaces contaminated by spills of liquid PCBs. Rather, the selected procedures would be based on site-specific conditions, including PCB concentration and degree of PCB migration into the concrete. If the cleanup of the concrete floor or walls do not meet the criteria for low or high occupancy areas, the owner may apply to the Regional Administrator for a risk-based cleanup approval under 40 CFR §761.61(c) or an alternate decontamination approval under 40 CFR §761.79(h) in order to establish different cleanup levels and different engineering and/or administrative controls.

A. Typical Cleanup Situation and Applicable Responses

Background: An abandoned warehouse (or factory) is being redeveloped for use as an office building. PCB fluids were found stored in the basement, and PCB-containing paint had been used previously to cover the floor/walls (which are porous) of the basement. It has not been determined whether the painted floor/walls have also been contaminated by spills of PCB fluids. No PCB contamination has been found on the upper floors. Restrictions on the use of the basement are contingent upon the cleanup level achieved for that area. No restrictions apply to the upper floors, where PCB contamination has not been found.

Beginning the Cleanup. There are at least two sources of PCB contamination in the basement in this example: the liquid PCBs and the PCB-contaminated paint. The liquid PCBs stored in the basement should be removed and incinerated in a permitted TSCA incinerator (40 CFR §761.60(a)) or by an alternate disposal technology approved by EPA (40 CFR §761.60(e)). A list of currently approved disposal facilities can be found at the PCB website, www.epa.gov/pcb.

The floor/walls with surfaces of PCB-contaminated paint could be either *PCB bulk product waste* or *bulk PCB remediation waste.* The disposal requirements are based on the type of PCB waste, that is, the actual PCB source; e.g., was the item soiled by PCBs (remediation waste) or was the non-liquid item manufactured with PCBs (bulk product waste).

Managing PCB Bulk Product Waste. If the PCB-contaminated paint is the only source of the contamination on certain portions of the porous floor/walls, the PCB waste is a *PCB bulk product waste*; see 40 CFR §761.3. Disposal of the bulk product waste must be in accordance with 40 CFR §761.62(a) or (b), or, as with *PCB remediation waste*, there is an option to deviate from the requirements for the disposal of *PCB bulk product waste* if the proposed activities can be justified based on an evaluation of the risk; see 40 CFR §761.62(c). Decontamination in accordance with 40 CFR §761.79 is also an option for disposing of this waste; see 40 CFR §761.62(a)(5). Following removal of the PCB-contaminated paint, sampling of the bare *porous surface* (e.g., walls/floor) is strongly recommended to determine whether additional cleanup measures are needed. If the PCBs have leached into the concrete (from either the paint application or the combination of applied PCB paint and spilled liquid PCBs), additional cleanup may be required. At that point, the concrete is generally considered a *bulk PCB remediation waste*, and the procedures listed below for *bulk PCB remediation* waste should be followed.

Self-Implementing Cleanup Requirements for PCB Remediation Waste: If the PCB-painted concrete is a *bulk PCB remediation* waste because it was contaminated from a spill of liquid PCBs or PCBs that have leached from the paint into the concrete, the concrete must be cleaned up or removed and disposed of per 40 CFR §761.61(a). Otherwise, concrete painted with PCB-containing paint (e.g., floor/walls) should be treated as *PCB bulk product waste;* see the discussion above on *PCB bulk product waste.* At least thirty (30) days prior to initiating cleanup activities, provide written notifications to the EPA Regional Administrator (ATTN: Regional PCB Coordinator), the Director of the State or Tribal environmental protection agency, and the Director of the county or local environmental protection agency where the cleanup will be conducted per 40 CFR §761.61(a)(3)(i)(A)-(E). These notifications are required only for *PCB remediation waste.* Cleanup levels are determined based on the intended use of the building and contaminated medium. Post-cleanup verification sampling of the *porous surfaces* (e.g., floor/walls) is required to determine that the cleanup standards have been met. Follow the verification sampling procedures as required in 40 CFR §761.61(a)(6), Subpart O, or a verification sampling plan approved under a risk-based approval (40 CFR 761.61(c)). Another option for PCB remediation waste is to apply for a risk-based cleanup and disposal approval per 40 CFR §761.61(c). Under this provision, decisions regarding the sampling, cleanup levels and disposal of PCB remediation waste are based on an evaluation of the risk of exposure to PCBs as a result of the proposed activities. PCB contamination located in a limited portion of the property would not otherwise affect the use of those portions of the property where no PCB contamination exists.

Porous Materials*:* The cleanup level for *PCB remediation waste* in the form of porous surfaces in a *high occupancy area* is one part per million or less (≤1 ppm) without further conditions. The cleanup level for porous surfaces in a *low occupancy area* is 25 ppm or less (≤25 ppm) with a deed restriction. Cleanup levels not specified at 40 CFR §761.61(a) also may be appropriate based on an assessment and evaluation of the resulting risks under an approval issued by the Regional Administrator for a risk-based sampling, cleanup or disposal procedure (40 CFR §761.61(c)) or for an alternative decontamination or sampling procedure (40 CFR §761.79(h)). For example, in one risk-based cleanup where the site would be used after cleanup for industrial use, the Agency approved the following cleanup levels. Use of the site by children under the age of six was prohibited. The cleanup levels for *porous surfaces* were: (1) an average concentration of greater than 5 ppm (>5 ppm) but less than or equal to 10 ppm (≤10 ppm) in concrete with a maximum concentration of 25 ppm at a depth of 15 centimeters (15 cm or 6 inches) *provided* a deed restriction limiting the use of the basement to an *industrial use* only, plus two applications of a paint or epoxy coating of contrasting colors (or a barrier over accessible areas) and posting the PCB M_L mark are implemented; or (2) an average concentration of less than or equal to 5 ppm (≤5 ppm) in concrete with a maximum concentration of 10 ppm at 5 centimeters (5 cm or 2 inches) *provided* that there was a deed restriction limiting the use of the site to an *industrial use* only (refer to Table 2).

Storage and Disposal Requirements: Storage of PCB waste must be in conformance with 40 CFR §761.65 (e.g., a TSCA PCB facility; a RCRA Sec. 3004, Sec. 3005 or Sec. 3006 State authorized hazardous waste storage unit) if any PCB wastes are to be stored prior to disposal. All PCB wastes are required to be disposed of properly. *PCB bulk product waste* must be disposed of in accordance with 40 CFR §761.62. Non-liquid cleanup waste (e.g., non-liquid cleaning materials, personal equipment) at any concentration and *bulk PCB remediation wastes* at concentrations of less than 50 ppm (<50 ppm) may be disposed of at: an approved PCB disposal facility, a permitted municipal solid waste or non-municipal non-hazardous waste facility under 40 CFR 761.61(a) or (c), or a RCRA Sec. 3004 or Sec. 3006 permitted hazardous waste landfill; manifesting and recordkeeping requirements do not apply (40 CFR §§761.61(a)(5)(i)(B)(2)(ii) & 761.61(a)(5)(v)(A)). *Bulk PCB remediation waste* at concentrations of 50 ppm or greater (≥50 ppm) must be disposed of in a RCRA Sec. 3004 or 3006 permitted hazardous waste landfill or an approved PCB disposal facility (e.g., incinerator, chemical waste landfill; an approved alternate disposal method or coordinated approval). (See 40 CFR §761.61(a)(5)(i)(B)(2)(iii).) A Uniform Hazardous Waste Manifest must accompany PCB waste at concentrations of 50 ppm or greater (≥50 ppm) to any off-site storage or disposal facilities (see 40 CFR §761.208), except as provided at 40 CFR §§761.61(a)(5)(i)(B)(2)(ii) and 761.61(a)(5)(v)(A). A signed copy of each manifest must be retained for a period of three years (40 CFR §761.209(a)). The notification and certification and cleanup records required under 40 CFR §761.61(a) must be retained for five years (40 CFR §§761.61(a)(9) and 761.125(c)(5)). The requirements for annual records and the annual document log at 40 CFR §761.180(a) are relevant *only if* the quantity of PCBs used or stored at any one time is at least 45 kilograms (99.4 pounds) of PCBs.

TYPICAL PCB WASTE MANAGEMENT CLEANUP SCENARIO

Background: This chart is a summary of the information that was presented in the example at Section VII.A. An abandoned warehouse is being redeveloped as an office building. PCB fluids were found in the basement, and PCB-containing paint had been used to cover the floor/walls (which are porous) of the basement. No PCB contamination has been found on the upper floors. Restrictions on the use of the basement are contingent upon the cleanup level achieved for that area. No restrictions apply to the upper floors where PCB contamination has not been found. Cleanup activities may be completed in any number of ways; therefore, this chart should not be considered a comprehensive listing of all applicable requirements. Consult the Regional PCB Coordinator whenever you have questions or require assistance.

ACTIVITY	***TIME FRAME***	***EPA RESPONSE, WHERE NEEDED***
– Properly containerize ***PCB fluids*** for transport to a permitted storage facility or TSCA permitted incinerator. – Complete Uniform Hazardous Waste Manifest. – Manifest must include an EPA identification number, either the generic "40 CFR Part 761" or an unique EPA ID number. – Retain signed copy of all manifests for at least 3 years from the date the PCB waste was accepted by the initial transporter.	– Immediate removal is recommended; removal of liquids does not require a §761.61(a) notification.	– Not applicable.
– For ***PCB bulk product waste***, submit §761.62(c) application and await approval of the method to remove ***PCB-containing paint*** from floor/walls of the basement. – Dispose of the paint as PCB bulk product waste. (See disposal requirements below.) – After the PCB-containing paint has been removed, sample ***bare porous surfaces***.	– Submit at any time, but paint removal activities may not commence before receipt of EPA approval under §761.62(c).	– RA may issue a risk-based approval under §761.62(c), request additional information or deny the request. There is no regulatory time frame for the approval to be issued.
– ***Self-implementing Cleanup Notification***. Notify: RA, USEPA (ATTN: PCB Coord.), Director, State or Tribal EPA, and Director, County or Local EPA (see §761.61(a)(3)).	– 30 days prior to cleanup. Required only if waste meets criteria of PCB remediation waste.	– If EPA does not respond within 30 days of receiving the notification, you may proceed with cleanup. Otherwise, address concerns identified by the RA before initiating cleanup.

ACTIVITY	***TIME FRAME***	***EPA RESPONSE, WHERE NEEDED***
– If PCBs have migrated into porous materials, generally handle as ***bulk PCB remediation waste***. (See disposal requirements below.) – Clean up contaminated porous areas; $\leq$1 ppm for high occupancy without furhter conditions, $\leq$25 ppm w/deed restriction for low occupancy (see requirements at §761.61(a)(3) for notification & (4) for cleanup levels), or as approved based on a §761.61(c) risk evaluation. – Verify cleanup per sampling as required by §761.61(a)(6) and Subpart O (or via a risk-based approval).	– If sampling is to be conducted per a §761.61(c) approval, await receipt of approval from EPA.	– If a request is submitted to the RA for a risk-based sampling, cleanup or disposal approval under §761.61(c), there is no regulatory time frame for the approval to be issued.
– Several options for ***storage of waste*** prior to disposal (see 761.65): permitted TSCA PCB storage facility or RCRA Sec. 3004, 3005 or 3006 State authorized hazardous waste storage unit. The TSCA annual records and annual document log requirements are not applicable if the quantity of PCBs used/stored at any one time is less than 45 kilograms (99.4 pounds).	– EPA recommends storage for no longer than 9 months in order to ensure disposal occurs within the mandatory 1-year time frame.	– Not applicable.
– ***Disposal options for PCB bulk product waste***. Performance-based options include: a TSCA permitted incinerator or chemical waste landfill, a hazardous waste landfill permitted or authorized under RCRA Sec. 3004 or 3006, a TSCA approved alternate disposal technology, decontamination under §761.79, or a TSCA PCB Coordinated Approval. Certain PCB bulk product wastes may be disposed of in a solid waste landfill, see §761.62(b) for specifics. A risk-based disposal approval is also available under §761.62(c).	– Must be disposed of within 1 year of the date the PCB waste was designated for disposal.	– Not applicable.
– ***Disposal options for bulk PCB remediation wastes*** that include non-liquid cleanp waste, at any concentration, and less than 50 ppm bulk PCB remediation waste are: a TSCA permitted PCB disposal facility, a permitted RCRA Sec.	– Must be disposed of within 1 year of the date the PCB waste was designated for disposal.	– Not applicable.

ACTIVITY	***TIME FRAME***	***EPA RESPONSE, WHERE NEEDED***
3004 or 3006 hazardous waste landfill, or when disposed pursuant to §761.61(a) or (c), a permitted municipal solid waste or non-municipal non-hazardous waste facility. Manifesting and recordkeeping requirements are not applicable. All other bulk PCB remediation wastes must be disposed of in either a TSCA permitted PCB disposal facility, or a permitted RCRA Sec. 3004 or 3006 hazardous waste landfill, or pursuant to an approval issued under §761.61(c). These wastes are subject to the TSCA manifesting and reporting (§761.202-.218) and recordkeeping (§761.180(a)) requirements.		

B. Worst Case Cleanup Scenario

<u>Background:</u> An abandoned facility is being proposed for revitalization as a day care center. The facility is a single building with walls and floors constructed of concrete. The concrete floors are coated with paint that has been subsequently contaminated by spills of liquid PCBs. The concrete walls are bare, but have been contaminated by spills of liquid PCBs. The liquid PCBs are the only known source for PCB contamination (e.g., the paint does not contain PCBs). For self-implementing cleanups under 40 CFR §761.61(a), the pre-cleanup notifications and storage and disposal requirements previously mentioned in the example in Section VII.A. apply.

<u>Management of Concrete Floors:</u> The concrete floors are covered with a coating (paint), that was subsequently contaminated by spills of liquid PCBs. The PCB contamination may reside only in the paint, or the PCB contamination may have migrated through the paint to the underlying concrete floor. In order for the building to be reused as a day care center (i.e., *high occupancy area*), the contaminated concrete floor (i.e., *bulk PCB remediation waste*) must be cleaned to the applicable standard (refer to Table 2). If the spill is less than 72 (<72) hours old, the concrete floor must be cleaned to a level of less than 10 $\mu g/100\ cm^2$ ($<10\ \mu g/100\ cm^2$) for unrestricted use (40 CFR §761.79(b)(4)). If the spill is greater than 72 (>72) hours old, the contaminated concrete must be decontaminated (see 40 CFR §761.79(h)) or removed and disposed of as a *bulk PCB remediation waste* in accordance with 40 CFR §761.61(a) or a risk-based cleanup and disposal approval per 40 CFR §761.61(c). For site characterization, follow the concrete coring procedures of either 40 CFR Part 761, Subpart N, Appendix A or another procedure which produces reliable results. Core sampling will help to determine the extent to which the PCBs may have migrated through the paint into the concrete floor. Post-cleanup verification sampling of the porous surfaces (e.g., walls/floors) is required to confirm the cleanup standards have been met. Post-cleanup verification sampling is required pursuant to 40 CFR §761.61(a)(6) and Subpart O, or a verification sampling plan under a risk-based cleanup and disposal approval issued by an EPA Regional Administrator. The use authorization for *porous surfaces* contaminated by an old spill (40 CFR §761.30(p)) is not applicable to this project as the use of the building will change to a day care center.

<u>Management of Concrete Walls:</u> The concrete walls are contaminated by spills of liquid PCBs. In order to be reused as a day care center, the walls must be cleaned to an applicable standard. If the spill is less than or equal to 72 (≤72) hours old, the concrete walls must be cleaned to a level of less than 10 $\mu g/100\ cm^2$ ($<10 \mu g/100\ cm^2$) for unrestricted use (40 CFR §761.79(b)(4)). If the spill is greater than 72 (>72) hours old, the contaminated concrete must be decontaminated (see 40 CFR §761.79(h)), or removed and disposed of as a *bulk PCB remediation waste* in accordance with 40 CFR §761.61(a) or a risk-based cleanup and disposal approval per 40 CFR §761.61(c). The use authorization for *porous surfaces* contaminated by an old spill is not applicable to this project as the use of the building will change to a day care center.

C. PCB Contamination and Reuse Scenarios

In addition to the "typical" and "worst case" cleanup scenarios discussed above, Table 7 (p. 39) provides additional examples of potential reuse scenarios where PCB remediation may be required. Applicable cleanup requirements for PCB remediation wastes are based on the intended reuse of the property; i.e., *high* or *low occupancy*, and the type of contaminated material. The reader is cautioned not to rely on this chart alone, and is encouraged to contact the Regional PCB Coordinator (see Section VI,

p. 28) and, if applicable, the appropriate State environmental official(s). In addition to the actual cleanup, individuals should:

(1) Identify all abandoned PCBs and PCB-containing equipment and comply with the disposal requirements of 40 CFR §761.60:

- remove PCB fluids where required under 40 CFR 761.60(b) and incinerate per §761.60(a);
- remove and dispose of PCB Articles per §761.60(b) (e.g., PCB-containing equipment such as transformers, capacitors, hydraulic machines, electrical equipment, etc.) in a TSCA incinerator, chemical waste landfill or municipal solid waste or non-municipal non-hazardous waste facility, where allowed, or via approved decontamination procedures; and
- remove and dispose of PCB containers per §761.60(c) in an incinerator, or after draining, in a chemical waste landfill, or if applicable, a municipal solid waste facility.

(2) Dispose of *PCB remediation waste* (e.g., soil, sediments, dredged materials, muds, PCB sewage sludge, industrial sludge, rags and other debris) in compliance with any number of options that are available under 40 CFR 761.61(a) for a self-implementing cleanup (see 40 CFR §761.61(a)(5)); e.g., TSCA incinerator or chemical waste landfill, soil washing procedures, RCRA Sec. 3004 or 3006 hazardous waste landfill, municipal solid waste or non-municipal non-hazardous waste facilities, or decontamination).

(3) When storage is required, PCB wastes at concentrations of 50 ppm or greater shall be placed in a storage facility in compliance with §761.65. Disposal is required within 1-year of the date that the decision was made to dispose of the waste per §761.65(a)(1).

Table 7. ***PCB Contamination and Reuse Scenarios*** (*NOTE*: All PCB concentrations are total PCBs.)

Contamination Scenario	Reuse Scenarios	Reuse Scenario Exposure Characteristics	Necessary Remediation Levels	Remarks
Warehouse with PCB-contaminated paint on floor and walls ***Note:*** No other source(s) of PCBs are present or were known to be used at the site.	Shopping malls Residential townhouses Public facilities including medical facilities, schools, recreational centers ***Mixed use:*** Ground floor - commercial Upper floors - offices & residential	High occupancy	**TSCA Cleanup standards** In this scenario, the issue is the proper management of *PCB bulk product waste*. There is no cleanup standard for this type of waste in 761.62. However, post- paint removal use of the area must be in compliance with 761.30(u) which requires contaminated materials to be decontaminated via a TSCA PCB disposal approval, pursuant to an applicable standard in 761.79 or in accordance with an applicable EPA PCB spill cleanup policy. ***Note:*** For continued use, the floor and walls must be decontaminated and the PCB containing paint must be disposed of as *PCB bulk product waste* per 761.62. There are multiple disposal options for the various forms of *PCB bulk product waste*; see 761.62. If additional cleanup of the concrete is required due to the leaching of PCBs from the paint, the concrete is to be treated as *bulk PCB remediation waste*. If the self-implementing procedures of 761.61(a) are to be followed, core samples of the bare porous surface will be needed to determine the level of PCB contamination in the porous materials. For characterization sampling, follow Subpart N in conjunction with Appendix A, or another reliable sampling protocol. The cleanup level	Assumes PCB contamination is limited to interior of building (e.g., floor and walls) and that PCBs are in the paint and have not penetrated into the concrete floor. For continued use, the floor and walls must be decontaminated and the PCB containing paint must be disposed of as *PCB bulk product waste* per 761.62. If the PCBs have leached from the paint into the concrete, the contaminated concrete is a *bulk PCB remediation waste* and may require additional cleanup to meet the ≤ 1 ppm cleanup standard. Provide notification to EPA (ATTN: Regional PCB Coordinator) & others 30 days prior to initiating cleanup of the contaminated concrete. (761.61 (a)(3)(i)(A)-(E)). Non-liquid cleanup waste (e.g., non-liquid cleaning materials, personal equipment) at any concentration and *bulk PCB remediation wastes* <50 ppm may be disposed of at: an approved PCB disposal facility, a permitted or non-municipal non-hazardous waste facility pursuant to §761.61(a) or (c), or a RCRA Sec. 3004 or Sec. 3006 permitted hazardous waste landfill; manifesting and recordkeeping requirements do not apply (761.61(a)(5)(i)(B)(2)(ii) & 761.61(a)(5)(v)(A)).

Contamination Scenario	Reuse Scenarios	Reuse Scenario Exposure Characteristics	Necessary Remediation Levels	Remarks
	Warehouse Reuse Scenarios (continued)		is based on the intended reuse scenario as a high occupancy area as noted above (i.e., $\leq$ **1 ppm** in porous surfaces w/o further conditions). Otherwise, a 40 CFR 761.61(c) risk-based approval may be appropriate for this scenario. See Sec. III.A. of this document for an example of a risk-based cleanup.	A 40 CFR 761.61(c) risk-based approval may be appropriate for this scenario. See Sec. III.A. of this document for an example of a risk-based cleanup. Also see the above listed manifesting, disposal and recordkeeping requirements. *Bulk PCB remediation waste* $\geq$50 ppm must be disposed of in a RCRA Sec. 3004 or 3006 permitted hazardous waste landfill or an approved PCB disposal facility (e.g., incinerator, chemical waste landfill, an approved alternate disposal method or coordinated approval). (761.61(a)(5)(i)(B)(2)(iii).) Obtain an EPA identification number for use on the manifest (e.g., Hazardous Waste Manifest) when transporting PCB waste offsite and maintain records as required (761.202 - 761.218). Maintain records of notification and cleanup (761.125(c)(5)).
	Light industrial/commercial business parks Distribution centers including warehouse and office space	High occupancy	**TSCA Cleanup standards** The PCB containing paint is a *PCB bulk product waste*. For continued use, the floor and walls must be decontaminated. Dispose of the PCB-contaminated paint as *PCB bulk product waste* per 761.62.	

Contamination Scenario	Reuse Scenarios	Reuse Scenario Exposure Characteristics	Necessary Remediation Levels	Remarks
Scrap yard; soil contaminated with spilled PCBs	Same reuse scenarios as listed under "warehouse." New construction as either ***high or low occupancy*** should not extend beneath or beyond the cleaned up area. Likewise, the cap, if one is installed, should not be disturbed.	High occupancy	<u>**TSCA Cleanup standards**</u> ≤ **1 ppm** in residual waste or porous surface, w/o further conditions, or **>1 to ≤10 ppm** if site covered w/cap (761.61(a)(7)) & institutional control implemented (i.e., deed restriction; 761.61(a)(8)). Conduct post-cleanup sampling per 40 CFR 761.61(a)(6) and Subpart O.	Assumes PCB contamination is limited to environmental media (e.g., outside). However, if there are contaminated buildings on the property which are intended for continued use, clean up and disposal of spilled PCBs must be conducted in compliance with the *PCB remediation waste* requirements at 761.61, or as otherwise authorized under 761.30(u).
		Low occupancy	**≤25 ppm** in soil, with an institutional control (i.e., deed restriction, 761.61(a)(8)), or **>25 to ≤50 ppm** if site is secured by a fence with a PCB M_L mark & institutional control implemented (i.e., deed restriction; 761.61(a)(8)), or **>25 to ≤100 ppm** if site covered w/cap (761.61(a)(7)) & institutional control implemented (i.e., deed restriction; 761.61(a)(8)). Conduct post-cleanup sampling per 40 CFR 761.61(a)(6) and Subpart O.	There are no use restrictions on new construction provided it does not extend beneath or beyond the cleaned up area. A cap, if one has been installed, cannot be disturbed. There are no use restrictions on existing structures if PCB contamination is not present. For contaminated buildings, also see the notification, manifesting, disposal and recordkeeping requirements in "Remarks" for a warehouse with interior PCB remediation waste contamination. *PCB bulk product waste* must be disposed of in accordance with 761.62.

Contamination Scenario	Reuse Scenarios	Reuse Scenario Exposure Characteristics	Necessary Remediation Levels	Remarks
Port and industrial area with contamination from spilled PCBs and abandoned PCB-containing solvents and fuels	See reuse scenarios for scrap yard with contaminated soil.	For PCB remediation waste, see reuse scenario exposure characteristics for scrap yard with contaminated soil.	**TSCA Cleanup Standards** For PCB remediation waste, see cleanup standards for scrap yard with contaminated soil.	Certain PCB fluids may be decontaminated pursuant to 761.79(b)(1) & (b)(2) or in accordance with a risk-based decontamination approval under 761.79(h). All other PCB fluids must be disposed of in compliance with 761.60(a) or (e) or, for liquid PCB remediation wastes, in accordance with 761.61(a)(5)(iv). See "Reuse Scenarios" for scrap yard regarding new structures and "Remarks" for existing structures. Also see the notification, manifesting, disposal and recordkeeping requirements in "Remarks" for a warehouse with interior PCB remediation waste contamination.
Metalworking facilities with PCBs in chemical sludge waste	See reuse scenarios for scrap yard with contaminated soil.	See reuse scenario exposure characteristics for scrap yard with contaminated soil.	**TSCA Cleanup Standards** See cleanup standards for scrap yard with contaminated soil.	Assumes PCB contamination is in environmental media (e.g., outside). However, because of the likely dispersion of PCB fluids during use of the equipment, contamination may also extend to equipment, floors and walls. Additional sampling of these items may be required to determine the extent of contamination. Also see the notification, manifesting, disposal and recordkeeping requirements in "Remarks" for a warehouse with interior PCB remediation waste contamination.

Contamination Scenario	Reuse Scenarios	Reuse Scenario Exposure Characteristics	Necessary Remediation Levels	Remarks
Former manufacturing facility with PCBs in flourescent light ballasts	See reuse scenarios for warehouse.	See reuse scenario exposure characteristics for ware-house.	**TSCA Cleanup Standards** Intact and non-leaking PCB capacitors are authorized for use. Light ballasts containing PCB capacitors do not have to be removed ***IF*** the capacitors are intact and non-leaking and are the only source of PCBs. However, PCBs have been found in the potting material of older flourescent light fixtures, a use that is not authorized. Recommend replacing old flourescent light ballasts to avoid violations of PCB use prohibitions. Cleanup of floors/walls may be required in the event of a failure of the PCB fluorescent light ballast.	Assumes only PCB source is PCB fluorescent light ballasts and that contamination is limited to interior of building. Intact, non-leaking PCB small capacitors may be disposed as municipal solid waste (761.60(b)(2)(ii)) – manifests are not required. Fluorescent light ballasts containing PCBs in the potting material are regulated for disposal as a *PCB bulk product waste* in a RCRA Sec. 3004 or 3006 permitted hazardous waste landfill or an approved PCB disposal facility (e.g., incinerator, chemical waste landfill, an approved alternate disposal method or coordinated approval) (See 761.62(a)). If PCB remediation waste is present and PCB cleanup of walls/floors is necessary, provide notification to EPA (ATTN: Regional PCB Coordinator) and others 30 days prior to initiation of a self-implementing cleanup (761.61(a)(3)(i)(A)-(E)). Also see the manifesting, disposal and recordkeeping requirements for PCB remediation waste in "Remarks" for a warehouse.

Contamination Scenario	Reuse Scenarios	Reuse Scenario Exposure Characteristics	Necessary Remediation Levels	Remarks
Former tannery with abandoned waste PCB fluids	See reuse scenarios for warehouse.	See reuse scenario exposure characteristics for ware-house.	<u>**TSCA Cleanup Standards**</u> See cleanup standards for warehouse if PCB remediation waste is present as a result of spilled PCBs.	PCB fluids should be removed and disposed of in compliance with 761.60(a) or (e). Certain liquids containing PCBs may be decon-taminated (see 761.79(b)(1) and (b)(2) and 761.79(h)). Obtain an EPA identification number for use on the manifest when transporting PCB waste offsite and maintain records as required (761.202 - 761.218). Assumes PCB contamination from previous activities, if any, is limited to interior of building. Also see the notification, manifesting, disposal and recordkeeping requirements in "Remarks" for a warehouse if PCB remediation is necessary.
Building with roof transformer with PCB-contamination in concrete roof	No change	Low occupancy	<u>**TSCA Cleanup Standards**</u> Follow cleanup requirements per 761.61, or procedures for continued use of porous surfaces contaminated by old spills. Remove source of contamination, clean accessible porous surfaces and cover completely with 2 coatings of solvent resistant/water repellent paint or epoxy of contrasting colors, or secure a solid barrier to the surface of accessible areas of the contamination. Place the PCB M_L mark in a visible location and implement a deed restriction. (761.30(p))	If the use of the contaminated surface is to change, then all contaminated porous surfaces must be removed and disposed of or cleaned up to appropriate levels as specified in 761.61 or 761.79. Also see the notification, manifesting, disposal and recordkeeping requirements for PCB remediation waste in "Remarks" for a warehouse.

Contamination Scenario	Reuse Scenarios	Reuse Scenario Exposure Characteristics	Necessary Remediation Levels	Remarks
Industrial park with 8 tons of PCB-contaminated soil	See reuse scenario for scrap yard with contaminated soil.	Reuse scenarios may include a combination of high and low occupancy area. See reuse scenario exposure characteristics for scrap yard with contaminated soil.	**TSCA Cleanup Standards** See cleanup standards for scrap yard with contaminated soil.	See the notification, manifesting, disposal and recordkeeping requirements for PCB remediation waste in "Remarks" for a warehouse. Also see "Reuse Scenarios" for scrap yard regarding new structures and "Remarks" for use of existing structures.
Solid waste transfer station with PCB-contaminated wastes	See reuse scenarios for scrap yard with contaminated soil.		**TSCA Cleanup Standards** See cleanup standards for scrap yard with contaminated soil.	Assumes PCB wastes were abandoned on site. Wastes should be removed and disposed of as referenced in section VII.C. ("PCB Contamination and Reuse Scenarios"). If PCB remediation wastes are present, then the site should be cleaned and redeveloped based on occupancy expectations; e.g., high or low occupancy area. A 761.61(c) risk-based approval also may be appropriate for managing bulk PCB remediation waste. See the notification, manifesting, disposal and recordkeeping requirements for PCB remediation waste in "Remarks" for a warehouse. Also see "Reuse Scenarios" for a scrap yard regarding new structures and "Remarks" for use of existing structures.

APPENDIX A

REGION I, EPA-NEW ENGLAND

DRAFT
STANDARD OPERATING PROCEDURE
FOR SAMPLING CONCRETE IN THE FIELD

REGION I, EPA-NEW ENGLAND

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STANDARD OPERATING PROCEDURE
FOR SAMPLING CONCRETE IN THE FIELD

U.S. EPA-NEW ENGLAND
Region I
Quality Assurance Unit Staff
Office of Environmental Measurement and Evaluation

Prepared by:	**Alan W Peterson** **Quality Assurance Chemist**	**Date:**	12/30/97
Reviewed by:	**Andrew Beliveau** **Senior Technical Specialist**	**Date:**	12/30/97
Approved by:	**Nancy Barmakian** **Branch Chief**	**Date:**	12/30/97

Region I, EPA New England

Standard Operating Procedure for Sampling Concrete in the Field

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Region I, EPA New England

Standard Operating Procedure for Sampling Concrete in the Field

1.0 Scope and Application

The following Standard Operating Procedure (SOP) describes a concrete sampling technique which uses an impact hammer drill to generate a uniform, finely ground, powder which is easily homogenized, extracted and analyzed. This procedure is primarily geared at providing enough sample for one or two different analyses at a time. That is, the time required to generate sufficient sample for a full suite of analyses may be impractical. The concrete powder is suitable for all types of environmental analyses, with the exception of volatile compounds, and may be analyzed in the field or at a fixed laboratory. This procedure is applicable for the collection of samples from concrete floors, walls, and ceilings.

The impact hammer drill is far less labor intensive than previous techniques using coring devices, or hammers and chisels. It allows for easy selection of sample location and sample depth. Not only can the project planner control the depth to sample into the concrete, from surface samples (0 - ½ inch) down to a core of the entire slab, but the technique can also be modified to collect samples at discrete depths within the concrete slab.

Another issue with concrete sampling is the fact that the amount of time spent drilling translates into the weight of sample produced. Thus, to maximize sampling time, it is important to know the minimum amount of sample required for each analysis. To do this, the project planner should take the following steps: 1) Use the Data Quality Objective (DQO) process and familiarity with the site to develop the objectives of the sampling project and the depth(s) of sample to be collected. 2) Review the site history and any previous data collected to determined possible contaminants of concern. 3) Establish the action levels for those possible contaminants and determine the appropriate analytical methods (both field and/or fixed laboratory) to meet the DQOs of the project. 4) Based on the detection limits of these methods, determine the amount of sample required for each analysis and the total sample weight require for each sample location (including quality control samples).

As with any environmental data collection project, all aspects of a concrete sampling episode should be well thought out, prior to going out in the field, and thoroughly described in a Quality Assurance Project Plan (QAPP). The QAPP should clearly state the DQOs of the project and document a complete Quality Assurance/Quality Control program to reconcile the data generated with the established DQOs. For more information on these subjects, refer to EPA documents QA/R-5, EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations, and QA/G-4, Guidance for the Data Quality Objective Process.

2.0 Method Summary

A one-inch diameter carbide drill bit is used in a rotary impact hammer drill to generate a fine concrete powder suitable for analysis. The powder is placed in a sample container and homogenized for field or fixed laboratory analysis. The procedure can be used to sample a single depth into the concrete, or may be modified to sample the concrete at distinctly different depth zones. The modified depth sampling procedure is designed to minimize any cross contamination between the sampling zones. If different sampling depths are required, two different diameter drill bits and a vacuum sampling apparatus are employed.

3.0 Health and Safety

Eye and hearing protection are required at all times during sample drilling. A small amount of dust is generated during the drilling process. Proper respiratory protection and/or a dust control system must be in place at all times during sampling.

4.0 Interferences and Potential Problems

Since this sampling technique produces a finely ground uniform powder, physical matrix effects from variations in the sample consistency (i.e., particle size, uniformity, homogeneity, and surface condition) are minimized. Matrix spike analysis of a sample is highly recommended to monitor for any matrix related interferences.

As stated in Section 1.0 above, this sampling procedure is not recommended for volatile organic compound (VOC) analysis. The combination of heat generated during drilling and the exposure of a large amount of surface area will greatly reduce VOC recovery. If low boiling point semi-volatile compounds (i.e., naphthalene) are being analyzed, then the drill speed should be reduced to minimize heat build-up.

5.0 Equipment and Supplies

5.1 Single Depth Concrete Sampling

5.1.1 Rotary impact hammer drill
5.1.2 1-inch diameter carbide drill bits
5.1.3 Stainless steel scoopulas
5.1.4 Stainless steel spoonulas (for collecting sample in deeper holes, >2-inches)
5.1.5 Rectangular aluminum pans (to catch concrete during wall and ceiling sampling)
5.1.6 Gasoline powered generator (if alternative power source is required)

5.2 Multiple Depth Sampling (in addition to all the above)

5.2.1 ½ inch diameter carbide drill bits
5.2.2 Vacuum/sample trap assembly (see Section 7.2 and Figure 1)

5.2.2.1 Vacuum pump
5.2.2.2 2-hole rubber stopper
5.2.2.3 Glass tubing (to fit stopper)
5.2.2.4 Large glass test tubes, or Erlenmeyer flasks, for sample trap (several are suggested)
5.2.2.5 Polyethylene tubing for trap inlet (Tygon tubing may be used for the trap outlet)
5.2.2.6 Pasture pipets
5.2.2.7 Pipe cleaners
5.2.2.8 In-line dust filter (glass fiber filter, or equivalent)

6.0 Sample Containers, Preservation, and Storage

Concrete samples must be collected in glass containers for organic analyses, and may be collected in either glass or plastic containers for inorganic analyses. In general, a 2-ounce sample container with Teflon-lined cap (wide-mouth jars are preferred) will hold sufficient volume for most analyses. A 2-

ounce jar can hold roughly 90 grams sample. Note, samples which require duplicate and/or matrix spike/matrix spike duplicate analyses may require a larger sample container, or additional 2-ounce sample containers.

Organic samples are to be shipped on ice and maintained at 4°C (± 2°C) until the time of extraction and analysis. Inorganic samples may be shipped and stored at room temperature. Refer to 40 CFR Part 136 for guidelines on analysis holding times.

To maintain sample integrity, chain-of-custody procedures must be implemented at the time of sampling to 1) document all sample locations and associated field sample identification numbers, 2) document all quality control samples taken, including field duplicates, split samples for confirmatory analyses, and PE samples, and 3) document the transfer of field samples from field sampler to field chemist or fixed laboratory.

7.0 Procedure

7.1 Single Depth Concrete Sampling

Lock a 1-inch diameter carbide drill bit into the impact hammer drill and plug the drill into an appropriate power source. (A gasoline generator will be needed if electricity is not available.) For easy identification, sample locations may be pre-marked using a crayon or a non-contaminating spray paint. (Note, the actual drilling point must not be marked.) Depending on the appearance of the sample location, or the objectives of the sampling project, it may be desired to wipe the concrete surface with a clean dry cloth prior to drilling. All sampling decisions of this nature should be noted in the sampling logbook. Begin drilling in the designated location. Apply steady even pressure and let the drill do the work. Applying too much pressure will generate excessive heat and dull the drill bit prematurely. The drill will provide a finely ground concrete powder that can be easily collected, homogenized and analyzed. Having several decontaminated impact drill bits on hand will help expedite sampling when numerous sample locations are to be drilled.

Sample Collection

A ½-inch deep hole (using a 1-inch diameter drill bit) generates about 10 grams of concrete powder. Based on this and the action levels for the project, determine the sampling depth, and/or the number of sample holes to be composited, to generate sufficient sample volume for all of the required analyses. (Note, with the absorbency of concrete, a ½-inch deep hole can be considered a surface sample.)

A decontaminated stainless steel scoopula can be used to collect the sample. The powder can either be collected directly from the surface of the concrete and/or the concrete powder can be scraped back into the hole and the less rounded back edge of the scoopula can be used to collect the sample. For holes greater than 2-inches in depth, a stainless steel spoonula will make it easier to collect the sample from the bottom of the hole.

To ensure collection of a representative sample when multiple analyses are required, a concrete sample should always be collected and homogenized in a single container and then divided up into the individual containers for the various analyses or split samples. This is particularly important when sample holes are deep, or when several holes are drilled adjacent to each other to form a sample composite.

Wall and Ceiling Sampling

A team of two samplers will be required for wall and ceiling sampling. The second person will be needed to hold a clean catch surface (i.e., an aluminum pan) below the drill to collect the falling powder. For wall samples, a scoopula, or spoonula, can be used to collect remaining concrete powder from within the hole. For ceiling holes, it may be necessary to drill the hole at an angle so the concrete powder can fall freely in the collection plan (and avoid falling on the drill). Another alternative might be to use the chuck-end of the drill bit and punch a hole through the center of the collection pan. The drill bit is then mounted through the pan and into the drill. Thus, the driller can be drilling straight up while the assistant steadies the pan to catch the falling dust. As a precaution, it may be advantageous to tape a piece of plastic around the drill, just below the chuck, to avoid dust contaminating the body of the drill and entering the mechanical vents. (Note, the plastic should deflect dust from the drill, but be loose enough underneath to allow for proper ventilation.)

7.2 Multiple Depth Concrete Sampling

The above method for concrete sampling can also be used to collect samples from different depths within the concrete. To do this, two different sized drill bits (i.e., ½ inch and 1 inch) and a simple vacuum pump with a vacuum trap assembly is required (see Figure 1). First, the 1 inch drill bit is used to drill to the first level and the concrete sample is collected as described in Section 7.1. The vacuum pump is then turned on and the hole is cleaned out using the vacuum trap assembly. The drill bit is then changed to the ½ inch bit and the next depth is drilled out (the ½ inch bit is used to avoid contact with the sides of the first hole). A clean tube or flask is placed on the vacuum trap, and the sample from the second drilling is collected. To go further, the 1 inch drill is used to open up the hole to the second level, the hole is cleared, and then the ½ inch drill is used again to go to a third level, etc. Note, the holes and concrete surface should be vacuumed thoroughly to minimize any cross-contamination between sample depths.

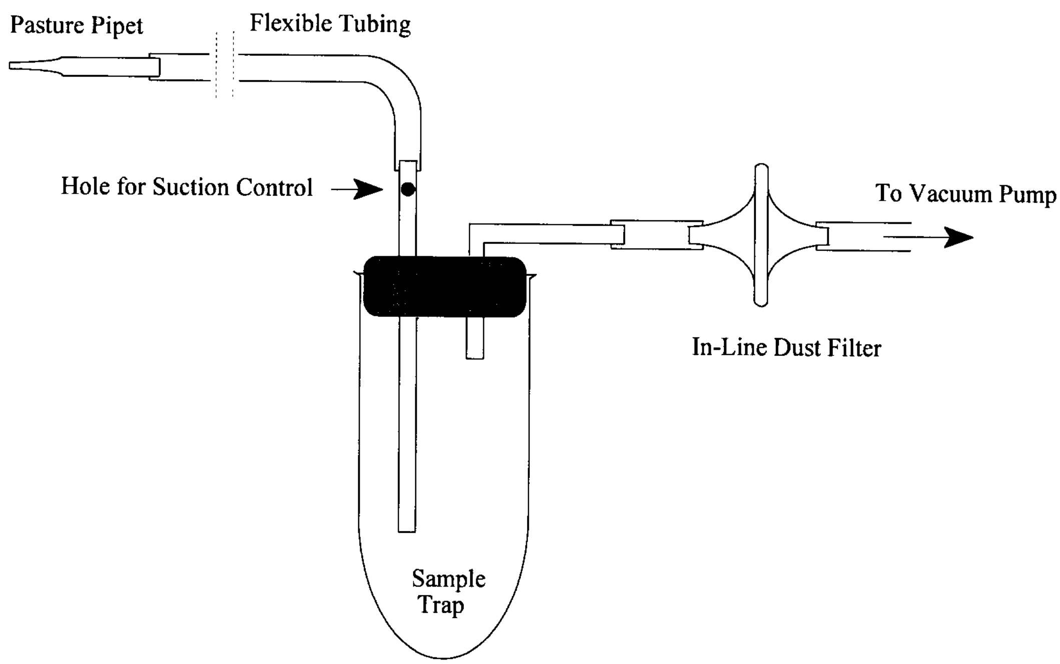
Vacuum Trap Design and Clean-out

The trap presented in Figure 1 is a convenient and thorough way for collecting and removing concrete powder from drilled holes. The trap system is designed to allow for control of the suction from the vacuum pump and easy trap clean-out between samples. Note, by placing a hole in the inlet tube (see Figure 1), a finger on the hand holding the trap can be used to control the suction at the sampling tip. Thus, when this hole is left completely open, there will be no suction, and the sampler can have complete control over where and what to sample. To change-out between samples the following steps should be taken: 1) The pasture pipet and piece of polyethylene tubing at the sample inlet should be replaced with new materials, 2) the portion of the rubber stopper and glass tubing that was in the trap should be wiped down with a clean damp paper towel (wetted with deionized water) and then dried with a fresh paper towel, 3) a clean pipe cleaner should be drawn through the glass inlet tube to remove any concrete dust present, and 4) the glass tube or flask used to collect the sample should swapped out with a clean decontaminated sample trap. Having several clean tubes or flasks on hand will facilitate change-out between samples.

7.3 Decontamination Procedure

Necessary supplies for decontamination include: two small buckets, a scrub brush, potable water, deionized water, a squirt bottle for the deionized water, and paper towels. The first bucket contains a soap and potable water solution, and the second bucket contains just potable water. Place all used drill bits and

Figure 1



utensils in the soap and water bucket. Scrub each piece thoroughly using the scrub brush. Note, the concrete powder does cling to the metal surfaces, so care should be taken during this step, especially with the twists and curves of the drill bits. Next, rinse each piece in the potable water bucket, and follow with a deionized water rinse from the squirt bottle. Place the deionized water rinsed pieces on clean paper towels and individually dry and inspect each piece. Note, all pieces should be dry prior to reuse.

8.0 Field Documentation

All Site related documentation and reports generated from concrete sampling should be maintained in the central Site file. If personal logbooks are used, legible copies of all pertinent pages must be placed in the Site file.

8.1 Field Logbooks

All field documentation should be maintained in bound logbooks with numbered pages. If loose-leaf logsheets are used to document site activities, extra care should be taken in keep track of all logsheets. The original copy of all logsheets should be maintained in the central Site file. Note, all sample locations must be documented by tying in their location to a detailed site map, or by using two or more permanent landmarks. The following information should be documented in the field logbooks:

- Site name and location,
- EPA Site Manager,
- Name and affiliation of field samplers (EPA, Contractor company name, etc.),
- Sampling date,
- Sample locations and IDs,
- Sampling times and depths, and
- Other pertinent information or comments

8.2 Sample Labeling and Chain-of-Custody

8.2.1 Sample Labels

Sample labels will be affixed to all sample containers. Labels must contain the following information:

- Project name,
- Sample number, and/or location
- Date and time of sampling,
- Analysis,
- Preservation, and
- Sampler's name.

8.2.2 Chain-of-Custody

All samples must be traced from collection, to shipment, to laboratory receipt and laboratory custody. The Chain-of-Custody (COC) Record is a multi-part form that is initiated as samples are acquired and accompanies a sample (or group of samples) as they are transferred from person to person. The COC form is signed by all individuals responsible for sampling, sample transport, and laboratory receipt. (Note, overnight deliver services, often used with sample transport, are exempt from having to sign the COC form. However, copies of all shipping invoices must be kept with the COC documentation.) One copy of the COC is retained by the field sampling crew, while the original (top, signed copy) and remaining carbonless copies are placed in a zip-lock bag and taped to the inside lid of the shipping cooler. If multiple coolers are required for a sample shipment to a single laboratory, the COC need only be sent with one of the coolers. The COC should state how many coolers are included with the shipment. All sample shipments to different laboratories require individual COC forms. The original COC form accompanies the samples until the project is complete, and is then kept in the permanent project file. A copy of the COC is also kept with the project manager, the laboratory manager, and attached to the data package.

8.2.3 Custody Seal

The Custody seal is an adhesive-backed label which is also part of the chain-of-custody process. The custody seal is used to prevent tampering with the samples after they have been collected in the field and sealed in coolers for transit to the laboratory. The Custody seals are signed and dated by a sampler and affixed across the opening edges of each cooler containing samples. Clear packing tape should be wrapped around the cooler, and over the Custody seal, to secure the cooler and avoid accidental tampering with the Custody seal.

9.0 Quality Assurance and Quality Control (QA/QC)

A solid QA/QC program is essential to establishing the quality of the data generated so that proper project decisions can be made. The following are key quality control elements which should be incorporated into a concrete sampling and analytical program.

9.1 Equipment Blanks

An equipment blank should be performed on decontaminated drill bits and collection utensils at a frequency of 1 per 20 samples or 1 per day, whichever is greater. To prepare the equipment blank, place the decontaminated drill bit and utensils in a large clean stainless steel bowl. Pour sufficient deionized water into the bowl to fill all of the required sample containers. Next, stir the drill bit and utensils in the bowl with a clean utensil to thoroughly mix the blank. Finally, decant off the equipment blank into the sample containers. Note, a clean funnel may help to pour off the equipment blank into the containers.

9.2 Field Duplicates

Field duplicates are samples collected adjacent to each other (collocated) at the same sample location (not two aliquots of the same sample). Field duplicates not only help provide an indicator of overall precision, but measure the cumulative effects of both the field and analytical precision, and also measure the representativeness of the sample. Field duplicates must be prepared and analyzed at a frequency of 1 per 20 samples or 1 per non-related concrete matrix, whichever is greater. An example of a non-related concrete matrix might be the investigation of two different types of chemical spills.

Calculate the Relative Percent Difference (RPD) between the sample and its duplicate using Equation 1.

Equation 1

$$RPD = \frac{|S - D|}{\frac{(S + D)}{2}} x\ 100$$

Where:

S = Original sample result
D = Duplicate sample result

The following general guidelines have been established for field duplicate criteria:

- If both the original and field duplicate values are ≥ practical quantitation limit (PQL), then the control limit for RPD is ≤50%,
- If one or both values are < PQL, then do not assess the RPD.

If more rigorous field duplicate criteria are needed to achieve project DQOs, then that criteria should be documented in the project QAPP.

If the field duplicate criteria specified above are not met, then flag that target element with an "*" on the final report for both the original and field duplicate samples. Report both the original and field duplicate analyses; do not report the average. Field duplicate samples should be indicated on the sample ID. For example, the sample ID can contain the suffix "FD."

9.3 Laboratory Duplicates

Laboratory duplicates are two aliquots of the same sample that are prepared, homogenized and analyzed in the same manner. (Note, proper sample homogenization is critical in producing meaningful results.) The precision of the sample preparation and analytical methods is determined by performing a laboratory duplicate analysis. Laboratory duplicates can be prepared in the field and submitted as blind samples, or the laboratory can be requested to perform the laboratory duplicate analysis. In the case of laboratory prepared duplicates, the field sampling team must be sure to provide sufficient sample volume. Laboratory duplicates must be prepared and analyzed at a frequency of 1 per 20 samples or 1 per non-related concrete matrix, whichever is greater.

Calculate the RPD between the sample and its duplicate using Equation 1. The following general guidelines have been established for laboratory duplicate criteria:

- If both the original and laboratory duplicate values are ≥ PQL, then the control limit for RPD is ≤25%,
- If one or both values are < PQL, then do not assess the RPD.

If duplicate criteria are not met, then flag that target element with an "*" on the final report for both the original and duplicate samples. Report both the original and duplicate analyses; do not report the average.

9.4 Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate samples (MS/MSDs) are two additional aliquots of a sample which are spiked with the appropriate compound(s) or analyte(s) of concern and then prepared and analyzed along with the original sample. (Note, proper sample homogenization, prior to spiking, is critical in producing meaningful results.) MS/MSDs help evaluate the effects of sample matrix on the analytical methods being used. The field sampling team must provide sufficient sample volume such that the field or fixed laboratory can prepare and analyze MS/MSDs at a frequency of 1 per 20 samples or 1 per non-related concrete matrix, whichever is greater.

Calculate the recovery of each matrix spike compound or analyte using Equation 2.

Equation 2

$$MSR = \frac{SSR - SR}{SA} \times 100$$

Where,

MSR	=	Matrix Spike Recovery,	SA	=	Spike Added
SSR	=	Spiked Sample Result,	SR	=	Sample Result

Calculate the relative percent difference (RPD) between the recoveries of each compound or analyte in the matrix spike and matrix spike duplicate using Equation 3.

Equation 3

$$RPD = \frac{|MSR - MSRD|}{\frac{(MSR + MSRD)}{2}} \times 100$$

Where,

MSR = Matrix Spike Recovery
MSRD = Matrix Spike Duplicate Recovery

9.5 Performance Evaluation Samples

In accordance with the EPA Region I Performance Evaluation Program Guidance, performance evaluation (PE) samples should be submitted for each type of analysis to be performed in the field or by the fixed laboratory performing full protocol EPA methods. PE samples provide information on the quality of the individual data packages. PE samples are certified standard reference materials (SRMs) from a source other than that used to calibrate the instrument. If both field and fixed laboratories are being used to analyze samples, at least one solid PE sample should undergo both field analysis and confirmatory full protocol EPA method analysis to facilitate data comparability. A copy of the certified values for the SRM must be submitted with the final data packages to facilitate data evaluation.

9.6 Data Verification and Validation

All field data and supporting information (including chain-of-custody) that is collected during a concrete sampling episode should be verified daily, by a person other than that performing the work, to check for possible errors.

During the project planning process, a plan for data validation should be established for all data, both for field and fixed laboratories. All data must be validated to assure that it is of a quality suitable to make project decisions. For help in developing a data validation program refer to Region I, EPA New England, Data Validation Functional Guidelines for Evaluating Environmental Analyses.

9.7 Audits

9.7.1 Internal Audits

As part of the Quality Assurance/Quality Control Program for any sampling project, a series of internal audit checks should be instituted to monitor and maintain the integrity of the sample collection process. Timely internal reviews will insure that proper sampling, decontamination, chain-of-custody and quality control procedures are being followed. Also, the internal audit review is there to monitor any corrective actions taken, and/or institute corrective actions that should have been taken and were not. All corrective actions taken must be documented in an appropriate logbook, and if any corrective actions impact the final data reported, then they must also be documented in the final report narrative. The results of all internal audits must be documented in a report, and copies of the report issued to the Project Manager and the Quality Assurance Manager. The original copy of any audit report must remain with the main project file and be available for review.

9.7.2 External Audits

The Agency reserves the right to perform periodic field audits to ensure compliance with this SOP.

10.0 References

1) Guidance for the Data Quality Objective Process, QA/G-4, EPA/600/R-96/055, September 1994.

2) EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations, QA/R-5, Interim Final, October 1997.

3) Guidance for the Preparation of Standard Operating Procedures for Quality-related Operations, QA/G-6, EPA/600/R-96/027, November 1995.

4) Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses, July 1996.

5) EPA Region I Performance Evaluation Program Guidance, July 1996.

6) U.S. EPA Code of Federal Regulations, 40 CFR, Part 136, Appendix B, Revised as of July 1995.

APPENDIX B

EXCERPTS FROM THE SELF-IMPLEMENTING PROVISIONS OF THE PCB REGULATIONS AT 40 CFR PART 761 FOR PCB WASTE CLEANUP AND DISPOSAL

The entire text of the Code of Federal Regulations for 40 CFR Part 761 can be found on the U.S. Government Printing Office's website at www.gpo.gov, under "Legislative Resources," and on the PCB website at www.epa.gov/pcb under "Laws and Regulations." This excerpt includes the following regulatory provisions which are referenced in 40 CFR 761.61:

Section 761.60(a), (b) and (c)
Section 761.65(a) and (c)
Section 761.79(b)
Section 761.125(c)(5)
Subpart N, Section 761.269
Subpart O, Section 761.283, 761.286, and 761.292

[Code of Federal Regulations]
[Title 40, Volume 28]
[Revised as of July 1, 2003]
From the U.S. Government Printing Office via GPO Access
[CITE: 40CFR761]

[Pages 579-708]

TITLE 40--PROTECTION OF ENVIRONMENT

CHAPTER I--ENVIRONMENTAL PROTECTION AGENCY (CONTINUED)

PART 761--POLYCHLORINATED BIPHENYLS (PCBs) MANUFACTURING, PROCESSING, DISTRIBUTION IN COMMERCE, AND USE PROHIBITIONS

Subpart D--Storage and Disposal

Sec. 761.60 **Disposal requirements.**

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(a) PCB liquids. PCB liquids at concentrations ≥50 ppm must be disposed of in an incinerator which complies with Sec. 761.70, except that PCB liquids at concentrations ≥50 ppm and <500 ppm may be disposed of as follows:

(1) For mineral oil dielectric fluid, in a high efficiency boiler according to Sec. 761.71(a).

(2) For liquids other than mineral oil dielectric fluid, in a high efficiency boiler according to Sec. 761.71(b).

(3) For liquids from incidental sources, such as precipitation, condensation, leachate or load separation and are associated with PCB Articles or non-liquid PCB wastes, in a chemical waste landfill which complies with Sec. 761.75 if:

(i) [Reserved]

(ii) Information is provided to or obtained by the owner or operator of the chemical waste landfill that shows that the liquids do not exceed 500 ppm PCB and are not an ignitable waste as described in Sec. 761.75(b)(8)(iii).

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(b) PCB Articles. This paragraph does not authorize disposal that is otherwise prohibited in Sec. 761.20 or elsewhere in this part.

(1) Transformers. (i) PCB Transformers shall be disposed of in accordance with either of the following:

(A) In an incinerator that complies with Sec. 761.70; or

(B) In a chemical waste landfill approved under Sec. 761.75; provided that all free-flowing liquid is removed from the transformer, the transformer is filled with a solvent, the transformer is allowed to stand for at least 18 continuous hours, and then the solvent is thoroughly removed. Any person disposing of PCB liquids that are removed from the transformer (including the dielectric fluid and all solvents used as a flush), shall do so in an incinerator that complies with Sec. 761.70 of this part, or shall decontaminate them in accordance with Sec. 761.79. Solvents may include kerosene, xylene, toluene, and other solvents in which PCBs are readily soluble. Any person disposing of these PCB liquids must ensure that the solvent flushing procedure is conducted in accordance with applicable safety and health standards as required by Federal or State regulations.

(ii) [Reserved]

(2) PCB Capacitors. (i) The disposal of any capacitor shall comply with all requirements of this subpart unless it is known from label or nameplate information, manufacturer's literature (including documented communications with the manufacturer), or chemical analysis that the capacitor does not contain PCBs.

(ii) Any person may dispose of PCB Small Capacitors as municipal solid waste, unless that person is subject to the requirements of paragraph (b)(2)(iv) of this section.

(iii) Any PCB Large High or Low Voltage Capacitor which contains 500 ppm or greater PCBs, owned by any person, shall be disposed of in accordance with either of the following:

(A) Disposal in an incinerator that complies with Sec. 761.70; or

(B) Until March 1, 1981, disposal in a chemical waste landfill that complies with Sec. 761.75.

(iv) Any person who manufactures or at any time manufactured PCB Capacitors or PCB Equipment, and acquired the PCB Capacitor in the course of such manufacturing, shall place the PCB Small Capacitors in a container meeting the DOT packaging requirements at 49 CFR parts 171 through 180 and dispose of them in accordance with either of the following:

(A) Disposal in an incinerator which complies with Sec. 761.70; or

(B) Until March 1, 1981, disposal in a chemical waste landfill which complies with Sec. 761.75.

(v) Notwithstanding the restrictions imposed by paragraph (b)(2)(iii)(B) or (b)(2)(iv)(B) of this section, PCB capacitors may be disposed of in PCB chemical waste landfills that comply with Sec. 761.75 subsequent to March 1, 1981, if the Assistant Administrator for Prevention, Pesticides and Toxic Substances publishes a notice in the Federal Register declaring that those landfills are available for such disposal and explaining the reasons for the extension or reopening. An extension or reopening for disposal of PCB capacitors that is granted under this subsection shall be subject to such terms and conditions as the Assistant Administrator may prescribe and shall be in effect for such period as the Assistant Administrator may prescribe. The Assistant Administrator may permit disposal of PCB capacitors in EPA approved chemical waste landfills after March 1, 1981, if in his opinion,

(A) Adequate incineration capability for PCB capacitors is not available, or

(B) The incineration of PCB capacitors will significantly interfere with the incineration of liquid PCBs, or

(C) There is other good cause shown.

As part of this evaluation, the Assistant Administrator will consider the impact of his action on the incentives to construct or expand PCB

incinerators.
(vi) Any person disposing of large PCB capacitors or small PCB capacitors described in paragraph (b)(2)(iv) of this section in a chemical waste landfill approved under Sec. 761.75, shall first place them in a container meeting the DOT packaging requirements at 49 CFR parts 171 through 180. In all cases, the person must fill the interstitial space in the container with sufficient absorbent material (such as soil) to absorb

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any liquid PCBs remaining in the capacitors.
(3) PCB hydraulic machines. (i) Any person disposing of PCB hydraulic machines containing PCBs at concentrations of ≥ 50 ppm, such as die casting machines, shall do so by one of the following methods:
(A) In accordance with Sec. 761.79.
(B) In a facility which is permitted, licensed, or registered by a State to manage municipal solid waste subject to part 258 of this chapter or non-municipal non-hazardous waste subject to Secs. 257.5 through 257.30 of this chapter, as applicable (excluding thermal treatment units).
(C) In a scrap metal recovery oven or smelter operating in compliance with Sec. 761.72.
(D) In a disposal facility approved under this part.
(ii) All free-flowing liquid must be removed from each machine and the liquid must be disposed of in accordance with the provisions of paragraph (a) of this section. If the PCB liquid contains $\geq 1{,}000$ ppm PCB, then the hydraulic machine must be decontaminated in accordance with Sec. 761.79 or flushed prior to disposal with a solvent listed at paragraph (b)(1)(i)(B) of this section which contains <50 ppm PCB. The solvent must be disposed of in accordance with paragraph (a) of this section or Sec. 761.79.
(4) PCB-Contaminated Electrical Equipment. Any person disposing of PCB-Contaminated Electrical Equipment, except capacitors, shall do so in accordance with paragraph (b)(6)(ii)(A) of this section. Any person disposing of Large Capacitors that contain ≥ 50 ppm but < 500 ppm PCBs shall do so in a disposal facility approved under this part.
(5) Natural gas pipeline systems containing PCBs. The owner or operator of natural gas pipeline systems containing ≥ 50 ppm PCBs, when no longer in use, shall dispose of the system either by abandonment in place of the pipe under paragraph (b)(5)(i) of this section or removal with subsequent action under paragraph (b)(5)(ii) of this section. Any person determining the PCB concentrations in natural gas pipeline systems shall do so in accordance with paragraph (b)(5)(iii) of this section.
(i) Abandonment. Natural gas pipe containing ≥ 50 ppm PCBs may be abandoned in place under one or more of the following provisions:
(A) Natural gas pipe having a nominal inside diameter of ≤ 4 inches, and containing PCBs at any concentration but no free-flowing liquids, may be abandoned in the place it was used to transport natural gas if each end is sealed closed and the pipe is either:
(1) Included in a public service notification program, such as a "one-call" system under 49 CFR 192.614(a) and (b).

(2) Filled to 50 percent or more of the volume of the pipe with grout (such as a hardening slurry consisting of cement, bentonite, or clay) or high density polyurethane foam.

(B) PCB-Contaminated natural gas pipe of any diameter, where the PCB concentration was determined after the last transmission of gas through the pipe or at the time of abandonment, that contains no free-flowing liquids may be abandoned in the place it was used to transport natural gas if each end is sealed closed.

(C) Natural gas pipe of any diameter which contains PCBs at any concentration but no free-flowing liquids, may be abandoned in the place it was used to transport natural gas, if each end is sealed closed, and either:

(1) The interior surface is decontaminated with one or more washes of a solvent in accordance with the use and disposal requirements of Sec. 761.79(d). This decontamination process must result in a recovery of 95 percent of the solvent volume introduced into the system, and the PCB concentration of the recovered wash must be <50 ppm (see Sec. 761.79(a)(1) for requirements on use and disposal of decontaminating fluids).

(2) The pipe is filled to 50 percent or more of the volume of the pipe with grout (such as a hardening slurry-like cement, bentonite, or clay) or high density polyurethane foam (except that only cement shall be used as grout under rivers or streams) and each end is sealed closed.

(D) Natural gas pipe of any diameter which contains PCBs at any concentration may be abandoned in place after decontamination in accordance with

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Sec. 761.79(c)(3), (c)(4) or (h) or a PCB disposal approval issued under Sec. 761.60(e) or Sec. 761.61(c).

(ii) Removal with subsequent action. Natural gas pipeline systems may be disposed of under one of the following provisions:

(A) The following classifications of natural gas pipe containing no free-flowing liquids may be disposed of in a facility permitted, licensed, or registered by a State to manage municipal solid waste subject to part 258 of this chapter or non-municipal non-hazardous waste subject to Secs. 257.5 through 257.30 of this chapter, as applicable (excluding thermal treatment units); a scrap metal recovery oven or smelter operating in compliance with the requirements of Sec. 761.72; or a disposal facility approved under this part:

(1) PCB-Contaminated natural gas pipe of any diameter where the PCB concentration was determined after the last transmission of gas through the pipe or during removal from the location it was used to transport natural gas.

(2) Natural gas pipe containing PCBs at any concentration and having a nominal inside diameter ≤ 4 inches.

(B) Any component of a natural gas pipeline system may be disposed of under one of the following provisions:

(1) In an incinerator operating in compliance with Sec. 761.70.

(2) In a chemical waste landfill operating in compliance with Sec. 761.75, provided that all free-flowing liquid PCBs have been thoroughly drained.

(3) As a PCB remediation waste in compliance with Sec. 761.61.
(4) In accordance with Sec. 761.79.
(iii) Characterization of natural gas pipeline systems by PCB concentration in condensate. (A) Any person disposing of a natural gas pipeline system under paragraphs (b)(5)(i)(B) or (b)(5)(ii)(A)(1) of this section must characterize it for PCB contamination by analyzing organic liquids collected at existing condensate collection points in the natural gas pipeline system. The level of PCB contamination found at a collection point is assumed to extend to the next collection point downstream. If no organic liquids are present, drain free-flowing liquids and collect standard wipe samples according to subpart M of this part. Collect condensate within 72 hours of the final transmission of natural gas through the part of the system to be abandoned or removed. Collect wipe samples after the last transmission of gas through the pipe or during removal from the location it was used to transport natural gas.
(B) PCB concentration of the organic phase of multi-phasic liquids shall be determined in accordance with Sec. 761.1(b)(4).
(iv) Disposal of pipeline liquids. (A) Any person disposing of liquids containing PCBs ≥50 ppm removed, spilled, or otherwise released from a natural gas pipeline system must do so in accordance with Sec. 761.61(a)(5)(iv) based on the PCB concentration at the time of removal from the system. Any person disposing of material contaminated by spills or other releases of PCBs ≥50 ppm from a natural gas pipeline system, must do so in accordance with Sec. 761.61 or Sec. 761.79, as applicable.
(B) Any person who markets or burns for energy recovery liquid containing PCBs at concentrations <50 ppm PCBs at the time of removal from a natural gas pipeline system must do so in accordance with the provisions pertaining to used oil at Sec. 761.20(e). No other use of liquid containing PCBs at concentrations above the quantifiable level/ level of detection removed from a natural gas pipeline system is authorized.
(6) Other PCB Articles. (i) PCB articles with concentrations at 500 ppm or greater must be disposed of:
(A) In an incinerator that complies with Sec. 761.70; or
(B) In a chemical waste landfill that complies with Sec. 761.75, provided that all free-flowing liquid PCBs have been thoroughly drained from any articles before the articles are placed in the chemical waste landfill and that the drained liquids are disposed of in an incinerator that complies with Sec. 761.70.
(ii)(A) Except as specifically provided in paragraphs (b)(1) through (b)(5) of this section, any person disposing of a PCB-Contaminated Article must do so by removing all free-flowing liquid from the article, disposing of the liquid in accordance with paragraph (a) of this section, and disposing of the PCB-Contaminated Article with no free-

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flowing liquid by one of the following methods:
(1) In accordance with Sec. 761.79.
(2) In a facility permitted, licensed, or registered by a State to manage municipal solid waste subject to part 258 of this chapter or non-

municipal non-hazardous waste subject to Secs. 257.5 through 257.30 of this chapter, as applicable (excluding thermal treatment units).

(3) In a scrap metal recovery oven or smelter operating in compliance with Sec. 761.72.

(4) In a disposal facility approved under this part.

(B) Storage for disposal of PCB-Contaminated Articles from which all free-flowing liquids have been removed is not regulated under subpart D of this part.

(C) Requirements in subparts J and K of this part do not apply to PCB-Contaminated Articles from which all free-flowing liquids have been removed.

(iii) Fluorescent light ballasts containing PCBs in their potting material must be disposed of in a TSCA-approved disposal facility, as bulk product waste under Sec. 761.62, as household waste under Sec. 761.63 (where applicable), or in accordance with the decontamination provisions of Sec. 761.79.

(7) Storage of PCB Articles. Except for a PCB Article described in paragraph (b)(2)(ii) of this section and hydraulic machines that comply with the municipal solid waste disposal provisions described in paragraph (b)(3) of this section, any PCB Article, with PCB concentrations at 50 ppm or greater, shall be stored in accordance with Sec. 761.65 prior to disposal.

(8) Persons disposing of PCB Articles must wear or use protective clothing or equipment to protect against dermal contact with or inhalation of PCBs or materials containing PCBs.

(c) PCB Containers. (1) Unless decontaminated in compliance with Sec. 761.79 or as provided in paragraph (c)(2) of this section, a PCB container with PCB concentrations at 500 ppm or greater shall be disposed of:

(i) In an incinerator which complies with Sec. 761.70, or

(ii) In a chemical waste landfill that complies with Sec. 761.75; provided that if there are PCBs in a liquid state, the PCB Container shall first be drained and the PCB liquid disposed of in accordance with paragraph (a) of this section.

(2) Any PCB Container used to contain only PCBs at a concentration less than 500 ppm shall be disposed of as municipal solid wastes; provided that if the PCBs are in a liquid state, the PCB Container shall first be drained and the PCB liquid shall be disposed of in accordance with paragraph (a) of this section.

(3) Prior to disposal, a PCB container with PCB concentrations at 50 ppm or greater shall be stored in a unit which complies with Sec. 761.65.

(Sec. 6, Pub. L. 94-469, 90 Stat. 2020 (15 U.S.C. 2605)

[44 FR 31542, May 31, 1979]

Editorial Note: For Federal Register citations affecting Sec. 761.60, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and on GPO Access.

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Sec. 761.61 **PCB remediation waste.**

This section provides cleanup and disposal options for PCB remediation waste. Any person cleaning up and disposing of PCBs managed under this section shall do so based on the concentration at which the PCBs are found. This section does not prohibit any person from implementing temporary emergency measures to prevent, treat, or contain further releases or mitigate migration to the environment of PCBs or PCB remediation waste.

(a) Self-implementing on-site cleanup and disposal of PCB remediation waste. EPA designed the self-implementing procedure for a general, moderately-sized site where there should be low residual environmental impact from remedial activities. The procedure may be less practical for larger or environmentally diverse sites. For these other sites, the self-implementing procedure still

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applies, but an EPA Regional Administrator may authorize more practical procedures through paragraph (c) of this section. Any person may conduct self-implementing cleanup and disposal of PCB remediation waste in accordance with the following requirements without prior written approval from EPA.

(1) Applicability. (i) The self-implementing procedures may not be used to clean up:

(A) Surface or ground waters.

(B) Sediments in marine and freshwater ecosystems.

(C) Sewers or sewage treatment systems.

(D) Any private or public drinking water sources or distribution systems.

(E) Grazing lands.

(F) Vegetable gardens.

(ii) The self-implementing cleanup provisions shall not be binding upon cleanups conducted under other authorities, including but not limited to, actions conducted under section 104 or section 106 of CERCLA, or section 3004(u) and (v) or section 3008(h) of RCRA.

(2) Site characterization. Any person conducting self-implementing cleanup of PCB remediation waste must characterize the site adequately to be able to provide the information required by paragraph (a)(3) of this section. Subpart N of this part provides a method for collecting new site characterization data or for assessing the sufficiency of existing site characterization data.

(3) Notification and certification. (i) At least 30 days prior to the date that the cleanup of a site begins, the person in charge of the cleanup or the owner of the property where the PCB remediation waste is located shall notify, in writing, the EPA Regional Administrator, the Director of the State or Tribal environmental protection agency, and the Director of the county or local environmental protection agency where the cleanup will be conducted. The notice shall include:

(A) The nature of the contamination, including kinds of materials contaminated.

(B) A summary of the procedures used to sample contaminated and adjacent areas and a table or cleanup site map showing PCB concentrations measured in all pre-cleanup characterization samples. The summary must include sample collection and analysis dates. The EPA Regional Administrator may require more detailed information including, but not limited to, additional characterization sampling or all sample identification numbers from all previous characterization activities at the cleanup site.

(C) The location and extent of the identified contaminated area, including topographic maps with sample collection sites cross referenced to the sample identification numbers in the data summary from paragraph (a)(3)(i)(B) of this section.

(D) A cleanup plan for the site, including schedule, disposal technology, and approach. This plan should contain options and contingencies to be used if unanticipated higher concentrations or wider distributions of PCB remediation waste are found or other obstacles force changes in the cleanup approach.

(E) A written certification, signed by the owner of the property where the cleanup site is located and the party conducting the cleanup, that all sampling plans, sample 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 designated in the certificate, and are available for EPA inspection. Persons using alternate methods for chemical extraction and chemical analysis for site characterization must include in the certificate a statement that such a method will be used and that a comparison study which meets or exceeds the requirements of subpart Q of this part, and for which records are on file, has been completed prior to verification sampling.

(ii) Within 30 calendar days of receiving the notification, the EPA Regional Administrator will respond in writing approving of the self-implementing cleanup, disapproving of the self-implementing cleanup, or requiring additional information. If the EPA Regional Administrator does not respond within 30 calendar days of receiving the

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notice, the person submitting the notification may assume that it is complete and acceptable and proceed with the cleanup according to the information the person provided to the EPA Regional Administrator. Once cleanup is underway, the person conducting the cleanup must provide any proposed changes from the notification to the EPA Regional Administrator in writing no less than 14 calendar days prior to the proposed implementation of the change. The EPA Regional Administrator will determine in his or her discretion whether to accept the change, and will respond to the change notification verbally within 7 calendar days and in writing within 14 calendar days of receiving it. If the EPA Regional Administrator does not respond verbally within 7 calendar days and in writing within 14 calendar days of receiving the change notice, the person who submitted it may deem it complete and acceptable and proceed with the cleanup according to the information in the change notice provided to the EPA Regional Administrator.

(iii) Any person conducting a cleanup activity may obtain a waiver of the 30-day notification requirement, if they receive a separate waiver, in writing, from each of the agencies they are required to notify under this section. The person must retain the original written waiver as required in paragraph (a)(9) of this section.

(4) Cleanup levels. For purposes of cleaning, decontaminating, or removing PCB remediation waste under this section, there are four general waste categories: bulk PCB remediation waste, non-porous surfaces, porous surfaces, and liquids. Cleanup levels are based on the kind of material and the potential exposure to PCBs left after cleanup is completed.

(i) Bulk PCB remediation waste. Bulk PCB remediation waste includes, but is not limited to, the following non-liquid PCB remediation waste: soil, sediments, dredged materials, muds, PCB sewage sludge, and industrial sludge.

(A) High occupancy areas. The cleanup level for bulk PCB remediation waste in high occupancy areas is ≤ 1 ppm without further conditions. High occupancy areas where bulk PCB remediation waste remains at concentrations 1 ppm and ≤ 10 ppm shall be covered with a cap meeting the requirements of paragraphs (a)(7) and (a)(8) of this section.

(B) Low occupancy areas. (1) The cleanup level for bulk PCB remediation waste in low occupancy areas is ≤ 25 ppm unless otherwise specified in this paragraph.

(2) Bulk PCB remediation wastes may remain at a cleanup site at concentrations >25 ppm and ≤ 50 ppm if the site is secured by a fence and marked with a sign including the M_L mark.

(3) Bulk PCB remediation wastes may remain at a cleanup site at concentrations >25 ppm and ≤ 100 ppm if the site is covered with a cap meeting the requirements of paragraphs (a)(7) and (a)(8) of this section.

(ii) Non-porous surfaces. In high occupancy areas, the surface PCB cleanup standard is ≤ 10 $\mu g/100$ cm^2 of surface area. In low occupancy areas, the surface cleanup standard is <100 $\mu g/100$ cm^2 of surface area. Select sampling locations in accordance with subpart P of this part or a sampling plan approved under paragraph (c) of this section.

(iii) Porous surfaces. In both high and low occupancy areas, any person disposing of porous surfaces must do so based on the levels in paragraph (a)(4)(i) of this section. Porous surfaces may be cleaned up for use in accordance with Sec. 761.79(b)(4) or Sec. 761.30(p).

(iv) Liquids. In both high and low occupancy areas, cleanup levels are the concentrations specified in Sec. 761.79(b)(1) and (b)(2).

(v) Change in the land use for a cleanup site. Where there is an actual or proposed change in use of an area cleaned up to the levels of a low occupancy area, and the exposure of people or animal life in or at that area could reasonably be expected to increase, resulting in a change in status from a low occupancy area to a high occupancy area, the owner of the area shall clean up the area in accordance with the high occupancy area cleanup levels in paragraphs (a)(4)(i) through (a)(4)(iv) of this section.

(vi) The EPA Regional Administrator, as part of his or her response to a notification submitted in accordance with Sec. 761.61(a)(3) of this part, may require cleanup of the site, or portions of

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it, to more stringent cleanup levels than are otherwise required in this section, based on the proximity to areas such as residential dwellings, hospitals, schools, nursing homes, playgrounds, parks, day care centers, endangered species habitats, estuaries, wetlands, national parks, national wildlife refuges, commercial fisheries, and sport fisheries.

(5) Site cleanup. In addition to the options set out in this paragraph, PCB disposal technologies approved under Secs. 761.60 and 761.70 are acceptable for on-site self-implementing PCB remediation waste disposal within the confines of the operating conditions of the respective approvals.

(i) Bulk PCB remediation waste. Any person cleaning up bulk PCB remediation waste shall do so to the levels in paragraph (a)(4)(i) of this section.

(A) Any person cleaning up bulk PCB remediation waste on-site using a soil washing process may do so without EPA approval, subject to all of the following:

(1) A non-chlorinated solvent is used.

(2) The process occurs at ambient temperature.

(3) The process is not exothermic.

(4) The process uses no external heat.

(5) The process has secondary containment to prevent any solvent from being released to the underlying or surrounding soils or surface waters.

(6) Solvent disposal, recovery, and/or reuse is in accordance with relevant provisions of approvals issued according to paragraphs (b)(1) or (c) of this section or applicable paragraphs of Sec. 761.79.

(B) Bulk PCB remediation waste may be sent off-site for decontamination or disposal in accordance with this paragraph, provided the waste is either dewatered on-site or transported off-site in containers meeting the requirements of the DOT Hazardous Materials Regulations (HMR) at 49 CFR parts 171 through 180.

(1) Removed water shall be disposed of according to paragraph (b)(1) of this section.

(2) Any person disposing off-site of dewatered bulk PCB remediation waste shall do so as follows:

(i) Unless sampled and analyzed for disposal according to the procedures set out in Sec. Sec. 761.283, 761.286, and 761.292, the bulk PCB remediation waste shall be assumed to contain ≥50 ppm PCBs.

(ii) Bulk PCB remediation wastes with a PCB concentration of <50 ppm shall be disposed of in accordance with paragraph (a)(5)(v)(A) of this section.

(iii) Bulk PCB remediation wastes with a PCB concentration ≥50 ppm shall be disposed of in a hazardous waste landfill permitted by EPA under section 3004 of RCRA, or by a State authorized under section 3006 of RCRA, or a PCB disposal facility approved under this part.

(iv) The generator must provide written notice, including the quantity to be shipped and highest concentration of PCBs (using extraction EPA Method 3500B/3540C or Method 3500B/3550B followed by chemical analysis using EPA Method 8082 in SW-846 or methods validated under subpart Q of this part) at least 15 days before the first shipment of bulk PCB remediation waste from each cleanup site by the generator, to each off-site facility where the waste is destined for an area not subject to a TSCA PCB Disposal Approval.

(3) Any person may decontaminate bulk PCB remediation waste in accordance with Sec. 761.79 and return the waste to the cleanup site for disposal as long as the cleanup standards of paragraph (a)(4) of this section are met.

(ii) Non-porous surfaces. PCB remediation waste non-porous surfaces shall be cleaned on-site or off-site for disposal on-site, disposal off-site, or use, as follows:

(A) For on-site disposal, non-porous surfaces shall be cleaned on-site or off-site to the levels in paragraph (a)(4)(ii) of this section using:

(1) Procedures approved under Sec. 761.79.

(2) Technologies approved under Sec. 761.60(e).

(3) Procedures or technologies approved under paragraph (c) of this section.

(B) For off-site disposal, non-porous surfaces:

(1) Having surface concentrations $<100\ \mu g/100\ cm^2$ shall be disposed of in accordance with paragraph (a)(5)(i)(B)(2)(ii) of this section. Metal

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surfaces may be thermally decontaminated in accordance with Sec. 761.79(c)(6)(i).

(2) Having surface concentrations $\geq 100\ \mu g/100\ cm^2$ shall be disposed of in accordance with paragraph (a)(5)(i)(B)(2)(iii) of this section. Metal surfaces may be thermally decontaminated in accordance with Sec. 761.79(c)(6)(ii).

(C) For use, non-porous surfaces shall be decontaminated on-site or off-site to the standards specified in Sec. 761.79(b)(3) or in accordance with Sec. 761.79(c).

(iii) Porous surfaces. Porous surfaces shall be disposed on-site or off-site as bulk PCB remediation waste according to paragraph (a)(5)(i) of this section or decontaminated for use according to Sec. 761.79(b)(4), as applicable.

(iv) Liquids. Any person disposing of liquid PCB remediation waste shall either:

(A) Decontaminate the waste to the levels specified in Sec. 761.79(b)(1) or (b)(2).

(B) Dispose of the waste in accordance with paragraph (b) of this section or an approval issued under paragraph (c) of this section.

(v) Cleanup wastes. Any person generating the following wastes during and from the cleanup of PCB remediation waste shall dispose of or reuse them using one of the following methods:

(A) Non-liquid cleaning materials and personal protective equipment waste at any concentration, including non-porous surfaces and other non-liquid materials such as rags, gloves, booties, other disposable personal protective equipment, and similar materials resulting from cleanup activities shall be either decontaminated in accordance with Sec. 761.79(b) or (c), or disposed of in one of the following facilities, without regard to the requirements of subparts J and K of this part:

(1) A facility permitted, licensed, or registered by a State to manage municipal solid waste subject to part 258 of this chapter.

(2) A facility permitted, licensed, or registered by a State to manage non-municipal non-hazardous waste subject to Sec. Sec. 257.5 through 257.30 of this chapter, as applicable.

(3) A hazardous waste landfill permitted by EPA under section 3004 of RCRA, or by a State authorized under section 3006 of RCRA.

(4) A PCB disposal facility approved under this part.

(B) Cleaning solvents, abrasives, and equipment may be reused after decontamination in accordance with Sec. 761.79.

(6) Cleanup verification--(i) Sampling and analysis. Any person collecting and analyzing samples to verify the cleanup and on-site disposal of bulk PCB remediation wastes and porous surfaces must do so in accordance with subpart O of this part. Any person collecting and analyzing samples from non-porous surfaces must do so in accordance with subpart P of this part. Any person collecting and analyzing samples from liquids must do so in accordance with Sec. 761.269. Any person conducting interim sampling during PCB remediation waste cleanup to determine when to sample to verify that cleanup is complete, may use PCB field screening tests.

(ii) Verification. (A) Where sample analysis results in a measurement of PCBs less than or equal to the levels specified in paragraph (a)(4) of this section, self-implementing cleanup is complete.

(B) Where sample analysis results in a measurement of PCBs greater than the levels specified in paragraph (a)(4) of this section, self-implementing cleanup of the sampled PCB remediation waste is not complete. The owner or operator of the site must either dispose of the sampled PCB remediation waste, or reclean the waste represented by the sample and reinitiate sampling and analysis in accordance with paragraph (a)(6)(i) of this section.

(7) Cap requirements. A cap means, when referring to on-site cleanup and disposal of PCB remediation waste, a uniform placement of concrete, asphalt, or similar material of minimum thickness spread over the area where remediation waste was removed or left in place in order to prevent or minimize human exposure, infiltration of water, and erosion. Any person designing and constructing a cap must do so in accordance with Sec. 264.310(a) of this chapter, and ensure that it complies with the permeability, sieve, liquid limit, and plasticity index parameters in Sec. 761.75(b)(1)(ii) through (b)(1)(v). A

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cap of compacted soil shall have a minimum thickness of 25 cm (10 inches). A concrete or asphalt cap shall have a minimum thickness of 15 cm (6 inches). A cap must be of sufficient strength to maintain its effectiveness and integrity during the use of the cap surface which is exposed to the environment. A cap shall not be contaminated at a level $\geq$1 ppm PCB per AroclorTM (or equivalent) or per congener.
Repairs shall begin within 72 hours of discovery for any breaches which would impair the integrity of the cap.

(8) Deed restrictions for caps, fences and low occupancy areas. When a cleanup activity conducted under this section includes the use of a fence or a cap, the owner of the site must maintain the fence or cap, in perpetuity. In addition, whenever a cap, or the procedures and requirements for a low occupancy area, is used, the owner of the site

must meet the following conditions:

(i) Within 60 days of completion of a cleanup activity under this section, the owner of the property shall:

(A) Record, in accordance with State law, a notation on the deed to the property, or on some other instrument which is normally examined during a title search, that will in perpetuity notify any potential purchaser of the property:

(1) That the land has been used for PCB remediation waste disposal and is restricted to use as a low occupancy area as defined in Sec. 761.3.

(2) Of the existence of the fence or cap and the requirement to maintain the fence or cap.

(3) The applicable cleanup levels left at the site, inside the fence, and/or under the cap.

(B) Submit a certification, signed by the owner, that he/she has recorded the notation specified in paragraph (a)(8)(i)(A) of this section to the EPA Regional Administrator.

(ii) The owner of a site being cleaned up under this section may remove a fence or cap after conducting additional cleanup activities and achieving cleanup levels, specified in paragraph (a)(4) of this section, which do not require a cap or fence. The owner may remove the notice on the deed no earlier than 30 days after achieving the cleanup levels specified in this section which do not require a fence or cap.

(9) Recordkeeping. For paragraphs (a)(3), (a)(4), and (a)(5) of this section, recordkeeping is required in accordance with Sec. 761.125(c)(5).

(b) Performance-based disposal. (1) Any person disposing of liquid PCB remediation waste shall do so according to Sec. 761.60(a) or (e), or decontaminate it in accordance with Sec. 761.79.

(2) Any person disposing of non-liquid PCB remediation waste shall do so by one of the following methods:

(i) Dispose of it in a high temperature incinerator approved under Sec. 761.70(b), an alternate disposal method approved under Sec. 761.60(e), a chemical waste landfill approved under Sec. 761.75, or in a facility with a coordinated approval issued under Sec. 761.77.

(ii) Decontaminate it in accordance with Sec. 761.79.

(3) Any person may manage or dispose of material containing <50 ppm PCBs that has been dredged or excavated from waters of the United States:

(i) In accordance with a permit that has been issued under section 404 of the Clean Water Act, or the equivalent of such a permit as provided for in regulations of the U.S. Army Corps of Engineers at 33 CFR part 320.

(ii) In accordance with a permit issued by the U.S. Army Corps of Engineers under section 103 of the Marine Protection, Research, and Sanctuaries Act, or the equivalent of such a permit as provided for in regulations of the U.S. Army Corps of Engineers at 33 CFR part 320.

(c) Risk-based disposal approval. (1) Any person wishing to sample, cleanup, or dispose of PCB remediation waste in a manner other than prescribed in paragraphs (a) or (b) of this section, or store PCB remediation waste in a manner other than prescribed in Sec. 761.65, must apply in writing to the EPA Regional Administrator in the Region where the sampling, cleanup, disposal or storage site is located, for sampling, cleanup, disposal or storage occurring in a single EPA Region; or to the Director of the National Program Chemicals Division, for sampling, cleanup, disposal or storage occurring in more than one EPA Region. Each application must contain information described in

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the notification required by Sec. 761.61(a)(3). EPA may request other information that it believes necessary to evaluate the application. No person may conduct cleanup activities under this paragraph prior to obtaining written approval by EPA.

(2) EPA will issue a written decision on each application for a risk-based method for PCB remediation wastes. EPA will approve such an application if it finds that the method will not pose an unreasonable risk of injury to health or the environment.

[63 FR 35448, June 29, 1998, as amended at 64 FR 33761, June 24, 1999]

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Sec. 761.65 **Storage for disposal.**

This section applies to the storage for disposal of PCBs at concentrations of 50 ppm or greater and PCB Items with PCB concentrations of 50 ppm or greater.

(a)(1) Storage limitations. Any PCB waste shall be disposed of as required by subpart D of this part within 1-year from the date it was determined to be PCB waste and the decision was made to dispose of it. This date is the date of removal from service for disposal and the point at which the 1-year time frame for disposal begins. PCB/radioactive waste removed from service for disposal is exempt from the 1-year time limit provided that the provisions at paragraphs (a)(2)(ii) and (a)(2)(iii) of this section are followed and the waste is managed in accordance with all other applicable Federal, State, and local laws and regulations for the management of radioactive material.

(2) One-year extension. Any person storing PCB waste that is subject to the 1-year time limit for storage and disposal in paragraph (a)(1) of this section may provide written notification to the EPA Regional Administrator for the Region in which the PCB waste is stored that their continuing attempts to dispose of or secure disposal for their waste within the 1-year time limit have been unsuccessful. Upon receipt of the notice by the EPA Regional Administrator, the time for disposal is automatically extended for 1 additional year (2 years total) if the following conditions are met:

(i) The notification is received by the EPA Regional Administrator at least 30 days before the initial 1-year time limit expires and the notice identifies the storer, the types, volumes, and locations of the waste and the reasons for failure to meet the initial 1-year time limit.

(ii) A written record documenting all continuing attempts to secure disposal is maintained until the waste is disposed of.

(iii) The written record required by paragraph (a)(2)(ii) of this section is available for inspection or submission if requested by EPA.

(iv) Continuing attempts to secure disposal were initiated within

270 days after the time the waste was first subject to the 1-year time limit requirement, as specified in paragraph (a)(1) of this section. Failure to initiate and continue attempts to secure disposal throughout the total time the waste is in storage shall automatically disqualify the notifier from receiving an automatic extension under this section.

(3) Additional extensions. Upon written request, the EPA Regional Administrator for the Region in which the wastes are stored or the Director, National Program Chemicals Division, may grant additional extensions beyond the 1-year extension authorized in paragraph (a)(2) of this section. At the time of the request, the requestor must supply specific justification for the additional extension and indicate what measures the requestor is taking to secure disposal of the waste or indicate why disposal could not be conducted during the period of the prior extension. The EPA Regional Administrator or the Director, National Program Chemicals Division may require, as a condition to granting any extension under this section, specific actions including, but not limited to, marking, inspection, recordkeeping, or financial assurance to ensure that the waste does not pose an unreasonable risk of injury to health or the environment.

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(4) Storage at an approved facility. Increased time for storage may be granted as a condition of any TSCA PCB storage or disposal approval, by the EPA Regional Administrator for the Region in which the PCBs or PCB Items are to be stored or disposed of, or by the Director, National Program Chemicals Division, if EPA determines that there is a demonstrated need or justification for additional time, that the owner or operator of the facility is pursuing relevant treatment or disposal options, and that no unreasonable risk of injury to health or the environment will result from the increased storage time. In making this determination, EPA will consider such factors as absence of any approved treatment technology and insufficient time to complete the treatment or destruction process. EPA may require as a condition of the approval that the owner or operator submit periodic progress reports.

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(c)(1) The following PCB Items may be stored temporarily in an area that does not comply with the requirements of paragraph (b) of this section for up to thirty days from the date of their removal from service, provided that a notation is attached to the PCB Item or a PCB Container (containing the item) indicating the date the item was removed from service:

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(i) Non-leaking PCB Articles and PCB Equipment;

(ii) Leaking PCB Articles and PCB Equipment if the PCB Items are placed in a non-leaking PCB Container that contains sufficient sorbent materials to absorb any liquid PCBs remaining in the PCB Items;

(iii) PCB Containers containing non-liquid PCBs such as contaminated soil, rags, and debris; and

(iv) PCB containers containing liquid PCBs at concentrations of [ge]50 ppm, provided a Spill Prevention, Control and Countermeasure Plan has been prepared for the temporary storage area in accordance with part 112 of this chapter and the liquid PCB waste is in packaging authorized in the DOT Hazardous Materials Regulations at 49 CFR parts 171 through 180 or stationary bulk storage tanks (including rolling stock such as, but not limited to, tanker trucks, as specified by DOT).

(2) Non-leaking and structurally undamaged PCB Large High Voltage Capacitors and PCB-Contaminated Electrical Equipment that have not been drained of free flowing dielectric fluid may be stored on pallets next to a storage facility that meets the requirements of paragraph (b) of this section. PCB-Contaminated Electrical Equipment that has been drained of free flowing dielectric fluid is not subject to the storage provisions of Sec. 761.65. Storage under this subparagraph will be permitted only when the storage facility has immediately available unfilled storage space equal to 10 percent of the volume of capacitors and equipment stored outside the facility. The capacitors and equipment temporarily stored outside the facility shall be checked for leaks weekly.

(3) Any storage area subject to the requirements of paragraph (b) or paragraph (c)(1) of this section shall be marked as required in subpart C Sec. 761.40(a)(10).

(4) No item of movable equipment that is used for handling PCBs and PCB Items in the storage units and that comes in direct contact with PCBs shall be removed from the storage unit area unless it has been decontaminated as specified in Sec. 761.79.

(5) All PCB Items in storage shall be checked for leaks at least once every 30 days. Any leaking PCB Items and their contents shall be transferred immediately to properly marked non-leaking containers. Any spilled or leaked materials shall be immediately cleaned up and the materials and residues containing PCBs shall be disposed of in accordance with Sec. 761.61. Records of inspections, maintenance, cleanup and disposal must be maintained in accordance with Sec. 761.180(a) and (b).

(6) Except as provided in paragraphs (c)(6)(i) and (c)(6)(ii) of this section, any container used for the storage of liquid or non-liquid PCB waste shall be in accordance with the requirements set forth in the DOT Hazardous Materials Regulations (HMR) at 49 CFR parts 171 through 180. PCB waste not subject to the HMR (i.e., PCB wastes at concentrations of <20 ppm or <1 pound of PCBs regardless of concentration) must be packaged in accordance with Packaging Group III, unless other hazards associated with the PCB waste cause it to require packaging in accordance with Packaging Groups I or II. For purposes of describing PCB waste not subject to DOT's HMR on a manifest, one may use the term "Non-DOT Regulated PCBs."

(i) Containers other than those meeting HMR performance standards may be used for storage of PCB/radioactive waste provided the following requirements are met:

(A) Containers used for storage of liquid PCB/radioactive wastes must be non-leaking.

(B) Containers used for storage of non-liquid PCB/ radioactive wastes must be designed to prevent the buildup of liquids if such containers are stored in an area meeting the containment requirements of paragraph (b)(1)(ii) of this section, as well as all other applicable State or Federal regulations or requirements for control of radioactive materials.

(C) Containers used to store both liquid and non-liquid PCB/ radioactive wastes must meet all regulations and requirements pertaining to nuclear criticality safety. Acceptable container materials currently include polyethylene and stainless steel provided that the container material is chemically compatible with the wastes being stored. Other containers may be used

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to store both liquid and non-liquid PCB/radioactive wastes if the users are able to demonstrate, to the appropriate Regional Administrator and other appropriate regulatory authorities (i.e., Nuclear Regulatory Commission, Department of Energy or the Department of Transportation), that the use of such containers is protective of health and the environment as well as public health and safety.

(ii) The following DOT specification containers that conform to the requirements of 49 CFR, chapter I, subchapter C in effect on September 30, 1991, may be used for storage and transportation activities that are not subject to DOT regulation, and may be used on a transitional basis as permitted at 49 CFR 171.14. For liquid PCBs: Specification 5 container without removable head, Specification 5B container without removable head, Specification 6D overpack with Specification 2S or 2SL polyethylene containers, or Specification 17E container. For non-liquid PCBs: Specification 5 container, Specification 5B container, or Specification 17C container.

(7) Stationary storage containers for liquid PCBs can be larger than the containers specified in paragraph (c)(6) of this section provided that:

(i) The containers are designed, constructed, and operated in compliance with Occupational Safety and Health Standards, 29 CFR 1910.106, Flammable and combustible liquids. Before using these containers for storing PCBs, the design of the containers must be reviewed to determine the effect on the structural safety of the containers that will result from placing liquids with the specific gravity of PCBs into the containers (see 29 CFR 1910.106(b)(1)(i)(f)).

(ii) The owners or operators of any facility using containers described in paragraph (c)(7)(i) of this section, shall prepare and implement a Spill Prevention Control and Countermeasure (SPCC) Plan as described in part 112 of this title. In complying with 40 CFR part 112, the owner or operator shall read "oil(s)" as "PCB(s)" whenever it appears. The exemptions for storage capacity, 40 CFR 112.1(d)(2), and the amendment of SPCC plans by the Regional Administrator, 40 CFR 112.4, shall not apply unless some fraction of the liquids stored in the container are oils as defined by section 311 of the Clean Water Act.

(8) PCB Items shall be dated on the item when they are removed from service for disposal. The storage shall be managed so that the PCB Items can be located by this date. Storage containers provided in paragraph (c)(7) of this section, shall have a record that includes for each batch of PCBs the quantity of the batch and date the batch was added to the container. The record shall also include the date, quantity, and

disposition of any batch of PCBs removed from the container.

(9) Bulk PCB remediation waste or PCB bulk product waste may be stored at the clean-up site or site of generation for 180 days subject to the following conditions:

(i) The waste is placed in a pile designed and operated to control dispersal of the waste by wind, where necessary, by means other than wetting.

(ii) The waste must not generate leachate through decomposition or other reactions.

(iii) The storage site must have:

(A) A liner that is designed, constructed, and installed to prevent any migration of wastes off or through the liner into the adjacent subsurface soil, ground water or surface water at any time during the active life (including the closure period) of the storage site. The liner may be constructed of materials that may allow waste to migrate into the liner. The liner must be:

(1) Constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrogeologic forces), physical contact with the waste or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation.

(2) Placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression, or uplift.

(3) Installed to cover all surrounding earth likely to be in contact with the waste.

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(B) A cover that meets the requirements of paragraph (c)(9)(iii)(A) of this section, is installed to cover all of the stored waste likely to be contacted with precipitation, and is secured so as not to be functionally disabled by winds expected under normal seasonal meteorological conditions at the storage site.

(C) A run-on control system designed, constructed, operated, and maintained such that:

(1) It prevents flow onto the stored waste during peak discharge from at least a 25-year storm.

(2) It collects and controls at least the water volume resulting from a 24-hour, 25-year storm. Collection and holding facilities (e.g., tanks or basins) must be emptied or otherwise managed expeditiously after storms to maintain design capacity of the system.

(iv) The provisions of this paragraph may be modified under Sec. 761.61(c).

(10) Owners or operators of storage facilities shall establish and maintain records as provided in Sec. 761.180.

(Sec. 6, Pub. L. 94-469, 90 Stat. 2020 (15 U.S.C. 2605)

[44 FR 31542, May 31, 1979. Redesignated at 47 FR 19527, May 6, 1982, and amended at 47 FR 37359, Aug. 8, 1982; 49 FR 28191, July 10, 1984; 53

FR 12524, Apr. 15, 1988; 54 FR 52746, Dec. 21, 1989; 55 FR 695, Jan. 8, 1990; 55 FR 26205, June 27, 1990; 58 FR 15809, Mar. 24, 1993; 58 FR 34205, June 23, 1993; 58 FR 59374, Nov. 9, 1993; 63 FR 35439, 35452, June 29, 1998]

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Sec. 761.79 **Decontamination standards and procedures.**

(b) Decontamination standards. Chopping (including wire chopping), distilling, filtering, oil/water separation, spraying, soaking, wiping, stripping of insulation, scraping, scarification or the use of abrasives or solvents may be used to remove or separate PCBs, to the following standards, from liquids, concrete, or non-porous surfaces.

(1) The decontamination standard for water containing PCBs is:

(i) Less than 200 µg/L (i.e., <200 ppb PCBs) for non-contact use in a closed system where there are no releases;

(ii) For water discharged to a treatment works (as defined in Sec. 503.9(aa) of this chapter) or to navigable waters, <3 µg/L (approximately <3 ppb) or a PCB discharge limit included in a permit issued under section 307(b) or 402 of the Clean Water Act; or

(iii) Less than or equal to 0.5 µg/L (i.e., approximately ≤0.5 ppb PCBs) for unrestricted use.

(2) The decontamination standard for organic liquids and non-aqueous inorganic liquids containing PCBs is <2 milligrams per kilogram (i.e., <2 ppm PCBs).

(3) The decontamination standard for non-porous surfaces in contact with liquid and non-liquid PCBs is:

(i) For unrestricted use:

(A) For non-porous surfaces previously in contact with liquid PCBs at any concentration, where no free-flowing liquids are currently present, ≤10 micrograms PCBs per 100 square centimeters (≤10 µg/100 cm^2) as measured by a standard wipe test (Sec. 761.123) at locations selected in accordance with subpart P of this part.

(B) For non-porous surfaces in contact with non-liquid PCBs (including non-porous surfaces covered with a porous surface, such as paint or coating on metal), cleaning to Visual Standard No. 2, Near-White Blast Cleaned Surface Finish, of the National Association of Corrosion Engineers (NACE). A person shall verify compliance with standard No. 2 by visually inspecting all cleaned areas.

(ii) For disposal in a smelter operating in accordance with Sec. 761.72(b):

(A) For non-porous surfaces previously in contact with liquid PCBs at any concentration, where no free-flowing liquids are currently present, <100 µg/100 cm^2 as measured by a standard wipe test (Sec. 761.123) at locations selected in accordance with subpart P of this part.

(B) For non-porous surfaces in contact with non-liquid PCBs (including non-porous surfaces covered with a porous surface, such as paint or coating on metal), cleaning to Visual Standard No. 3, Commercial Blast Cleaned Surface Finish, of the National Association of Corrosion Engineers (NACE). A person shall verify compliance with standard No. 3 by visually inspecting all cleaned areas.

(4) The decontamination standard for concrete is ≤10 μg/100 cm^2 as measured by a standard wipe test (Sec. 761.123) if the decontamination procedure is commenced within 72 hours of the initial spill of PCBs to the concrete or portion thereof being decontaminated.

[63 FR 35457, June 29, 1998, as amended at 64 FR 33761, June 24, 1999]

Subpart G--PCB Spill Cleanup Policy

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Sec. 761.125 **Requirements for PCB spill cleanup.**

(c) Requirements for cleanup of high-concentration spills and low-concentration spills involving 1 pound or more PCBs by weight (270 gallons or more of untested mineral oil). Cleanup of low-concentration spills involving 1 lb or more PCBs by weight and of all spills of materials other than low-concentration materials shall be considered complete if all of the immediate requirements, cleanup standards, sampling, and recordkeeping requirements of paragraphs (c) (1) through (5) of this section are met.

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(5) Records. The responsible party shall document the cleanup with records of decontamination. The records must be maintained for a period of 5 years. The records and certification shall consist of the following:

(i) Identification of the source of the spill, e.g., type of equipment.

(ii) Estimated or actual date and time of the spill occurrence.

(iii) The date and time cleanup was completed or terminated (if cleanup was delayed by emergency or adverse weather: the nature and duration of the delay).

(iv) A brief description of the spill location and the nature of the materials contaminated. This information should include whether the spill occurred in an outdoor electrical substation, other restricted access location, or in a nonrestricted access area.

(v) Precleanup sampling data used to establish the spill boundaries if required because of insufficient visible traces and a brief description of the sampling methodology used to establish the spill boundaries.

(vi) A brief description of the solid surfaces cleaned.

(vii) Approximate depth of soil excavation and the amount of soil removed.

(viii) Postcleanup verification sampling data and, if not otherwise apparent from the documentation, a brief description of the sampling methodology and analytical technique used.

(ix) While not required for compliance with this policy, information on the estimated cost of cleanup (by man-hours, dollars, or both) would be useful if maintained in the records.

[52 FR 10705, Apr. 2, 1987, as amended at 53 FR 40884, Oct. 19, 1988; 63 FR 35461, June 29, 1998]

Subpart N--Cleanup Site Characterization Sampling for PCB Remediation Waste in Accordance with Sec. 761.61(a)(2)

Source: 63 FR 35465, June 29, 1998, unless otherwise noted.

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Sec. 761.269 **Sampling liquid PCB remediation waste.**

(a) If the liquid is single phase, collect and analyze one sample. There are no required procedures for collecting a sample.

(b) If the liquid is multi-phasic, separate the phases, and collect and analyze a sample from each liquid phase. There are no required procedures for collecting a sample from each single phase liquid.

(c) If the liquid has a non-liquid phase which is <ls-thn-eq>0.5 percent by total weight of the waste, separate the non-liquid phase from the liquid phase and sample it separately as a non-liquid in accordance with Sec. 761.265.

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Subpart O--Sampling to Verify Completion of Self-Implementing Cleanup and On-Site Disposal of Bulk PCB Remediation Waste and Porous Surfaces in Accordance with Sec. 761.61(a)(6)

Source: 63 FR 35465, June 29, 1998, unless otherwise noted.

Sec. 761.283 **Determination of the number of samples to collect and sample collection locations.**

This section addresses how to determine the number of samples to collect and sample collection locations for bulk PCB remediation waste and porous surfaces destined to remain at a cleanup site after cleanup.

(a) Minimum number of samples. (1) At each separate cleanup site at a PCB remediation waste location, take a minimum of three samples for each type of bulk PCB remediation waste or porous surface at the cleanup site, regardless of the amount of each type of waste that is present. There is no upper limit to the number of samples required or allowed.

(2) This is an example of how to calculate the minimum number of required samples at a PCB remediation waste location. There are three distinct cleanup sites at this example location: a loading dock, a

transformer storage lot, and a disposal pit. The minimum number of samples to take appears in parentheses after each type of waste for each cleanup site. The PCB remediation wastes present at the loading dock are concrete (three samples) and clay soil (three samples). The non-liquid PCB remediation wastes present at the transformer storage lot are oily soil (three samples), clay soil (three samples) and gravel (three samples). The PCB remediation wastes present at the disposal pit are sandy soil (three samples), clay soil (three samples), oily soil (three samples), industrial sludge (three samples), and gravel (three samples).

(b) Selection of sample locations--general. (1)(i) Use a square-based grid system to overlay the entire area to be sampled. Orient the grid axes on a magnetic north-south line centered in the area and an east-west axis perpendicular to the magnetic north-south axis also centered in the area.

(ii) If the site is recleaned based on the results of cleanup verification conducted in accordance with Sec. 761.61(a)(6), follow the procedures in paragraph (b) of this section for locating sampling

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points after the recleaning, but reorient the grid axes established in paragraph (b)(1)(i) of this section by moving the origin one meter in the direction of magnetic north and one meter in the direction east of magnetic north.

(2) Mark out a series of sampling points 1.5 meters apart oriented to the grid axes. The sampling points shall proceed in every direction to the extent sufficient to result in a two-dimensional grid completely overlaying the sampling area.

(3) Collect a sample at each point if the grid falls in the cleanup area. Analyze all samples either individually or according to the compositing schemes provided in the procedures at Sec. 761.289. So long as every sample collected at a grid point is analyzed as either an individual sample or as part of a composite sample, there are no other restrictions on how many samples are analyzed.

(c) Selection of sample locations--small cleanup sites. When a cleanup site is sufficiently small or irregularly shaped that a square grid with a grid interval of 1.5 meters will not result in a minimum of three sampling points for each type of bulk PCB remediation waste or porous surface at the cleanup site, there are two options.

(1) Use a smaller square grid interval and the procedures in paragraph (b) of this section.

(2) Use the following coordinate-based random sampling scheme. If the site is recleaned based on the results of cleanup verification conducted in accordance with Sec. 761.61(a)(6), follow the procedures in this section for locating sampling points after the recleaning, but select three new pairs of sampling coordinates.

(i) Beginning in the southwest corner (lower left when facing magnetic north) of the area to be sampled, measure in centimeters (or inches) the maximum magnetic north-south dimension of the area to be sampled. Next, beginning in the southwest corner, measure in centimeters (or inches) the maximum magnetic east-west dimension of the area to be sampled. Designate the north-south and east-west dimensions (describing the west and south boundaries, respectively, of the area to be sampled), as the reference axes of a square-based grid system.

(ii) Use a random number table or random number generator to select a pair of coordinates that will locate the sample within the area to be sampled. The first coordinate in the pair is the measurement on the north-south axis. The second coordinate in the pair is the measurement on the east-west axis. Collect the sample at the intersection of an east-west line drawn through the measured spot on the north-south axis, and a north-south line drawn through the measured spot on the east-west axis. If the cleanup site is irregularly shaped and this intersection falls outside the cleanup site, select a new pair of sampling coordinates. Continue to select pairs of sampling coordinates until three are selected for each type of bulk PCB remediation waste or porous surface at the cleanup site.

(d) Area of inference. Analytical results for an individual sample point apply to the sample point and to an area of inference extending to four imaginary lines parallel to the grid axes and one half grid interval distant from the sample point in four different directions. The area of inference forms a square around the sample point. The sides of the square are parallel to the grid axes and one grid interval in length. The sample point is in the center of the square area of inference. The area of inference from a composite sample is the total of the areas of the individual samples included in the composite.

Sec. 761.286 **Sample size and procedure for collecting a sample.**

At each selected sampling location for bulk PCB remediation waste or porous surfaces, collect at least 20 milliliters of waste, or a portion of sufficient weight for the chemical analyst to measure the concentration of PCBs and still have sufficient analytical detection sensitivity to reproducibly measure PCBs at the levels designated in Sec. 761.61(a)(4). Use a core sampler having a diameter $\geq$2 cm and $\leq$3 cm. Collect waste to a maximum depth of 7.5 cms.

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Sec. 761.292 **Chemical extraction and analysis of individual samples and composite samples.**

Use either Method 3500B/3540C or Method 3500B/3550B from EPA's SW-846, Test Methods for Evaluating Solid Waste, or a method validated under subpart Q of this part, for chemical extraction of PCBs from individual and composite samples of PCB remediation waste. Use Method 8082 from SW-846, or a method validated under subpart Q of this part, to analyze these extracts for PCBs.

APPENDIX B

Carpet Sampling Protocol

Appendix D

Housedust Sampling Protocol

(Adapted from "Total Pesticide Exposure Study: Standard Operating Procedures- SOP Section 2. House Dust Sampling Procedures. University of Washington, Department of Environmental Health, Alex Lu, PhD")

2.0 Objective

Collect house dust samples for measurement of PCB in order to provide an estimate of potential exposure to residents.

2.1 Materials

Nilfisk
Ethyl alcohol
Waste container with cap for ethyl alcohol
Disposable gloves
Kimwipe™
Measuring tape and masking tape
Housedust Sample Data Sheets
Sharpie and sample labels
Field notebook
Nilfisk GS-80 or GM-80 vacuum cleaner
Nilfisk GS-80 or GM-80 vacuum cleaner accessories (vacuum cleaner bags, polyliner bags, straight steel wand, 32-mm anti-static vacuum hose, 32-mm anti-static vacuum hose coupler components, and 5" upholstery nozzle)
Extension cord
Adapter (3-prong to 2-prong)
Vacuum template (1 m x 1 m template)
Ziplock plastic bags (9" x 13")
Squeeze bottle (filled with deionized water)
Regular pen
Storage boxes (for transporting supplies)
Paper towels
Camel-hair paintbrush

2.2 Pre-field Preparation

Clean the Nilfisk vacuum hoses, curved plastic tubes, and upholstery nozzles with soap and water, tap water rinse and solvent rinse with ethyl alcohol.

2.3 Field Base Procedures

There are really no procedures that need to be performed at the Field Base with respect to the house dust samples. Simply keep the samples (in their ziplock bags) secured in a storage box or cooler (no ice is necessary).

2.4 On-site Preparation

1. Complete the Housedust Sample Data Sheet with homeowner.
2. Label each data sheet with the appropriate home owner identification number.
3. Date and initial all data sheets.

2.5 Criteria for Sampling

1. Explain to the parent that you wish to vacuum their carpet. Ask the parent where the best place is for plugging in the vacuum cleaner.
2. Ask the parent where the most frequently used areas of the home are located. This area usually includes the central living area of the home.
3. Collect a sample of approximately 10 grams from a high use carpeted area of the home. Sample another area of the carpet next to the area you just sampled if you do not collect sufficient dust. Do not sample within 3 feet of the doorway.

2.6 Housedust Sampling Procedures

2.6.1 Setting up the Nilfisk Vacuum Cleaner

1. The Nilfisk unit is divided into three layers: the top layer is the high efficiency particulate air (HEPA) filter; the middle layer is where the motor and main filter can be found; and the lower layer is the container in which the polyliner and vacuum collection bags are placed.
2. Unsnap the two lower container clips and pull up on the Nilfisk unit handle to remove the top two-thirds of the Nilfisk unit. With a lightly moistened paper towel, wipe clean the lower container of the Nilfisk unit, in particular the hose socket where the hose connects to the Nilfisk unit. Attach a new vacuum collection bag by placing the plastic ring on the bag around the hose socket tube on the interior wall of the lower container of the Nilfisk unit. Carefully place a polyliner bag around the vacuum collection bag. The opening of the polyliner bag should loosely wrap around where the vacuum bag attaches to the hose socket tube.

3. Place the top two-thirds of the Nilfisk unit back onto the lower container until it fits snugly in the grooves. Snap shut the lower container clips.

4. Connect one end of the 2-m length of 32-mm anti-static hose to the coupler pieces and the other end to the curved plastic tube.

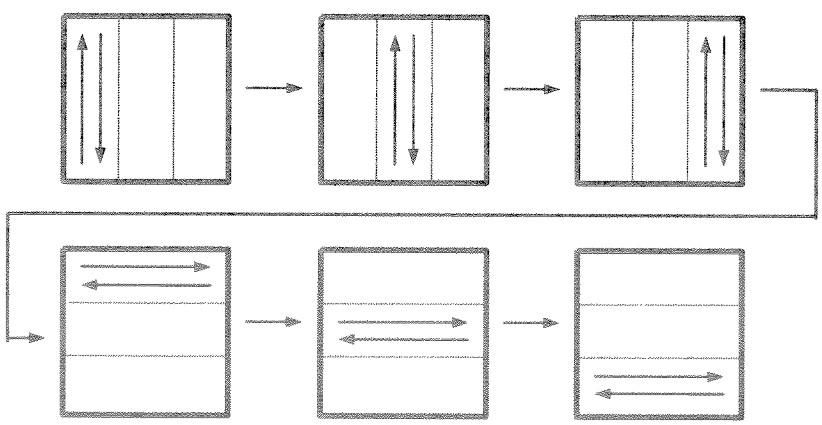
5. Attach the two steel wands together. The end that has the plastic ring around it should be connected to the curved plastic tube end of the vacuum hose. The 5" upholstery nozzle will fit snugly on the steel metal end of the two wands.

6. The coupler side of the vacuum hose can then be placed into the hose socket on the exterior of the Nilfisk unit itself. Turn the coupler clockwise to lock it into place.

7. Plug the power cord into the electric socket found on the top layer of the Nilfisk unit. Once the Nilfisk unit is plugged into an electric outlet, turn it on by pushing down on the blue button.

2.6.2. House Dust Sampling

1. Measure out a 1.0 m by 1.0 m template for the sampling area and tape it down with masking tape. Using the Nilfisk vacuum cleaner unit hooked up to the upholstery nozzle, vacuum the marked out area in a repetitive fashion (up, down, over; repeat (see diagram below)). Once the entire area has been vacuumed, vacuum the same area again in the same manner, but in a perpendicular direction to what was originally done (see diagram below). Completion of this procedure will ensure that each area within the vacuuming template will have been vacuumed over four times.



2. The dust collection procedure calls for a total dust sample of approximately 10 grams, although more is better. Sample another area of the carpet next to the area you just sampled if you do not collect sufficient dust.

   » Use the following floor, room, and area preference lists/protocols to help make decisions during the vacuuming procedure:

   A. Floor Preference
   1. Full carpet
   2. Area rugs
   3. Smooth floors

   B. Room Preference
   1. Living/common room
   2. Child's bedroom
   3. Kitchen/dining area
   4. Use your judgment and be sure to record your choice

   C. Area Protocol
   1. Four (4) template areas for shaggy, ≥ 1 inch fiber carpet
   2. Six (6) template areas for low < 1 inch carpet
   3. Eight (8) template areas for smooth floors

3. Once the vacuuming procedure has been completed, lift the vacuum hose off of the ground and allow air to be sucked in for about ten (10) to fifteen (15) seconds. This will ensure that any dust particles still in the vacuum hose will be sucked into the vacuum bag.

4. Turn off the Nilfisk unit. Allow the Nilfisk unit to sit undisturbed for at least thirty (30) seconds before doing anything else with it. This delay allows the dust to settle within the vacuum bag and reduces the chance of sample loss when the polyliner and vacuum bags are removed.

5. Unsnap the two lower container clips and remove the polyliner and vacuum collection bags within it. Fold the polyliner bag carefully, making sure to seal off the vacuum collection bag inside. Label the sample with appropriate sample number and description (subject ID number and initial "E" for entry, "L" for living room, "P" for playroom, "B" for bedroom) Record this information on the sample data sheet. Record on the Housedust Sample Data Sheet the location and size of the sample area. Transfer these two bags into a prelabeled ziplock bag.

6. Place the house dust sample into a storage box or cooler (36-qt) for transfer to the Field Base. No ice is necessary.

7. Remove the used hose and nozzle and set aside for cleaning at the Field Base. With a lightly moistened paper towel (use deionized water from the squeeze bottle), wipe clean the lower container of the Nilfisk unit which held the polyliner and vacuum

collection bags. In particular, clean the hose socket where the hose connects to the Nilfisk unit. A brush can be used to clean out hard-to-reach spots. Insert a new polyliner and new vacuum collection bag. If the vacuum is to be used again immediately, attach a previously decontaminated replacement hose and nozzle.

8. Wipe the template with a moistened paper towel and store for later use.

2.7. Cleaning the Nilfisk Unit and Accessories

1. The lower containers of the Nilfisk units should be wiped down with a lightly moistened paper towel each time the polyliner and vacuum bags are replaced. Be careful not to wet the insides of the Nilfisk unit too much as excess moisture will harm the motor and HEPA filter.

2. The used vacuum hoses, curved plastic tubes, and upholstery nozzles should be cleaned at the Field Base.

3. Place a polyliner and vacuum bag into a Nilfisk unit as described above in step 2.6.1. If available, it may be useful to keep one Nilfisk unit at the Field Base specifically for cleaning purposes. Also, one polyliner bag and one vacuum bag can be reused for the cleaning procedure. Change the bags only when they appear to be worn or full.

4. If available, use the long vacuum hose brush to scrub the interior of a used vacuum hose to remove any accumulated dust. If a vacuum hose brush is not available, tie a piece of string around a moistened paper towel or kimwipe and with the aid of the Nilfisk unit's suction, maneuver the string through the vacuum hose to one end. Once this is accomplished, pull the moistened towel through the hose. Repeat this process with new towels until the towels exit the hose in a reasonably clean state. Take caution to prevent the motor from overheating if the hose opening is plugged up.

5. After carefully cleaning the interior of the hose, attach it to the Nilfisk unit. Run the unit for about 15 seconds, holding the vacuum hose in a vertical position and gently tapping it to help any dislodged particles to be sucked into the vacuum collection bag. The interior of the hose can also be brushed while the Nilfisk unit is running, but caution must be used to prevent the motor from overheating if the hose opening is plugged up. Repeat this process for each used vacuum hose.

6. Wipe the curved plastic tube with a moistened paper towel to remove any visible dirt or dust.

7. The upholstery nozzles can be washed using warm water and a little bit of soap. Make sure they have fully dried before using them again.

Housedust Sample Data Sheets

Residence Location: ____

Residence ID: ____________________

Sample Location 1: ________________ Sample Area 1 (m^2): ________________

Sample Location 2: ________________ Sample Area 2 (m^2): ________________

Comments:

____

____

____

____

____

Operator: _______________________

Date: ________________ Time: ________________

Sample Key

Indoor Dust Samples	
Resident	ID Code

Certification

This Health Consultation was prepared by the Washington State Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.

Alan Parham
Technical Project Officer, CAT, SPAB, DHAC
ATSDR

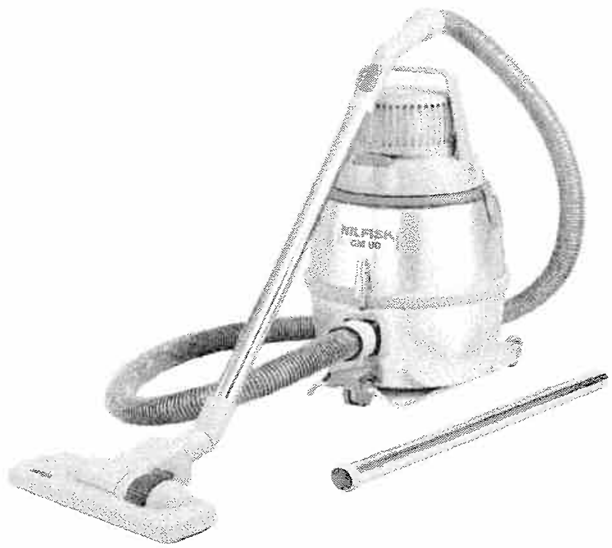
The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health consultation and concurs with the findings.

Roberta Erlwein
Team Lead, CAT, SPAB, DHAC
ATSDR

NILFISK MODEL GM-80

Specifications

Motor type	GMPJ
Voltage @ 60 Hz	110-120
Amps	9
Watts	1100
Waterlift, max.	102"
CFM	87
Tank capacity	3.25 gallons
Paper bag capacity	2.25 gallons
Filter area	1477 sq inches
Dimensions	14 x 12 x 16"
Weight	13 lbs.
Cord Length	30'
Sound level @ 6'6"	59 dB(A)



PART #	DESCRIPTION	PRICE
01790100	Nilfisk Model GM-80 with accessory kit* 115V, 1100 W	$890.95
01790190	Nilfisk Model GM-80 with no accessory kit 115V, 1100 W includes: bag, power cord and trolley	$758.80
01790032	Nilfisk GM-80 Double Insulated 115V w/ HEPA (use with power nozzle)	$1,254.54
01790111	Nilfisk Model GM-80BP with accessory kit* 115V Bypass Motor, 1100 W	$1,037.21
01790132	Nilfisk Model GM-80 HEPA-Filtered with accessory kit* 115V, 1100 W	$1,184.50
01790134	Nilfisk Model GM-80 HEPA-Filtered with accessory kit* 115V, 800 W	$1,184.50
01790300	Nilfisk Model GM-80 with accessory kit* 220V, 1100 W double-insulated for export only	$890.95
01790400	Nilfisk Model GM-80 with accessory kit* 220V, 1100 W	$889.92
01790129	Nilfisk Model GM-80 HEPA-Filtered Museum System with Variable Speed Control, Microtool Kit and accessory kit* 115V, 1100 W	$1,642.85

* Accessory Kit Includes:
Positive Twist Safety Latches, Detachable Trolley, 6'6" 32MM Plastic Hose, 2 Straight Steel Wands, Combination Floor Nozzle, Dust Brush, Crevice Nozzle, Upholstery Nozzle w/insert, 30' Power Cord and a package of 5 Paper Bags

SHIPPING INFORMATION:

The GM80 will ship in a single box that is 16 x 12 x 23" and 23 pounds. The unit is shipped by UPS or other small package carrier. Accessories will add additional weight and boxes to the order.

APPENDIX C

EPA Wipe-Sampling Guidance

WIPE SAMPLING AND DOUBLE WASH/RINSE CLEANUP

AS RECOMMENDED BY

THE ENVIRONMENTAL PROTECTION AGENCY PCB SPILL CLEANUP POLICY

June 23, 1987

Revised and Clarified on April 18, 1991

Written By:

John H. Smith, Ph.D.
Chief, PCB Disposal Section
Chemical Regulation Branch
United States Environmental Protection Agency
Washington, D.C.

CONTENTS

I. WIPE SAMPLING ACCORDING TO THE PCB SPILL CLEANUP POLICY

Introduction:

This document was prepared following the publication of the PCB Spill Cleanup Policy in the Federal Register on April 2, 1987. The procedures were demonstrated by EPA PCB program technical staff at PCB Forum '87 and PCB Forum '88. These PCB forums were privately sponsored seminars discussing the requirements of the recently issued PCB Spill Cleanup Policy. The seminars were publicly announced and held in eight cities near the EPA Regional Offices.

The revisions and clarifications to the document include the addition of an Introduction heading, the addition of three paragraphs to the Background heading, and the amendment to item 4 in "An Example of a Wipe Sampling Procedure."

This document was revised and clarified because it did not clearly and completely state EPA's intentions in an area where details were essential, that is the original version of this document assumed that a gloved hand would apply the gauze with moderate pressure, but inadvertently this requirement was never explicitly stated in the example of the wipe sampling procedure. The gloved-hand application of the gauze might have been assumed since the gloves were to be discarded after each sample. The procedure clearly did not say to apply the gauze to the surface with forceps. The EPA demonstrations and discussions at the PCB Forums clearly emphasized the pressurized application of moistened cotton gauze to the surface with a gloved hand.

Background:

The PCB spill Cleanup Policy requires wipe sampling for the determination of surface levels of PCBs resulting from PCB spills onto hard, "smooth", surfaces such as metal, wood, concrete, plastic, and glass (see Tables 1 and 2). There are several activities surrounding a PCB spill cleanup where wipe sampling may be used: (a) site characterization; (b) interim evaluation of the progress of the cleanup; and (c) the final process to verify that the cleanup has met requirements of the PCB Spill Cleanup Policy.

Wipe sampling has a number of advantages. The most apparent advantage is that wipe sampling is probably the best way to determine smooth "impervious" surface concentrations. Wipe sampling is most effective in areas with relatively large, flat, easily accessible surfaces where an accidental and/or short time exposure to PCBs has occurred. The surfaces which are sampled by wipe sampling in many cases will have been (or will be) cleaned by wiping or wiping-related activities.

Wipe sampling is best used in conjunction with statistical random sampling and/or area sampling techniques. Reduction in sampling errors for all kinds of sampling procedures can be accomplished by statistical selection of the smaller sampling sites selected to represent a larger area. Non-sampling errors may be reduced by maintaining consistency within the sampling activities; use of comprehensive quality control procedures and samples; and wherever possible, establishing a reference point for comparison.

Unfortunately, wipe sampling is not quantitative because of the fairly large variability in several component parts of sampling and the relative inefficiency of extraction of the analyte of interest from the wipes. Wipe sampling evaluation study results are known to vary widely, for example, when the same sampling is done (1) by different samplers; (2) on similarly contaminated surfaces having different textures or porosities; (3) using no solvent or solvents having different polarities; and (4) using different kinds of wiping material such as filter paper or cotton gauze.

When a decision is made to use wipe sampling, (1) it should be assumed that the results are not always reproducible; (2) extra care should be used to minimize the variability and optimize quantitation; and (3) even if representative sampling is employed, wipe sampling results can indicate residual levels substantially below true surface levels. In developing the PCB Spill Cleanup Policy, EPA has considered the advantages and disadvantages of wipe sampling and accordingly has established allowable residual PCB levels as measured by wipe sampling.

Since the objective of surface sampling is to remove PCB liquids and particles, which may be adhering to the surface, from the surface an aggressive sampling procedure is necessary. The aggressive sampling is appropriate since often the surfaces being samples have been aggressively cleaned and may drive residual PCBs into the surface. For determining the PCB surface concentrations on smooth surfaces, EPA recommends wipe sampling using cotton gauze as the wipe medium and using a gloved or doubly gloved hand to apply the wipe to the surface. This procedure requires changing into new/clean gloves between samples. EPA recognizes that there may be some transport of PCBs from the gauze to the surface of the gloves. However, this potential loss is considered more acceptable than the problems from the disadvantages of other wipe sampling procedures.

Procedures employing filter paper and/or glass fiber pads and application of these pads to surfaces by swabbing, dipping, or brushing with a pair of forceps are unacceptable. EPA recognizes that this kind of wipe sampling technique may be widely applied to address other kinds of surface sampling objectives. However, to meet EPA's PCB surface sampling objectives, these procedures are less efficient and less effective than hand wiping with the more absorbent cotton gauze.

Any compositing of wipe samples or sampling of areas larger than 100 cm^2 may not address the intent of PCB Spill Cleanup Policy verification sampling.

Answers to Questions on Wipe Sampling Procedures:

Why is does it take so much care to wipe sample correctly?

There is a considerable variability possible among wipe sampling results due to (a) the sampling technique of the sampler and (b) the efficiencies of removing PCBs from several matrices and placing the PCBs into several other matrices. Therefore it is important to reduce this variability to the maximum extent possible, so that in the event of a verification analysis by quality control samplers or government enforcement inspectors, similar wipe sampling results will be obtained for a clean site.

Two factors increase the probability of reducing errors introduced by the sampler's technique: consistency and quality control. Consistency is aided by proper training, easily understood sampling procedures, immediate availability of proper supplies, and whenever possible, using the same sampler to do all sampling at a particular site. Quality control procedures provide reference points and comparisons for the field sample results. When the analytical results from quality control samples indicate potential sampling and analysis problems, there is often sufficient time to reexamine field results. Quality control sampling can reduce or eliminate additional sampling and analysis start up and/or additional cleanup costs.

The reproducibility and efficiency of transferring residual PCBs from one place to another require that such residual PCBs must have a much greater affinity to partition, in one or more steps, from the place of origin to the ultimate destination. For all transfer steps, PCBs must exhibit a much greater propensity to be in the destination medium than in the medium of origin. There are several transfer steps in the process which starts from the removal of PCBs from the surface sampled and ends with the production of a PCB surface concentration by way of instrumental analysis.

The first of these transfer steps is removing residual PCBs from the surface to be sampled and transferring them into the sampling medium*. Gauze pads are sturdier, allow better surface to surface contact, and absorb more solvent (and more PCBs) than filter paper. Therefore, gauze pads are the absorbent/sampling medium of choice. Since PCBs are very soluble in organic solvents, organic solvent is used to moisten the gauze pads to ease the transport of PCBs from the sampled surface into the sampling media. Once the areas of where the spill occurred have been sampled (after cleanup) and the residual PCBs have been transported to the moistened gauze, then the gauze is air dried and stored/shipped for chemical analysis. The gauze is dried so as to facilitate transfer by organic solvent from the gauze to another medium during the laboratory extraction step.

In the extraction step the PCBs must be isolated from the gauze in a form amenable to the chemical analysis methods to be used. The PCBs now in the gauze are usually extracted into a solvent by repeated rinsing with and subsequent collection of organic solvent. The extraction solvent is removed from the PCBs by evaporation of the solvent prior to chemical analysis. The more volatile organic solvent evaporates and leaves the less volatile PCBs in a more concentrated solution for further treatment or instrumental analysis.

What is the best way to wipe sample for PCBs on smooth surfaces?

There are several steps in a wipe sampling procedure. The first step is to prepare the sampler for the sampling activity. The sampler may have to be advised of (through a briefing or a refresher course), or trained in, the objectives of the sampling program and the procedures to be used to accomplish those objectives.

Once advised of the objectives and sampling procedures, the sampler must either prepare or obtain the sampling plan and sampling materials. The sampler must know the exact sampling sites or know the exact procedure for selecting those sites. The sampling supplies must be sufficient in quantity and quality for all normally expected occurrences. Provisions should be also made for quality assurance samples, chain of custody forms, and shipping materials for storage.

* When PCB-contaminated office paper has been solvent rinsed, then wipe sampled and bulk sampled, some recent chemical analysis results indicate that the PCB concentration in the surface wipes is not the same as the concentration in the bulk samples. PCB levels in uncontaminated paper were used as a control. The difference in PCB levels in the wipe samples and bulk samples may

be explained by PCB migration into the paper either during cleanup to remove PCBs or during the wipe sampling step.

An important series of quality assurance measures taken before on-site sampling occurs may save considerable expense from collecting contaminated or unusable wipe samples. Sampler training can include practice sampling of surfaces spiked with PCB surrogate compounds, such as tri- and tetrachlorobenzenes to sharpen skills (a) in wiping thoroughly and consistently, and (b) avoiding cross contamination. In addition, before field sampling is conducted, method blanks can be used to verify that sampling equipment supplies and procedures do not introduce PCBs or analytical interferences to the wipe samples. Complete supplies for sampling should be cleaned, a fraction of the supplies sampled individually or through method blanks, and, if clean, the supplies should be protected against contamination or destruction while being transported to the sampling site and while at the sampling site before actual sampling occurs.

The sampler arrives at a sampling site and determines the exact location where the 100 square centimeter (cm^2) sample will be taken. The sample location may be marked or framed by a template. The sampler must be conscious of possibility of cross contamination during all stages of the sampling activity. All surfaces should be wiped with as uniform a pressure as possible. It is important to use the appropriate pressure to thoroughly wipe materials off the surface. Wiping proceeds from left to right in rows from the top to the bottom of the framed sampling area. The sampling area is wiped again with the same uniform pressure in columns from the top to the bottom from the left side to the right side of the entire framed area. It is not critical whether wiping starts at the top left or with rows first and then columns. The objective is to systematically, thoroughly, and consistently wipe the entire framed area twice, each time from a different direction and orientation.

Once the area has been wiped, the sampling gauze is allowed to air dry and is replaced in the sample vial. The sample vial is then labelled, the chain of custody filled out, and the sample prepared/stored for shipping.

Table 1

SUMMARY OF CLEANUP LEVELS
BASED ON THE EPA PCB SPILL CLEANUP POLICY

Requirements for Cleanup of Low-Concentration Spills Which Involve Less Than One Pound PCBs by Weight (Less Than 270 Gallons of Untested Mineral Oil [Containing Less Than 500 ppm PCBs])

Solid Surfaces (except for all indoor, residential surfaces other than vault areas)	Double washed/rinsed
All Indoor, Residential Surfaces Other Than Vault Areas	10 micrograms per 100 cm^2 by standard commercial wipe tests
Soil	Remove visible traces of the spill and soil within a one foot buffer of the visible traces

Table 2

SUMMARY OF CLEANUP LEVELS
BASED ON THE EPA PCB SPILL CLEANUP POLICY

Requirements for Cleanup of
High-Concentration Spills and Low-Concentration Spills
Involving One Pound or More PCBs by Weight
(270 Gallons or More of Untested Mineral Oil
[Containing Less Than 500 ppm PCBs])

Residential/Commercial/Rural	
Indoor (except vaults), and Outdoor High Contact	10 micrograms per 100 cm^2
Indoor Vaults	10 micrograms per 100 cm^2
Outdoor Low Contact	10 micrograms per 100 cm^2
Porous Surface Option	100 micrograms per 100 cm^2 plus encapsulation
Soil	10 ppm Plus a 10 Inch Cap
Restricted Access (Non-Sub-Station)	
High Contact Surfaces	10 micrograms per 100 cm^2
Low Contact Indoor Surfaces	10 micrograms per 100 cm^2
Porous Surface Option	100 micrograms per 100 cm^2 Plus Encapsulation
Outdoor Low Contact Surfaces	100 micrograms per 100 cm^2
Soil	25 ppm
Outdoor Electrical Substations	
Surfaces	100 micrograms per 100 cm^2

Soil	25 ppm or 50 ppm with Notice

Additional Wipe Sampling Information
(Contents)

An Example of a List of Wipe Sampling Supplies

Copy of Sampling Procedures and Study Objectives

Pen (Indelible Ink)

Pre-numbered Sample Labels

Tape to Cover Labels

Chain of Custody Forms

Screw Top Vials with Teflon Lined Caps
These Vials Contain Pre-Cleaned 3" x 3" Surgical Gauze Pads

Teflon Squirt Bottle for Applying Solvent to Wipes and Washing

Solvent, preferably in a bottle with a volumetric delivery top

Graduated cylinder, when not using a volumetric delivery top

Disposable Gloves

Metal Ruler

Sampling Template

Forceps for Removing (Replacing) Gauze from (into) Vials

Disposable Wipes (for cleaning ruler)

Garbage Bags/Containers (for disposal of gloves and solid waste)

Funnel

Five Gallon Solvent Can for Disposal of Rinse Solvent

Shipping/Storage Containers for Samples

Sampling Site Description Forms with Optional Instant Print Camera

An Example of Sample Site Preparations

At each sample site location:

- Mark the exact sample site with the template or a ruler

- If the site is not easily marked with a template or ruler (an irregular non-planar surface), write a detailed description of the area sampled. A instant print photograph with the ruler included (for scale) is a very valuable descriptor.

- Prepare all necessary forms and sampling logs for entry of the sampling time, date, location, and other information describing the sampling at that particular site.

- Prepare all sampling equipment for sampling the site.

An Example of a Wipe Sampling Procedure

Assume that the exact sampling site has been marked.

1. With gloved hands, remove the cap from the sampling vial.

2. With the forceps, remove the gauze from the sampling vial.

3. From a solvent bottle, use the volumetric delivery device or fill a graduated cylinder with 5 milliliters of solvent to the gauze.

4. Immediately begin applying the gauze using a gloved hand and, applying pressure, wipe the marked area completely twice, from left to right and then from top to bottom.

5. Let the gauze air dry.

6. Fold the dry gauze (sampled side inward) and return it to the sample vial.

7. Cap the sample vial.

8. Remove and discard the gloves.

9. Label the vial and fill out sampling details on the sampling forms.

10. Fill out chain of custody forms and prepare the sample for storage and shipping.

A Detailed Description of Quality Controls for Wipe Sampling Activities

Several kinds of quality control (QC) samples should be used. Each kind of sample provides an indication of the reliability of a part of the sampling and analysis process.

It is better not to identify QC samples as such when submitting the QC samples to the analytical laboratory. It is best to randomly number all samples when submitting them to the analytical laboratory. The chemical analysis laboratory does not need to know sample descriptions except for matrix type or in the event of the presence of an unusually high concentration in the wipe. Specific identification of the QC samples will not be necessary since the concentration range in these samples should be in the normal operating range of the analytical instruments.

Vials refer to the glass vials containing sampling gauze.

1. Field Blanks - at least 5% of the total samples include at least two samples each from the following:

   a. Ship unopened vials back for analysis.

   b. With gloved hands, remove the cap from a sample vial for the estimated time (record this time) of normal wipe sampling, allow the gauze to air dry without applying it to any surface, and proceed with step 7 in the wipe sampling procedure.

   c. Use the wipe sampling procedures to wipe some areas/surfaces near the sampling site but which are not expected to be contaminated.

2. Duplicates - at least 5% of total samples including at a minimum the designated samples from both the following groups:

   a. Double wipe at least two sample sites, label which was the first wipe and which was the second wipe for each of the two sites, for each kind of surface sampled.

   b. For at least two sample sites for each kind of surface sampled, wipe two adjacent identical or nearly identical areas. Clearly identify the samples as being adjacent to one another in the sample description forms.

A Detailed Description of Quality Controls for Wipe Sampling Activities (Continued)

3. Field Spikes - at least 5% of total samples including at a minimum the designated samples from each of the following groups for each kind of surface sampled. Clearly describe these samples on the sample description forms.

    a. For two vials or more, remove each gauze and moisten as for sampling and spike each wet gauze with ten micrograms each of the kind of PCBs which was spilled, wipe a contaminated surface adjacent to a sampled surface as in 2b (above), let the gauze air dry, replace the gauze, and proceed with step 7 in the wipe sampling procedure.

    b. For a second pair of vials or more, remove each gauze and moisten as for sampling, wipe a contaminated surface adjacent to a sampled surface as in 2b (above), after wipe sampling (but before air drying) spike each wet gauze with ten micrograms each of the kind of PCBs which was spilled, let the gauze air dry, replace the gauze in the vials, and proceed with step 7 in the wipe sampling procedure.

    c. For a third pair of vials or more, spike sampling surfaces adjacent to another sampled surface as in 2b (above) with ten micrograms each of the kind of PCBs which was spilled and allow to air dry; remove each gauze and moisten as for sampling; wipe the surface; let the gauze air dry, replace the gauze in the vials; and proceed with step 7 in the wipe sampling procedure.

Wipe Sampling Quality Control Samples (Summary)

1. Field Blanks - At least two samples from each category

    a. For each spill site prepare the following blanks:

        i. Unopened sampling vials containing gauze

        ii. Remove gauze but do not use to wipe

    b. For each kind of surface, wipe an uncontaminated 100 cm^2 surface with a gauze as a blank surface

2. Duplicate Samples - At least 5% of total samples

    a. For each kind of surface at each spill site:

        i. Double wipe at least two sample sites

        ii. Side by side wipe at least two sample sites

3. Spiked Samples - At least 5% of total samples

    a. Wipe no less than two samples each for each kind of surface at each spill site. All are side by side paired samples. One sample for each pair is untreated, for the other sample:

        i. Spike gauze with 10 micrograms of PCBs, then wipe the 100 cm^2 area

        ii. Wipe the 100 cm^2 area first, then spike gauze with 10 micrograms of PCBs

        iii. Spike the 100 cm^2 site with 10 micrograms of PCBs, then wipe

An Example of Quality Assurance Procedures Useful When Conducting Wipe Sampling Activities

1. Designate a person, not the sampler or chemical analyst, who is responsible for quality assurance and quality control including: training, preparation of sampling supplies, wipe sampling, sample preparation/extraction, chemical analysis, analytical data reduction, reporting of the sampling results, and conclusions drawn from the results.

2. Document the objectives of the wipe sampling and subsequent chemical analysis. Include performance requirements such as number of samples required, precision, accuracy, measurable deliverables, and schedules.

3. Develop a quality assurance plan which includes: the objectives; quality assurance/quality control procedures, audits, and schedules; persons responsible for all aspects of the sampling and chemical analysis efforts; references to all safety, training, sampling, and chemical analysis procedures; and corrective actions (including approximate times before corrective actions will occur) to be taken in the event that documented procedures cannot be or have not been followed.

4. Verify that staff doing sampling are the designated staff or suitably trained and informed replacements for the designated staff.

5. Verify that the sampling equipment and the sample gauze/vials are not going to introduce contamination into the samples.

6. Verify that sufficient quality control samples are taken and taken properly, that sampling objectives are met, and that chain of custody procedures are being followed.

7. Verify that sample extraction and chemical analysis occurs according to documented procedures. Assure that suitable and sufficient analytical quality control samples and reference standards are analyzed.

8. Verify that analytical data calculations are properly generated and the data are correctly associated with the proper samples.

9. Assure that conclusions based on the chemical analysis of the samples are in keeping with the sampling procedures and sample site locations.

10. Document quality assurance activities including: who did it, what was done, when it was done, where was it done, and why was it

done. Document and justify any deviations from documented procedures and policies.

An Example of
Procedures to Use When Cleaning Wipe Sampling Equipment

1. Using clean (or cleaned) disposable equipment is overall probably more cost-effective than cleaning and verifying that cleaned sampling equipment is free from PCBs. The second choice is not cleaning any equipment on or near the sampling site, but to have sufficient recleaned sampling equipment to completely sample a site. The least favorable situation is to clean sampling equipment for reuse at the same sampling site. If cleaning must be done at or near the sampling site, clean the sampling equipment as far from the actual site of cleanup/contaminations as possible.

2. Try to have sufficient clean materials on-site to completely sample a site (plus at least ten percent surplus for unforeseen accidents and blunders) so as not to have to clean any sampling equipment.

3. Use cleaning procedures which have been verified as effective previously. Good cleaning includes:

Washing with soapy water
Rinsing thoroughly with water
Rinsing three times thoroughly with distilled water
Rinsing with PCB-free organic solvent
Air drying for non-glass
Drying in a muffle furnace at 350°C for glass
Verification sampling and analysis of cleaned equipment
Protective packaging for shipment to the sampling site

4. The same kind of verification procedures should be used for new equipment as is used for equipment which has been cleaned:

a. Selecting a statistical sample from the equipment. For lots having large numbers of units (such as sample bottles), a 5% or less proportion of the units may be sufficient. For equipment which comes in direct contact with contaminated surfaces (such as templates) a 10% sample may be more appropriate unless historical data have verified that a smaller proportion is sufficient.

b. Rinsing "clean", dry equipment with the same amount of organic solvent as is used in the sampling procedure or more than sufficient solvent to completely cover and rinse off all contact (with the wipe sample, sampler, or the surface) surfaces of equipment. The rinseate is collected and treated as an extract from a sample gauze pad.

c. The presence of detectable levels of PCBs indicate that contamination is present and that the lot from which the verification sample(s) came must be either recleaned and reverified or disposed of appropriately.

II. DESCRIPTION OF DOUBLE WASH/RINSE

Introduction

The PCB Spill Cleanup Policy requires that low concentration spills of small amounts of PCBs on surfaces are to be removed by a double wash/rinse procedure. The objectives of the double wash/rinse are (1) to recognize the lesser hazard resulting from these small quantity spills and from the cleanup of such spills, and (2) to remove the easily removable PCB material thoroughly and quickly. It is also important not to redistribute PCBs or leave pieces of cleanup materials as a result of the cleanup procedure.

General Requirements for All Double Wash/Rinse Surfaces

For spills where there is still visible PCB-containing liquid present on the surface to be cleaned up, the double wash/rinse procedure first requires a pre-cleaning step. This step includes thoroughly wiping/mopping up the entire surface with absorbent paper or cloth material, such that there are no longer visible signs of the liquid present on the surface.

The double wash/rinse procedure called for in the cleanup of surfaces contaminated by small spills includes the two washing steps and two rinsing steps. The two washing and rinsing steps are slightly different depending on: (a) whether a contaminated surface was relatively clean before the spill, or (b) whether a surface was coated/covered with some sort of absorbent material, such as dust, dirt, grime, or grease.

Minimization of residual PCBs following the double wash/rinse procedure is facilitated by the proper selection and use of cleanup equipment. Scrubbers and the absorbent pads used in the double wash/rinse procedure shall not be dissolved by solvents or cleaners used. Scrubbers and absorbent pads shall not contain greater than 2 parts per million (weight per weight) PCBs. Washing scrubbers and absorbent pads shall not be reused. Rinsing scrubbers and absorbent pads may be reused as washing scrubbers or absorbent pads if necessary, but this is not recommended. All double wash/rinse cleaning/absorbent materials must remain intact (i.e. do not shred, crumble, or leave visible fragments on the surface) after the double wash/rinse operation.

During the double wash/rinse process, all washing and rinsing liquids/solvents must be contained, captured, and properly disposed of in accordance with local, state, and Federal regulations. Following use in the double wash/rinse process, all double wash/rinse equipment and absorbent materials must also be disposed of in accordance with local state, and Federal regulations.

Summary of The Double Wash/Rinse Procedure

General

1. Use disposable cleaning materials which do not

   - dissolve or break apart
   - contain traces of PCBs.

2. Remove any visible PCB liquid before washing/rinsing.

3. Capture and contain washing/rinsing solutions.

4. Properly dispose of cleaning materials and solutions/liquids.

Specific

1. For surfaces not covered with dirt, dust, grime, grease or other potential absorbent of PCBs:

   WASH 1: Scrub with organic solvent and wipe up the solvent.

   RINSE 1: Wipe surface with moistened pad, wipe up with dry pad.

   WASH 2: Repeat WASH 1.

   RINSE 2: Repeat RINSE 1.

2. For surfaces covered with dirt, dust, grime, grease or other potential absorbent of PCBs:

   WASH 1: Scrub with detergent and water, dry.

   RINSE 1: Rinse with water, wipe with wet adsorbent pad, dry.

   WASH 2: Scrub with organic solvent and wipe up the solvent.

   RINSE 2: Wipe surface with moistened pad, wipe up with dry pad.

Detailed Requirements for the Double Wash/Rinse

1. Specific requirements for surfaces that do not appear dusty or grimy before a spill, such as glass, automobile surfaces, newly poured concrete, and desk tops:

WASH 1.

If there is no visible liquid or after having removed the visible liquid, cover the entire surface with organic solvent in which PCBs are soluble to at least 5% by weight. Contain and collect any runoff solvent for disposal. Scrub rough surfaces with a scrub brush or disposable scrubbing pad. Add solvent such that the surface is always very wet for one minute per square foot. Wipe smooth surfaces with a solvent-soaked, disposable absorbent pad for one minute per square foot. Any surface less than one square foot shall also be washed for one minute. Wipe, mop, and/or sorb the solvent onto absorbent material until no visible traces of the solvent remain.

RINSE 1.

Wipe the surface with an absorbent pad soaked with the same organic solvent with a solvent-soaked, disposable absorbent pad for one minute per square foot. Any surface less than one square foot shall also be washed for one minute. Immediately wipe/sop up the solvent on the surface with a dry absorbent.

WASH 2.

Repeat WASH 1.

RINSE 2.

Repeat RINSE 1.

Detailed Requirements for the Double Wash/Rinse (Continued)

2. Specific requirements for dirty, dusty, grimy, or greasy surfaces or surfaces having surface coverings of some other kind of sorbant materials (where the spill probably largely sorbed onto the materials on the surface):

WASH 1.

If there is no visible liquid or after having removed the visible liquid, cover the entire surface with concentrated or industrial strength detergent or non-ionic surfactant solution. Contain and collect all cleaning solutions for proper disposal. Scrub rough surfaces with a scrub brush or scrubbing pad, adding cleaning solution such that the surface is always very wet, for one minute per square foot. Wipe smooth surfaces with a cleaning solution-soaked disposable absorbent pad for one minute per square foot. Any surface less than one square foot shall also be washed for one minute. Mop up or absorb the residual cleaner solution and suds with an absorbent pad until the surface appears dry. This cleaning should remove any residual dirt, dust, grime, or other sorbant materials left on the surface following step one (above).

RINSE 1.

Rinse off the wash solution with one gallon of water per square foot and capture the rinse water. Mop up the wet surface until the surface appears dry.

WASH 2.

Next, cover the entire dry surface with organic solvent in which PCBs are soluble to at least 5% by weight. Scrub rough surfaces with a scrub brush or scrubbing pad adding solvent such that the surface is always very wet for one minute per square foot. Wipe smooth surfaces with a solvent-soaked, disposable absorbent pad for one minute per square foot. Any surface less than one square foot shall also be washed for one minute. Wipe, mop, and/or sorb the solvent onto absorbent material until no visible traces of the solvent remain.

RINSE 2.

Wipe the surface with an absorbent pad soaked with the same organic solvent as in RINSE 1 (above) and immediately wipe up the solvent on the surface with a dry absorbent.

APPENDIX D

NIOSH Method 5503 - PCBs

POLYCHLOROBIPHENYLS 5503

mixture: $C_{12}H_{10-x}Cl_x$ [where x = 1 to 10]

MW: ca. 258 (42% Cl ; $C_{12}H_7Cl_3$); ca. 326 (54% Cl ; $C_{12}H_5Cl_5$)

CAS: Table 1

RTECS: Table 1

METHOD: 5503, Issue 2

EVALUATION: PARTIAL

Issue 1: 15 February 1984
Revision #1: 15 August 1987
Issue 2: 15 August 1994

OSHA : 1 mg/m³ (42% Cl); 0.5 mg/m³ (54% Cl)
NIOSH: 0.001 mg/m³/10 h (carcinogen)
ACGIH: 1 mg/m³ (42% Cl) (skin); 0.5 mg/m³ (54% Cl) (skin)

PROPERTIES: 42% Cl: BP 325 to 366 °C; MP -19 °C; d 1.38 g/mL @ 25 °C; VP 0.01 Pa (8 x 10^{-5} mm Hg; 1 mg/m³) @ 20 °C
54% Cl: BP 365 to 390 °C; MP 10 °C; d 1.54 g/mL @ 25 °C; VP 0.0004 Pa (3 x 10^{-6} mm Hg; 0.05 mg/m³) @ 20 °C

SYNONYMS: PCB; 1,1'-biphenyl chloro; chlorodiphenyl, 42% Cl (Aroclor 1242); and 54% Cl (Aroclor 1254)

SAMPLING

SAMPLER: FILTER + SOLID SORBENT (13-mm glass fiber + Florisil, 100 mg/50 mg)

FLOW RATE: 0.05 to 0.2 L/min or less

VOL-MIN: 1 L @ 0.5 mg/m³
-MAX: 50 L

SHIPMENT: transfer filters to glass vials after sampling

SAMPLE STABILITY: unknown for filters; 2 months for Florisil tubes [1]

BLANKS: 2 to 10 field blanks per set

ACCURACY

RANGE STUDIED: not studied

BIAS: none identified

OVERALL PRECISION ($\hat{S}_{rT}$): not evaluated

ACCURACY: not determined

MEASUREMENT

TECHNIQUE: GAS CHROMATOGRAPHY, ECD (^{63}Ni)

ANALYTE: polychlorobiphenyls

DESORPTION: filter + front section, 5 mL hexane; back section, 2 mL hexane

INJECTION VOLUME: 4-µL with 1-µL backflush

TEMPERATURE-INJECTION: 250 to 300 °C
-DETECTOR: 300 to 325 °C
-COLUMN: 180 °C

CARRIER GAS: N_2, 40 mL/min

COLUMN: glass, 1.8 m x 2-mm ID, 1.5% OV-17/1.95% QF-1 on 80/100 mesh Chromosorb WHP

CALIBRATION: standard PCB mixture in hexane

RANGE: 0.4 to 4 µg per sample [2]

ESTIMATED LOD: 0.03 µg per sample [2]

PRECISION ($\bar{S}_r$): 0.044 [1]

APPLICABILITY: The working range is 0.01 to 10 mg/m³ for a 40-L air sample [1]. With modifications, surface wipe samples may be analyzed [3,4].

INTERFERENCES: Chlorinated pesticides, such as DDT and DDE, may interfere with quantification of PCB. Sulfur-containing compounds in petroleum products also interfere [5].

OTHER METHODS: This method revises methods S120 [6] and P&CAM 244 [1]. Methods S121 [7] and P&CAM 253 [8] for PCB have not been revised.

REAGENTS:

1. Hexane, pesticide quality.
2. Florisil, 30/48 mesh sieved from 30/60 mesh. After sieving, dry at 105 °C for 45 min. Mix the cooled Florisil with 3% (w/w) distilled water.
3. Nitrogen, purified.
4. Stock standard solution of the PCB in methanol or isooctane (commercially available).*

* See SPECIAL PRECAUTIONS.

EQUIPMENT:

1. Sampler: 13-mm glass fiber filter without binders in a Swinnex cassette (Cat. No. SX 0001300, Millipore Corp.) followed by a glass tube, 7 cm long, 6-mm OD, 4-mm ID containing two sections of 30/48 mesh deactivated Florisil. The front section is preceded by glass wool and contains 100 mg and the backup section contains 50 mg; urethane foam between sections and behind the backup section. (SKC 226-39, Supelco ORBO-60, or equivalent) Join the cassette and Florisil tube with PVC tubing, 3/8" L x 9/32" OD x 5/32" ID, on the outlet of the cassette and with another piece of PVC tubing, 3/4" L x 5/16" OD x 3/16" ID, complete the union.
2. Personal sampling pump, 0.05 to 0.2 L/min, with flexible connecting tubing.
3. Tweezers.
4. Vials, glass, 4- and 7-mL, with aluminum or PTFE-lined caps
5. Gas chromatograph, electron capture detection (^{63}Ni), integrator and column (page 5503-1).
6. Volumetric flasks, 10-mL and other convenient sizes for preparing standards.
7. Syringe, 10-µL.

SPECIAL PRECAUTIONS: Avoid prolonged or repeated contact of skin with PCB and prolonged or repeated breathing of the vapor [9-11].

SAMPLING:

1. Calibrate each personal sampling pump with a representative sampler in line.
2. Break the ends of the Florisil tube immediately before sampling. Connect Florisil tube to Swinnex cassette and attach sampler to personal sampling pump with flexible tubing.
3. Sample at an accurately known flow rate between 0.05 and 0.2 L/min for a total sample size of 1 to 50 L.

   NOTE: At low PCB concentrations, the sampler was found to be efficient when operated at flow rates up to 1 L/min, for 24 hours [4]. Under these conditions, the limit of detection was 0.02 µg/m^3.
4. Transfer the glass fiber filters to 7-mL vials. Cap the Florisil tubes with plastic (not rubber) caps and pack securely for shipment.

SAMPLE PREPARATION:

5. Place the glass wool and 100-mg Florisil bed in the same 7-mL vial in which the filter was stored. Add 5.0 mL hexane.
6. In a 4-mL vial, place the 50-mg Florisil bed including the two urethane plugs. Add 2.0 mL hexane.
7. Allow to stand 20 min with occasional agitation.

CALIBRATION AND QUALITY CONTROL:

8. Calibrate daily with at least six working standards over the range 10 to 500 ng/mL PCB.
   a. Add known amounts of stock standard solution to hexane in 10-mL volumetric flasks and dilute to the mark.
   b. Analyze together with samples and blanks (steps 11 and 12).
   c. Prepare calibration graph (sum of areas of selected peaks vs. ng PCB per sample).
9. Determine desorption efficiency (DE) at least once for each lot of glass fiber filters and Florisil used for sampling in the calibration range (step 8). Prepare three tubes at each of five levels plus three media blanks.
   a. Remove and discard back sorbent section of a media blank Florisil tube.
   b. Inject known amounts of stock standard solution directly onto front sorbent section and onto a media blank filter with a microliter syringe.
   c. Cap the tube. Allow to stand overnight.
   d. Desorb (steps 5 through 7) and analyze together with working standards (steps 11 and 12).
   e. Prepare a graph of DE vs. µg PCB recovered.
10. Analyze three quality control blind spikes and three analyst spikes to ensure that the calibration graph and DE graph are in control.

MEASUREMENT:

11. Set gas chromatograph according to manufacturer's recommendations and to conditions given on page 5503-1. Inject sample aliquot manually using solvent flush technique or with autosampler.
    NOTE 1: Where individual identification of PCB is needed, a procedure using a capillary column may be used [12].
    NOTE 2: If peak area is above the linear range of the working standards, dilute with hexane, reanalyze and apply the appropriate dilution factor in calculations.
12. Sum the areas for five or more selected peaks.

CALCULATIONS:

13. Determine the mass, µg (corrected for DE) of PCB found on the glass fiber filter (W) and in the Florisil front (W_f) and back (W_b) sorbent sections, and in the average media blank filter (B) and front (B_f) and back (B_b) sorbent sections.
    NOTE: If $W_b > W_f/10$, report breakthrough and possible sample loss.
14. Calculate concentration, C, of PCB in the air volume sampled, V (L):

$$C = \frac{(W + W_f + W_b - B - B_f - B_b)}{V}, \text{ mg/m}^3.$$

EVALUATION OF METHOD:

This method uses 13-mm glass fiber filters which have not been evaluated for collecting PCB. In Method S120, however, Aroclor 1242 was completely recovered from 37-mm glass fiber filters using 15 mL isooctane [8,13,14]. With 5 mL of hexane, Aroclor 1016 was also completely recovered from 100-mg Florisil beds after one-day storage [1]. Thus, with no adsorption effect likely on glass fiber filters for PCB, 5 mL hexane should be adequate to completely extract PCB from combined filters and front sorbent sections. Sample stability on glass fiber filters has not been investigated. Breakthrough volume was >48 L for the Florisil tube at 75% RH in an atmosphere containing 10 mg/m^3 Aroclor 1016 [1].

REFERENCES:

[1] NIOSH Manual of Analytical Methods, 2nd ed., V. 1, P&CAM 244, U.S. Department of health, Education, and Welfare, Publ. (NIOSH) 77-157-A (1977).
[2] User check, Southern Research Institute, NIOSH Sequence #4121-U (unpublished, January 25, 1984).
[3] Kominsky, J. Applied Ind. Hyg. 1 (4), R-6 (1986).
[4] NIOSH Health Hazard Evaluation Report, HETA 85-289-1738 (unpublished, 1986).
[5] Hofstader, R. A., C. A. Bache, and D. J. Lisk. Bull, Environ. Contam. Toxicol., 11, 136 (1974).
[6] NIOSH Manual of Analytical Methods, 2nd ed., V. 4, S120, U.S. Department of Health, Education, and Welfare, Publ. (NIOSH) 78-175 (1978).
[7] Ibid, V. 2, S121, U.S. Department of Health, Education, and Welfare, Publ. (NIOSH) 77-157-B (1977).
[8] Ibid, Vol. 1, P&CAM 253
[9] Criteria for a Recommended Standard . . . Occupational Exposure to Polychlorinated Biphenyls, U.S. Department of Health, Education, and Welfare, Publ. (NIOSH) 77-225 (1977).
[10] Current Intelligence Bulletin 7, Polychlorinated Biphenyls (PCBs), U.S. Department of Health and Human Services, Publ. (NIOSH) 78-127 (1975).
[11] Occupational Diseases, A Guide to Their Recognition, revised ed., 255-256, U.S. Department of Health, Education, and Welfare, Publ. (NIOSH) 77-181 (1978).
[12] Dunker, J. C. and M. T. J. Hillebrand. Characterization of PCB Components in Clophen Formulations by Capillary GC-MS and GC-ECD Techniques, Environ. Sci. Technol., 17 (8), 449-456 (1983).
[13] Backup Data Report for S120, prepared under NIOSH Contract 210-76-0123, available as "Ten NIOSH Analytical Methods, Set 2," Order No. Pb 271-464 from NTIS, Springfield, VA 22161.
[14] NIOSH Research Report-Development and Validation of Methods for Sampling and Analysis of Workplace Toxic Substances, U.S. Department of Health and Human Services, Publ. (NIOSH) 80-133 (1980).
[15] Hutzinger, O., S. Safe, and V. Zitko. The Chemistry of PCBs, CRC Press, Inc., Cleveland, OH (1974).

METHOD REVISED BY:

James E. Arnold, NIOSH/DPSE; S120 originally validated under NIOSH Contract 210-76-0123.

Table 1. General Information.

Compound	CAS	RTECS
Polychlorinated Biphenyls	1336-36-3	TQ1350000
Chlorobiphenyl	27323-18-8	DV2063000
Aroclor 1016 (41% Cl)	12674-11-2	TQ1351000
Aroclor 1242 (42% Cl)	53469-21-9	TQ1356000
Aroclor 1254 (54% Cl)	11097-69-1	TQ1360000

Table 2. Composition of some Aroclors [15].

Major Components	Aroclor 1016	Aroclor 1242	Aroclor 1254
Biphenyl	0.1%	<0.1%	<0.1%
Monochlorobiphenyls	1	1	<0.1
Dichlorobiphenyls	20	16	0.5
Trichlorobiphenyls	57	49	1
Tetrachlorobiphenyls	21	25	21
Pentachlorobiphenyls	1	8	48
Hexachlorobiphenyls	<0.1	1	23
Heptachlorobiphenyls	none detected	<0.1	6
Octachlorobiphenyls	none detected	none detected	none detected

APPENDIX E

Laboratory Data and Data Validation Report

Herrera Environmental Consultants, Inc.

Memorandum

To	Project File, C09-04193-002
From	Gina Catarra, Herrera Environmental Consultants
Date	September 7, 2010
Subject	Polychlorinated Biphenyl Data Validation for King County Youth Services Center

This memorandum presents a review of polychlorinated biphenyl (PCB) data collected from the King County Youth Services Center building in Seattle, Washington. Herrera Environmental Consultants collected four sediment, 58 soil, 81 wipe, 15 destructive concrete, 35 dust, and 24 caulk samples between June 3 and August 26, 2010. Medtox collected four caulk samples on April 28, 2010 and six air samples on August 5, 2010. EMSL Analytical, Inc. of Westmont, New Jersey analyzed the air samples for PCBs using NIOSH method 5503. OnSite Environmental of Redmond, Washington analyzed all other samples for PCBs using EPA Method 8082 (USEPA 2004). Results for the following samples were validated.

Sample ID	Laboratory Reference Number	Date Collected	Matrix
7258.4-JH-19 PCB	1004-209	4/28/2010	Caulk
7258.4-JH-20 PCB	1004-209	4/28/2010	Caulk
7258.4-JH-21 PCB	1004-209	4/28/2010	Caulk
7258.4-JH-22 PCB	1004-209	4/28/2010	Caulk
CONC-E-1/8	1066-043	6/03/2010	Concrete
CONC-E-1/4	1066-043	6/03/2010	Concrete
CONC-EN-1/8	1066-043	6/03/2010	Concrete
CONC-EN/1/4	1066-043	6/03/2010	Concrete
WN-WIPE	1066-043	6/03/2010	Wipe
CONC-WN-1/8	1066-043	6/03/2010	Concrete
CONC-WN-1/4	1066-043	6/03/2010	Concrete
CONC-FACE-WN	1066-043	6/03/2010	Concrete
WS-WIPE	1066-043	6/03/2010	Wipe
CONC-WS-1/8	1066-043	6/03/2010	Concrete
CONC-WS-1/4	1066-043	6/03/2010	Concrete
CONC-FACE-WS	1066-043	6/03/2010	Concrete
N-SS-0-4	1066-043	6/03/2010	Soil
W-SS-0-4	1066-043	6/03/2010	Soil
E-SS-0-4	1066-043	6/03/2010	Soil
W-CRTYRD-CAULK	1066-043	6/03/2010	Caulk

Sample ID	Laboratory Reference Number	Date Collected	Matrix
WSW-CRTYRD-CAULK	1066-043	6/03/2010	Caulk
E-CRTYRD-CAULK	1066-043	6/03/2010	Caulk
Concrete Sealant	1007-090	7/13/2010	Concrete
ENE-CONC-FACE-1/8	1007-090	7/13/2010	Concrete
ENE-CONC-FACE-1/4	1007-090	7/13/2010	Concrete
ENC-CONC-FACE-1/8	1007-090	7/13/2010	Concrete
ENC-CONC-FACE-1/4	1007-090	7/13/2010	Concrete
307/308-Wipe-DT	1007-217	7/31/2010	Wipe
307/308-Wipe-WO	1007-217	7/31/2010	Wipe
307/308-Wipe-WI	1007-217	7/31/2010	Wipe
307/308-Wipe-VF	1007-217	7/31/2010	Wipe
307/308-Wipe-FR	1007-217	7/31/2010	Wipe
316-Wipe-DT	1007-217	7/31/2010	Wipe
316-Wipe-WO	1007-217	7/31/2010	Wipe
316-Wipe-WI	1007-217	7/31/2010	Wipe
332-Wipe-DT	1007-217	7/31/2010	Wipe
332-Wipe-WO	1007-217	7/31/2010	Wipe
332-Wipe-WI	1007-217	7/31/2010	Wipe
402-Wipe-DT	1007-217	7/31/2010	Wipe
402-Wipe-WO	1007-217	7/31/2010	Wipe
402-Wipe-WI	1007-217	7/31/2010	Wipe
412-Wipe-DT	1007-217	7/31/2010	Wipe
412-Wipe-WO	1007-217	7/31/2010	Wipe
412-Wipe-WI	1007-217	7/31/2010	Wipe
413-Wipe-DT	1007-217	7/31/2010	Wipe
413-Wipe-WO	1007-217	7/31/2010	Wipe
413-Wipe-WI	1007-217	7/31/2010	Wipe
413-Wipe-FC	1007-217	7/31/2010	Wipe
503-Wipe-DT	1007-217	7/31/2010	Wipe
503-Wipe-WO	1007-217	7/31/2010	Wipe
503-Wipe-WI	1007-217	7/31/2010	Wipe
503-Wipe-DS	1007-217	7/31/2010	Wipe
508-Wipe-DT	1007-217	7/31/2010	Wipe
508-Wipe-WO	1007-217	7/31/2010	Wipe
508-Wipe-WI	1007-217	7/31/2010	Wipe
508-Wipe-DS	1007-217	7/31/2010	Wipe
517-Wipe-DT	1007-217	7/31/2010	Wipe
517-Wipe-WO	1007-217	7/31/2010	Wipe
517-Wipe-WI	1007-217	7/31/2010	Wipe
517-Wipe-RA	1007-217	7/31/2010	Wipe
336-Wipe-DT	1007-217	7/31/2010	Wipe

Sample ID	Laboratory Reference Number	Date Collected	Matrix
336-Wipe-WO	1007-217	7/31/2010	Wipe
336-Wipe-WI	1007-217	7/31/2010	Wipe
244-Wipe-DT	1007-218	7/31/2010	Wipe
244-Wipe-WO	1007-218	7/31/2010	Wipe
244-Wipe-WI	1007-218	7/31/2010	Wipe
244-Wipe-VF	1007-218	7/31/2010	Wipe
228-Wipe-DT	1007-218	7/31/2010	Wipe
228-Wipe-WO	1007-218	7/31/2010	Wipe
228-Wipe-WI	1007-218	7/31/2010	Wipe
228-Wipe-VF	1007-218	7/31/2010	Wipe
358-Wipe-DT	1007-218	7/31/2010	Wipe
358-Wipe-WO	1007-218	7/31/2010	Wipe
358-Wipe-WI	1007-218	7/31/2010	Wipe
358-Wipe-DS	1007-218	7/31/2010	Wipe
302-Wipe-DT	1007-218	7/31/2010	Wipe
302-Wipe-WO	1007-218	7/31/2010	Wipe
302-Wipe-WI	1007-218	7/31/2010	Wipe
302-Wipe-DT	1007-218	7/31/2010	Wipe
420-Wipe-DT	1007-218	7/31/2010	Wipe
420-Wipe-WO	1007-218	7/31/2010	Wipe
420-Wipe-WI	1007-218	7/31/2010	Wipe
420-Wipe-VF	1007-218	7/31/2010	Wipe
434-Wipe-DT	1007-218	7/31/2010	Wipe
434-Wipe-WO	1007-218	7/31/2010	Wipe
434-Wipe-WI	1007-218	7/31/2010	Wipe
434-Wipe-VF	1007-218	7/31/2010	Wipe
434-Wipe-FC	1007-218	7/31/2010	Wipe
427-Wipe-DT	1007-218	7/31/2010	Wipe
427-Wipe-WO	1007-218	7/31/2010	Wipe
427-Wipe-WI	1007-218	7/31/2010	Wipe
427-Wipe-VF	1007-218	7/31/2010	Wipe
533-Wipe-DT	1007-218	7/31/2010	Wipe
533-Wipe-WO	1007-218	7/31/2010	Wipe
533-Wipe-WI	1007-218	7/31/2010	Wipe
533-Wipe-HT	1007-218	7/31/2010	Wipe
534-Wipe-DT	1007-218	7/31/2010	Wipe
534-Wipe-WO	1007-218	7/31/2010	Wipe
534-Wipe-WI	1007-218	7/31/2010	Wipe
534-Wipe-FT	1007-218	7/31/2010	Wipe
528-Wipe-DT	1007-218	7/31/2010	Wipe
528-Wipe-WO	1007-218	7/31/2010	Wipe

Sample ID	Laboratory Reference Number	Date Collected	Matrix
528-Wipe-WI	1007-218	7/31/2010	Wipe
228-Caulk	1008-007	8/02/2010	Caulk
228-Caulk	1008-007	8/02/2010	Caulk
244-Caulk	1008-007	8/02/2010	Caulk
302-Caulk	1008-007	8/02/2010	Caulk
308-Caulk	1008-007	8/02/2010	Caulk
316-Caulk	1008-007	8/02/2010	Caulk
332-Caulk	1008-007	8/02/2010	Caulk
336-Caulk	1008-007	8/02/2010	Caulk
358-Caulk	1008-007	8/02/2010	Caulk
402-Caulk	1008-007	8/02/2010	Caulk
412-Caulk	1008-007	8/02/2010	Caulk
413-Caulk	1008-007	8/02/2010	Caulk
420-Caulk	1008-007	8/02/2010	Caulk
427-Caulk	1008-007	8/02/2010	Caulk
434-Caulk	1008-007	8/02/2010	Caulk
503-Caulk	1008-007	8/02/2010	Caulk
508-Caulk	1008-007	8/02/2010	Caulk
517-Caulk	1008-007	8/02/2010	Caulk
528-Caulk	1008-007	8/02/2010	Caulk
533-Caulk	1008-007	8/02/2010	Caulk
534-Caulk	1008-007	8/02/2010	Caulk
SA4-00-SS01-00	1008-008	8/02/2010	Soil
SA4-00-SS02-06	1008-008	8/02/2010	Soil
SA4-00-SS03-12	1008-008	8/02/2010	Soil
SA4-02-SS04-00	1008-008	8/02/2010	Soil
SA4-04-SS05-00	1008-008	8/02/2010	Soil
SA4-00-SS06-00	1008-008	8/02/2010	Soil
SA4-00-SS07-06	1008-008	8/02/2010	Soil
SA4-00-SS08-12	1008-008	8/02/2010	Soil
SA4-02-SS09-00	1008-008	8/02/2010	Soil
SA4-04-SS10-00	1008-008	8/02/2010	Soil
SA5-00-SS11-00	1008-008	8/02/2010	Soil
SA5-00-SS12-06	1008-008	8/02/2010	Soil
SA5-00-SS13-12	1008-008	8/02/2010	Soil
SA5-02-SS14-00	1008-008	8/02/2010	Soil
SA5-04-SS15-00	1008-008	8/02/2010	Soil
SA5-00-SS16-00	1008-008	8/02/2010	Soil
SA5-00-SS17-06	1008-008	8/02/2010	Soil
SA5-00-SS18-12	1008-008	8/02/2010	Soil
SA5-02-SS19-00	1008-008	8/02/2010	Soil

Sample ID	Laboratory Reference Number	Date Collected	Matrix
SA5-04-SS20-00	1008-008	8/02/2010	Soil
SA6-00-SS21-00	1008-008	8/02/2010	Soil
SA6-00-SS22-06	1008-008	8/02/2010	Soil
SA6-00-SS23-12	1008-008	8/02/2010	Soil
SA6-02-SS24-00	1008-008	8/02/2010	Soil
SA6-04-SS25-00	1008-008	8/02/2010	Soil
SA6-00-SS26-00	1008-008	8/02/2010	Soil
SA6-00-SS27-06	1008-008	8/02/2010	Soil
SA6-00-SS28-12	1008-008	8/02/2010	Soil
SA6-02-SS29-00	1008-008	8/02/2010	Soil
SA6-04-SS30-00	1008-008	8/02/2010	Soil
SA7-00-SS31-00	1008-008	8/02/2010	Soil
SA7-00-SS32-06	1008-008	8/02/2010	Soil
SA7-00-SS33-12	1008-008	8/02/2010	Soil
SA7-02-SS34-00	1008-008	8/02/2010	Soil
SA7-04-SS35-00	1008-008	8/02/2010	Soil
RD-W-SD01-02	1008-008	8/02/2010	Sediment
SA3-00-SS36-00	1008-030	8/03/2010	Soil
SA3-00-SS37-06	1008-030	8/03/2010	Soil
SA3-00-SS38-12	1008-030	8/03/2010	Soil
SA3-02-SS39-00	1008-030	8/03/2010	Soil
SA3-04-SS40-00	1008-030	8/03/2010	Soil
SA2-00-SS41-00	1008-030	8/03/2010	Soil
SA2-00-SS42-06	1008-030	8/03/2010	Soil
SA2-00-SS43-12	1008-030	8/03/2010	Soil
SA2-02-SS44-00	1008-030	8/03/2010	Soil
SA2-04-SS45-00	1008-030	8/03/2010	Soil
SA1-00-SS46-00	1008-030	8/03/2010	Soil
SA1-00-SS47-06	1008-030	8/03/2010	Soil
SA1-00-SS48-12	1008-030	8/03/2010	Soil
SA1-02-SS49-00	1008-030	8/03/2010	Soil
SA1-04-SS50-00	1008-030	8/03/2010	Soil
SA1-00-SS51-00	1008-030	8/03/2010	Soil
SA1-00-SS52-06	1008-030	8/03/2010	Soil
SA1-00-SS53-12	1008-030	8/03/2010	Soil
SA1-02-SS54-00	1008-030	8/03/2010	Soil
SA1-04-SS55-00	1008-030	8/03/2010	Soil
RD-N-SD02-01	1008-030	8/03/2010	Sediment
RP-E-SD03-00	1008-030	8/03/2010	Sediment
DP-S-SD04-40	1008-030	8/03/2010	Sediment
244-CARPET	1008-045	8/05/2010	Dust

Sample ID	Laboratory Reference Number	Date Collected	Matrix
336-CARPET	1008-045	8/05/2010	Dust
332-CARPET	1008-045	8/05/2010	Dust
316-CARPET	1008-045	8/05/2010	Dust
228-CARPET	1008-045	8/05/2010	Dust
307/308-CARPET	1008-054	8/07/2010	Dust
302-CARPET	1008-054	8/07/2010	Dust
358-CARPET	1008-054	8/07/2010	Dust
413-CARPET	1008-054	8/07/2010	Dust
402-CARPET	1008-054	8/07/2010	Dust
412-CARPET	1008-054	8/07/2010	Dust
508-CARPET	1008-054	8/07/2010	Dust
503-CARPET	1008-054	8/07/2010	Dust
533-CARPET	1008-059	8/09/2010	Dust
528-CARPET	1008-059	8/09/2010	Dust
534-CARPET	1008-059	8/09/2010	Dust
517-CARPET	1008-059	8/09/2010	Dust
E-CONCFACE-DUST	1008-069	8/10/2010	Dust
E-CONCFACE-SEALANT	1008-069	8/10/2010	Dust
W-CONCFACE-DUST	1008-069	8/10/2010	Dust
W-CONCFACE-SEALANT	1008-069	8/10/2010	Dust
5N-CARPET	1008-113	8/17/2010	Dust
5S-CARPET	1008-113	8/17/2010	Dust
4N-CARPET	1008-113	8/17/2010	Dust
4S-CARPET	1008-113	8/17/2010	Dust
3N-CARPET	1008-113	8/17/2010	Dust
2N-CARPET	1008-143	8/19/2010	Dust
2S-CARPET	1008-143	8/19/2010	Dust
3S-CARPET	1008-143	8/19/2010	Dust
1-MUSTER-CARPET	1008-143	8/19/2010	Dust
1-HALL-CARPET	1008-143	8/19/2010	Dust
1SA-WIPE-VF	1008-143	8/19/2010	Wipe
1SB-WIPE-VF	1008-143	8/19/2010	Wipe
PH-SUPPLY-DUST	1008-212	8/26/2010	Dust
PH-RETURN-DUST	1008-212	8/26/2010	Dust
PH-POSTSUPPLY-WIPE	1008-212	8/26/2010	Wipe
5S-SUPPLY-WIPE	1008-212	8/26/2010	Wipe
5S-RETURN-DUST	1008-212	8/26/2010	Dust
4N-SUPPLY-WIPE	1008-212	8/26/2010	Wipe
4N-RETURN-DUST	1008-212	8/26/2010	Dust
1-MUSTER-WIPE	1008-212	8/26/2010	Wipe
CTRM5-01	011004013	8/05/2010	Air

Sample ID	Laboratory Reference Number	Date Collected	Matrix
336-02	011004013	8/05/2010	Air
302-03	011004013	8/05/2010	Air
417-04	011004013	8/05/2010	Air
525-05	011004013	8/05/2010	Air
EXT-06	011004013	8/05/2010	Air

The laboratory's performance was reviewed in accordance with quality control (QC) criteria outlined in the specified analytical method.

Quality control data submitted by the laboratory were reviewed; raw laboratory data were not submitted by the laboratory. Data validation results are summarized below, followed by a summary of laboratory communications and definitions of data qualifiers.

Data Validation

Custody, Preservation, Holding Times, and Completeness—Acceptable

Sample custody was properly maintained from sample collection to receipt at the laboratory. The samples were properly preserved and were received intact at the laboratory. Samples were analyzed within the recommended holding time of 14 days from collection to extraction and 40 days from extraction to analysis. The laboratory data package is complete and contains test results for all samples listed on the chain of custody forms.

Blank Analysis—Acceptable

Method blanks were analyzed at the required frequency. Blanks did not contain levels of PCBs above the laboratory reporting limit.

Surrogate Analysis—Acceptable with Qualification

One surrogate compound was analyzed with each sample and blank in accordance with the method. With one exception, surrogate recovery values for decachlorobiphenyl (DCB) were within the control limits established by the laboratory for each matrix.

The exception was the surrogate recovery value (37 percent) for dust sample 4S-CARPET, which was below the 46 to 122 percent recovery criteria established by the laboratory. As shown in the table below, sample 4S-CARPET was qualified (flagged) as estimated (J) to indicate a potential low bias.

Sample ID	Date Collected	Matrix	Reason for Qualification	Flag

4S-CARPET	8/17/2010	Dust	Surrogate recovery was low	J

Matrix Spike Analysis—Acceptable

Matrix spike/matrix spike duplicate (MS/MSD) or MS analyses were performed for concrete and soil samples at the required frequency. The percent recovery values met the control established by the laboratory.

Duplicate Analysis—Acceptable

Matrix spike/matrix spike duplicate (MS/MSD) analyses or blank spike/blank spike duplicate (BS/BSD) analyses were performed at the required frequency. The relative percent difference (RPD) values met the control limits established by the laboratory.

Blank Spike Sample Analysis—Acceptable

Blank spike (BS) or BS/BSD analyses were performed at the required frequency. All percent recovery values met the control limits established by the laboratory.

Laboratory Reporting Limits—Acceptable

The reporting limits reported by the laboratory were reasonable for the method.

Overall Assessment of Data Quality

The usability of the data is based on the guidance documents listed above. Upon consideration of the information presented here, the data are acceptable as qualified.

Laboratory Communications

The laboratories were not contacted regarding the PCBs analyses.

Definition of Data Qualifiers

The following data validation qualifiers were used in the review of this data set. These qualifiers are from Functional Guidelines (USEPA 1999).

U	The analyte was analyzed for but was not detected above the reporting limit.
J	The analyte was positively identified; the associated numerical value is an estimate of the concentration of the analyte in the sample.
UJ	The analyte was not detected above the sample reporting limit. However, the reporting limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

References

USEPA. 1999. USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review. U.S. Environmental Protection Agency, Washington, D.C. EPA 540/R-99/008. October 1999.

USEPA. 2004. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846 Third Edition, Updates I, II, IIA, IIB, III, IIIA, and IIIB. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency.

OnSite Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

April 30, 2010

Peter Jowise
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 7258.4
Laboratory Reference No. 1004-209

Dear Peter:

Enclosed are the analytical results and associated quality control data for samples submitted on April 29, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: April 30, 2010
Samples Submitted: April 29, 2010
Laboratory Reference: 1004-209
Project: 7258.4

Case Narrative

Samples were collected on April 28, 2010 and received by the laboratory on April 29, 2010. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: April 30, 2010
Samples Submitted: April 29, 2010
Lab Traveler: 1004-209
Project: 7258.4

PCBs by EPA 8082

Matrix: Caulk
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**7258.4-JH-19 PCB**					
Laboratory ID:	04-209-01					
Aroclor 1016	**ND**	14000	EPA 8082	4-29-10	4-30-10	
Aroclor 1221	**ND**	14000	EPA 8082	4-29-10	4-30-10	
Aroclor 1232	**ND**	14000	EPA 8082	4-29-10	4-30-10	
Aroclor 1242	**ND**	14000	EPA 8082	4-29-10	4-30-10	
Aroclor 1248	**ND**	14000	EPA 8082	4-29-10	4-30-10	
Aroclor 1254	**100000**	14000	EPA 8082	4-29-10	4-30-10	
Aroclor 1260	**ND**	14000	EPA 8082	4-29-10	4-30-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S
Client ID:	**7258.4-JH-20 PCB**					
Laboratory ID:	04-209-02					
Aroclor 1016	**ND**	11000	EPA 8082	4-29-10	4-30-10	
Aroclor 1221	**ND**	11000	EPA 8082	4-29-10	4-30-10	
Aroclor 1232	**ND**	11000	EPA 8082	4-29-10	4-30-10	
Aroclor 1242	**ND**	11000	EPA 8082	4-29-10	4-30-10	
Aroclor 1248	**ND**	11000	EPA 8082	4-29-10	4-30-10	
Aroclor 1254	**58000**	11000	EPA 8082	4-29-10	4-30-10	
Aroclor 1260	**ND**	11000	EPA 8082	4-29-10	4-30-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S
Client ID:	**7258.4-JH-21 PCB**					
Laboratory ID:	04-209-03					
Aroclor 1016	**ND**	9100	EPA 8082	4-29-10	4-30-10	
Aroclor 1221	**ND**	9100	EPA 8082	4-29-10	4-30-10	
Aroclor 1232	**ND**	9100	EPA 8082	4-29-10	4-30-10	
Aroclor 1242	**ND**	9100	EPA 8082	4-29-10	4-30-10	
Aroclor 1248	**ND**	9100	EPA 8082	4-29-10	4-30-10	
Aroclor 1254	**62000**	9100	EPA 8082	4-29-10	4-30-10	
Aroclor 1260	**ND**	9100	EPA 8082	4-29-10	4-30-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S

Date of Report: April 30, 2010
Samples Submitted: April 29, 2010
Lab Traveler: 1004-209
Project: 7258.4

PCBs by EPA 8082

Matrix: Caulk
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**7258.4-JH-22 PCB**					
Laboratory ID:	04-209-04					
Aroclor 1016	**ND**	9000	EPA 8082	4-29-10	4-30-10	
Aroclor 1221	**ND**	9000	EPA 8082	4-29-10	4-30-10	
Aroclor 1232	**ND**	9000	EPA 8082	4-29-10	4-30-10	
Aroclor 1242	**ND**	9000	EPA 8082	4-29-10	4-30-10	
Aroclor 1248	**ND**	9000	EPA 8082	4-29-10	4-30-10	
Aroclor 1254	**59000**	9000	EPA 8082	4-29-10	4-30-10	
Aroclor 1260	**ND**	9000	EPA 8082	4-29-10	4-30-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S

Date of Report: April 30, 2010
Samples Submitted: April 29, 2010
Lab Traveler: 1004-209
Project: 7258.4

PCBs by EPA 8082
QUALITY CONTROL

Matrix: Solid
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0429S1					
Aroclor 1016	**ND**	0.050	EPA 8082	4-29-10	4-29-10	
Aroclor 1221	**ND**	0.050	EPA 8082	4-29-10	4-29-10	
Aroclor 1232	**ND**	0.050	EPA 8082	4-29-10	4-29-10	
Aroclor 1242	**ND**	0.050	EPA 8082	4-29-10	4-29-10	
Aroclor 1248	**ND**	0.050	EPA 8082	4-29-10	4-29-10	
Aroclor 1254	**ND**	0.050	EPA 8082	4-29-10	4-29-10	
Aroclor 1260	**ND**	0.050	EPA 8082	4-29-10	4-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*83*	*46-122*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS											
Laboratory ID:	SB0429S1										
	SB	SBD	SB	SBD		SB	SBD				
Aroclor 1260	**0.401**	**0.408**	0.500	0.500	N/A	**80**	**82**	54-123	2	20	
Surrogate:											
DCB						*85*	*86*	*46-122*			

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Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in the diesel range are impacting the lube oil range result.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.
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Chain of Custody

Company: Herrera
Project Number: 7258.4
Project Name: King County Youth Service Cntr
Project Manager: Peter Jowise
Sampled by: Anthony Fuller

Turnaround Request (in working days)
(Check One)
- [ ] Same Day
- [x] 1 Day
- [ ] 2 Day
- [ ] 3 Day
- [ ] Standard (7 working days) (TPH analysis 5 working days)
- [ ] ______ (other)

Laboratory Number: 04-209

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664							% Moisture
1	7258.4-SH-~~09~~ PCB	4/28		Chalk	1								X												
2	7258.4-JH-20 PCB	4/28		↓	1								X												
3	7258.4-JH-21 PCB	4/28		↓	1								X												
4	7258.4-JH-22 PCB	4/28		↓	1								X												

	Signature	Company	Date	Time
Relinquished by	[illegible]	Med-Tox NW	4/29/2010	0755
Received by	[illegible]	OSE	4/29/10	07:55
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:
150,000 mg/Kg

Chromatograms with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Client Copy

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June 16, 2010

Peter Jowise
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 09-04193-002
Laboratory Reference No. 1006-043

Dear Peter:

Enclosed are the analytical results and associated quality control data for samples submitted on June 4, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: June 16, 2010
Samples Submitted: June 4, 2010
Laboratory Reference: 1006-043
Project: 09-04193-002

Case Narrative

Samples were collected on June 3, 2010 and received by the laboratory on June 4, 2010. They were maintained at the laboratory at a temperature of 2^oC to 6^oC.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: June 16, 2010
Samples Submitted: June 4, 2010
Laboratory Reference: 1006-043
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Concrete
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CONC-E-1/8**					
Laboratory ID:	06-043-01					
Aroclor 1016	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1221	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1232	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1242	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1248	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1254	**22000**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1260	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*97*	*46-122*				
Client ID:	**CONC-E-1/4**					
Laboratory ID:	06-043-02					
Aroclor 1016	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1221	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1232	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1242	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1248	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1254	**12000**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1260	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*94*	*46-122*				
Client ID:	**CONC-EN-1/8**					
Laboratory ID:	06-043-03					
Aroclor 1016	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1221	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1232	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1242	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1248	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1254	**12000**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1260	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*90*	*46-122*				

Date of Report: June 16, 2010
Samples Submitted: June 4, 2010
Laboratory Reference: 1006-043
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Concrete
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CONC-EN-1/4**					
Laboratory ID:	06-043-04					
Aroclor 1016	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1221	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1232	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1242	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1248	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1254	**7700**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1260	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*90*	*46-122*				
Client ID:	**CONC-WN-1/8**					
Laboratory ID:	06-043-06					
Aroclor 1016	**ND**	100	EPA 8082	6-9-10	6-15-10	
Aroclor 1221	**ND**	100	EPA 8082	6-9-10	6-15-10	
Aroclor 1232	**ND**	100	EPA 8082	6-9-10	6-15-10	
Aroclor 1242	**ND**	100	EPA 8082	6-9-10	6-15-10	
Aroclor 1248	**ND**	100	EPA 8082	6-9-10	6-15-10	
Aroclor 1254	**700**	100	EPA 8082	6-9-10	6-15-10	
Aroclor 1260	**ND**	100	EPA 8082	6-9-10	6-15-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*91*	*46-122*				
Client ID:	**CONC-WN-1/4**					
Laboratory ID:	06-043-07					
Aroclor 1016	**ND**	100	EPA 8082	6-9-10	6-15-10	
Aroclor 1221	**ND**	100	EPA 8082	6-9-10	6-15-10	
Aroclor 1232	**ND**	100	EPA 8082	6-9-10	6-15-10	
Aroclor 1242	**ND**	100	EPA 8082	6-9-10	6-15-10	
Aroclor 1248	**ND**	100	EPA 8082	6-9-10	6-15-10	
Aroclor 1254	**740**	100	EPA 8082	6-9-10	6-15-10	
Aroclor 1260	**ND**	100	EPA 8082	6-9-10	6-15-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*83*	*46-122*				

Date of Report: June 16, 2010
Samples Submitted: June 4, 2010
Laboratory Reference: 1006-043
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Concrete
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CONC-FACE-WN**					
Laboratory ID:	06-043-08					
Aroclor 1016	**ND**	0.50	EPA 8082	6-9-10	6-10-10	
Aroclor 1221	**ND**	0.50	EPA 8082	6-9-10	6-10-10	
Aroclor 1232	**ND**	0.50	EPA 8082	6-9-10	6-10-10	
Aroclor 1242	**ND**	0.50	EPA 8082	6-9-10	6-10-10	
Aroclor 1248	**ND**	0.50	EPA 8082	6-9-10	6-10-10	
Aroclor 1254	**1.2**	0.50	EPA 8082	6-9-10	6-10-10	
Aroclor 1260	**ND**	0.50	EPA 8082	6-9-10	6-10-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*90*	*46-122*				
Client ID:	**CONC-WS-1/8**					
Laboratory ID:	06-043-10					
Aroclor 1016	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1221	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1232	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1242	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1248	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1254	**9200**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1260	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*97*	*46-122*				
Client ID:	**CONC-WS-1/4**					
Laboratory ID:	06-043-11					
Aroclor 1016	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1221	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1232	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1242	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1248	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1254	**6800**	5000	EPA 8082	6-9-10	6-15-10	
Aroclor 1260	**ND**	5000	EPA 8082	6-9-10	6-15-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*92*	*46-122*				

Date of Report: June 16, 2010
Samples Submitted: June 4, 2010
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Project: 09-04193-002

PCBs by EPA 8082

Matrix: Concrete
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CONC-FACE-WS**					
Laboratory ID:	06-043-12					
Aroclor 1016	**ND**	5.0	EPA 8082	6-9-10	6-15-10	
Aroclor 1221	**ND**	5.0	EPA 8082	6-9-10	6-15-10	
Aroclor 1232	**ND**	5.0	EPA 8082	6-9-10	6-15-10	
Aroclor 1242	**ND**	5.0	EPA 8082	6-9-10	6-15-10	
Aroclor 1248	**ND**	5.0	EPA 8082	6-9-10	6-15-10	
Aroclor 1254	**11**	5.0	EPA 8082	6-9-10	6-15-10	
Aroclor 1260	**ND**	5.0	EPA 8082	6-9-10	6-15-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*85*	*46-122*				

Date of Report: June 16, 2010
Samples Submitted: June 4, 2010
Laboratory Reference: 1006-043
Project: 09-04193-002

PCBs by EPA 8082
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0609S1					
Aroclor 1016	**ND**	0.050	EPA 8082	6-9-10	6-10-10	
Aroclor 1221	**ND**	0.050	EPA 8082	6-9-10	6-10-10	
Aroclor 1232	**ND**	0.050	EPA 8082	6-9-10	6-10-10	
Aroclor 1242	**ND**	0.050	EPA 8082	6-9-10	6-10-10	
Aroclor 1248	**ND**	0.050	EPA 8082	6-9-10	6-10-10	
Aroclor 1254	**ND**	0.050	EPA 8082	6-9-10	6-10-10	
Aroclor 1260	**ND**	0.050	EPA 8082	6-9-10	6-10-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*91*	*46-122*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	06-043-15										
	MS	MSD	MS	MSD		MS	MSD				
Aroclor 1260	**0.515**	**0.478**	0.500	0.500	ND	**103**	**96**	36-121	7	15	
Surrogate:											
DCB						*88*	*71*	*46-122*			

Date of Report: June 16, 2010
Samples Submitted: June 4, 2010
Laboratory Reference: 1006-043
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**WN-WIPE**					
Laboratory ID:	06-043-05					
Aroclor 1016	**ND**	2.0	EPA 8082	6-9-10	6-10-10	
Aroclor 1221	**ND**	2.0	EPA 8082	6-9-10	6-10-10	
Aroclor 1232	**ND**	2.0	EPA 8082	6-9-10	6-10-10	
Aroclor 1242	**ND**	2.0	EPA 8082	6-9-10	6-10-10	
Aroclor 1248	**ND**	2.0	EPA 8082	6-9-10	6-10-10	
Aroclor 1254	**9.6**	2.0	EPA 8082	6-9-10	6-10-10	
Aroclor 1260	**ND**	2.0	EPA 8082	6-9-10	6-10-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*106*	*74-135*				
Client ID:	**WS-WIPE**					
Laboratory ID:	06-043-09					
Aroclor 1016	**ND**	2.0	EPA 8082	6-9-10	6-10-10	
Aroclor 1221	**ND**	2.0	EPA 8082	6-9-10	6-10-10	
Aroclor 1232	**ND**	2.0	EPA 8082	6-9-10	6-10-10	
Aroclor 1242	**ND**	2.0	EPA 8082	6-9-10	6-10-10	
Aroclor 1248	**ND**	2.0	EPA 8082	6-9-10	6-10-10	
Aroclor 1254	**ND**	2.0	EPA 8082	6-9-10	6-10-10	
Aroclor 1260	**ND**	2.0	EPA 8082	6-9-10	6-10-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*101*	*74-135*				

Date of Report: June 16, 2010
Samples Submitted: June 4, 2010
Laboratory Reference: 1006-043
Project: 09-04193-002

PCBs by EPA 8082
QUALITY CONTROL

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0609P1					
Aroclor 1016	**ND**	2.0	EPA 8082	6-9-10	6-10-10	
Aroclor 1221	**ND**	2.0	EPA 8082	6-9-10	6-10-10	
Aroclor 1232	**ND**	2.0	EPA 8082	6-9-10	6-10-10	
Aroclor 1242	**ND**	2.0	EPA 8082	6-9-10	6-10-10	
Aroclor 1248	**ND**	2.0	EPA 8082	6-9-10	6-10-10	
Aroclor 1254	**ND**	2.0	EPA 8082	6-9-10	6-10-10	
Aroclor 1260	**ND**	2.0	EPA 8082	6-9-10	6-10-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*105*	*74-135*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS											
Laboratory ID:	SB0609P1										
	SB	SBD	SB	SBD		SB	SBD				
Aroclor 1260	**21.8**	**21.4**	20.0	20.0	N/A	**109**	**107**	81-128	2	7	
Surrogate:											
DCB						*106*	*104*	*74-135*			

Date of Report: June 16, 2010
Samples Submitted: June 4, 2010
Laboratory Reference: 1006-043
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**N-SS-0-4**					
Laboratory ID:	06-043-13					
Aroclor 1016	**ND**	0.071	EPA 8082	6-9-10	6-10-10	
Aroclor 1221	**ND**	0.071	EPA 8082	6-9-10	6-10-10	
Aroclor 1232	**ND**	0.071	EPA 8082	6-9-10	6-10-10	
Aroclor 1242	**ND**	0.071	EPA 8082	6-9-10	6-10-10	
Aroclor 1248	**ND**	0.071	EPA 8082	6-9-10	6-10-10	
Aroclor 1254	**ND**	0.071	EPA 8082	6-9-10	6-10-10	
Aroclor 1260	**ND**	0.071	EPA 8082	6-9-10	6-10-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*77*	*46-122*				
Client ID:	**W-SS-0-4**					
Laboratory ID:	06-043-14					
Aroclor 1016	**ND**	0.060	EPA 8082	6-9-10	6-10-10	
Aroclor 1221	**ND**	0.060	EPA 8082	6-9-10	6-10-10	
Aroclor 1232	**ND**	0.060	EPA 8082	6-9-10	6-10-10	
Aroclor 1242	**ND**	0.060	EPA 8082	6-9-10	6-10-10	
Aroclor 1248	**ND**	0.060	EPA 8082	6-9-10	6-10-10	
Aroclor 1254	**1.4**	0.060	EPA 8082	6-9-10	6-10-10	
Aroclor 1260	**ND**	0.060	EPA 8082	6-9-10	6-10-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*84*	*46-122*				
Client ID:	**E-SS-0-4**					
Laboratory ID:	06-043-15					
Aroclor 1016	**ND**	0.060	EPA 8082	6-9-10	6-10-10	
Aroclor 1221	**ND**	0.060	EPA 8082	6-9-10	6-10-10	
Aroclor 1232	**ND**	0.060	EPA 8082	6-9-10	6-10-10	
Aroclor 1242	**ND**	0.060	EPA 8082	6-9-10	6-10-10	
Aroclor 1248	**ND**	0.060	EPA 8082	6-9-10	6-10-10	
Aroclor 1254	**0.41**	0.060	EPA 8082	6-9-10	6-10-10	
Aroclor 1260	**ND**	0.060	EPA 8082	6-9-10	6-10-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*81*	*46-122*				

Date of Report: June 16, 2010
Samples Submitted: June 4, 2010
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Project: 09-04193-002

PCBs by EPA 8082

Matrix: Caulk
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**W-CRTYRD-CAULK**					
Laboratory ID:	06-043-16					
Aroclor 1016	**ND**	0.54	EPA 8082	6-9-10	6-10-10	
Aroclor 1221	**ND**	0.54	EPA 8082	6-9-10	6-10-10	
Aroclor 1232	**ND**	0.54	EPA 8082	6-9-10	6-10-10	
Aroclor 1242	**ND**	0.54	EPA 8082	6-9-10	6-10-10	
Aroclor 1248	**ND**	0.54	EPA 8082	6-9-10	6-10-10	
Aroclor 1254	**1.4**	0.54	EPA 8082	6-9-10	6-10-10	
Aroclor 1260	**ND**	0.54	EPA 8082	6-9-10	6-10-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*94*	*46-122*				
Client ID:	**WSW-CRTYRD-CAULK**					
Laboratory ID:	06-043-17					
Aroclor 1016	**ND**	0.62	EPA 8082	6-9-10	6-10-10	
Aroclor 1221	**ND**	0.62	EPA 8082	6-9-10	6-10-10	
Aroclor 1232	**ND**	0.62	EPA 8082	6-9-10	6-10-10	
Aroclor 1242	**ND**	0.62	EPA 8082	6-9-10	6-10-10	
Aroclor 1248	**ND**	0.62	EPA 8082	6-9-10	6-10-10	
Aroclor 1254	**0.70**	0.62	EPA 8082	6-9-10	6-10-10	
Aroclor 1260	**ND**	0.62	EPA 8082	6-9-10	6-10-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*87*	*46-122*				
Client ID:	**E-CRTYRD-CAULK**					
Laboratory ID:	06-043-18					
Aroclor 1016	**ND**	1.1	EPA 8082	6-9-10	6-10-10	
Aroclor 1221	**ND**	1.1	EPA 8082	6-9-10	6-10-10	
Aroclor 1232	**ND**	1.1	EPA 8082	6-9-10	6-10-10	
Aroclor 1242	**ND**	1.1	EPA 8082	6-9-10	6-10-10	
Aroclor 1248	**ND**	1.1	EPA 8082	6-9-10	6-10-10	
Aroclor 1254	**ND**	1.1	EPA 8082	6-9-10	6-10-10	
Aroclor 1260	**ND**	1.1	EPA 8082	6-9-10	6-10-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*90*	*46-122*				

Date of Report: June 16, 2010
Samples Submitted: June 4, 2010
Laboratory Reference: 1006-043
Project: 09-04193-002

PCBs by EPA 8082
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0609S1					
Aroclor 1016	**ND**	0.050	EPA 8082	6-9-10	6-10-10	
Aroclor 1221	**ND**	0.050	EPA 8082	6-9-10	6-10-10	
Aroclor 1232	**ND**	0.050	EPA 8082	6-9-10	6-10-10	
Aroclor 1242	**ND**	0.050	EPA 8082	6-9-10	6-10-10	
Aroclor 1248	**ND**	0.050	EPA 8082	6-9-10	6-10-10	
Aroclor 1254	**ND**	0.050	EPA 8082	6-9-10	6-10-10	
Aroclor 1260	**ND**	0.050	EPA 8082	6-9-10	6-10-10	
Surrogate:	*Percent Recovery*	*Control Limits*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	06-043-15										
	MS	MSD	MS	MSD		MS	MSD				
Aroclor 1260	**0.515**	**0.478**	0.500	0.500	ND	**103**	**96**	36-121	7	15	
Surrogate:											
DCB						*88*	*71*	*46-122*			

Date of Report: June 16, 2010
Samples Submitted: June 4, 2010
Laboratory Reference: 1006-043
Project: 09-04193-002

% MOISTURE

Date Analyzed: 6-9-10

Client ID	Lab ID	% Moisture
N-SS-0-4	06-043-13	30
W-SS-0-4	06-043-14	17
E-SS-0-4	06-043-15	17

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Laboratory Number: 06-043

Company: HERRERA
Project Number: 09-04193-002
Project Name: KCYSCPCB
Project Manager: PETER JOWISE
Sampled by: BRADY HANSON

Turnaround Request (in working days)
(Check One)
- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☒ Standard (7 working days) (TPH analysis 5 working days)
- ☐ ______ (other)

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.
1	CONC-E-1/8	6-3-10	1645	CONC	1
2	CONC-E-1/4		1730	CONC	1
3	CONC-EN-1/8		1800	CONC	1
4	CONC-EN-1/4		1820	CONC	1
5	WN-WIPE		1840	CONC	1
6	CONC-WN-1/8		1920	CONC	1
7	CONC-WN-1/4		1945	CONC	1
8	CONC-FACE-WN		2010	CONC	1
9	WS-WIPE		2025	CONC	1
10	CONC-WS-1/8		2035	CONC	1

Requested Analysis

Lab ID	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664							% Moisture
1								X												~~X~~
2								X												~~X~~
3								X												~~X~~
4								X												~~X~~
5								X												~~X~~
6								X												~~X~~
7								X												~~X~~
8								X												~~X~~
9								X												~~X~~
10								X												~~X~~

	Signature	Company	Date	Time
Relinquished by	[signature]	HERRERA	6-4-10	
Received by	[signature]	OSE	6/4/10	1700
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:

Chromatograms with final report ☐

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Chain of Custody

Laboratory Number: 06-043

Company: HERRERA
Project Number: 09-04193-002
Project Name: KCYSCPCB
Project Manager: PETER JOWISE
Sampled by: BRADY HANSON

Turnaround Request (in working days)
(Check One)
- [ ] Same Day
- [ ] 1 Day
- [ ] 2 Day
- [ ] 3 Day
- [x] Standard (7 working days) (TPH analysis 5 working days)
- [ ] ______ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	% Moisture
11	CONC-WS-1/4	6.3.10	2055	CONC.	1								X						X
12	CONC-FACE-WS	6.3.10	2130	CONC	1								X						X
13	N-SS-0-4	6.3.10	2200	Soil	1								X						X
14	W-SS-0-4	6.3.10	2215	Soil	1								X						X
15	E-SS-0-4	6.3.10	2230	Soil	1								X						X
16	W-CRTYRD-CAULK	6.3.10	2250	Caulk	1								X						X
17	WSW-CRTYRD-CAULK	6.3.10	2300	Caulk	1								X						X
18	E-CRTYRD-CAULK	6.3.10	2310	Caulk	1								X						X
		~~6~~ BH																	

	Signature	Company	Date	Time
Relinquished by	[signature]	HERRERA	6.4.10	1400
Received by	Courier	sent by Onsite	6.4.10	1400.
Relinquished by				
Received by	[signature]	OSE	6/4/10	1700
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:

Chromatograms with final report ☐

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OnSite
Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

July 22, 2010

Peter Jowise
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 09-04193-002
Laboratory Reference No. 1007-090

Dear Peter:

Enclosed are the analytical results and associated quality control data for samples submitted on July 14, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: July 22, 2010
Samples Submitted: July 14, 2010
Laboratory Reference: 1007-090
Project: 09-04193-002

Case Narrative

Samples were collected on July 13, 2010 and received by the laboratory on July 14, 2010. They were maintained at the laboratory at a temperature of $2^{o}C$ to $6^{o}C$.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: July 22, 2010
Samples Submitted: July 14, 2010
Laboratory Reference: 1007-090
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Concrete
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CONCRETE SEALANT**					
Laboratory ID:	07-090-01					
Aroclor 1016	**ND**	0.61	EPA 8082	7-19-10	7-19-10	
Aroclor 1221	**ND**	0.61	EPA 8082	7-19-10	7-19-10	
Aroclor 1232	**ND**	0.61	EPA 8082	7-19-10	7-19-10	
Aroclor 1242	**ND**	0.61	EPA 8082	7-19-10	7-19-10	
Aroclor 1248	**ND**	0.61	EPA 8082	7-19-10	7-19-10	
Aroclor 1254	**1.4**	0.61	EPA 8082	7-19-10	7-19-10	
Aroclor 1260	**ND**	0.61	EPA 8082	7-19-10	7-19-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*77*	*46-122*				
Client ID:	**ENE-CONC-FACE-1/8**					
Laboratory ID:	07-090-02					
Aroclor 1016	**ND**	0.11	EPA 8082	7-19-10	7-19-10	
Aroclor 1221	**ND**	0.11	EPA 8082	7-19-10	7-19-10	
Aroclor 1232	**ND**	0.11	EPA 8082	7-19-10	7-19-10	
Aroclor 1242	**ND**	0.11	EPA 8082	7-19-10	7-19-10	
Aroclor 1248	**ND**	0.11	EPA 8082	7-19-10	7-19-10	
Aroclor 1254	**0.11**	0.11	EPA 8082	7-19-10	7-19-10	
Aroclor 1260	**ND**	0.11	EPA 8082	7-19-10	7-19-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*80*	*46-122*				
Client ID:	**ENE-CONC-FACE-1/4**					
Laboratory ID:	07-090-03					
Aroclor 1016	**ND**	0.14	EPA 8082	7-19-10	7-19-10	
Aroclor 1221	**ND**	0.14	EPA 8082	7-19-10	7-19-10	
Aroclor 1232	**ND**	0.14	EPA 8082	7-19-10	7-19-10	
Aroclor 1242	**ND**	0.14	EPA 8082	7-19-10	7-19-10	
Aroclor 1248	**ND**	0.14	EPA 8082	7-19-10	7-19-10	
Aroclor 1254	**ND**	0.14	EPA 8082	7-19-10	7-19-10	
Aroclor 1260	**ND**	0.14	EPA 8082	7-19-10	7-19-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*77*	*46-122*				

Date of Report: July 22, 2010
Samples Submitted: July 14, 2010
Laboratory Reference: 1007-090
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Concrete
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**ENE-CONC-1/8**					
Laboratory ID:	07-090-04					
Aroclor 1016	**ND**	170	EPA 8082	7-19-10	7-21-10	
Aroclor 1221	**ND**	170	EPA 8082	7-19-10	7-21-10	
Aroclor 1232	**ND**	170	EPA 8082	7-19-10	7-21-10	
Aroclor 1242	**ND**	170	EPA 8082	7-19-10	7-21-10	
Aroclor 1248	**ND**	170	EPA 8082	7-19-10	7-21-10	
Aroclor 1254	**5700**	170	EPA 8082	7-19-10	7-21-10	
Aroclor 1260	**ND**	170	EPA 8082	7-19-10	7-21-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*91*	*46-122*				
Client ID:	**ENE-CONC-1/4**					
Laboratory ID:	07-090-05					
Aroclor 1016	**ND**	110	EPA 8082	7-19-10	7-21-10	
Aroclor 1221	**ND**	110	EPA 8082	7-19-10	7-21-10	
Aroclor 1232	**ND**	110	EPA 8082	7-19-10	7-21-10	
Aroclor 1242	**ND**	110	EPA 8082	7-19-10	7-21-10	
Aroclor 1248	**ND**	110	EPA 8082	7-19-10	7-21-10	
Aroclor 1254	**1200**	110	EPA 8082	7-19-10	7-21-10	
Aroclor 1260	**ND**	110	EPA 8082	7-19-10	7-21-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*78*	*46-122*				

Date of Report: July 22, 2010
Samples Submitted: July 14, 2010
Laboratory Reference: 1007-090
Project: 09-04193-002

PCBs by EPA 8082
QUALITY CONTROL

Matrix: Solid
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0719S1					
Aroclor 1016	**ND**	0.050	EPA 8082	7-19-10	7-19-10	
Aroclor 1221	**ND**	0.050	EPA 8082	7-19-10	7-19-10	
Aroclor 1232	**ND**	0.050	EPA 8082	7-19-10	7-19-10	
Aroclor 1242	**ND**	0.050	EPA 8082	7-19-10	7-19-10	
Aroclor 1248	**ND**	0.050	EPA 8082	7-19-10	7-19-10	
Aroclor 1254	**ND**	0.050	EPA 8082	7-19-10	7-19-10	
Aroclor 1260	**ND**	0.050	EPA 8082	7-19-10	7-19-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*80*	*46-122*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	07-108-05										
	MS	MSD	MS	MSD		MS	MSD				
Aroclor 1260	**0.359**	**0.367**	0.500	0.500	ND	**72**	**73**	36-121	2	15	
Surrogate:											
DCB						*66*	*67*	*46-122*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • Fax: (425) 885-4603

Company: HERRERA
Project Number: 09-04193-002
Project Name: KCYSCPCB
Project Manager: PETER JOWISE
Sampled by: BRADY HANSON

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☒ Standard (7 working days) (TPH analysis 5 working days)
- ☐ ________ (other)

Laboratory Number: 07-090

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	VPH	EPH						% Moisture
1	CONCRETE SEALANT	7-13-10	1730	CONC.	1								X													X
2	ENE-CONC-FACE-1/8	|	1745	|	1								X													X
3	ENE-CONC-FACE-1/4	|	1815	|	1								X													X
4	ENC-CONC-1/8	|	1900	|	1								X													X
5	ENC-CONC-1/4	|	1930	|	1								X													X

	Signature	Company	Date	Time
Relinquished by	[signature]	HERRERA	7-14-10	1000
Received by	COURIER	COURIER for Onsite	7-14-10	1000
Relinquished by	[signature]	Speedy	7/14/10	11:00
Received by	[signature]	OSE	7/14/10	1100
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:

Chromatograms with final report ☐

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August 3, 2010

Peter Jowise
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 09-04193-002
Laboratory Reference No. 1007-217

Dear Peter:

Enclosed are the analytical results and associated quality control data for samples submitted on July 31, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-217
Project: 09-04193-002

Case Narrative

Samples were collected on July 31, 2010 and received by the laboratory on July 31, 2010. They were maintained at the laboratory at a temperature of 2^oC to 6^oC.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-217
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**307/308-WIPE-DT**					
Laboratory ID:	07-217-01					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*101*	*74-135*				
Client ID:	**307/308-WIPE-WO**					
Laboratory ID:	07-217-02					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1254	**17**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*99*	*74-135*				
Client ID:	**307/308-WIPE-WI**					
Laboratory ID:	07-217-03					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*101*	*74-135*				

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-217
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**307/308-WIPE-VF**					
Laboratory ID:	07-217-04					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*102*	*74-135*				
Client ID:	**307/308-WIPE-FR**					
Laboratory ID:	07-217-05					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*100*	*74-135*				
Client ID:	**316-WIPE-DT**					
Laboratory ID:	07-217-06					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*95*	*74-135*				

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-217
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**316-WIPE-WO**					
Laboratory ID:	07-217-07					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1254	**19**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*101*	*74-135*				
Client ID:	**316-WIPE-WI**					
Laboratory ID:	07-217-08					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*100*	*74-135*				
Client ID:	**332-WIPE-DT**					
Laboratory ID:	07-217-09					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*97*	*74-135*				

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-217
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**332-WIPE-WO**					
Laboratory ID:	07-217-10					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1254	**11**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*100*	*74-135*				
Client ID:	**402-WIPE-DT**					
Laboratory ID:	07-217-11					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*98*	*74-135*				
Client ID:	**402-WIPE-WO**					
Laboratory ID:	07-217-12					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1254	**18**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*100*	*74-135*				

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-217
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**402-WIPE-WI**					
Laboratory ID:	07-217-13					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*99*	*74-135*				
Client ID:	**412-WIPE-DT**					
Laboratory ID:	07-217-14					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*100*	*74-135*				
Client ID:	**412-WIPE-WO**					
Laboratory ID:	07-217-15					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1254	**15**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*100*	*74-135*				

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-217
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**412-WIPE-WI**					
Laboratory ID:	07-217-16					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*100*	*74-135*				
Client ID:	**413-WIPE-DT**					
Laboratory ID:	07-217-17					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*99*	*74-135*				
Client ID:	**413-WIPE-WO**					
Laboratory ID:	07-217-18					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1254	**10**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*98*	*74-135*				

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-217
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**413-WIPE-WI**					
Laboratory ID:	07-217-19					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*99*	*74-135*				
Client ID:	**413-WIPE-FC**					
Laboratory ID:	07-217-20					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*100*	*74-135*				
Client ID:	**503-WIPE-WO**					
Laboratory ID:	07-217-21					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**38**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*101*	*74-135*				

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-217
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**503-WIPE-WI**					
Laboratory ID:	07-217-22					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**2.7**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*100*	*74-135*				
Client ID:	**503-WIPE-DT**					
Laboratory ID:	07-217-23					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*99*	*74-135*				
Client ID:	**503-WIPE-DS**					
Laboratory ID:	07-217-24					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*99*	*74-135*				

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-217
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**508-WIPE-WO**					
Laboratory ID:	07-217-25					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**17**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*102*	*74-135*				
Client ID:	**508-WIPE-WI**					
Laboratory ID:	07-217-26					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*99*	*74-135*				
Client ID:	**508-WIPE-DT**					
Laboratory ID:	07-217-27					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*102*	*74-135*				

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-217
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**508-WIPE-DS**					
Laboratory ID:	07-217-28					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*99*	*74-135*				
Client ID:	**517-WIPE-WO**					
Laboratory ID:	07-217-29					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**8.8**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*99*	*74-135*				
Client ID:	**517-WIPE-WI**					
Laboratory ID:	07-217-30					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*99*	*74-135*				

Date of ReporT: August 3, 2010
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Laboratory Reference: 1007-217
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**517-WIPE-DT**					
Laboratory ID:	07-217-31					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*101*	*74-135*				
Client ID:	**517-WIPE-RA**					
Laboratory ID:	07-217-32					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*100*	*74-135*				
Client ID:	**332-WIPE-WI**					
Laboratory ID:	07-217-33					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*98*	*74-135*				

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-217
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**336-WIPE-DT**					
Laboratory ID:	07-217-34					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*100*	*74-135*				
Client ID:	**336-WIPE-WO**					
Laboratory ID:	07-217-35					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**9.9**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*101*	*74-135*				
Client ID:	**336-WIPE-WI**					
Laboratory ID:	07-217-36					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**2.0**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*100*	*74-135*				

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-217
Project: 09-04193-002

PCBs by EPA 8082
QUALITY CONTROL

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0801P1					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-1-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*101*	*74-135*				
Laboratory ID:	MB0801P2					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*102*	*74-135*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS											
Laboratory ID:	SB0801P1										
	SB	SBD	SB	SBD		SB	SBD				
Aroclor 1260	**22.1**	**21.9**	20.0	20.0	N/A	**111**	**110**	81-128	1	7	
Surrogate:											
DCB						*107*	*134*	*74-135*			
Laboratory ID:	SB0801P2										
	SB	SBD	SB	SBD		SB	SBD				
Aroclor 1260	**22.4**	**22.2**	20.0	20.0	N/A	**112**	**111**	81-128	1	7	
Surrogate:											
DCB						*109*	*109*	*74-135*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

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Chain of Custody

Laboratory Number: 07-217

Company: Herrera
Project Number: 09-04193-002
Project Name: KCYSC
Project Manager: Peter Jowise
Sampled by: AF/JH

Turnaround Request (in working days)
(Check One)
☒ Same Day ☐ 1 Day
☒ 2 Day ☐ 3 Day
☐ Standard (7 working days) (TPH analysis 5 working days)
☐ ______ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664							% Moisture
1	307/308-wipe-DT	7/31	1030	W	1								X												
2	307/308-wipe-WO	7/31	1030	W	1																				
3	307/308-wipe-WI	7/31	1030	W	1																				
4	307/308-wipe-VF	7/31	1030	W	1																				
5	307/308-wipe-FR	7/31	1030	W	1																				
6	316-wipe-DT	7/31	1022	W	1																				
7	316-wipe-WO	7/31	1022	W	1																				
8	316-wipe-WI	7/31	1022	W	1																				
9	332-wipe-DT	7/31	10:00	W	1																				
10	332-wipe-WO	7/31	1000	W	1																				

	Signature	Company	Date	Time
Relinquished by	[signature]	Herrera	7/31/10	1252
Received by	[signature]	OnSite Env	7/31/10	1252
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions: W = wipe

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Chain of Custody

Laboratory Number: 07-217

Company:	Herrera
Project Number:	09-04193-002
Project Name:	KCYSC
Project Manager:	Peter Jowise
Sampled by:	AF-JH

Turnaround Request (in working days)
(Check One)
- [x] Same Day
- [ ] 1 Day
- [ ] 2 Day
- [ ] 3 Day
- [ ] Standard (7 working days) (TPH analysis 5 working days)
- [ ] ______ (other)

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	% Moisture
11	402-WIPE-DT	7/31	1105	W	1								X						
12	402-WIPE-WO	7/31	1105	W	1														
13	402-WIPE-WI	7/31	1105	W	1														
14	412-WIPE-DT	7/31	1055	W	1														
15	412-WIPE-WO	7/31	1055	W	1														
16	412-WIPE-WI	7/31	1055	W	1														
17	413-WIPE-DT	7/31	1045	W	1														
18	413-WIPE-WO	7/31	1045	W	1														
19	413-WIPE-WI	7/31	1045	W	1														
20	413-WIPE-FC	7/31	1045	W	1														

	Signature	Company	Date	Time
Relinquished by	[signature]	Herrera	7/31/10	1252
Received by	[signature]	OnSite Env	7/31/10	1252
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions: W = wipe

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Chain of Custody

Laboratory Number: 07-217

Company: Herrera Env
Project Number: 09-04193-002
Project Name: KCYSC
Project Manager: Peter Jowise
Sampled by: AF/JH

Turnaround Request (in working days)
(Check One)
- [x] Same Day
- [ ] 1 Day
- [ ] 2 Day
- [ ] 3 Day
- [ ] Standard (7 working days) (TPH analysis 5 working days)
- [ ] ________ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	% Moisture
21	503-Wipe-WO	7/31	1120	W	1								X						
22	503-wipe-WI	7/31	1120																
23	503-wipe-DT	7/31	~~11~~20																
24	503-wipe-DS	7/31	1120																
25	508-wipe-WO	7/31	1130																
26	508-wipe-WI	7/31	1130																
27	508-wipe-DT	7/31	1130																
28	508-Wipe-DS	7/31	1130																
29	517-wipe-WO	7/31	1140																
30	517-wipe-WI	7/31	1140																

	Signature	Company	Date	Time
Relinquished by	[signature]	Herrera	7/31/10	1252
Received by	[signature]	OnSite Env	7/31/10	1252
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:
W=wipe

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Chain of Custody

Company: Herrera ENV
Project Number: 09-04493-002
Project Name: KCYSC
Project Manager: Peter Jowise
Sampled by: AF/JH

Turnaround Request (in working days)
(Check One)
- [x] Same Day
- [ ] 1 Day
- [ ] 2 Day
- [ ] 3 Day
- [ ] Standard (7 working days) (TPH analysis 5 working days)
- [ ] ______ (other)

Laboratory Number: 07-217

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664							% Moisture
31	517-wipe-DT	7/31	1140	W	1								X												
32	517-wipe-RA	7/31	1140	W	1																				
33	332-WIPE-WI	7/31	1000	W	1																				
34	336-WIPE-DT	7/31	1010	W	1																				
35	336-WIPE-WO	7/31	1010	W	1																				
36	336-WIPE-WI	7/31	1010	W	1																				

	Signature	Company	Date	Time
Relinquished by	[signature]	Herrera	7/31/10	1252
Received by	[signature]	OnSite Env	7/31/10	1252
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:
W= wipE

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OnSite
Environmental Inc.

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August 3, 2010

Peter Jowise
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 09-04193-002
Laboratory Reference No. 1007-218

Dear Peter:

Enclosed are the analytical results and associated quality control data for samples submitted on July 31, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-218
Project: 09-04193-002

Case Narrative

Samples were collected on July 31, 2010 and received by the laboratory on July 31, 2010. They were maintained at the laboratory at a temperature of 2^oC to 6^oC.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-218
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**244-WIPE-WO**					
Laboratory ID:	07-218-01					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**9.4**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*101*	*74-135*				
Client ID:	**244-WIPE-WI**					
Laboratory ID:	07-218-02					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*100*	*74-135*				
Client ID:	**244-WIPE-VF**					
Laboratory ID:	07-218-03					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*99*	*74-135*				

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-218
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**244-WIPE-DT**					
Laboratory ID:	07-218-04					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*98*	*74-135*				
Client ID:	**228-WIPE-DT**					
Laboratory ID:	07-218-05					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*103*	*74-135*				
Client ID:	**228-WIPE-WO**					
Laboratory ID:	07-218-06					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**3.4**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*102*	*74-135*				

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-218
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**228-WIPE-WI**					
Laboratory ID:	07-218-07					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*101*	*74-135*				
Client ID:	**228-WIPE-VF**					
Laboratory ID:	07-218-08					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*101*	*74-135*				
Client ID:	**358-WIPE-WO**					
Laboratory ID:	07-218-09					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**39**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*101*	*74-135*				

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-218
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**358-WIPE-WI**					
Laboratory ID:	07-218-10					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*102*	*74-135*				
Client ID:	**358-WIPE-DS**					
Laboratory ID:	07-218-11					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*101*	*74-135*				
Client ID:	**358-WIPE-DT**					
Laboratory ID:	07-218-12					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*100*	*74-135*				

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Laboratory Reference: 1007-218
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**302-WIPE-HT**					
Laboratory ID:	07-218-13					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*102*	*74-135*				
Client ID:	**302-WIPE-WI**					
Laboratory ID:	07-218-14					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*101*	*74-135*				
Client ID:	**302-WIPE-WO**					
Laboratory ID:	07-218-15					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**8.9**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*106*	*74-135*				

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PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**420-WIPE-VF**					
Laboratory ID:	07-218-16					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*106*	*74-135*				
Client ID:	**420-WIPE-DT**					
Laboratory ID:	07-218-17					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*104*	*74-135*				
Client ID:	**420-WIPE-WI**					
Laboratory ID:	07-218-18					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*106*	*74-135*				

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PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**420-WIPE-WO**					
Laboratory ID:	07-218-19					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**6.4**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*107*	*74-135*				
Client ID:	**434-WIPE-FC**					
Laboratory ID:	07-218-20					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*106*	*74-135*				
Client ID:	**434-WIPE-VF**					
Laboratory ID:	07-218-21					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*106*	*74-135*				

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PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**434-WIPE-DT**					
Laboratory ID:	07-218-22					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*103*	*74-135*				
Client ID:	**434-WIPE-WI**					
Laboratory ID:	07-218-23					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*105*	*74-135*				
Client ID:	**434-WIPE-WO**					
Laboratory ID:	07-218-24					
Aroclor 1016	**ND**	40	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	40	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	40	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	40	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	40	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**180**	40	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	40	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*107*	*74-135*				

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PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**302-WIPE-DT**					
Laboratory ID:	07-218-25					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*101*	*74-135*				
Client ID:	**427-WIPE-WI**					
Laboratory ID:	07-218-26					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*105*	*74-135*				
Client ID:	**427-WIPE-WO**					
Laboratory ID:	07-218-27					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**10**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*106*	*74-135*				

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PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**427-WIPE-VF**					
Laboratory ID:	07-218-28					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*109*	*74-135*				
Client ID:	**427-WIPE-DT**					
Laboratory ID:	07-218-29					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*104*	*74-135*				
Client ID:	**533-WIPE-HT**					
Laboratory ID:	07-218-30					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*111*	*74-135*				

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PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**533-WIPE-WI**					
Laboratory ID:	07-218-31					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*110*	*74-135*				
Client ID:	**533-WIPE-DT**					
Laboratory ID:	07-218-32					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*111*	*74-135*				
Client ID:	**533-WIPE-WO**					
Laboratory ID:	07-218-33					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**29**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*108*	*74-135*				

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-218
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**534-WIPE-FT**					
Laboratory ID:	07-218-34					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*107*	*74-135*				
Client ID:	**534-WIPE-WI**					
Laboratory ID:	07-218-35					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*109*	*74-135*				
Client ID:	**534-WIPE-DT**					
Laboratory ID:	07-218-36					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*97*	*74-135*				

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-218
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**534-WIPE-WO**					
Laboratory ID:	07-218-37					
Aroclor 1016	**ND**	20	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	20	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	20	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	20	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	20	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**77**	20	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	20	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*104*	*74-135*				
Client ID:	**528-WIPE-WI**					
Laboratory ID:	07-218-38					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*101*	*74-135*				
Client ID:	**528-WIPE-WO**					
Laboratory ID:	07-218-39					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**28**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*105*	*74-135*				

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-218
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**528-WIPE-DT**					
Laboratory ID:	07-218-40					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*87*	*74-135*				

Date of ReporT: August 3, 2010
Samples Submitted: July 31, 2010
Laboratory Reference: 1007-218
Project: 09-04193-002

PCBs by EPA 8082
QUALITY CONTROL

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0801P3					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*106*	*74-135*				
Laboratory ID:	MB0801P4					
Aroclor 1016	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-1-10	8-2-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*106*	*74-135*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS											
Laboratory ID:	SB0801P2										
	SB	SBD	SB	SBD		SB	SBD				
Aroclor 1260	**22.4**	**22.2**	20.0	20.0	N/A	**112**	**111**	81-128	1	7	
Surrogate:											
DCB						*109*	*109*	*74-135*			
Laboratory ID:	SB0801P3										
	SB	SBD	SB	SBD		SB	SBD				
Aroclor 1260	**22.4**	**22.6**	20.0	20.0	N/A	**112**	**113**	81-128	1	7	
Surrogate:											
DCB						*111*	*111*	*74-135*			
Laboratory ID:	SB0801P4										
	SB	SBD	SB	SBD		SB	SBD				
Aroclor 1260	**22.4**	**22.5**	20.0	20.0	N/A	**112**	**113**	81-128	0	7	
Surrogate:											
DCB						*113*	*113*	*74-135*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

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Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Company: Herrera Env
Project Number: 09-04193-002
Project Name: KCYSC
Project Manager: Peter Jowise
Sampled by: GC/BH

Turnaround Request (in working days)
(Check One)
- ☐ Same Day
- ☐ 1 Day
- ☒ 2 Day
- ☐ 3 Day
- ☐ Standard (7 working days) (TPH analysis 5 working days)
- ☐ ________ (other)

Laboratory Number: 07-218

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664								% Moisture
1	~~09~~ 244-Wipe-WO	7/31/10	0903	Wipe	1								X													
2	244-Wipe-W1		0910																							
3	244-Wipe-VF		0920																							
4	244-Wipe-DT		0925																							
5	228-Wipe-DT		0935																							
6	228-Wipe-WO		0935																							
7	228-Wipe-W1		0940																							
8	228-Wipe-VF		0945																							
9	358-Wipe-WO		1000																							
10	358-Wipe-W1		1005																							

	Signature	Company	Date	Time
Relinquished by	[illegible]	Herrera	7/31/10	1252
Received by	[illegible]	OnSite Env	7/31/10	1252
Relinquished by				
Received by				
Relinquished by				
Received by				

Comments/Special Instructions: 100 cm² wipes

Reviewed by/Date

Reviewed by/Date

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Chain of Custody

Laboratory Number: 07-218

Company:	Herrera Env
Project Number:	09-04193-002
Project Name:	KCYSC
Project Manager:	Peter Jowise
Sampled by:	GC/BH

Turnaround Request (in working days)
(Check One)
- [x] Same Day
- [ ] 1 Day
- [ ] 2 Day
- [ ] 3 Day
- [ ] Standard (7 working days) (TPH analysis 5 working days)
- [ ] ________ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664							% Moisture
11	358-Wipe-DS	7/31/10	1010	wipe	1								X												
12	358-Wipe-DT		1010																						
13	302-Wipe-DTHT		1018																						
14	302-Wipe-WI		1020																						
15	302-Wipe-WO		1025																						
16	420-Wipe-VF		1045																						
17	420-Wipe-DT		1050																						
18	420-Wipe-WI		1050																						
19	420-Wipe-WO		1052																						
20	434-Wipe-FC		1057																						

	Signature	Company	Date	Time
Relinquished by		Herrera	7/31/10	1252
Received by		OnSite Env	7/31/10	1252
Relinquished by				
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Comments/Special Instructions:

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Chain of Custody

Laboratory Number: 07-218

Company: Herrera EnV
Project Number: 09-04193-002
Project Name: KCYSC
Project Manager: Peter Jowise
Sampled by: GC/BH

Turnaround Request (in working days)

(Check One)

- [x] Same Day
- [ ] 1 Day
- [ ] 2 Day
- [ ] 3 Day
- [ ] Standard (7 working days) (TPH analysis 5 working days)
- [ ] ______ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664							% Moisture
21	434-Wipe-VF	7/31/10	1058	Wipe	1								X												
22	434-Wipe-DT		1102																						
23	434-Wipe-WI		1100																						
24	434-Wipe-WO		1104																						
25	302-Wipe-DT		1023																						
26	427-Wipe-WI		1108																						
27	427-Wipe-WO		1110																						
28	427-Wipe-VF		1111																						
29	427-Wipe-DT		1114																						
30	533-Wipe-HT		1120																						

	Signature	Company	Date	Time
Relinquished by	[signature]	Herrera	7/31/10	1252
Received by	[signature]	OnSite Env	7/31/10	1252
Relinquished by				
Received by				
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Comments/Special Instructions:

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Chain of Custody

Company: Herrera
Project Number: 09-04193-802
Project Name: KCYSC
Project Manager: Peter Jowise
Sampled by: GC/BH

Turnaround Request (in working days)
(Check One)
- [ ] Same Day
- [ ] 1 Day
- [x] 2 Day
- [ ] 3 Day
- [ ] Standard (7 working days) (TPH analysis 5 working days)
- [ ] ______ (other)

Laboratory Number: 07-218

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664							% Moisture
31	533-Wipe-WI	7/31/10	1122	Wipe	1								X												
32	533-Wipe-DT		1125																						
33	533-Wipe-WO		1124																						
34	534-Wipe-FT		1129																						
35	534-Wipe-WI		1131																						
36	534-Wipe-DT		1135																						
37	534-Wipe-WO		1133																						
38	528-Wipe-WI		1137																						
39	528-Wipe-WO		1139																						
40	528-Wipe-DT		1140																						

	Signature	Company	Date	Time
Relinquished by	[signature]	Herrera	7/31/10	1252
Received by	[signature]	OnSite Env	7/31/10	1252
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:

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August 5, 2010

Peter Jowise
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 09-04193-002
Laboratory Reference No. 1008-007

Dear Peter:

Enclosed are the analytical results and associated quality control data for samples submitted on August 3, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: August 5, 2010
Samples Submitted: August 3, 2010
Laboratory Reference: 1008-007
Project: 09-04193-002

Case Narrative

Samples were collected on August 2, 2010 and received by the laboratory on August 3, 2010. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: August 5, 2010
Samples Submitted: August 3, 2010
Laboratory Reference: 1008-007
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Caulk
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**228-CAULK**					
Laboratory ID:	08-007-01					
Aroclor 1016	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1221	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1232	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1242	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1248	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1254	**97000**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1260	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S
Client ID:	**244-CAULK**					
Laboratory ID:	08-007-02					
Aroclor 1016	**ND**	19000	EPA 8082	8-3-10	8-4-10	
Aroclor 1221	**ND**	19000	EPA 8082	8-3-10	8-4-10	
Aroclor 1232	**ND**	19000	EPA 8082	8-3-10	8-4-10	
Aroclor 1242	**ND**	19000	EPA 8082	8-3-10	8-4-10	
Aroclor 1248	**ND**	19000	EPA 8082	8-3-10	8-4-10	
Aroclor 1254	**89000**	19000	EPA 8082	8-3-10	8-4-10	
Aroclor 1260	**ND**	19000	EPA 8082	8-3-10	8-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S
Client ID:	**302-CAULK**					
Laboratory ID:	08-007-03					
Aroclor 1016	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1221	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1232	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1242	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1248	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1254	**110000**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1260	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S

Date of Report: August 5, 2010
Samples Submitted: August 3, 2010
Laboratory Reference: 1008-007
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Caulk
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**308-CAULK**					
Laboratory ID:	08-007-04					
Aroclor 1016	**ND**	9300	EPA 8082	8-3-10	8-4-10	
Aroclor 1221	**ND**	9300	EPA 8082	8-3-10	8-4-10	
Aroclor 1232	**ND**	9300	EPA 8082	8-3-10	8-4-10	
Aroclor 1242	**ND**	9300	EPA 8082	8-3-10	8-4-10	
Aroclor 1248	**ND**	9300	EPA 8082	8-3-10	8-4-10	
Aroclor 1254	**70000**	9300	EPA 8082	8-3-10	8-4-10	
Aroclor 1260	**ND**	9300	EPA 8082	8-3-10	8-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S
Client ID:	**316-CAULK**					
Laboratory ID:	08-007-05					
Aroclor 1016	**ND**	8800	EPA 8082	8-3-10	8-4-10	
Aroclor 1221	**ND**	8800	EPA 8082	8-3-10	8-4-10	
Aroclor 1232	**ND**	8800	EPA 8082	8-3-10	8-4-10	
Aroclor 1242	**ND**	8800	EPA 8082	8-3-10	8-4-10	
Aroclor 1248	**ND**	8800	EPA 8082	8-3-10	8-4-10	
Aroclor 1254	**76000**	8800	EPA 8082	8-3-10	8-4-10	
Aroclor 1260	**ND**	8800	EPA 8082	8-3-10	8-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S
Client ID:	**332-CAULK**					
Laboratory ID:	08-007-06					
Aroclor 1016	**ND**	9600	EPA 8082	8-3-10	8-4-10	
Aroclor 1221	**ND**	9600	EPA 8082	8-3-10	8-4-10	
Aroclor 1232	**ND**	9600	EPA 8082	8-3-10	8-4-10	
Aroclor 1242	**ND**	9600	EPA 8082	8-3-10	8-4-10	
Aroclor 1248	**ND**	9600	EPA 8082	8-3-10	8-4-10	
Aroclor 1254	**92000**	9600	EPA 8082	8-3-10	8-4-10	
Aroclor 1260	**ND**	9600	EPA 8082	8-3-10	8-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S

Date of Report: August 5, 2010
Samples Submitted: August 3, 2010
Laboratory Reference: 1008-007
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Caulk
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**336-CAULK**					
Laboratory ID:	08-007-07					
Aroclor 1016	**ND**	10000	EPA 8082	8-3-10	8-4-10	
Aroclor 1221	**ND**	10000	EPA 8082	8-3-10	8-4-10	
Aroclor 1232	**ND**	10000	EPA 8082	8-3-10	8-4-10	
Aroclor 1242	**ND**	10000	EPA 8082	8-3-10	8-4-10	
Aroclor 1248	**ND**	10000	EPA 8082	8-3-10	8-4-10	
Aroclor 1254	**78000**	10000	EPA 8082	8-3-10	8-4-10	
Aroclor 1260	**ND**	10000	EPA 8082	8-3-10	8-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S
Client ID:	**358-CAULK**					
Laboratory ID:	08-007-08					
Aroclor 1016	**ND**	12000	EPA 8082	8-3-10	8-4-10	
Aroclor 1221	**ND**	12000	EPA 8082	8-3-10	8-4-10	
Aroclor 1232	**ND**	12000	EPA 8082	8-3-10	8-4-10	
Aroclor 1242	**ND**	12000	EPA 8082	8-3-10	8-4-10	
Aroclor 1248	**ND**	12000	EPA 8082	8-3-10	8-4-10	
Aroclor 1254	**110000**	12000	EPA 8082	8-3-10	8-4-10	
Aroclor 1260	**ND**	12000	EPA 8082	8-3-10	8-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S
Client ID:	**402-CAULK**					
Laboratory ID:	08-007-09					
Aroclor 1016	**ND**	10000	EPA 8082	8-3-10	8-4-10	
Aroclor 1221	**ND**	10000	EPA 8082	8-3-10	8-4-10	
Aroclor 1232	**ND**	10000	EPA 8082	8-3-10	8-4-10	
Aroclor 1242	**ND**	10000	EPA 8082	8-3-10	8-4-10	
Aroclor 1248	**ND**	10000	EPA 8082	8-3-10	8-4-10	
Aroclor 1254	**100000**	10000	EPA 8082	8-3-10	8-4-10	
Aroclor 1260	**ND**	10000	EPA 8082	8-3-10	8-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S

Date of Report: August 5, 2010
Samples Submitted: August 3, 2010
Laboratory Reference: 1008-007
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Caulk
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**412-CAULK**					
Laboratory ID:	08-007-10					
Aroclor 1016	**ND**	14000	EPA 8082	8-3-10	8-4-10	
Aroclor 1221	**ND**	14000	EPA 8082	8-3-10	8-4-10	
Aroclor 1232	**ND**	14000	EPA 8082	8-3-10	8-4-10	
Aroclor 1242	**ND**	14000	EPA 8082	8-3-10	8-4-10	
Aroclor 1248	**ND**	14000	EPA 8082	8-3-10	8-4-10	
Aroclor 1254	**160000**	14000	EPA 8082	8-3-10	8-4-10	
Aroclor 1260	**ND**	14000	EPA 8082	8-3-10	8-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S
Client ID:	**413-CAULK**					
Laboratory ID:	08-007-11					
Aroclor 1016	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1221	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1232	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1242	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1248	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1254	**120000**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1260	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S
Client ID:	**420-CAULK**					
Laboratory ID:	08-007-12					
Aroclor 1016	**ND**	9900	EPA 8082	8-3-10	8-4-10	
Aroclor 1221	**ND**	9900	EPA 8082	8-3-10	8-4-10	
Aroclor 1232	**ND**	9900	EPA 8082	8-3-10	8-4-10	
Aroclor 1242	**ND**	9900	EPA 8082	8-3-10	8-4-10	
Aroclor 1248	**ND**	9900	EPA 8082	8-3-10	8-4-10	
Aroclor 1254	**120000**	9900	EPA 8082	8-3-10	8-4-10	
Aroclor 1260	**ND**	9900	EPA 8082	8-3-10	8-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S

Date of Report: August 5, 2010
Samples Submitted: August 3, 2010
Laboratory Reference: 1008-007
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Caulk
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**427-CAULK**					
Laboratory ID:	08-007-13					
Aroclor 1016	**ND**	9500	EPA 8082	8-3-10	8-4-10	
Aroclor 1221	**ND**	9500	EPA 8082	8-3-10	8-4-10	
Aroclor 1232	**ND**	9500	EPA 8082	8-3-10	8-4-10	
Aroclor 1242	**ND**	9500	EPA 8082	8-3-10	8-4-10	
Aroclor 1248	**ND**	9500	EPA 8082	8-3-10	8-4-10	
Aroclor 1254	**120000**	9500	EPA 8082	8-3-10	8-4-10	
Aroclor 1260	**ND**	9500	EPA 8082	8-3-10	8-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S
Client ID:	**434-CAULK**					
Laboratory ID:	08-007-14					
Aroclor 1016	**ND**	16000	EPA 8082	8-3-10	8-4-10	
Aroclor 1221	**ND**	16000	EPA 8082	8-3-10	8-4-10	
Aroclor 1232	**ND**	16000	EPA 8082	8-3-10	8-4-10	
Aroclor 1242	**ND**	16000	EPA 8082	8-3-10	8-4-10	
Aroclor 1248	**ND**	16000	EPA 8082	8-3-10	8-4-10	
Aroclor 1254	**120000**	16000	EPA 8082	8-3-10	8-4-10	
Aroclor 1260	**ND**	16000	EPA 8082	8-3-10	8-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S
Client ID:	**503-CAULK**					
Laboratory ID:	08-007-15					
Aroclor 1016	**ND**	15000	EPA 8082	8-3-10	8-4-10	
Aroclor 1221	**ND**	15000	EPA 8082	8-3-10	8-4-10	
Aroclor 1232	**ND**	15000	EPA 8082	8-3-10	8-4-10	
Aroclor 1242	**ND**	15000	EPA 8082	8-3-10	8-4-10	
Aroclor 1248	**ND**	15000	EPA 8082	8-3-10	8-4-10	
Aroclor 1254	**150000**	15000	EPA 8082	8-3-10	8-4-10	
Aroclor 1260	**ND**	15000	EPA 8082	8-3-10	8-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S

Date of Report: August 5, 2010
Samples Submitted: August 3, 2010
Laboratory Reference: 1008-007
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Caulk
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**508-CAULK**					
Laboratory ID:	08-007-16					
Aroclor 1016	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1221	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1232	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1242	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1248	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1254	**110000**	11000	EPA 8082	8-3-10	8-4-10	
Aroclor 1260	**ND**	11000	EPA 8082	8-3-10	8-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S
Client ID:	**517-CAULK**					
Laboratory ID:	08-007-17					
Aroclor 1016	**ND**	8900	EPA 8082	8-3-10	8-4-10	
Aroclor 1221	**ND**	8900	EPA 8082	8-3-10	8-4-10	
Aroclor 1232	**ND**	8900	EPA 8082	8-3-10	8-4-10	
Aroclor 1242	**ND**	8900	EPA 8082	8-3-10	8-4-10	
Aroclor 1248	**ND**	8900	EPA 8082	8-3-10	8-4-10	
Aroclor 1254	**96000**	8900	EPA 8082	8-3-10	8-4-10	
Aroclor 1260	**ND**	8900	EPA 8082	8-3-10	8-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S
Client ID:	**528-CAULK**					
Laboratory ID:	08-007-18					
Aroclor 1016	**ND**	9100	EPA 8082	8-3-10	8-4-10	
Aroclor 1221	**ND**	9100	EPA 8082	8-3-10	8-4-10	
Aroclor 1232	**ND**	9100	EPA 8082	8-3-10	8-4-10	
Aroclor 1242	**ND**	9100	EPA 8082	8-3-10	8-4-10	
Aroclor 1248	**ND**	9100	EPA 8082	8-3-10	8-4-10	
Aroclor 1254	**110000**	9100	EPA 8082	8-3-10	8-4-10	
Aroclor 1260	**ND**	9100	EPA 8082	8-3-10	8-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S

Date of Report: August 5, 2010
Samples Submitted: August 3, 2010
Laboratory Reference: 1008-007
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Caulk
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**533-CAULK**					
Laboratory ID:	08-007-19					
Aroclor 1016	**ND**	9300	EPA 8082	8-3-10	8-4-10	
Aroclor 1221	**ND**	9300	EPA 8082	8-3-10	8-4-10	
Aroclor 1232	**ND**	9300	EPA 8082	8-3-10	8-4-10	
Aroclor 1242	**ND**	9300	EPA 8082	8-3-10	8-4-10	
Aroclor 1248	**ND**	9300	EPA 8082	8-3-10	8-4-10	
Aroclor 1254	**85000**	9300	EPA 8082	8-3-10	8-4-10	
Aroclor 1260	**ND**	9300	EPA 8082	8-3-10	8-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S
Client ID:	**534-CAULK**					
Laboratory ID:	08-007-20					
Aroclor 1016	**ND**	13000	EPA 8082	8-3-10	8-4-10	
Aroclor 1221	**ND**	13000	EPA 8082	8-3-10	8-4-10	
Aroclor 1232	**ND**	13000	EPA 8082	8-3-10	8-4-10	
Aroclor 1242	**ND**	13000	EPA 8082	8-3-10	8-4-10	
Aroclor 1248	**ND**	13000	EPA 8082	8-3-10	8-4-10	
Aroclor 1254	**120000**	13000	EPA 8082	8-3-10	8-4-10	
Aroclor 1260	**ND**	13000	EPA 8082	8-3-10	8-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	---	*46-122*				S

Date of Report: August 5, 2010
Samples Submitted: August 3, 2010
Laboratory Reference: 1008-007
Project: 09-04193-002

PCBs by EPA 8082
QUALITY CONTROL

Matrix: Solid
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0803S1					
Aroclor 1016	**ND**	0.050	EPA 8082	8-3-10	8-3-10	
Aroclor 1221	**ND**	0.050	EPA 8082	8-3-10	8-3-10	
Aroclor 1232	**ND**	0.050	EPA 8082	8-3-10	8-3-10	
Aroclor 1242	**ND**	0.050	EPA 8082	8-3-10	8-3-10	
Aroclor 1248	**ND**	0.050	EPA 8082	8-3-10	8-3-10	
Aroclor 1254	**ND**	0.050	EPA 8082	8-3-10	8-3-10	
Aroclor 1260	**ND**	0.050	EPA 8082	8-3-10	8-3-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*100*	*46-122*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS											
Laboratory ID:	SB0803S1										
	SB	SBD	SB	SBD		SB	SBD				
Aroclor 1260	**0.468**	**0.499**	0.500	0.500	N/A	**94**	**100**	54-123	6	20	
Surrogate:											
DCB						*90*	*95*	*46-122*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.

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Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Laboratory Number: 08-007

Company: HERRERA

Project Number: 09-04193-002

Project Name: KCYSC

Project Manager: Peter Jowise

Sampled by: BRADY HANSON

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☐ Standard (7 working days) (TPH analysis 5 working days)
- ☐ ________ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix*	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	% Moisture
1	328-CAULK	8.2.10	1740	M									X						
2	244-CAULK		1730																
3	302-CAULK		1910																
4	308-CAULK		1900																
5	316-CAULK		1815																
6	332-CAULK		1840																
7	336-CAULK		1830																
8	358-CAULK		1850																
9	402-CAULK		2100																
10	412-CAULK		1920																

	Signature	Company	Date	Time
Relinquished by	[illegible]	HERRERA	8.3.10	815
Received by	P McKahon	OSE	8.3.10	8:15A
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:

*M = CAULK (MATERIAL)

Chromatograms with final report ☐

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Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Company: HERRERA
Project Number: 09-04193-002
Project Name: KCYSC
Project Manager: Peter Jowise
Sampled by: Brady Hanson

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Day ☐ 3 Day
☐ Standard (7 working days) (TPH analysis 5 working days)
☐ ______ (other)

Laboratory Number: 08-007

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664							% Moisture
11	413-CAULK	8.2.10	1915	M*	1								X												
12	420-CAULK		2010																						
13	427-CAULK		1955																						
14	434-CAULK		2000																						
15	503-CAULK		2015																						
16	508-CAULK		2055																						
17	517-CAULK		2020																						
18	528-CAULK		2040																						
19	533-CAULK		2025																						
20	53~~4~~-CAULK	↓	2030	↓	↓								↓												

	Signature	Company	Date	Time
Relinquished by	[signature]	HERRERA	8.3.10	815
Received by	D McMahon	OSE	8.3.10	8:15A
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:
*M - MATERIAL (CAULK)

Chromatograms with final report ☐

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Environmental Inc.
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August 9, 2010

Peter Jowise
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 09-04193-002
Laboratory Reference No. 1008-008

Dear Peter:

Enclosed are the analytical results and associated quality control data for samples submitted on August 3, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: August 9, 2010
Samples Submitted: August 3, 2010
Laboratory Reference: 1008-008
Project: 09-04193-002

Case Narrative

Samples were collected on August 2, 2010 and received by the laboratory on August 3, 2010. They were maintained at the laboratory at a temperature of 2^oC to 6^oC.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: August 9, 2010
Samples Submitted: August 3, 2010
Laboratory Reference: 1008-008
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SA4-00-SS01-00**					
Laboratory ID:	08-008-01					
Aroclor 1016	**ND**	0.053	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.053	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.053	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.053	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.053	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**1.5**	0.053	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.053	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*104*	*46-122*				
Client ID:	**SA4-00-SS02-06**					
Laboratory ID:	08-008-02					
Aroclor 1016	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**0.35**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*103*	*46-122*				
Client ID:	**SA4-00-SS03-12**					
Laboratory ID:	08-008-03					
Aroclor 1016	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**0.27**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*96*	*46-122*				

Date of Report: August 9, 2010
Samples Submitted: August 3, 2010
Laboratory Reference: 1008-008
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SA4-04-SS05-00**					
Laboratory ID:	08-008-04					
Aroclor 1016	**ND**	0.055	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.055	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.055	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.055	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.055	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**0.16**	0.055	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.055	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*93*	*46-122*				
Client ID:	**SA4-02-SS04-00**					
Laboratory ID:	08-008-05					
Aroclor 1016	**ND**	0.055	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.055	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.055	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.055	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.055	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**0.26**	0.055	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.055	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*94*	*46-122*				
Client ID:	**SA4-00-SS06-00**					
Laboratory ID:	08-008-06					
Aroclor 1016	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**0.97**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*92*	*46-122*				

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Project: 09-04193-002

PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SA4-00-SS07-06**					
Laboratory ID:	08-008-07					
Aroclor 1016	**ND**	0.054	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.054	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.054	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.054	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.054	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**1.9**	0.054	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.054	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*91*	*46-122*				
Client ID:	**SA4-00-SS08-12**					
Laboratory ID:	08-008-08					
Aroclor 1016	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**0.44**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*96*	*46-122*				
Client ID:	**SA4-02-SS09-00**					
Laboratory ID:	08-008-09					
Aroclor 1016	**ND**	0.53	EPA 8082	8-4-10	8-6-10	
Aroclor 1221	**ND**	0.53	EPA 8082	8-4-10	8-6-10	
Aroclor 1232	**ND**	0.53	EPA 8082	8-4-10	8-6-10	
Aroclor 1242	**ND**	0.53	EPA 8082	8-4-10	8-6-10	
Aroclor 1248	**ND**	0.53	EPA 8082	8-4-10	8-6-10	
Aroclor 1254	**2.4**	0.53	EPA 8082	8-4-10	8-6-10	
Aroclor 1260	**ND**	0.53	EPA 8082	8-4-10	8-6-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*98*	*46-122*				

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Project: 09-04193-002

PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SA4-04-SS10-00**					
Laboratory ID:	08-008-10					
Aroclor 1016	**ND**	0.051	EPA 8082	8-4-10	8-6-10	
Aroclor 1221	**ND**	0.051	EPA 8082	8-4-10	8-6-10	
Aroclor 1232	**ND**	0.051	EPA 8082	8-4-10	8-6-10	
Aroclor 1242	**ND**	0.051	EPA 8082	8-4-10	8-6-10	
Aroclor 1248	**ND**	0.051	EPA 8082	8-4-10	8-6-10	
Aroclor 1254	**0.16**	0.051	EPA 8082	8-4-10	8-6-10	
Aroclor 1260	**ND**	0.051	EPA 8082	8-4-10	8-6-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*100*	*46-122*				
Client ID:	**SA5-00-SS11-00**					
Laboratory ID:	08-008-11					
Aroclor 1016	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*85*	*46-122*				
Client ID:	**SA5-00-SS12-06**					
Laboratory ID:	08-008-12					
Aroclor 1016	**ND**	0.053	EPA 8082	8-4-10	8-6-10	
Aroclor 1221	**ND**	0.053	EPA 8082	8-4-10	8-6-10	
Aroclor 1232	**ND**	0.053	EPA 8082	8-4-10	8-6-10	
Aroclor 1242	**ND**	0.053	EPA 8082	8-4-10	8-6-10	
Aroclor 1248	**ND**	0.053	EPA 8082	8-4-10	8-6-10	
Aroclor 1254	**ND**	0.053	EPA 8082	8-4-10	8-6-10	
Aroclor 1260	**ND**	0.053	EPA 8082	8-4-10	8-6-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*95*	*46-122*				

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Project: 09-04193-002

PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SA5-00-SS13-12**					
Laboratory ID:	08-008-13					
Aroclor 1016	**ND**	0.054	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.054	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.054	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.054	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.054	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**ND**	0.054	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.054	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*87*	*46-122*				
Client ID:	**SA5-02-SS14-00**					
Laboratory ID:	08-008-14					
Aroclor 1016	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*81*	*46-122*				
Client ID:	**SA5-04-SS15-00**					
Laboratory ID:	08-008-15					
Aroclor 1016	**ND**	0.052	EPA 8082	8-4-10	8-6-10	
Aroclor 1221	**ND**	0.052	EPA 8082	8-4-10	8-6-10	
Aroclor 1232	**ND**	0.052	EPA 8082	8-4-10	8-6-10	
Aroclor 1242	**ND**	0.052	EPA 8082	8-4-10	8-6-10	
Aroclor 1248	**ND**	0.052	EPA 8082	8-4-10	8-6-10	
Aroclor 1254	**0.13**	0.052	EPA 8082	8-4-10	8-6-10	
Aroclor 1260	**ND**	0.052	EPA 8082	8-4-10	8-6-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*99*	*46-122*				

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Project: 09-04193-002

PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SA5-00-SS16-00**					
Laboratory ID:	08-008-16					
Aroclor 1016	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*91*	*46-122*				
Client ID:	**SA5-00-SS17-06**					
Laboratory ID:	08-008-17					
Aroclor 1016	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*93*	*46-122*				
Client ID:	**SA5-00-SS18-12**					
Laboratory ID:	08-008-18					
Aroclor 1016	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*86*	*46-122*				

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PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SA5-02-SS19-00**					
Laboratory ID:	08-008-19					
Aroclor 1016	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**0.071**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*87*	*46-122*				
Client ID:	**SA5-04-SS20-00**					
Laboratory ID:	08-008-20					
Aroclor 1016	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**0.077**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*87*	*46-122*				
Client ID:	**SA6-00-SS21-00**					
Laboratory ID:	08-008-21					
Aroclor 1016	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**0.092**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*87*	*46-122*				

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Project: 09-04193-002

PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SA6-00-SS22-06**					
Laboratory ID:	08-008-22					
Aroclor 1016	**ND**	0.053	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.053	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.053	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.053	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.053	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**0.089**	0.053	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.053	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*89*	*46-122*				
Client ID:	**SA6-00-SS23-12**					
Laboratory ID:	08-008-23					
Aroclor 1016	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**0.15**	0.052	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.052	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*84*	*46-122*				
Client ID:	**SA6-02-SS24-00**					
Laboratory ID:	08-008-24					
Aroclor 1016	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*84*	*46-122*				

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PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SA6-04-SS25-00**					
Laboratory ID:	08-008-25					
Aroclor 1016	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*87*	*46-122*				
Client ID:	**SA6-00-SS26-00**					
Laboratory ID:	08-008-26					
Aroclor 1016	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**0.087**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*84*	*46-122*				
Client ID:	**SA6-00-SS27-06**					
Laboratory ID:	08-008-27					
Aroclor 1016	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*83*	*46-122*				

Date of Report: August 9, 2010
Samples Submitted: August 3, 2010
Laboratory Reference: 1008-008
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SA6-00-SS28-12**					
Laboratory ID:	08-008-28					
Aroclor 1016	**ND**	0.054	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.054	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.054	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.054	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.054	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**0.10**	0.054	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.054	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*96*	*46-122*				
Client ID:	**SA6-02-SS29-00**					
Laboratory ID:	08-008-29					
Aroclor 1016	**ND**	0.053	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.053	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.053	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.053	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.053	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**0.14**	0.053	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.053	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*85*	*46-122*				
Client ID:	**SA6-04-SS30-00**					
Laboratory ID:	08-008-30					
Aroclor 1016	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**0.068**	0.051	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.051	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*85*	*46-122*				

Date of Report: August 9, 2010
Samples Submitted: August 3, 2010
Laboratory Reference: 1008-008
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SA7-00-SS31-00**					
Laboratory ID:	08-008-31					
Aroclor 1016	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**0.13**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*75*	*46-122*				
Client ID:	**SA7-00-SS32-06**					
Laboratory ID:	08-008-32					
Aroclor 1016	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*93*	*46-122*				
Client ID:	**SA7-00-SS33-12**					
Laboratory ID:	08-008-33					
Aroclor 1016	**ND**	0.055	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.055	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.055	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.055	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.055	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**0.11**	0.055	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.055	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*92*	*46-122*				

Date of Report: August 9, 2010
Samples Submitted: August 3, 2010
Laboratory Reference: 1008-008
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SA7-02-SS34-00**					
Laboratory ID:	08-008-34					
Aroclor 1016	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**0.13**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*83*	*46-122*				
Client ID:	**SA7-04-SS35-00**					
Laboratory ID:	08-008-35					
Aroclor 1016	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**0.10**	0.056	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.056	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*82*	*46-122*				
Client ID:	**RD-W-SD01-02**					
Laboratory ID:	08-008-36					
Aroclor 1016	**ND**	0.51	EPA 8082	8-4-10	8-6-10	
Aroclor 1221	**ND**	0.51	EPA 8082	8-4-10	8-6-10	
Aroclor 1232	**ND**	0.51	EPA 8082	8-4-10	8-6-10	
Aroclor 1242	**ND**	0.51	EPA 8082	8-4-10	8-6-10	
Aroclor 1248	**ND**	0.51	EPA 8082	8-4-10	8-6-10	
Aroclor 1254	**2.4**	0.51	EPA 8082	8-4-10	8-6-10	
Aroclor 1260	**ND**	0.51	EPA 8082	8-4-10	8-6-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*71*	*46-122*				

Date of Report: August 9, 2010
Samples Submitted: August 3, 2010
Laboratory Reference: 1008-008
Project: 09-04193-002

PCBs by EPA 8082
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0804S1					
Aroclor 1016	**ND**	0.050	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.050	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.050	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.050	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.050	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**ND**	0.050	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.050	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*94*	*46-122*				
Laboratory ID:	MB0804S2					
Aroclor 1016	**ND**	0.050	EPA 8082	8-4-10	8-5-10	
Aroclor 1221	**ND**	0.050	EPA 8082	8-4-10	8-5-10	
Aroclor 1232	**ND**	0.050	EPA 8082	8-4-10	8-5-10	
Aroclor 1242	**ND**	0.050	EPA 8082	8-4-10	8-5-10	
Aroclor 1248	**ND**	0.050	EPA 8082	8-4-10	8-5-10	
Aroclor 1254	**ND**	0.050	EPA 8082	8-4-10	8-5-10	
Aroclor 1260	**ND**	0.050	EPA 8082	8-4-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*87*	*46-122*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	07-199-01										
	MS	MSD	MS	MSD		MS	MSD				
Aroclor 1260	**0.453**	**0.437**	0.500	0.500	ND	**91**	**87**	36-121	4	15	
Surrogate:											
DCB						*82*	*82*	*46-122*			
Laboratory ID:	08-008-23										
	MS	MSD	MS	MSD		MS	MSD				
Aroclor 1260	**0.426**	**0.423**	0.500	0.500	ND	**85**	**85**	36-121	1	15	
Surrogate:											
DCB						*71*	*71*	*46-122*			

Date of Report: August 9, 2010
Samples Submitted: August 3, 2010
Laboratory Reference: 1008-008
Project: 09-04193-002

% MOISTURE

Date Analyzed: 8-3-10

Client ID	Lab ID	% Moisture
SA4-00-SS01-00	08-008-01	6
SA4-00-SS02-06	08-008-02	10
SA4-00-SS03-12	08-008-03	11
SA4-04-SS05-00	08-008-04	9
SA4-02-SS04-00	08-008-05	8
SA4-00-SS06-00	08-008-06	11
SA4-00-SS07-06	08-008-07	8
SA4-00-SS08-12	08-008-08	11
SA4-02-SS09-00	08-008-09	6
SA4-04-SS10-00	08-008-10	3
SA5-00-SS11-00	08-008-11	1
SA5-00-SS12-06	08-008-12	5
SA5-00-SS13-12	08-008-13	7
SA5-02-SS14-00	08-008-14	3
SA5-04-SS15-00	08-008-15	3
SA5-00-SS16-00	08-008-16	1
SA5-00-SS17-06	08-008-17	4
SA5-00-SS18-12	08-008-18	2
SA5-02-SS19-00	08-008-19	3
SA5-04-SS20-00	08-008-20	3
SA6-00-SS21-00	08-008-21	4
SA6-00-SS22-06	08-008-22	5
SA6-00-SS23-12	08-008-23	5
SA6-02-SS24-00	08-008-24	2
SA6-04-SS25-00	08-008-25	2
SA6-00-SS26-00	08-008-26	3
SA6-00-SS27-06	08-008-27	3
SA6-00-SS28-12	08-008-28	7
SA6-02-SS29-00	08-008-29	5
SA6-04-SS30-00	08-008-30	2
SA7-00-SS31-00	08-008-31	11
SA7-00-SS32-06	08-008-32	11
SA7-00-SS33-12	08-008-33	10
SA7-02-SS34-00	08-008-34	11
SA7-04-SS35-00	08-008-35	11
RD-W-SD01-02	08-008-36	1

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Company: Herrera
Project Number: 09-04193-002
Project Name: KCYSC
Project Manager: P. Jowise
Sampled by: BC/GC

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Day ☐ 3 Day
☐ Standard (7 working days) (TPH analysis 5 working days)
☐ ______ (other)

Laboratory Number: 08-008

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664							% Moisture
1	SA4-00-SS01-00	8/2/10	1758	S	1								X												X
2	SA4-00-SS02-06		1755										X												X
3	SA4-00-SS03-12		1754										X												
4	SA4-04-SS05-00		1806										X												
5	SA4-02-SS04-00		1804										X												
6	SA4-00-SS06-00		1815										X												
7	SA4-06-SS07-06		1812										X												
8	SA4-00-SS08-12		1810										X												
9	SA4-02-SS09-00		1815										X												
10	SA4-04-SS10-00		1820										X												

	Signature	Company	Date	Time
Relinquished by	[illegible signature]	HERRERA	8-3-10	815
Received by	[illegible signature]	OSE	8.3.10	8:15
Relinquished by				
Received by				
Relinquished by				
Received by				

Comments/Special Instructions:

Reviewed by/Date

Reviewed by/Date

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Chain of Custody

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Laboratory Number: 08-008

Company:	Herrera Env
Project Number:	09-04193-002
Project Name:	KCYSC
Project Manager:	P. Jowise
Sampled by:	BC/GC

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☐ Standard (7 working days)
- ☐ ______ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	VPH	EPH					% Moisture
11	SA5-00-SS11-00	8/2/10	1900	S	1								X												X
12	SA5-00-SS12-06		1855										X												
13	SA5-00-SS13-12		1850										X												
14	SA5-02-SS14-00		1900										X												
15	SA5-04-SS15-00		1905										X												
16	SA5-00-SS16-00		1852										X												
17	SA5-00-SS17-06		1850										X												
18	SA5-00-SS18-12		1848										X												
19	SA5-02-SS19-00		1854										X												
20	SA5-04-SS20-00		1856										X												

	Signature	Company	Date	Time
Relinquished by	[signature]	HERRERA	8.3.10	815
Received by	DMcKahon	OSE	8.3.10	8:15
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:

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OnSite Environmental Inc.

Phone: (425) 883-3881 • Fax: (425) 885-4603

Chain of Custody

Company: Herrera ENV

Project Number: 09-04193-002

Project Name: KCYSC

Project Manager: P. Jowise

Sampled by: BC/GC

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☐ Standard (7 working days) (TPH analysis 5 working days)
- ☐ ______ (other)

Laboratory Number: 08-008

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664							% Moisture
21	SA6-00-SS21-00	8/2/10	1945	S	1								X												X
22	SA6-00-SS22-06		1939										X												
23	SA6-00-SS23-12		1932										X												
24	SA6-02-SS24-00		1950										X												
25	SA6-04-SS25-00		1954										X												
26	SA6-00-SS26-00		1935										X												
27	SA6-00-SS27-06		1932										X												
28	SA6-00-SS28-12		1930										X												
29	SA6-02-SS29-00		1940										X												
30	SA6-04-SS30-00		1945										X												

	Signature	Company	Date	Time
Relinquished by	[signature]	HERRERA	8-3-10	815
Received by	P McKalson	OSE	8-3-10	815
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:

Chromatograms with final report ☐

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Chain of Custody

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Phone: (425) 883-3881 • Fax: (425) 885-4603

Company: Herrera
Project Number: 09-04193-002
Project Name: KCYSC
Project Manager: P. Jowise
Sampled by: BC/GC

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☐ Standard (7 working days)
- ☐ ____________ (other)

Laboratory Number: 08-008

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	VPH	EPH	% Moisture
31	SA7-00-SS31-00	8/2/10	2019	S	1								X								X
32	SA7-00-SS32-06		2018										X								
33	SA7-00-SS33-12		2015										X								
34	SA7-02-SS34-00		2020										X								
35	SA7-04-SS35-00		2024										X								
36	RD-W-SD01-02		1800										X								

	Signature	Company	Date	Time
Relinquished by	[illegible]	HERRERA	8.3.10	815
Received by	P McKinnon	OSE	8.3.10	8:15
Relinquished by				
Received by				
Relinquished by				
Received by				

Reviewed by/Date

Reviewed by/Date

Comments/Special Instructions:

Chromatograms with final report ☐

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OnSite Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

August 9, 2010

Peter Jowise
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 09-04193-002
Laboratory Reference No. 1008-030

Dear Peter:

Enclosed are the analytical results and associated quality control data for samples submitted on August 4, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: August 9, 2010
Samples Submitted: August 4, 2010
Laboratory Reference: 1008-030
Project: 09-04193-002

Case Narrative

Samples were collected on August 3, 2010 and received by the laboratory on August 4, 2010. They were maintained at the laboratory at a temperature of $2^{o}C$ to $6^{o}C$.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: August 9, 2010
Samples Submitted: August 4, 2010
Laboratory Reference: 1008-030
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SA3-00-SS36-00**					
Laboratory ID:	08-030-01					
Aroclor 1016	**ND**	0.057	EPA 8082	8-5-10	8-5-10	
Aroclor 1221	**ND**	0.057	EPA 8082	8-5-10	8-5-10	
Aroclor 1232	**ND**	0.057	EPA 8082	8-5-10	8-5-10	
Aroclor 1242	**ND**	0.057	EPA 8082	8-5-10	8-5-10	
Aroclor 1248	**ND**	0.057	EPA 8082	8-5-10	8-5-10	
Aroclor 1254	**ND**	0.057	EPA 8082	8-5-10	8-5-10	
Aroclor 1260	**ND**	0.057	EPA 8082	8-5-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*78*	*46-122*				
Client ID:	**SA3-00-SS37-06**					
Laboratory ID:	08-030-02					
Aroclor 1016	**ND**	0.060	EPA 8082	8-5-10	8-5-10	
Aroclor 1221	**ND**	0.060	EPA 8082	8-5-10	8-5-10	
Aroclor 1232	**ND**	0.060	EPA 8082	8-5-10	8-5-10	
Aroclor 1242	**ND**	0.060	EPA 8082	8-5-10	8-5-10	
Aroclor 1248	**ND**	0.060	EPA 8082	8-5-10	8-5-10	
Aroclor 1254	**ND**	0.060	EPA 8082	8-5-10	8-5-10	
Aroclor 1260	**ND**	0.060	EPA 8082	8-5-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*76*	*46-122*				
Client ID:	**SA3-00-SS38-12**					
Laboratory ID:	08-030-03					
Aroclor 1016	**ND**	0.065	EPA 8082	8-5-10	8-5-10	
Aroclor 1221	**ND**	0.065	EPA 8082	8-5-10	8-5-10	
Aroclor 1232	**ND**	0.065	EPA 8082	8-5-10	8-5-10	
Aroclor 1242	**ND**	0.065	EPA 8082	8-5-10	8-5-10	
Aroclor 1248	**ND**	0.065	EPA 8082	8-5-10	8-5-10	
Aroclor 1254	**ND**	0.065	EPA 8082	8-5-10	8-5-10	
Aroclor 1260	**ND**	0.065	EPA 8082	8-5-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*73*	*46-122*				

Date of Report: August 9, 2010
Samples Submitted: August 4, 2010
Laboratory Reference: 1008-030
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SA3-02-SS39-00**					
Laboratory ID:	08-030-04					
Aroclor 1016	**ND**	0.060	EPA 8082	8-5-10	8-5-10	
Aroclor 1221	**ND**	0.060	EPA 8082	8-5-10	8-5-10	
Aroclor 1232	**ND**	0.060	EPA 8082	8-5-10	8-5-10	
Aroclor 1242	**ND**	0.060	EPA 8082	8-5-10	8-5-10	
Aroclor 1248	**ND**	0.060	EPA 8082	8-5-10	8-5-10	
Aroclor 1254	**ND**	0.060	EPA 8082	8-5-10	8-5-10	
Aroclor 1260	**ND**	0.060	EPA 8082	8-5-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*82*	*46-122*				
Client ID:	**SA3-04-SS40-00**					
Laboratory ID:	08-030-05					
Aroclor 1016	**ND**	0.057	EPA 8082	8-5-10	8-5-10	
Aroclor 1221	**ND**	0.057	EPA 8082	8-5-10	8-5-10	
Aroclor 1232	**ND**	0.057	EPA 8082	8-5-10	8-5-10	
Aroclor 1242	**ND**	0.057	EPA 8082	8-5-10	8-5-10	
Aroclor 1248	**ND**	0.057	EPA 8082	8-5-10	8-5-10	
Aroclor 1254	**ND**	0.057	EPA 8082	8-5-10	8-5-10	
Aroclor 1260	**ND**	0.057	EPA 8082	8-5-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*79*	*46-122*				
Client ID:	**SA2-00-SS41-00**					
Laboratory ID:	08-030-06					
Aroclor 1016	**ND**	0.068	EPA 8082	8-5-10	8-5-10	
Aroclor 1221	**ND**	0.068	EPA 8082	8-5-10	8-5-10	
Aroclor 1232	**ND**	0.068	EPA 8082	8-5-10	8-5-10	
Aroclor 1242	**ND**	0.068	EPA 8082	8-5-10	8-5-10	
Aroclor 1248	**ND**	0.068	EPA 8082	8-5-10	8-5-10	
Aroclor 1254	**ND**	0.068	EPA 8082	8-5-10	8-5-10	
Aroclor 1260	**ND**	0.068	EPA 8082	8-5-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*78*	*46-122*				

Date of Report: August 9, 2010
Samples Submitted: August 4, 2010
Laboratory Reference: 1008-030
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SA2-00-SS42-06**					
Laboratory ID:	08-030-07					
Aroclor 1016	**ND**	0.065	EPA 8082	8-5-10	8-5-10	
Aroclor 1221	**ND**	0.065	EPA 8082	8-5-10	8-5-10	
Aroclor 1232	**ND**	0.065	EPA 8082	8-5-10	8-5-10	
Aroclor 1242	**ND**	0.065	EPA 8082	8-5-10	8-5-10	
Aroclor 1248	**ND**	0.065	EPA 8082	8-5-10	8-5-10	
Aroclor 1254	**ND**	0.065	EPA 8082	8-5-10	8-5-10	
Aroclor 1260	**ND**	0.065	EPA 8082	8-5-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*79*	*46-122*				
Client ID:	**SA2-00-SS43-12**					
Laboratory ID:	08-030-08					
Aroclor 1016	**ND**	0.064	EPA 8082	8-5-10	8-5-10	
Aroclor 1221	**ND**	0.064	EPA 8082	8-5-10	8-5-10	
Aroclor 1232	**ND**	0.064	EPA 8082	8-5-10	8-5-10	
Aroclor 1242	**ND**	0.064	EPA 8082	8-5-10	8-5-10	
Aroclor 1248	**ND**	0.064	EPA 8082	8-5-10	8-5-10	
Aroclor 1254	**ND**	0.064	EPA 8082	8-5-10	8-5-10	
Aroclor 1260	**ND**	0.064	EPA 8082	8-5-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*73*	*46-122*				
Client ID:	**SA2-02-SS44-00**					
Laboratory ID:	08-030-09					
Aroclor 1016	**ND**	0.074	EPA 8082	8-5-10	8-5-10	
Aroclor 1221	**ND**	0.074	EPA 8082	8-5-10	8-5-10	
Aroclor 1232	**ND**	0.074	EPA 8082	8-5-10	8-5-10	
Aroclor 1242	**ND**	0.074	EPA 8082	8-5-10	8-5-10	
Aroclor 1248	**ND**	0.074	EPA 8082	8-5-10	8-5-10	
Aroclor 1254	**ND**	0.074	EPA 8082	8-5-10	8-5-10	
Aroclor 1260	**ND**	0.074	EPA 8082	8-5-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*80*	*46-122*				

Date of Report: August 9, 2010
Samples Submitted: August 4, 2010
Laboratory Reference: 1008-030
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SA2-04-SS45-00**					
Laboratory ID:	08-030-10					
Aroclor 1016	**ND**	0.083	EPA 8082	8-5-10	8-5-10	
Aroclor 1221	**ND**	0.083	EPA 8082	8-5-10	8-5-10	
Aroclor 1232	**ND**	0.083	EPA 8082	8-5-10	8-5-10	
Aroclor 1242	**ND**	0.083	EPA 8082	8-5-10	8-5-10	
Aroclor 1248	**ND**	0.083	EPA 8082	8-5-10	8-5-10	
Aroclor 1254	**ND**	0.083	EPA 8082	8-5-10	8-5-10	
Aroclor 1260	**ND**	0.083	EPA 8082	8-5-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*87*	*46-122*				
Client ID:	**SA1-00-SS46-00**					
Laboratory ID:	08-030-11					
Aroclor 1016	**ND**	0.072	EPA 8082	8-5-10	8-5-10	
Aroclor 1221	**ND**	0.072	EPA 8082	8-5-10	8-5-10	
Aroclor 1232	**ND**	0.072	EPA 8082	8-5-10	8-5-10	
Aroclor 1242	**ND**	0.072	EPA 8082	8-5-10	8-5-10	
Aroclor 1248	**ND**	0.072	EPA 8082	8-5-10	8-5-10	
Aroclor 1254	**ND**	0.072	EPA 8082	8-5-10	8-5-10	
Aroclor 1260	**ND**	0.072	EPA 8082	8-5-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*80*	*46-122*				
Client ID:	**SA1-00-SS47-06**					
Laboratory ID:	08-030-12					
Aroclor 1016	**ND**	0.058	EPA 8082	8-5-10	8-5-10	
Aroclor 1221	**ND**	0.058	EPA 8082	8-5-10	8-5-10	
Aroclor 1232	**ND**	0.058	EPA 8082	8-5-10	8-5-10	
Aroclor 1242	**ND**	0.058	EPA 8082	8-5-10	8-5-10	
Aroclor 1248	**ND**	0.058	EPA 8082	8-5-10	8-5-10	
Aroclor 1254	**ND**	0.058	EPA 8082	8-5-10	8-5-10	
Aroclor 1260	**ND**	0.058	EPA 8082	8-5-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*90*	*46-122*				

Date of Report: August 9, 2010
Samples Submitted: August 4, 2010
Laboratory Reference: 1008-030
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SA1-00-SS48-12**					
Laboratory ID:	08-030-13					
Aroclor 1016	**ND**	0.058	EPA 8082	8-5-10	8-5-10	
Aroclor 1221	**ND**	0.058	EPA 8082	8-5-10	8-5-10	
Aroclor 1232	**ND**	0.058	EPA 8082	8-5-10	8-5-10	
Aroclor 1242	**ND**	0.058	EPA 8082	8-5-10	8-5-10	
Aroclor 1248	**ND**	0.058	EPA 8082	8-5-10	8-5-10	
Aroclor 1254	**ND**	0.058	EPA 8082	8-5-10	8-5-10	
Aroclor 1260	**ND**	0.058	EPA 8082	8-5-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*83*	*46-122*				
Client ID:	**SA1-02-SS49-00**					
Laboratory ID:	08-030-14					
Aroclor 1016	**ND**	0.071	EPA 8082	8-5-10	8-5-10	
Aroclor 1221	**ND**	0.071	EPA 8082	8-5-10	8-5-10	
Aroclor 1232	**ND**	0.071	EPA 8082	8-5-10	8-5-10	
Aroclor 1242	**ND**	0.071	EPA 8082	8-5-10	8-5-10	
Aroclor 1248	**ND**	0.071	EPA 8082	8-5-10	8-5-10	
Aroclor 1254	**ND**	0.071	EPA 8082	8-5-10	8-5-10	
Aroclor 1260	**ND**	0.071	EPA 8082	8-5-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*80*	*46-122*				
Client ID:	**SA1-04-SS50-00**					
Laboratory ID:	08-030-15					
Aroclor 1016	**ND**	0.14	EPA 8082	8-5-10	8-5-10	
Aroclor 1221	**ND**	0.14	EPA 8082	8-5-10	8-5-10	
Aroclor 1232	**ND**	0.14	EPA 8082	8-5-10	8-5-10	
Aroclor 1242	**ND**	0.14	EPA 8082	8-5-10	8-5-10	
Aroclor 1248	**ND**	0.14	EPA 8082	8-5-10	8-5-10	
Aroclor 1254	**ND**	0.14	EPA 8082	8-5-10	8-5-10	
Aroclor 1260	**ND**	0.14	EPA 8082	8-5-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*73*	*46-122*				

Date of Report: August 9, 2010
Samples Submitted: August 4, 2010
Laboratory Reference: 1008-030
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SA1-00-SS51-00**					
Laboratory ID:	08-030-16					
Aroclor 1016	**ND**	0.054	EPA 8082	8-5-10	8-5-10	
Aroclor 1221	**ND**	0.054	EPA 8082	8-5-10	8-5-10	
Aroclor 1232	**ND**	0.054	EPA 8082	8-5-10	8-5-10	
Aroclor 1242	**ND**	0.054	EPA 8082	8-5-10	8-5-10	
Aroclor 1248	**ND**	0.054	EPA 8082	8-5-10	8-5-10	
Aroclor 1254	**1.3**	0.054	EPA 8082	8-5-10	8-5-10	
Aroclor 1260	**ND**	0.054	EPA 8082	8-5-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*84*	*46-122*				
Client ID:	**SA1-00-SS52-06**					
Laboratory ID:	08-030-17					
Aroclor 1016	**ND**	0.055	EPA 8082	8-5-10	8-6-10	
Aroclor 1221	**ND**	0.055	EPA 8082	8-5-10	8-6-10	
Aroclor 1232	**ND**	0.055	EPA 8082	8-5-10	8-6-10	
Aroclor 1242	**ND**	0.055	EPA 8082	8-5-10	8-6-10	
Aroclor 1248	**ND**	0.055	EPA 8082	8-5-10	8-6-10	
Aroclor 1254	**0.19**	0.055	EPA 8082	8-5-10	8-6-10	
Aroclor 1260	**ND**	0.055	EPA 8082	8-5-10	8-6-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*93*	*46-122*				
Client ID:	**SA1-00-SS53-12**					
Laboratory ID:	08-030-18					
Aroclor 1016	**ND**	0.055	EPA 8082	8-5-10	8-6-10	
Aroclor 1221	**ND**	0.055	EPA 8082	8-5-10	8-6-10	
Aroclor 1232	**ND**	0.055	EPA 8082	8-5-10	8-6-10	
Aroclor 1242	**ND**	0.055	EPA 8082	8-5-10	8-6-10	
Aroclor 1248	**ND**	0.055	EPA 8082	8-5-10	8-6-10	
Aroclor 1254	**0.17**	0.055	EPA 8082	8-5-10	8-6-10	
Aroclor 1260	**ND**	0.055	EPA 8082	8-5-10	8-6-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*96*	*46-122*				

Date of Report: August 9, 2010
Samples Submitted: August 4, 2010
Laboratory Reference: 1008-030
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SA1-02-SS54-00**					
Laboratory ID:	08-030-19					
Aroclor 1016	**ND**	0.053	EPA 8082	8-5-10	8-6-10	
Aroclor 1221	**ND**	0.053	EPA 8082	8-5-10	8-6-10	
Aroclor 1232	**ND**	0.053	EPA 8082	8-5-10	8-6-10	
Aroclor 1242	**ND**	0.053	EPA 8082	8-5-10	8-6-10	
Aroclor 1248	**ND**	0.053	EPA 8082	8-5-10	8-6-10	
Aroclor 1254	**0.11**	0.053	EPA 8082	8-5-10	8-6-10	
Aroclor 1260	**ND**	0.053	EPA 8082	8-5-10	8-6-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*97*	*46-122*				
Client ID:	**SA1-04-SS55-00**					
Laboratory ID:	08-030-20					
Aroclor 1016	**ND**	0.055	EPA 8082	8-5-10	8-6-10	
Aroclor 1221	**ND**	0.055	EPA 8082	8-5-10	8-6-10	
Aroclor 1232	**ND**	0.055	EPA 8082	8-5-10	8-6-10	
Aroclor 1242	**ND**	0.055	EPA 8082	8-5-10	8-6-10	
Aroclor 1248	**ND**	0.055	EPA 8082	8-5-10	8-6-10	
Aroclor 1254	**0.11**	0.055	EPA 8082	8-5-10	8-6-10	
Aroclor 1260	**ND**	0.055	EPA 8082	8-5-10	8-6-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*103*	*46-122*				
Client ID:	**RD-N-SD02-01**					
Laboratory ID:	08-030-21					
Aroclor 1016	**ND**	0.081	EPA 8082	8-5-10	8-6-10	
Aroclor 1221	**ND**	0.081	EPA 8082	8-5-10	8-6-10	
Aroclor 1232	**ND**	0.081	EPA 8082	8-5-10	8-6-10	
Aroclor 1242	**ND**	0.081	EPA 8082	8-5-10	8-6-10	
Aroclor 1248	**ND**	0.081	EPA 8082	8-5-10	8-6-10	
Aroclor 1254	**0.82**	0.081	EPA 8082	8-5-10	8-6-10	
Aroclor 1260	**ND**	0.081	EPA 8082	8-5-10	8-6-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*57*	*46-122*				

Date of Report: August 9, 2010
Samples Submitted: August 4, 2010
Laboratory Reference: 1008-030
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**RP-E-SD03-00**					
Laboratory ID:	08-030-22					
Aroclor 1016	**ND**	1.0	EPA 8082	8-5-10	8-6-10	
Aroclor 1221	**ND**	1.0	EPA 8082	8-5-10	8-6-10	
Aroclor 1232	**ND**	1.0	EPA 8082	8-5-10	8-6-10	
Aroclor 1242	**ND**	1.0	EPA 8082	8-5-10	8-6-10	
Aroclor 1248	**ND**	1.0	EPA 8082	8-5-10	8-6-10	
Aroclor 1254	**7.0**	1.0	EPA 8082	8-5-10	8-6-10	
Aroclor 1260	**ND**	1.0	EPA 8082	8-5-10	8-6-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*78*	*46-122*				
Client ID:	**DP-S-SD04-40**					
Laboratory ID:	08-030-23					
Aroclor 1016	**ND**	0.056	EPA 8082	8-5-10	8-6-10	
Aroclor 1221	**ND**	0.056	EPA 8082	8-5-10	8-6-10	
Aroclor 1232	**ND**	0.056	EPA 8082	8-5-10	8-6-10	
Aroclor 1242	**ND**	0.056	EPA 8082	8-5-10	8-6-10	
Aroclor 1248	**ND**	0.056	EPA 8082	8-5-10	8-6-10	
Aroclor 1254	**0.069**	0.056	EPA 8082	8-5-10	8-6-10	
Aroclor 1260	**ND**	0.056	EPA 8082	8-5-10	8-6-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*70*	*46-122*				

Date of Report: August 9, 2010
Samples Submitted: August 4, 2010
Laboratory Reference: 1008-030
Project: 09-04193-002

PCBs by EPA 8082
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0805S1					
Aroclor 1016	**ND**	0.050	EPA 8082	8-5-10	8-5-10	
Aroclor 1221	**ND**	0.050	EPA 8082	8-5-10	8-5-10	
Aroclor 1232	**ND**	0.050	EPA 8082	8-5-10	8-5-10	
Aroclor 1242	**ND**	0.050	EPA 8082	8-5-10	8-5-10	
Aroclor 1248	**ND**	0.050	EPA 8082	8-5-10	8-5-10	
Aroclor 1254	**ND**	0.050	EPA 8082	8-5-10	8-5-10	
Aroclor 1260	**ND**	0.050	EPA 8082	8-5-10	8-5-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*92*	*46-122*				
Laboratory ID:	MB0805S2					
Aroclor 1016	**ND**	0.050	EPA 8082	8-5-10	8-6-10	
Aroclor 1221	**ND**	0.050	EPA 8082	8-5-10	8-6-10	
Aroclor 1232	**ND**	0.050	EPA 8082	8-5-10	8-6-10	
Aroclor 1242	**ND**	0.050	EPA 8082	8-5-10	8-6-10	
Aroclor 1248	**ND**	0.050	EPA 8082	8-5-10	8-6-10	
Aroclor 1254	**ND**	0.050	EPA 8082	8-5-10	8-6-10	
Aroclor 1260	**ND**	0.050	EPA 8082	8-5-10	8-6-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*92*	*46-122*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	08-030-20										
	MS	MSD	MS	MSD		MS	MSD				
Aroclor 1260	**0.511**	**0.577**	0.500	0.500	ND	**102**	**115**	36-121	12	15	
Surrogate:											
DCB						*95*	*91*	*46-122*			
SPIKE BLANKS											
Laboratory ID:	SB0805S2										
	SB	SBD	SB	SBD		SB	SBD				
Aroclor 1260	**0.560**	**0.520**	0.500	0.500	N/A	**112**	**104**	54-123	7	20	
Surrogate:											
DCB						*100*	*99*	*46-122*			

Date of Report: August 9, 2010
Samples Submitted: August 4, 2010
Laboratory Reference: 1008-030
Project: 09-04193-002

% MOISTURE

Date Analyzed: 8-5&6-10

Client ID	Lab ID	% Moisture
SA3-00-SS36-00	08-030-01	12
SA3-00-SS37-06	08-030-02	17
SA3-00-SS38-12	08-030-03	23
SA3-02-SS39-00	08-030-04	16
SA3-04-SS40-00	08-030-05	12
SA2-00-SS41-00	08-030-06	26
SA2-00-SS42-06	08-030-07	24
SA2-00-SS43-12	08-030-08	22
SA2-02-SS44-00	08-030-09	33
SA2-04-SS45-00	08-030-10	40
SA1-00-SS46-00	08-030-11	31
SA1-00-SS47-06	08-030-12	14
SA1-00-SS48-12	08-030-13	14
SA1-02-SS49-00	08-030-14	29
SA1-04-SS50-00	08-030-15	64
SA1-00-SS51-00	08-030-16	7
SA1-00-SS52-06	08-030-17	10
SA1-00-SS53-12	08-030-18	9
SA1-02-SS54-00	08-030-19	5
SA1-04-SS55-00	08-030-20	9
RD-N-SD02-01	08-030-21	38
RP-E-SD03-00	08-030-22	3
DP-S-SD04-40	08-030-23	11

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

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Chain of Custody

Laboratory Number: 08-030

Company: HERRERA
Project Number: 09-04193-002
Project Name: KCYSC
Project Manager: Peter Jowise
Sampled by: BRADY HANSON & BRUCE CARPENTER

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☒ Standard (7 working days) (TPH analysis 5 working days)
- ☐ ______ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	% Moisture
1	SA3-00-SS36-00	8.3.10	1756	Soil	1								X						X
2	SA3-00-SS37-06		1753																
3	SA3-00-SS38-12		1750																
4	SA3-02-SS39-00		1759																
5	SA3-04-SS40-00		1802																
6	SA2-00-SS41-00		1815																
7	SA2-00-SS42-06		1814																
8	SA2-00-SS43-12		1813																
9	SA2-02-SS44-00		1818																
10	SA2-04-SS45-00		1819																

	Signature	Company	Date	Time
Relinquished by		HERRERA	8.4.10	900
Received by		OnSite Courier	8.4.10	900
Relinquished by				
Received by		OBE	8/4/10	1200
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:

Chromatograms with final report ☐

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Chain of Custody

Laboratory Number: 08-030

Company: HERRERA

Project Number: 09-04193-002

Project Name: KCYSC

Project Manager: Pete Jowise

Sampled by: Brady H. & Bruce C.

Turnaround Request (in working days)

(Check One)

- [ ] Same Day
- [ ] 1 Day
- [ ] 2 Day
- [ ] 3 Day
- [X] Standard (7 working days) (TPH analysis 5 working days)
- [ ] ______ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664							% Moisture
11	SA1-00-SS46-00	8.3.10	1832	Soil	1								X												X
12	SA1-00-SS47-06		1834																						
13	SA1-00-SS48-12		1837																						
14	SA1-02-SS49-00		1839																						
15	SA1-04-SS50-00		1841																						
16	SA1-00-SS51-00		1852																						
17	SA1-00-SS52-06		1850																						
18	SA1-00-SS53-12		1847																						
19	SA1-02-SS54-00		1900																						
20	SA1-04-SS55-00		1906																						

	Signature	Company	Date	Time
Relinquished by	[signature]	HERRERA	8.4.10	900
Received by		OnSite Courier	8.4.10	900
Relinquished by				
Received by	[signature]	OBE	8/4/10	1200
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:

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Chain of Custody

Laboratory Number: 08-030

Company: HERRERA

Project Number: 09-04193-002

Project Name: KCYSC

Project Manager: Peter Jowise

Sampled by: BRADY H. & BRUCE C.

Turnaround Request (in working days)

(Check One)

- [ ] Same Day
- [ ] 1 Day
- [ ] 2 Day
- [ ] 3 Day
- [x] Standard (7 working days) (TPH analysis 5 working days)
- [ ] ______ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	% Moisture
21	RD-N-SD02-01	8.3.10	1825	Soil	1								X						X
22	RP-E-SD03-00	↓	1921	↓	↓								↓						↓
23	DP-S-SD04-40	↓	2000	↓	↓								↓						↓

	Signature	Company	Date	Time
Relinquished by	[signature]	HERRERA	8.4.10	900
Received by		OnSite Courier	8.4.10	900
Relinquished by				
Received by	[signature]	OSE	8/4/10	1200
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:

Chromatograms with final report ☐

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August 9, 2010

Peter Jowise
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 09-04193-002
Laboratory Reference No. 1008-045

Dear Peter:

Enclosed are the analytical results and associated quality control data for samples submitted on August 6, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: August 9, 2010
Samples Submitted: August 6, 2010
Laboratory Reference: 1008-045
Project: 09-04193-002

Case Narrative

Samples were collected on August 5, 2010 and received by the laboratory on August 6, 2010. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: August 9, 2010
Samples Submitted: August 6, 2010
Laboratory Reference: 1008-045
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Dust
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**244-Carpet**					
Laboratory ID:	08-045-01					
Aroclor 1016	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1254	**1.2**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*88*	*46-122*				
Client ID:	**336-Carpet**					
Laboratory ID:	08-045-02					
Aroclor 1016	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1254	**3.4**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*95*	*46-122*				
Client ID:	**332-Carpet**					
Laboratory ID:	08-045-03					
Aroclor 1016	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1254	**3.6**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*88*	*46-122*				

Date of Report: August 9, 2010
Samples Submitted: August 6, 2010
Laboratory Reference: 1008-045
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Dust
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**316-Carpet**					
Laboratory ID:	08-045-04					
Aroclor 1016	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1254	**2.7**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*75*	*46-122*				
Client ID:	**228-Carpet**					
Laboratory ID:	08-045-05					
Aroclor 1016	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1254	**9.7**	0.33	EPA 8082	8-6-10	8-9-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-6-10	8-9-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*96*	*46-122*				

Date of Report: August 9, 2010
Samples Submitted: August 6, 2010
Laboratory Reference: 1008-045
Project: 09-04193-002

PCBs by EPA 8082
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0806S1					
Aroclor 1016	**ND**	0.050	EPA 8082	8-6-10	8-9-10	
Aroclor 1221	**ND**	0.050	EPA 8082	8-6-10	8-9-10	
Aroclor 1232	**ND**	0.050	EPA 8082	8-6-10	8-9-10	
Aroclor 1242	**ND**	0.050	EPA 8082	8-6-10	8-9-10	
Aroclor 1248	**ND**	0.050	EPA 8082	8-6-10	8-9-10	
Aroclor 1254	**ND**	0.050	EPA 8082	8-6-10	8-9-10	
Aroclor 1260	**ND**	0.050	EPA 8082	8-6-10	8-9-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*81*	*46-122*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS											
Laboratory ID:	SB0806S1										
	SB	SBD	SB	SBD		SB	SBD				
Aroclor 1260	**0.506**	**0.502**	0.500	0.500	N/A	**101**	**100**	54-123	1	20	
Surrogate:											
DCB						*99*	*102*	*46-122*			

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

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Chain of Custody

Laboratory Number: 08-045

Company: Herrera
Project Number: 09-04193-002
Project Name: KCYSC
Project Manager: Peter Jowize
Sampled by: Brady Hanson

Turnaround Request (in working days)
(Check One)
- [ ] Same Day
- [x] 1 Day
- [ ] 2 Day
- [x] 3 Day
- [ ] Standard (7 working days) (TPH analysis 5 working days)
- [ ] ________ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	Bag Tare (grams)	Bag + Dust (grams)					% Moisture
1	244-Carpet	8-5-10	18:15	Dust	1								X						46	59					
2	336-Carpet	↓	19:10	↓	1								X						48	98					
3	332-Carpet	↓	19:50	↓	1								X						49	86					
4	316-Carpet	↓	20:30	↓	1								X						49	139					
5	228-Carpet	↓	21:15	↓	1								X						49	69					

	Signature	Company	Date	Time
Relinquished by	[signature]	HERRERA	8-6-10	850
Received by	[signature]	OSE	8/6/10	850
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:
*Please aim for 0.4ppm detection limit or less.
Thanks, Brady.
② Changed TA to 1 day ~~3~~

Chromatograms with final report ☐

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OnSite
Environmental Inc.

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August 11, 2010

Peter Jowise
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 09-04193-002
Laboratory Reference No. 1008-054

Dear Peter:

Enclosed are the analytical results and associated quality control data for samples submitted on August 9, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: August 11, 2010
Samples Submitted: August 9, 2010
Laboratory Reference: 1008-054
Project: 09-04193-002

Case Narrative

Samples were collected on August 7, 2010 and received by the laboratory on August 9, 2010. They were maintained at the laboratory at a temperature of 2^oC to 6^oC.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: August 11, 2010
Samples Submitted: August 9, 2010
Laboratory Reference: 1008-054
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Dust
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**307/308-CARPET**					
Laboratory ID:	08-054-01					
Aroclor 1016	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1254	**0.98**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*78*	*46-122*				
Client ID:	**302-CARPET**					
Laboratory ID:	08-054-02					
Aroclor 1016	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1254	**4.3**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*80*	*46-122*				
Client ID:	**358-CARPET**					
Laboratory ID:	08-054-03					
Aroclor 1016	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1254	**2.7**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*76*	*46-122*				

Date of Report: August 11, 2010
Samples Submitted: August 9, 2010
Laboratory Reference: 1008-054
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Dust
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**413-CARPET**					
Laboratory ID:	08-054-04					
Aroclor 1016	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1254	**3.6**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*74*	*46-122*				
Client ID:	**402-CARPET**					
Laboratory ID:	08-054-05					
Aroclor 1016	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1254	**1.5**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*68*	*46-122*				
Client ID:	**412-CARPET**					
Laboratory ID:	08-054-06					
Aroclor 1016	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1254	**2.3**	0.33	EPA 8082	8-10-10	8-10-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-10-10	8-10-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*62*	*46-122*				

Date of Report: August 11, 2010
Samples Submitted: August 9, 2010
Laboratory Reference: 1008-054
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Dust
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**508-CARPET**					
Laboratory ID:	08-054-07					
Aroclor 1016	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1254	**4.3**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*69*	*46-122*				

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**503-CARPET**					
Laboratory ID:	08-054-08					
Aroclor 1016	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1254	**5.7**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*75*	*46-122*				

Date of Report: August 11, 2010
Samples Submitted: August 9, 2010
Laboratory Reference: 1008-054
Project: 09-04193-002

PCBs by EPA 8082
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0810S1					
Aroclor 1016	**ND**	0.050	EPA 8082	8-10-10	8-10-10	
Aroclor 1221	**ND**	0.050	EPA 8082	8-10-10	8-10-10	
Aroclor 1232	**ND**	0.050	EPA 8082	8-10-10	8-10-10	
Aroclor 1242	**ND**	0.050	EPA 8082	8-10-10	8-10-10	
Aroclor 1248	**ND**	0.050	EPA 8082	8-10-10	8-10-10	
Aroclor 1254	**ND**	0.050	EPA 8082	8-10-10	8-10-10	
Aroclor 1260	**ND**	0.050	EPA 8082	8-10-10	8-10-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*98*	*46-122*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	08-046-01										
	MS	MSD	MS	MSD		MS	MSD				
Aroclor 1260	**0.431**	**0.436**	0.500	0.500	ND	**86**	**87**	36-121	1	15	
Surrogate:											
DCB						*99*	*99*	*46-122*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Laboratory Number: 08-054

Company: HERRERA
Project Number: 09-04193-002
Project Name: KCYSC
Project Manager: Peter Jowise
Sampled by: BRADY H. & BRUCE C.

Turnaround Request (in working days)
(Check One)
- ☐ Same Day
- ☐ 1 Day
- ☒ 2 Day
- ~~3 Day~~
- ☐ Standard (7 working days) (TPH analysis 5 working days)
- ☐ ______ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	Bag Tare (grams)	Bag + Dust (grams)					% Moisture
1	307/308-CARPET	8.9.10	930	Dust	1								X						49	83					
2	302-CARPET		1015																49	62					
3	358-CARPET		1055																49	96					
4	413-CARPET		1150																49	147					
5	402-CARPET		1330																49	96					
6	412-CARPET		1415																49	139					
7	508-CARPET		1515																49	109					
8	503-CARPET		1600																49	78					

	Signature	Company	Date	Time
Relinquished by	[signature]	HERRERA	~~8.30~~ 8.9.10	830
Received by	Courier	Onsite Courier	8.9.10	830
Relinquished by				
Received by	[signature]	OSE	8/9/10	1215
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:
* Please aim for 0.4 ppm detection limit or less.
Thanks, BRADY
(X) changed to a 2-day TA BCe 8/10/10
Thursday results please 8-12-10.

Chromatograms with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Client Copy

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

August 11, 2010

Peter Jowise
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 09-04193-002
Laboratory Reference No. 1008-059

Dear Peter:

Enclosed are the analytical results and associated quality control data for samples submitted on August 10, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: August 11, 2010
Samples Submitted: August 10, 2010
Laboratory Reference: 1008-059
Project: 09-04193-002

Case Narrative

Samples were collected on August 9, 2010 and received by the laboratory on August 10, 2010. They were maintained at the laboratory at a temperature of $2^{o}C$ to $6^{o}C$.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: August 11, 2010
Samples Submitted: August 10, 2010
Laboratory Reference: 1008-059
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Dust
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**533-CARPET**					
Laboratory ID:	08-059-01					
Aroclor 1016	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1254	**4.3**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*91*	*46-122*				
Client ID:	**528-CARPET**					
Laboratory ID:	08-059-02					
Aroclor 1016	**ND**	0.32	EPA 8082	8-10-10	8-11-10	
Aroclor 1221	**ND**	0.32	EPA 8082	8-10-10	8-11-10	
Aroclor 1232	**ND**	0.32	EPA 8082	8-10-10	8-11-10	
Aroclor 1242	**ND**	0.32	EPA 8082	8-10-10	8-11-10	
Aroclor 1248	**ND**	0.32	EPA 8082	8-10-10	8-11-10	
Aroclor 1254	**3.4**	0.32	EPA 8082	8-10-10	8-11-10	
Aroclor 1260	**ND**	0.32	EPA 8082	8-10-10	8-11-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*77*	*46-122*				
Client ID:	**534-CARPET**					
Laboratory ID:	08-059-03					
Aroclor 1016	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1254	**5.2**	0.33	EPA 8082	8-10-10	8-11-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-10-10	8-11-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*82*	*46-122*				

Date of Report: August 11, 2010
Samples Submitted: August 10, 2010
Laboratory Reference: 1008-059
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Dust
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**517-CARPET**					
Laboratory ID:	08-059-04					
Aroclor 1016	**ND**	0.32	EPA 8082	8-10-10	8-11-10	
Aroclor 1221	**ND**	0.32	EPA 8082	8-10-10	8-11-10	
Aroclor 1232	**ND**	0.32	EPA 8082	8-10-10	8-11-10	
Aroclor 1242	**ND**	0.32	EPA 8082	8-10-10	8-11-10	
Aroclor 1248	**ND**	0.32	EPA 8082	8-10-10	8-11-10	
Aroclor 1254	**3.4**	0.32	EPA 8082	8-10-10	8-11-10	
Aroclor 1260	**ND**	0.32	EPA 8082	8-10-10	8-11-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*83*	*46-122*				

Date of Report: August 11, 2010
Samples Submitted: August 10, 2010
Laboratory Reference: 1008-059
Project: 09-04193-002

PCBs by EPA 8082
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0810S1					
Aroclor 1016	**ND**	0.050	EPA 8082	8-10-10	8-10-10	
Aroclor 1221	**ND**	0.050	EPA 8082	8-10-10	8-10-10	
Aroclor 1232	**ND**	0.050	EPA 8082	8-10-10	8-10-10	
Aroclor 1242	**ND**	0.050	EPA 8082	8-10-10	8-10-10	
Aroclor 1248	**ND**	0.050	EPA 8082	8-10-10	8-10-10	
Aroclor 1254	**ND**	0.050	EPA 8082	8-10-10	8-10-10	
Aroclor 1260	**ND**	0.050	EPA 8082	8-10-10	8-10-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*98*	*46-122*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	08-046-01										
	MS	MSD	MS	MSD		MS	MSD				
Aroclor 1260	**0.431**	**0.436**	0.500	0.500	ND	**86**	**87**	36-121	1	15	
Surrogate:											
DCB						*99*	*99*	*46-122*			

OnSite
Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

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Chain of Custody

Company: Herrera Env
Project Number: 09-04193-002
Project Name: KCYSC
Project Manager: P. Jowise
Sampled by: BH / GC

Turnaround Request (in working days)
(Check One)
- ☐ Same Day ☐ 1 Day
- ☐ 2 Day ☐ 3 Day
- ☐ Standard (7 working days) (TPH analysis 5 working days)
- ☐ ________ (other)

Laboratory Number: 08-059

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	% Moisture
1	533-Carpet	8/9/10	1735	S	1								X						
2	528-Carpet	↓	1811	↓	↓								X						
3	534-Carpet	↓	1845	↓	↓								X						
4	517-Carpet	↓	1915	↓	↓								X						

	Signature	Company	Date	Time
Relinquished by	[illegible]	HERRERA	8-10-10	815
Received by	[illegible]	OnSite Env	8/10/10	815
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:
S = dust sample
aim for 0.4 ppm detection limit or lower please.
Thanks, Brady

Chromatograms with final report ☐

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OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

August 11, 2010

Peter Jowise
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 09-04193-002
Laboratory Reference No. 1008-069

Dear Peter:

Enclosed are the analytical results and associated quality control data for samples submitted on August 11, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: August 11, 2010
Samples Submitted: August 11, 2010
Laboratory Reference: 1008-069
Project: 09-04193-002

Case Narrative

Samples were collected on August 10, 2010 and received by the laboratory on August 11, 2010. They were maintained at the laboratory at a temperature of $2^{o}C$ to $6^{o}C$.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: August 11, 2010
Samples Submitted: August 11, 2010
Laboratory Reference: 1008-069
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Dust
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**E-CONCFACE-DUST**					
Laboratory ID:	08-069-01					
Aroclor 1016	**ND**	6.7	EPA 8082	8-11-10	8-11-10	
Aroclor 1221	**ND**	6.7	EPA 8082	8-11-10	8-11-10	
Aroclor 1232	**ND**	6.7	EPA 8082	8-11-10	8-11-10	
Aroclor 1242	**ND**	6.7	EPA 8082	8-11-10	8-11-10	
Aroclor 1248	**ND**	6.7	EPA 8082	8-11-10	8-11-10	
Aroclor 1254	**21**	6.7	EPA 8082	8-11-10	8-11-10	
Aroclor 1260	**ND**	6.7	EPA 8082	8-11-10	8-11-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*70*	*46-122*				
Client ID:	**E-CONCFACE-Sealant**					
Laboratory ID:	08-069-02					
Aroclor 1016	**ND**	0.33	EPA 8082	8-11-10	8-11-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-11-10	8-11-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-11-10	8-11-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-11-10	8-11-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-11-10	8-11-10	
Aroclor 1254	**ND**	0.33	EPA 8082	8-11-10	8-11-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-11-10	8-11-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*61*	*46-122*				
Client ID:	**W-CONCFACE-DUST**					
Laboratory ID:	08-069-03					
Aroclor 1016	**ND**	6.7	EPA 8082	8-11-10	8-11-10	
Aroclor 1221	**ND**	6.7	EPA 8082	8-11-10	8-11-10	
Aroclor 1232	**ND**	6.7	EPA 8082	8-11-10	8-11-10	
Aroclor 1242	**ND**	6.7	EPA 8082	8-11-10	8-11-10	
Aroclor 1248	**ND**	6.7	EPA 8082	8-11-10	8-11-10	
Aroclor 1254	**18**	6.7	EPA 8082	8-11-10	8-11-10	
Aroclor 1260	**ND**	6.7	EPA 8082	8-11-10	8-11-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*71*	*46-122*				

Date of Report: August 11, 2010
Samples Submitted: August 11, 2010
Laboratory Reference: 1008-069
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Dust
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**W-CONCFACE-Sealant**					
Laboratory ID:	08-069-04					
Aroclor 1016	**ND**	0.33	EPA 8082	8-11-10	8-11-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-11-10	8-11-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-11-10	8-11-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-11-10	8-11-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-11-10	8-11-10	
Aroclor 1254	**ND**	0.33	EPA 8082	8-11-10	8-11-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-11-10	8-11-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*65*	*46-122*				

Date of Report: August 11, 2010
Samples Submitted: August 11, 2010
Laboratory Reference: 1008-069
Project: 09-04193-002

PCBs by EPA 8082
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0811S1					
Aroclor 1016	**ND**	0.050	EPA 8082	8-11-10	8-11-10	
Aroclor 1221	**ND**	0.050	EPA 8082	8-11-10	8-11-10	
Aroclor 1232	**ND**	0.050	EPA 8082	8-11-10	8-11-10	
Aroclor 1242	**ND**	0.050	EPA 8082	8-11-10	8-11-10	
Aroclor 1248	**ND**	0.050	EPA 8082	8-11-10	8-11-10	
Aroclor 1254	**ND**	0.050	EPA 8082	8-11-10	8-11-10	
Aroclor 1260	**ND**	0.050	EPA 8082	8-11-10	8-11-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*81*	*46-122*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS											
Laboratory ID:	SB0811S1										
	SB	SBD	SB	SBD		SB	SBD				
Aroclor 1260	**0.459**	**0.404**	0.500	0.500	N/A	**92**	**81**	54-123	13	20	
Surrogate:											
DCB						*85*	*77*	*46-122*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: HERRERA
Project Number: 09-04193-002
Project Name: KCYSC
Project Manager: Peter Jowise
Sampled by: BH / BC

Turnaround Request (in working days)
(Check One)
- [x] Same Day
- [ ] 1 Day
- [ ] 2 Day
- [ ] 3 Day
- [ ] Standard (7 working days) (TPH analysis 5 working days)
- [ ] ______ (other)

Laboratory Number: 08-069

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664							% Moisture
1	E-CONCFACE-DUST	8.10.10	1845	Dust	1								X												
2	E-CONCFACE-Sealant	|	1930	|	|								X												
3	W-CONCFACE-DUST	|	2045	|	|								X												
4	W-CONCFACE-Sealant	|	2100	|	|								X												

	Signature	Company	Date	Time
Relinquished by	[signature]	HERRERA	8.11.10	835
Received by	[signature]	OnSite Env	8/11/10	835
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:
please aim for 0.4 ppm detection limit or less.
Thanks, BRADY

Chromatograms with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Client Copy

OnSite
Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

August 19, 2010

Peter Jowise
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 09-04193-002
Laboratory Reference No. 1008-113

Dear Peter:

Enclosed are the analytical results and associated quality control data for samples submitted on August 18, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: August 19, 2010
Samples Submitted: August 18, 2010
Laboratory Reference: 1008-113
Project: 09-04193-002

Case Narrative

Samples were collected on August 17, 2010 and received by the laboratory on August 18, 2010. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

PCBs EPA 8082 Analysis

The surrogate recovery for the sample 4S-Carpet (37%) was below the quality control limits of 46 – 122%. Because all of the dust samples in this batch had lower than normal surrogate recoveries and all other QC was within limits, the low recovery was attributed to matrix interference and no further action was performed.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: August 19, 2010
Samples Submitted: August 18, 2010
Laboratory Reference: 1008-113
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Dust
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**5N-CARPET**					
Laboratory ID:	08-113-01					
Aroclor 1016	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1254	**1.0**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*48*	*46-122*				
Client ID:	**5S-CARPET**					
Laboratory ID:	08-113-02					
Aroclor 1016	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1254	**2.2**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*57*	*46-122*				
Client ID:	**4N-CARPET**					
Laboratory ID:	08-113-03					
Aroclor 1016	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1254	**1.2**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*51*	*46-122*				

Date of Report: August 19, 2010
Samples Submitted: August 18, 2010
Laboratory Reference: 1008-113
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Dust
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**4S-CARPET**					
Laboratory ID:	08-113-04					
Aroclor 1016	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1254	**1.3**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*37*	*46-122*				Q
Client ID:	**3N-CARPET**					
Laboratory ID:	08-113-05					
Aroclor 1016	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1254	**1.5**	0.33	EPA 8082	8-18-10	8-18-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-18-10	8-18-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*53*	*46-122*				

Date of Report: August 19, 2010
Samples Submitted: August 18, 2010
Laboratory Reference: 1008-113
Project: 09-04193-002

PCBs by EPA 8082
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0818S1					
Aroclor 1016	**ND**	0.050	EPA 8082	8-18-10	8-18-10	
Aroclor 1221	**ND**	0.050	EPA 8082	8-18-10	8-18-10	
Aroclor 1232	**ND**	0.050	EPA 8082	8-18-10	8-18-10	
Aroclor 1242	**ND**	0.050	EPA 8082	8-18-10	8-18-10	
Aroclor 1248	**ND**	0.050	EPA 8082	8-18-10	8-18-10	
Aroclor 1254	**ND**	0.050	EPA 8082	8-18-10	8-18-10	
Aroclor 1260	**ND**	0.050	EPA 8082	8-18-10	8-18-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*71*	*46-122*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	08-116-01										
	MS	MSD	MS	MSD		MS	MSD				
Aroclor 1260	**0.403**	**0.401**	0.500	0.500	ND	**81**	**80**	36-121	0	15	
Surrogate:											
DCB						*75*	*72*	*46-122*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Laboratory Number: 08-113

Company: HERRERA
Project Number: 09-04193-002
Project Name: KCYSC
Project Manager: Peter Jowise
Sampled by: BH / GI

Turnaround Request (in working days)
(Check One)
- [X] Same Day
- [ ] 1 Day
- [ ] 2 Day
- [ ] 3 Day
- [ ] Standard (7 working days) (TPH analysis 5 working days)
- [ ] ______ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	bag tare (grams)	bag + dust (grams)					% Moisture
1	5N - CARPET	8-17-10	1750	Dust	1								X						49	247					
2	5S - CARPET		1855										X						49	118					
3	4N - CARPET		1945										X						49	250					
4	4S - CARPET		2030										X						49	247					
5	3N - CARPET		2130										X						49	174					

	Signature	Company	Date	Time
Relinquished by	[illegible]	HERRERA	8-18-10	8:30
Received by	[illegible]	OnSite Env	8/18/10	830
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:
Please aim for 0.4 ppm detection limit or lower.
Thanks, BRADY

Chromatograms with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Client Copy

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

August 20, 2010

Peter Jowise
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 09-04193-002
Laboratory Reference No. 1008-143

Dear Peter:

Enclosed are the analytical results and associated quality control data for samples submitted on August 20, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: August 23, 2010
Samples Submitted: August 20, 2010
Laboratory Reference: 1008-143
Project: 09-04193-002

Case Narrative

Samples were collected on August 19, 2010 and received by the laboratory on August 20, 2010. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: August 23, 2010
Samples Submitted: August 20, 2010
Laboratory Reference: 1008-143
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Dust
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**2N-CARPET**					
Laboratory ID:	08-143-01					
Aroclor 1016	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1254	**0.35**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*78*	*46-122*				
Client ID:	**2S-CARPET**					
Laboratory ID:	08-143-02					
Aroclor 1016	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1254	**1.2**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*74*	*46-122*				
Client ID:	**3S-CARPET**					
Laboratory ID:	08-143-03					
Aroclor 1016	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1254	**2.2**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*67*	*46-122*				

Date of Report: August 23, 2010
Samples Submitted: August 20, 2010
Laboratory Reference: 1008-143
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Dust
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**1-MUSTER-CARPET**					
Laboratory ID:	08-143-04					
Aroclor 1016	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1254	**0.44**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*76*	*46-122*				
Client ID:	**1-HALL-CARPET**					
Laboratory ID:	08-143-05					
Aroclor 1016	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1254	**0.43**	0.33	EPA 8082	8-20-10	8-20-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-20-10	8-20-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*72*	*46-122*				

Date of Report: August 23, 2010
Samples Submitted: August 20, 2010
Laboratory Reference: 1008-143
Project: 09-04193-002

PCBs by EPA 8082
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0820S1					
Aroclor 1016	**ND**	0.050	EPA 8082	8-20-10	8-20-10	
Aroclor 1221	**ND**	0.050	EPA 8082	8-20-10	8-20-10	
Aroclor 1232	**ND**	0.050	EPA 8082	8-20-10	8-20-10	
Aroclor 1242	**ND**	0.050	EPA 8082	8-20-10	8-20-10	
Aroclor 1248	**ND**	0.050	EPA 8082	8-20-10	8-20-10	
Aroclor 1254	**ND**	0.050	EPA 8082	8-20-10	8-20-10	
Aroclor 1260	**ND**	0.050	EPA 8082	8-20-10	8-20-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*93*	*46-122*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	08-148-01										
	MS	MSD	MS	MSD		MS	MSD				
Aroclor 1260	**0.451**	**0.446**	0.500	0.500	ND	**90**	**89**	36-121	1	15	
Surrogate:											
DCB						*82*	*83*	*46-122*			

Date of Report: August 23, 2010
Samples Submitted: August 20, 2010
Laboratory Reference: 1008-143
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**1SA-WIPE-VF**					
Laboratory ID:	08-143-06					
Aroclor 1016	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*98*	*74-135*				
Client ID:	**1SB-WIPE-VF**					
Laboratory ID:	08-143-07					
Aroclor 1016	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*99*	*74-135*				

Date of Report: August 23, 2010
Samples Submitted: August 20, 2010
Laboratory Reference: 1008-143
Project: 09-04193-002

PCBs by EPA 8082
QUALITY CONTROL

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0820P1					
Aroclor 1016	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-20-10	8-20-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*97*	*74-135*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS											
Laboratory ID:	SB0820P1										
	SB	SBD	SB	SBD		SB	SBD				
Aroclor 1260	**20.8**	**21.4**	20.0	20.0	N/A	**104**	**107**	81-128	3	7	
Surrogate:											
DCB						*101*	*101*	*74-135*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Laboratory Number: 08-143

Company: HERRERA
Project Number: 09-04193-002
Project Name: KCYSC
Project Manager: Peter Jowise
Sampled by: BH & GC

Turnaround Request (in working days)
(Check One)
- [x] Same Day
- [ ] 1 Day
- [ ] 2 Day
- [ ] 3 Day
- [ ] Standard (7 working days) (TPH analysis 5 working days)
- [ ] ______ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664							% Moisture
1	2N-CARPET	8·19·10	1800	Dust	1								X												X
2	2S-CARPET		1845										X												
3	3S-CARPET		1945										X												
4	1-MUSTER-CARPET		2035										X												
5	1-HALL-CARPET		2145										X												
6	1SA-WIPE-VF		2145	WIPE									X												
7	1SB-WIPE-VF		2155										X												

	Signature	Company	Date	Time
Relinquished by	[signature]	Onsite	8·20·10	830
Received by	[signature]	OnSite Env	8/20/10	830
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:
Please aim for 0.4 ppm detection limit.
Thanks
BRADY

Chromatograms with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Client Copy

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Environmental Inc.
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August 30, 2010

Peter Jowise
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 09-04193-002
Laboratory Reference No. 1008-212

Dear Peter:

Enclosed are the analytical results and associated quality control data for samples submitted on August 27, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: August 30, 2010
Samples Submitted: August 27, 2010
Laboratory Reference: 1008-212
Project: 09-04193-002

Case Narrative

Samples were collected on August 26, 2010 and received by the laboratory on August 27, 2010. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: August 30, 2010
Samples Submitted: August 27, 2010
Laboratory Reference: 1008-212
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Dust
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**PH-SUPPLY-DUST**					
Laboratory ID:	08-212-01					
Aroclor 1016	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1254	**6.2**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*77*	*46-122*				
Client ID:	**PH-RETURN-DUST**					
Laboratory ID:	08-212-02					
Aroclor 1016	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1254	**8.1**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*61*	*46-122*				
Client ID:	**5S-RETURN-DUST**					
Laboratory ID:	08-212-05					
Aroclor 1016	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1254	**1.8**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*81*	*46-122*				

Date of Report: August 30, 2010
Samples Submitted: August 27, 2010
Laboratory Reference: 1008-212
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Dust
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**4N-RETURN-DUST**					
Laboratory ID:	08-212-07					
Aroclor 1016	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1221	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1232	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1242	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1248	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1254	**0.46**	0.33	EPA 8082	8-27-10	8-27-10	
Aroclor 1260	**ND**	0.33	EPA 8082	8-27-10	8-27-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*78*	*46-122*				

Date of Report: August 30, 2010
Samples Submitted: August 27, 2010
Laboratory Reference: 1008-212
Project: 09-04193-002

PCBs by EPA 8082
QUALITY CONTROL

Matrix: Solid
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0827S1					
Aroclor 1016	**ND**	0.050	EPA 8082	8-27-10	8-27-10	
Aroclor 1221	**ND**	0.050	EPA 8082	8-27-10	8-27-10	
Aroclor 1232	**ND**	0.050	EPA 8082	8-27-10	8-27-10	
Aroclor 1242	**ND**	0.050	EPA 8082	8-27-10	8-27-10	
Aroclor 1248	**ND**	0.050	EPA 8082	8-27-10	8-27-10	
Aroclor 1254	**ND**	0.050	EPA 8082	8-27-10	8-27-10	
Aroclor 1260	**ND**	0.050	EPA 8082	8-27-10	8-27-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*89*	*46-122*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	08-203-01										
	MS	MSD	MS	MSD		MS	MSD				
Aroclor 1260	**0.441**	**0.439**	0.500	0.500	ND	**88**	**88**	36-121	0	15	
Surrogate:											
DCB						*90*	*86*	*46-122*			

Date of Report: August 30, 2010
Samples Submitted: August 27, 2010
Laboratory Reference: 1008-212
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**PH-POSTSUPPLY-WIPE**					
Laboratory ID:	08-212-03					
Aroclor 1016	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*100*	*74-135*				
Client ID:	**5S-SUPPLY-WIPE**					
Laboratory ID:	08-212-04					
Aroclor 1016	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*102*	*74-135*				
Client ID:	**4N-SUPPLY-WIPE**					
Laboratory ID:	08-212-06					
Aroclor 1016	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*104*	*74-135*				

Date of Report: August 30, 2010
Samples Submitted: August 27, 2010
Laboratory Reference: 1008-212
Project: 09-04193-002

PCBs by EPA 8082

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**1-MUSTER-WIPE**					
Laboratory ID:	08-212-08					
Aroclor 1016	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*102*	*74-135*				

Date of Report: August 30, 2010
Samples Submitted: August 27, 2010
Laboratory Reference: 1008-212
Project: 09-04193-002

PCBs by EPA 8082
QUALITY CONTROL

Matrix: Wipe
Units: ug/100cm2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0827P1					
Aroclor 1016	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1221	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1232	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1242	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1248	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1254	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Aroclor 1260	**ND**	2.0	EPA 8082	8-27-10	8-27-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
DCB	*102*	*74-135*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS											
Laboratory ID:	SB0827P1										
	SB	SBD	SB	SBD		SB	SBD				
Aroclor 1260	**20.9**	**21.0**	20.0	20.0	N/A	**104**	**105**	81-128	0	7	
Surrogate:											
DCB						*104*	*102*	*74-135*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Laboratory Number: 08-212

Company: HERRERA
Project Number: 09-04193-002
Project Name: KCYSC
Project Manager: Peter Jowiso
Sampled by: Brady Hanson / Anth. El

Turnaround Request (in working days)
(Check One)
- ☐ Same Day
- ☒ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☐ Standard (7 working days) (TPH analysis 5 working days)
- ☐ ______ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	% Moisture
1	PH-SUPPLY-DUST	8.26.10	1915	Dust	1								X						
2	PH-RETURN-DUST		2030	Dust	1								X						
3	PH-POSTSUPPLY-WIPE		2115	WIPE	1								X						
4	5S-SUPPLY-WIPE		2145	WIPE	1								X						
5	5S-RETURN-DUST		2230	Dust	1								X						
6	4N-SUPPLY-WIPE		2245	WIPE	1								X						
7	4N-RETURN-DUST		2315	Dust	1								X						
8	1-MUSTER-WIPE		2330	WIPE	1								X						

	Signature	Company	Date	Time
Relinquished by	[signature]	HERRERA	8.27.10	900
Received by	[signature]	OSE	8/27/10	900
Relinquished by				
Received by				
Relinquished by				
Received by				
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:
Please aim for 0.4 ppm detection limit or lower.
Thanks, BRADY
Results by Monday, Thanks.

Chromatograms with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Client Copy

Asbestos • Lead • Environmental • Materials & Indoor Air Analysis

EMSL Analytical, Inc.

http://www.emsl.com

3 Cooper St.
Westmont, NJ 08108
Phone: (856) 858-4800
Fax: (856) 858-4571

Attn: **Jon A. Havelock**
Med-Tox Northwest
PO Box 1446
Auburn, WA 98071

Phone: (253) 351-0677
Fax: (253) 351-0688

8/13/2010

The following analytical report covers the analysis performed on samples submitted to EMSL Analytical, Inc. on 8/10/2010. The results are tabulated on the attached data pages for the following client designated project:

KCYSC

The reference number for these samples is EMSL Order #011004013. Please use this reference when calling about these samples. If you have any questions, please do not hesitate to contact me at (856) 858-4800.

Reviewed and Approved By:

Julie Smith

Julie Smith - Laboratory Director or other approved signatory

ACCREDITED LABORATORY AIHA Environmental Lead & Industrial Hygiene See aihaiqap.org for details

Accreditation #100194

EMSL Analytical, Inc.

3 Cooper St., Westmont, NJ 08108
Phone: (856) 858-4800 Fax: (856) 858-4571 Email: jsmith@emsl.com

Attn: **Jon A. Havelock**
Med-Tox Northwest
PO Box 1446
Auburn, WA 98071

Fax: (253) 351-0688 Phone (253) 351-0677
Project: **KCYSC**

Customer ID: MEDT50
Customer PO: AC 105754
Received: 08/10/10 1:00 PM
EMSL Order: 011004013

Analytical Results

Client Sample Description CTRM5-01 Courtroom 5 on main floor. No open windows *Collected:* 8/5/2010 *Lab ID:* 0001

Method	Parameter	Concentration	Reporting Limit	Units	Analysis Date	Analyst
5503 Modified	Aroclor-1016	<0.0012	0.0012	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1221	<0.0012	0.0012	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1232	<0.0012	0.0012	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1242	<0.0012	0.0012	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1248	<0.0012	0.0012	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1254	<0.0012	0.0012	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1260	<0.0012	0.0012	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1262	<0.0012	0.0012	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1268	<0.0012	0.0012	mg/m³	8/12/2010	wfink

Client Sample Description 336-02 Room 336 conference room, open windows *Collected:* 8/5/2010 *Lab ID:* 0002

Method	Parameter	Concentration	Reporting Limit	Units	Analysis Date	Analyst
5503 Modified	Aroclor-1016	<0.0013	0.0013	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1221	<0.0013	0.0013	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1232	<0.0013	0.0013	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1242	<0.0013	0.0013	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1248	<0.0013	0.0013	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1254	<0.0013	0.0013	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1260	<0.0013	0.0013	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1262	<0.0013	0.0013	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1268	<0.0013	0.0013	mg/m³	8/12/2010	wfink

Client Sample Description 302-03 Clearks office room 302, open windows *Collected:* 8/5/2010 *Lab ID:* 0003

Method	Parameter	Concentration	Reporting Limit	Units	Analysis Date	Analyst
5503 Modified	Aroclor-1016	<0.0013	0.0013	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1221	<0.0013	0.0013	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1232	<0.0013	0.0013	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1242	<0.0013	0.0013	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1248	<0.0013	0.0013	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1254	<0.0013	0.0013	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1260	<0.0013	0.0013	mg/m³	8/12/2010	wfink

EMSL Analytical, Inc.
3 Cooper St., Westmont, NJ 08108
Phone: (856) 858-4800 Fax: (856) 858-4571 Email: jsmith@emsl.com

Attn: **Jon A. Havelock**
Med-Tox Northwest
PO Box 1446
Auburn, WA 98071
Fax: (253) 351-0688 Phone (253) 351-0677
Project: **KCYSC**

Customer ID: MEDT50
Customer PO: AC 105754
Received: 08/10/10 1:00 PM
EMSL Order: 011004013

Analytical Results

Client Sample Description 302-03 — ***Collected:*** 8/5/2010 — ***Lab ID:*** *0003*
Clearks office room 302, open windows

Method	*Parameter*	*Concentration*	*Reporting Limit*	*Units*	*Analysis Date*	*Analyst*
5503 Modified	Aroclor-1262	<0.0013	0.0013	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1268	<0.0013	0.0013	mg/m³	8/12/2010	wfink

Client Sample Description 417-04 — ***Collected:*** 8/5/2010 — ***Lab ID:*** *0004*
Room 417, windows closed

Method	*Parameter*	*Concentration*	*Reporting Limit*	*Units*	*Analysis Date*	*Analyst*
5503 Modified	Aroclor-1016	<0.0010	0.0010	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1221	<0.0010	0.0010	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1232	<0.0010	0.0010	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1242	<0.0010	0.0010	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1248	<0.0010	0.0010	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1254	<0.0010	0.0010	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1260	<0.0010	0.0010	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1262	<0.0010	0.0010	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1268	<0.0010	0.0010	mg/m³	8/12/2010	wfink

Client Sample Description 525-05 — ***Collected:*** 8/5/2010 — ***Lab ID:*** *0005*
Room 525 windows closed

Method	*Parameter*	*Concentration*	*Reporting Limit*	*Units*	*Analysis Date*	*Analyst*
5503 Modified	Aroclor-1016	<0.00097	0.00097	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1221	<0.00097	0.00097	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1232	<0.00097	0.00097	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1242	<0.00097	0.00097	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1248	<0.00097	0.00097	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1254	<0.00097	0.00097	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1260	<0.00097	0.00097	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1262	<0.00097	0.00097	mg/m³	8/12/2010	wfink
5503 Modified	Aroclor-1268	<0.00097	0.00097	mg/m³	8/12/2010	wfink

Client Sample Description EXT-06 — ***Collected:*** 8/5/2010 — ***Lab ID:*** *0006*
Exterior, third floor east side on roof.

Method	*Parameter*	*Concentration*	*Reporting Limit*	*Units*	*Analysis Date*	*Analyst*
5503 Modified	Aroclor-1016	<0.0011	0.0011	mg/m³	8/12/2010	wfink

EMSL Analytical, Inc.
3 Cooper St., Westmont, NJ 08108
Phone: (856) 858-4800 Fax: (856) 858-4571 Email: jsmith@emsl.com

Attn: **Jon A. Havelock**
Med-Tox Northwest
PO Box 1446
Auburn, WA 98071

Fax: (253) 351-0688 Phone (253) 351-0677
Project: **KCYSC**

Customer ID: MEDT50
Customer PO: AC 105754
Received: 08/10/10 1:00 PM
EMSL Order: 011004013

Analytical Results

Client Sample Description EXT-06
Exterior, third floor east side on roof.

Collected: 8/5/2010 ***Lab ID:*** *0006*

Method	*Parameter*	*Concentration*	*Reporting Limit*	*Units*	*Analysis Date*	*Analyst*
5503 Modified	Aroclor-1221	<0.0011	0.0011	mg/m^3	8/12/2010	wfink
5503 Modified	Aroclor-1232	<0.0011	0.0011	mg/m^3	8/12/2010	wfink
5503 Modified	Aroclor-1242	<0.0011	0.0011	mg/m^3	8/12/2010	wfink
5503 Modified	Aroclor-1248	<0.0011	0.0011	mg/m^3	8/12/2010	wfink
5503 Modified	Aroclor-1254	<0.0011	0.0011	mg/m^3	8/12/2010	wfink
5503 Modified	Aroclor-1260	<0.0011	0.0011	mg/m^3	8/12/2010	wfink
5503 Modified	Aroclor-1262	<0.0011	0.0011	mg/m^3	8/12/2010	wfink
5503 Modified	Aroclor-1268	<0.0011	0.0011	mg/m^3	8/12/2010	wfink

EMSL ANALYTICAL, INC.

Industrial Hygiene Chain of Custody

EMSL Order Number *(Lab Use Only)*: 011004013

Corporate -
Westmont/Cinnaminson, NJ
200 Route 130 North
Cinnaminson, NJ 08077
PHONE: 1-800-220-3675
FAX: (856) 858-4960

Report To Contact Name: Jon Havelock	**Bill To Company:** Med-Tox Northwest	**Sampled By (Signature):** Jon A. Havelock
Company Name: Med-Tox Northwest	**Attention To:** Jon Havelock	**Number of Samples in Shipment:** 6
Address 1: Post Office Box 1446	**Address 1:** Post Office Box 1446	**Date of Shipment:** 8/9/10
Address 2: Auburn, WA 98071-1446	**Address 2:** Auburn, WA 98071-1446	**U.S. State where Samples Collected:** WA
Phone : 253-351-0677 **Fax :** 253-351-0688	**Phone :** 253-351-0677 **Fax :** 253-351-0688	**Purchase Order:** A-7258.4
Email Results To: havelockj@medtoxnw.com	**Project Name:** KCYSC	

Turnaround Time – Please Check: Please Note Standard TAT is 2 Week.

2 Week	1 Week	4 Day	3 Day	2 Day	1 Day	Other (Call Lab)
☐	☐	☐	☒	☐	☐	☐

Media Type:
Manufacturer/Part #:
Lot #:

Sample ID	Media	Analyte / Method	Volume	Sample Date/Time	Location	Comments
SEE	Attached	DATA Sheet				

Note: Most NIOSH and OSHA methods require field blanks. It is the IH field sampler's responsibility to submit the proper number of field blanks and duplicates.

Released By	Date	Received By	Date
Jon A. Havelock	8/9/10 0930	FX	
		ESL	8/10/10 1:00pm

Comments/Special Instructions:

NIOSH 5503 ANALYSIS

LEFT MESS - TAT? + Emailed 3DAY results due 8/13

1:40p 8/10/10 -EZ

SAFE ENVIRONMENT OF AMERICA, INC. dba MED-TOX NORTHWEST

01100 4013

PCB AIR SAMPLING DATA SHEET

Project: King County Youth Services Center

Sample Date: August 5 and 7, 2010

	Sample No.	Sample type	Pump Model	Pump No.	Name/Worker cert #/Soc. Sec #/tasks	# emp. rep.	Location/Description/Interferences	PPE worn	Controls	Time (24hr) On	Off	Total min	Flow Rate (lpm) Pre	Post	Avg	Sample vol. (liters)	LOD	Results
1	CTRM5-01	Area	Buck, Libra	EMSL 0155	Not Applicable		Courtroom 5 on main floor. No open windows	N/A	N/A	17:12	20:40	208	0.2	0.19	0.195	40.56		
2	336-02	Area	Buck, Libra	EMSL 131	Not Applicable		Room 336 conference room, open windows	N/A	N/A	17:22	20:49	207	0.2	0.18	0.19	39.33		
3	302-03	Area	Buck, Libra	EMSL 01712	Not Applicable		Clearks office room 302, open windows	N/A	N/A	17:27	20:46	199	0.2	0.19	0.195	38.8		
4	417-04	Area	Buck, Libra	EMSL 131	Not Applicable		Room 417, windows closed	N/A	N/A	09:07	13:29	262	0.19	0.175	0.1825	47.8		
5	525-05	Area	Buck, Libra	EMSL 01712	Not Applicable		Room 525 windows closed	N/A	N/A	09:14	13:33	259	0.2	0.2	0.2	51.8		

Print clearly in blue or black ink

SAFE ENVIRONMENT OF AMERICA, INC. dba MED-TOX NORTHWEST

011004013

PCB AIR SAMPLING DATA SHEET

6

Sample No.	Sample type	Pump Model	Name/Worker cert #/Soc. Sec #/tasks # emp. rep.	PPE worn	Time (24hr)	Flow Rate (lpm)	Sample vol. (liters)	LOD	Results
EXT-06	Area	Buck, Libra	Not Applicable	N/A	On 0901	Pre 0.2	45.6		
		Pump No. EMSL 0155	Location/Description/Interferences: Exterior, third floor east side on roof. Raining for half of sampling period.	Controls N/A	Off 1301	Post 0.18			
					Total min 240	Avg 0.19			

Calibration Data					
Low Flow	Rotometer Mfg. Dwyer	Model #	Serial # EMSL 047L	Calibration date	4/27/2010
High Flow	Rotometer Mfg.	Model #	Serial #	Calibration date	

I certify that the above samples were taken in compliance with applicable standards, regulations and project specifications.

Sampler Name	Jon A. Havelock	Signature		Sampler Firm	Med-Tox Northwest	Date	

Sheet 3 of 3

Print clearly in blue or black ink

APPENDIX F

Letter Health Consultation

Letter Health Consultation

King County Alder Tower
Polychlorinated Biphenyls (PCBs)
Caulking Contamination

Seattle, King County, Washington

August 27, 2010

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

You May Contact ATSDR TOLL FREE at
1-800-CDC-INFO
or
Visit our Home Page at: http://www.atsdr.cdc.gov

LETTER HEALTH CONSULTATION

King County Alder Tower
Polychlorinated Biphenyls (PCBs)
Caulking Contamination

Seattle, King County, Washington

Prepared By:

Washington State Department of Health
Under Cooperative Agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
Division of Environmental Health
Office of Environmental Health, Safety, and Toxicology
234 Israel Road S.E. Town Center 3 PO Box 47846 Olympia, Washington 98504-7846
Tel: 360.236.3184 Toll Free: 1.877.485.7316 FAX: 360.236.2251
 TDD Relay Service: 1.800.833.6388

Letter Health Consultation

August 16, 2010

TO: Joe Hicker
King County Facilities Management Division

Bill Lawrence
Public Health Seattle King County

FROM: Lenford O'Garro
Washington State Department of Health (DOH)

SUBJECT: King County Alder Tower
Polychlorinated Biphenyls (PCBs) Caulking Contamination

Statement of Issues:

The Washington State Department of Health (DOH) prepared this Letter Health Consultation (LHC) at the request of King County Facilities Management Division (King County) and Public Health Seattle King County (PHSKC). The purpose is to evaluate whether PCBs found in dust samples from the King County Alder Tower (Alder Tower) building, Seattle pose a potential health hazard to humans. DOH prepares health consultations under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR).

Background:

Alder Tower is located on 12th Avenue and East Alder Street in Seattle's Central District, King County, Washington. Alder Tower was built in 1971 and is the administration center for the Youth Service Center. Other tenants include the King County Prosecutor's Office and Superior Courts. Alder Tower is scheduled for demolition in 2011 pending the outcome of an upcoming bond measure.

In anticipation of redeveloping the property, King County did a pre-design assessment for hazardous materials. Analysis of environmental samples collected during the assessment identified PCBs in the exterior window caulking. PCBs are present in caulking on the top three floors of the five story building. The first two floors had been extensively renovated in previous years. Since the Alder Tower was built in 1971, other potential sources for PCBs are fluorescent light ballasts.

King County collected additional samples including wipe samples from interior surfaces (Table 1), and window exteriors (Table 2). Dust samples were collected from carpets near windows, and five indoor and one exterior air samples was also collected.

Chemical Specific Toxicity

PCBs are a mixture of man-made organic chemicals. There are no known natural sources of PCBs in the environment. The manufacture of PCBs stopped in the United States (U.S.) in 1977, because evidence showed that they could build up in the environment and cause toxic health effects. Although no longer manufactured, PCBs can still be found in certain products such as old fluorescent lighting fixtures, electrical devices or appliances containing PCB capacitors that were made before the use of PCBs was banned, old microscope oil, and old hydraulic oil. Prior to 1977, PCBs entered the environment (soil, water, air) during the manufacture and use of PCBs. Today, PCBs can still enter the environment from illegal or improper dumping of PCB wastes, such as old hydraulic oil; leaks from electrical transformers that contain PCB oils; and disposal of old consumer products that contain PCBs [1]. Some hazardous waste sites can also contribute PCBs to the environment.

PCBs entered the environment as mixtures. There are 209 structural variations of PCBs, referred to as congeners, which differ in the number and location of chlorine atoms in the chemical structure. Most PCBs commercially produced in the U.S. were standard mixtures called Aroclors. The conditions for producing each Aroclor favor the synthesis of certain congeners, giving each Aroclor a unique pattern based on its congener composition. No Aroclor contains all 209 congeners.

Once in the environment, PCBs do not breakdown easily and may stay in the soil for months or years. PCBs stick to soil and do not usually move deep into the soil with rainfall. In air, PCBs can be carried long distance. Small amounts of PCBs can be found in almost all outdoor and indoor air, sediments, surface water, and animals. PCBs bioaccumulate in the food chain and are stored in the fat tissue. The major dietary source of PCBs is fish. PCBs are also found in meats and dairy products [1]. However, the general trends of PCBs in humans have largely decreased since the 1980s [2, 3].

In general, direct exposure to contaminants can occur by ingestion, inhalation, and dermal (skin) contact. Some of the PCBs that enter the body are metabolized and excreted from the body within a few days; others stay in the body fat and liver for months and even years. PCBs collect in milk fat and can enter the bodies of infants through breast-feeding [1]. Most of what is known about the possible human health risks of PCBs comes from animal studies and accidental human exposures to high levels of these chemicals in the workplace [4]. Chronic and acute exposure to PCBs has shown to produce a wide array of toxic effects in animals including neurobehavioral, immunological, and developmental deficits in newborns exposed to PCBs in utero [1]. Other toxic effects in humans include skin irritation, vomiting, nausea, diarrhea, abdominal pain, eye irritation, and liver damage [1]. ATSDR have derived a chronic minimal risk level (MRL) for Aroclor 1254 of 0.00002 mg/kg/day based on the lowest observed adverse effect level (LOAEL) of 0.005 mg/kg/day from immunological effects in monkeys. Similarly, the EPA has an established oral reference dose (RfD) of 0.00002 mg/kg/day [1]. The PCB levels found indoors at Alder Tower are not likely to produce these health effects because levels are below chronic and acute exposures.

Evaluating Non-cancer Hazards

Exposure assumptions for estimating contaminant doses from PCB exposures are found in Appendix A, Table A1. In order to evaluate the potential for non-cancer adverse health effects that may result from exposure to contaminated media (i.e., in this case dust), a dose is estimated for PCBs. These doses are calculated for situations (scenarios) in which a person might be exposed to the contaminated media. The estimated dose for each contaminant under each scenario is then compared to EPA's RfD. RfDs are doses below which non-cancer adverse health effects are not expected to occur (so-called "safe" doses). They are derived from toxic effect levels obtained from human population and laboratory animal studies. These toxic effect levels can be either LOAEL or the no-observed adverse effect level (NOAEL). In human or animal studies, the LOAEL is the lowest dose at which an adverse health effect is seen, while the NOAEL is the highest dose that an adverse health effect is seen.

Because of data uncertainty, the toxic effect level is divided by "safety factors" to produce the lower and more protective RfD. If a dose exceeds the RfD, this indicates only the potential for adverse health effects. The magnitude of this potential can be inferred from the degree to which this value is exceeded. If the estimated exposure dose is only slightly above the RfD, then that dose will fall well below the observed toxic effect level. The higher the estimated dose is above the RfD, the closer it will be to the actual observed toxic effect level. This comparison is called a hazard quotient (HQ) and is given by the equation below:

$$HQ = \frac{\text{Estimated Dose (mg/kg-day)}}{\text{RfD (mg/kg-day)}}$$

Chemicals with an HQ less than 1 are not considered a health threat.

Evaluating Cancer Risk

Some chemicals have the ability to cause cancer. Theoretical cancer risk is estimated by calculating a dose similar to that described above and multiplying it by a cancer potency factor, also known as the cancer slope factor. Some cancer potency factors are derived from human population data. Others are derived from laboratory animal studies involving doses much higher than are encountered in the environment. Use of animal data requires extrapolation of the cancer potency obtained from these high dose studies down to real-world exposures. This process involves much uncertainty.

Current regulatory practice assumes there is no "safe dose" of a carcinogen. Any dose of a carcinogen will result in some additional cancer risk. Theoretical cancer risk estimates are, therefore, not yes/no answers but measures of chance (probability). Such measures, however uncertain, are useful in determining the magnitude of a cancer threat because any level of a carcinogenic contaminant carries an associated risk. The validity of the "no safe dose" assumption for all cancer-causing chemicals is not clear. Some evidence suggests that certain chemicals considered to be carcinogenic must exceed a threshold of tolerance before initiating cancer. For such chemicals, risk estimates are not appropriate. Recent guidelines on cancer risk from EPA reflect the potential that thresholds for some carcinogenesis exist. However, EPA still assumes no threshold unless sufficient data indicate otherwise [5].

This health consultation letter describes theoretical cancer risk that is attributable to site-related contaminants in qualitative terms like low, very low, slight, and no significant increase in theoretical cancer risk. These terms can be better understood by considering the population size required for such an estimate to result in a single cancer case. For example, a low increase in cancer risk indicates an estimate in the range of one cancer case per ten thousand persons exposed over a lifetime. A very low estimate might result in one cancer case per several tens of thousands exposed over a lifetime and a slight estimate would require an exposed population of several hundreds of thousands to result in a single case. DOH considers theoretical cancer risk insignificant when the estimate results in less than one cancer per one million exposed over a lifetime. The reader should note that these estimates are for excess cancers that might result in addition to those normally expected in an unexposed population.

<u>Theoretical Cancer Risk</u>

Theoretical Cancer risk estimates do not reach zero no matter how low the level of exposure to a carcinogen. Terms used to describe this risk are defined below as the number of excess cancers expected in a lifetime:

Term		# of Excess Cancers
moderate	is approximately equal to	1 in 1,000
low	is approximately equal to	1 in 10,000
very low	is approximately equal to	1 in 100,000
slight	is approximately equal to	1 in 1,000,000
insignificant	is less than	1 in 1,000,000

Cancer is a common illness and its occurrence in a population increases with the age of the population. There are many different forms of cancer resulting from a variety of causes; not all are fatal. Approximately 1/4 to 1/3 of people living in the U.S. will develop cancer at some point in their lives [6].

Results and Discussion:

King County obtained indoor and outdoor PCB data during their assessment of hazardous materials in the Alder Tower building. In order for any contaminant to be a health concern, the contaminant must be present at a high enough concentration to cause potential harm, and there must be a completed route of exposure. While the exterior window glass, caulking, and nearby concrete from the upper floors contained high levels of PCBs (up to 150,000 parts per million (ppm) in the exterior caulk, neither worker, youth, nor visitor exposure to these contaminants is likely. Therefore, no completed route of exposure exists. As a result, no health evaluation is necessary for the exterior results. Workers, youth, and visitor exposure to PCBs in indoor air and dust, however, is possible. This could occur via incidental ingestion, inhalation, and/or dermal contact, DOH has evaluated the available indoor air and carpet dust data to determine whether the PCBS found in these media pose a health concern.

Interior Surface

ATSDR has no comparison values for surface wipe samples. However, the U.S. Environmental Protection Agency (EPA) has a regulatory clean-up standard or spill cleanup criteria for PCBs (10 ug/100cm^2) on wipes collected from indoor surfaces. EPA estimated that inhalation cancer risk from exposure to PCBs at 10 ug/100cm^2 would be at 1 cancer estimated per 1,000,000 exposed (1x 10^{-6}) [7]. Similarly, EPA estimated that dermal contact cancer risk from exposure to PCBs at 10 ug/100cm^2 would be at 1 cancer estimated per 100,000 exposed (1x 10^{-5}) [7]. Surface wipe samples were taken from a variety of interior surfaces. PCB (Aroclor 1254) was found on three window sills. However, all indoor surface wipe samples tested are below the EPA spill cleanup criteria of 10 ug/100cm^2 for PCBs. Therefore, no further evaluation is necessary for indoor wipe surface.

Indoor Air

All air samples were non-detected at a concentration ranging from less than 0.97 microgram per cubic meter (ug/m^3) to less than 1.3 ug/m^3 for PCBs. However, the analytical method detection limit was not low enough to attain the ATSDR air health comparison value (Cancer Risk Evaluation Guide (CREG)) therefore; DOH will further evaluate the indoor air through indoor carpet dust. PCB air concentrations were estimated using the EPA Particulate Emission Factor (PEF) approach using inhalation of dust particulates (Appendix A).

Indoor Carpet Dust

Indoor carpet dust samples were collected using a specialized vacuum and Aroclor 1254 were found at concentration ranging from 0.98 parts per million (ppm) to 9.7ppm. DOH conservatively compared the results to ATSDR's lowest PCB/Arochlor health comparison values to determine whether the levels pose a possible health concern.[1] As indicated in Table 1, PCB/aroclor levels in air and dust exceed the screening values. It is important to note that exceedances of a health comparison value does not mean that the PCB/aroclor poses a health threat, It does, however, indicate that further evaluation of the chemical is necessary. Lowest non-cancer ATSDR soil health comparison value for chronic exposure to Aroclor 1254 (Environmental Media Evaluation Guide (EMEG)) is 1ppm for a non-pica child and 0.06 ppm for a pica child. A pica child exposure is not anticipated given that the exposure is occurring via carpet dust and not readily available to ingest. No cancer ATSDR soil comparison value is available for Aroclor 1254. However, an ATSDR Cancer Risk Evaluation Guideline (CREG) comparison value of 0.04 ppm is available for PCBs. Therefore, DOH will further evaluate the indoor carpet dust (Appendix A).

[1] The lowest non-cancer ATSDR soil health comparison value for chronic exposure to Aroclor 1254 is 1ppm for a non-pica child (Environmental Media Evaluation Guide (EMEG)) and 0.06 ppm for a pica child (intermediate EMEG). A pica child exposure is not anticipated given that the exposure is occurring via carpet dust and not readily available to ingest. No cancer ATSDR soil comparison value is available for Aroclor 1254. However, an ATSDR Cancer Risk Evaluation Guideline (CREG) comparison value of 0.04 ppm is available for PCBs.

Table 1. Concentration range of PCBs detected in interior samples at the Alder Tower in Seattle, King County, Washington.

Indoor Sample Type	Compound	Concentration Range	Comparison Value	Comparison Value Reference	Contaminant of Concern (COC)
Air	PCB	<0.97- <1.3 (ug/m^3)	0.01(ug/m^3)	Air CREG	Yes
Surface Wipes – Desktop, file cabinets, heater, refrigerator		ND	10 (ug/100cm^2)	EPA - Spill Clean-up Criteria	No
Surface Wipes – Door trims, Vinyl floors		ND			No
Surface Wipes – Window sills		ND – 9.6 (ug/100cm^2)			No
Carpet vacuum dust		0.98 – 9.7 ppm	0.4 ppm	Soil CREG	Yes

CREG - ATSDR's Cancer Risk Evaluation Guide
EMEG - ATSDR's Environmental Media Evaluation Guide (chronic child)
ppm – parts per million
ND – Non Detected
ug/m^3 - micrograms per cubic meter
ug/100 cm^2 - micrograms per one hundred square centimeter

In evaluating the indoor dust further, DOH used a scenario of a worker being exposed 250 day per year for 25 years to the maximum PCB concentration in dust. Similarly, an older child (6-18 years old) is being exposed 60 day per year for 10 years to the maximum PCB concentration in dust. However, youth/children are not housed in the Alder Tower and are only there for courts proceedings or as a visitor. Therefore, 60 day per year for 10 years was selected as a very conservative exposure timeframe. Estimated exposure doses, exposure assumptions, and hazard quotients are presented in Appendix A, Tables A1and A2 for PCB in dust. How DOH estimated cancer and non-cancer health effects is also presented in Appendix A.

Based on exposure estimates quantified in Appendix A, workers and children are not likely to experience adverse non-cancer health effects from exposure to PCB dust since the estimated exposure dose does not exceed the RfD. Theoretical cancer risk estimates for exposure to PCB in dust is considered slight to insignificant (7 cancers estimated per 10,000,000 exposed), (see Appendix A, Table A3). Similarly, theoretical cancer risk estimates for an older child exposed to PCB in dust is considered insignificant (1 cancers estimated per 10,000,000 exposed), (see Appendix A, Table A3). Both exposure scenarios fall within an acceptable cancer risk range (1 cancer estimated per 10,000 exposed (1x 10^{-4}) to1 cancer estimated per 1,000,000 exposed (1x 10^{-6})).

Summary of the Indoor PCB evaluation

- EPA spill cleanup criteria for PCBs is 10 ug/100cm^2
- Maximum indoor surface wipe concentration was 9.6 ug/100cm^2
- EPA's acceptable cancer risk range 1x 10^{-4} to 1x 10^{-6}
- Theoretical cancer risk estimates for potential exposure to PCBs in indoor dust ranged from 1x 10^{-7} to 7 x 10^{-7}

Conclusions

DOH concludes that touching, breathing or accidentally ingesting PCBs dust from the interior of the King County Alder Tower is not expected to harm people's health.

Recommendations

Since the Alder Tower is scheduled for demolition in 2011, pending the outcome of an upcoming bond measure, DOH recommends some simple steps people can take to minimize the risk of exposure to contaminants until the building is redone:

Building Cleaning Staff

- Clean surfaces frequently to reduce dust and residue inside buildings.
- Use a wet or damp cloth (micro fiber) or mop to clean surfaces.
- Use vacuums with high-efficiency particulate air (HEPA) filters.
- Do not sweep with dry brooms; avoid using dusters.
- Wash hands with soap and water after cleaning, and before eating or drinking.

Workers, Youth, and Visitors

- Wash children's hands with soap and water often, particularly before eating.
- Wash hands with soap and water after cleaning, and before eating or drinking.

Public Health Action Plan

Actions Planned

1. DOH will provide copies of this letter health consultation to the EPA, Ecology, Public Health-Seattle and King County, and King County Facilities Management Division of the Alder Tower.

2. DOH will evaluate any additional data that becomes available.

Please feel free to contact Lenford O'Garro at (360) 236-3376 or 1-877-485-7316 if you have any questions about this letter.

References

1. Agency for Toxic Substances and Disease Registry (ATSDR). Toxicological profile for Polychlorinated Biphenyls (PCBs) (update) PB/2000/108027. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service. November 2000. Available at: http://www.atsdr.cdc.gov/toxprofiles/tp17.html.http://www.atsdr.cdc.gov/toxprofiles/tp17.pdf

2. Patterson DG Jr, Wong LY, Turner WE, Caudill SP, DiPietro E, McClure C, Cash TP, Osterloh JD, Pirkle JL, Sampson EJ, Needham LL. Levels in the U.S. Population of those Persistent Organic Pollutants (2003-2004) Included in the Stockholm Convention or in other Long-Range Transboundary Air Pollution Agreements. Environ. Sci. Technol., 2009, 43 (4), 1211-1218.

3. Centers for Disease Control and Prevention. *Fourth National Report on Human Exposure to Environmental Chemicals*. http://www.cdc.gov/exposurereport/. December 2009.

4. Zook D.R. and Rappe, C. Environmental sources, distribution and fate of polychlorinated dibenzodioxins, dibenzofurans, and related organochlorines. 1994.

5. U.S. Environmental Protection Agency. Guidelines for Carcinogen Risk Assessment (Review Draft). NCEA-F-0644 July 1999. Available at: http://www.epa.gov/NCEA/raf/cancer.htm.

6. ATSDR Agency for Toxic Substances and Disease Registry. ATSDR Fact Sheet: Cancer. Updated August 30, 2002. Atlanta: U.S. Department of Health and Human Services. Available at: http://www.atsdr.cdc.gov/COM/cancer-fs.html.

7. Part III, Environmental Protection Agency: Polychlorinated Biphenyls Spill Cleanup Policy, Final Rule, 52 Federal Register. 10688-10710 (April 2, 1987) (40 C.F.R. pt.761).

8. U.S. Environmental Protection Agency. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites: Office of Emergency and Remedial Response, Washington, DC. OSWER 9355.4-24, December 2002.

9. National Center for Environmental Assessment. Exposure Factors Handbook Volume 1 – General Factors EPA/600/P-95/002Fa: U.S. Environmental Protection Agency; August 1997.

10. Cowherd, C., G. Muleski, P. Engelhart, and D. Gillete. 1985. Rapid Assessment of Exposure to Particulate Emissions from Surface Contamination. EPA/600/8-85/002. Prepared for EPA Office of Health and Environmental Assessment, Washington, D.C.

Appendix A

This section provides calculated exposure dose and assumptions used for exposure to PCBs in indoor dust from the King County Alder Tower in Seattle, Washington. This exposure scenario was developed to model exposures that might occur to an adult worker or an older child. The following exposure parameters and dose equation were used to estimate exposure dose from inhalation, ingestion and dermal of PCBs.

Exposure to PCBs in dust via ingestion, inhalation, and dermal absorption

Total dose $_{\text{(non-cancer)}}$ = Ingested dose + inhaled dose + dermally absorbed dose

Ingestion Route

$$\text{Dose}_{\text{(non-cancer (mg/kg-day)}} = \frac{\text{C x CF x IR x EF x ED}}{\text{BW x AT}_{\text{non-cancer}}} \qquad [8]$$

$$\text{Cancer Risk} = \frac{\text{C x CF x IR x EF x CPF x ED}}{\text{BW x AT}_{\text{cancer}}} \qquad [8]$$

Dermal Route

$$\text{Dermal Transfer (DT)} = \frac{\text{C x AF x ABS x AD x CF}}{\text{ORAF}} \qquad [8]$$

$$\text{Dose}_{\text{(non-cancer (mg/kg-day)}} = \frac{\text{DT x SA x EF x ED}}{\text{BW x AT}_{\text{non-cancer}}} \qquad [8]$$

$$\text{Cancer Risk} = \frac{\text{DT x SA x EF x CPF x ED}}{\text{BW x AT}_{\text{cancer}}} \qquad [8]$$

For inhalation of dust particulates, air concentrations were estimated using the EPA Particulate Emission Factor (PEF) approach, as documented in EPA's Soil Screening Guidance [5].

Inhalation Route

$$\text{Dose}_{\text{non-cancer (mg/kg-day)}} = \frac{\text{C x SMF x IHR x EF x ED x 1/PEF}}{\text{BW x AT}_{\text{non-cancer}}} \qquad [8]$$

$$\text{Cancer Risk} = \frac{\text{C x SMF x IHR x EF x ED x CPF x 1/PEF}}{\text{BW x AT}_{\text{cancer}}} \qquad [8]$$

Table A1. Exposure assumptions used for exposure to PCBs in indoor dust from the King County Alder Tower in Seattle, Washington.

Parameter	Value	Unit	Comments
Concentration (C)	9.7	mg/kg	Maximum detected value
Conversion Factor (CF)	0.000001	kg/mg	Converts contaminant concentration from milligrams (mg) to kilograms (kg)
Ingestion Rate (IR) – Older child	3.1*	mg/day	Exposure Factors Handbook [9]
Ingestion Rate (IR) – adult	3.1*		
Exposure Frequency (EF)	60	Days/year	Estimated days per year
	250		Average working days per year
Exposure Duration (ED)	10	years	Maximum number of years
	25		Number of years at work
Body Weight (BW) – Older child	41	kg	Older child mean body weight
Body Weight (BW) - adult	72		Adult mean body weight
Surface area (SA) – child hand	400	cm^2	Exposure Factors Handbook [9]
Surface area (SA) – adult hand	840		
Averaging Time$_{non\text{-}cancer}$ (AT)	1825	days	5 years
Averaging Time$_{cancer}$ (AT)	27375	days	75 years
Cancer Potency Factor (CPF)	2	$mg/kg\text{-}day^{-1}$	Source: EPA
24 hr. absorption factor (ABS)	0.14	unitless	Source: EPA (Chemical Specific) PCB
Oral route adjustment factor (ORAF)	1	unitless	Non-cancer (nc) / cancer (c) - default
Adherence duration (AD)	1	days	Source: EPA
Adherence factor (AF)	0.2	mg/cm^2	Older child
	0.07		Adult
Inhalation rate (IHR) – Older Child	14	m^3/day	Exposure Factors Handbook [9]
Inhalation rate (IHR) - adult	15.2		
Soil matrix factor (SMF)	1	unitless	Non-cancer (nc) / cancer (c) - default
Particulate emission factor (PEF)	6.00E+8	m^3/kg	Model Parameters (no grass coverage) [10]

*assumes 31 mg of dust adhering to the hands (based on average soil adherence to palm [9]) and 10 percent of the total adherence of soil is ingested.

Table A2. Non-cancer hazard calculations resulting from exposure to PCBs in indoor dust from the King County Alder Tower in Seattle, Washington.

Contaminant	Maximum Concentration (ppm)	Scenarios	Estimated Dose (mg/kg/day)			RfD (mg/kg/day)	Hazard Quotient
			Ingestion	Dermal	Inhalation of Particulates		
PCB	9.7	Older Child	1.21E-7	4.36E-7	9.08E-10	2.0E-5	0.028
		Adult	2.86E-7	7.87E-7	3.90E-9		0.013

RfD – reference dose
ppm – parts per million

Table A3. Cancer hazard calculations resulting from exposure to PCBs in indoor dust from the King County Alder Tower in Seattle, Washington.

Contaminant	Maximum Concentration (ppm)	Cancer Potency Factor (mg/kg-day^{-1})	Scenario	Increased Cancer Risk			Total Cancer Risk
				Ingestion	Dermal	Inhalation of Particulates	
PCB	9.7	2	Older Child	3.21E-8	1.16E-7	2.42E-10	1.48E-7
			Adult	1.91E-7	5.24E-7	1.56E-9	7.17E-7

ppm – parts per million

Certification

The Washington State Department of Health prepared this Letter Health Consultation under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It was completed in accordance with approved methodology and procedures existing at the time the health consultation was initiated. Editorial review was completed by the Cooperative Agreement partner.

Audra Henry
Technical Project Officer, CAPEB, DHAC
Agency for Toxic Substances & Disease Registry

The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health consultation and concurs with the findings.

Alan W. Yarbrough
Team Lead, CAPEB, DHAC
Agency for Toxic Substances & Disease Registry

APPENDIX G

Assessment, Cleaning, and Restoration of HVAC Systems

NATIONAL AIR DUCT CLEANERS ASSOCIATION

ACR 2006

Assessment, Cleaning and Restoration of HVAC Systems

The Industry Standard for HVAC Cleaning Professionals

ACR 2006
Assessment, Cleaning, and Restoration of HVAC Systems

An Industry Standard Developed by the National Air Duct Cleaners Association

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Assessment, Cleaning, and Restoration of HVAC Systems *ACR 2006*

Table of Contents

Foreword

Assessment, Cleaning, and Restoration of HVAC Systems (ACR 2006) is an industry standard that has evolved from guidelines, industry standards of care, and research originating from the National Air Duct Cleaners Association (NADCA) along with other organizations dedicated to HVAC system hygiene, remediation and restoration. This standard establishes criteria for evaluating the cleanliness of HVAC system components, and for cleaning and restoring systems to a specific cleanliness level as described in Section 13.

ACR 2006 provides recommended inspection frequencies for HVAC systems. HVAC components that should be evaluated during inspections are described to assist users of this standard in determining when cleaning may be necessary.

In the assessment sections, ACR 2006 describes the areas of the HVAC system to be evaluated for contamination levels and the types of contaminants identified. Assessment information may then be used to select appropriate safeguards such as environmental engineering controls to protect the indoor environment during cleaning. The Guideline section of this document provides examples of several types of containment engineering strategies that may be employed in conjunction with an HVAC system cleaning project to control the migration of particulate, unwanted gasses, and vapors.

In the cleaning and restoration sections, ACR 2006 defines acceptable cleaning methods and criteria for cleaning tools and equipment. Cleaning encompasses the removal of contaminants in order to restore HVAC systems to a specific cleanliness level as described herein.

ACR 2006 addresses considerations for mold and biological contaminants and the cleaning of fiber glass insulation, duct liner and duct board. This document also provides requirements for creating service openings within HVAC systems; safety and health considerations for remediation workers, employees, and occupants; and procedures for monitoring cleaning projects as they progress.

The Standard also provides methods to verify HVAC system cleanliness. Three separate methods are defined and have been updated to address mold remediation clearance.

The term “HVAC system cleaning” is used exclusively throughout this document instead of the common term “air duct cleaning.” The requirements of this document encompass the entire HVAC system and its components. To ensure optimum system performance and environmental conditions, the entire HVAC system should be maintained at the highest cleanliness levels possible and at an acceptable hygiene condition as described in this Standard.

A Note Regarding Service Openings

The National Air Duct Cleaners Association (NADCA) recognizes the need for service openings in HVAC system components, including air ducts, to facilitate inspection and/or cleaning. NADCA has expanded ACR 2006 to define minimum requirements for the proper construction and installation of service openings. This document should be cited in Project Specifications for HVAC system cleaning projects to insure proper access and closure of system components.

In nearly all HVAC system cleaning projects, it will be necessary to make new service openings in duct walls in order to insert cleaning and inspection equipment. The creation of service openings, and their subsequent closure, requires craftsmanship and professional skills. Where possible, access to duct interiors should be made by dismantling the ducts or through existing openings such as supply diffusers, return grilles, duct end caps, and existing service openings.

This Standard applies to the majority of HVAC systems, regardless of the type of duct construction. Service openings created in any type of system component must meet or exceed the requirements defined herein.

There are two general types of service openings: removable **duct access doors** and permanent closure **panels**. Duct access doors are designed so they can be re-opened without dismantling or altering the system. Permanent closure panels are pieces of HVAC system material that are sealed and/or fastened permanently upon closure of the service opening. Depending on the methods used to seal permanent closure panels, it may be possible to remove and re-install them. Permanent closure panels sealed with gasketing may be removed and re-installed; whereas those closure panels sealed with mastic or caulking should not be removed. If new service openings will be used in the future for inspection or cleaning, then removable duct access doors may be most appropriate.

The location and size of new service openings is heavily dependent upon the equipment and methodologies the HVAC system cleaning contractor will use in the project. However, there are certain strategic locations in most systems where service openings are made to facilitate inspection. Visual inspection of interior HVAC system surfaces is required as noted in this Standard.

The most common locations for service openings in air ducts include:

- Adjacent to turning vanes
- Adjacent to dampers (balancing, fire, control, back draft, splitter, etc.)
- Mixing & VAV boxes
- Adjacent to in-duct electric heat strips
- Duct transitions, offsets, and changes of direction
- Adjacent to heating, reheat, & cooling coils
- Adjacent to all other in-duct mechanical components & sensors

Each of these locations may require one or more service openings to properly access the ducts for cleaning and inspection. The tools used in the installation of the new service openings should be industry-specific for the type(s) of duct material and construction techniques commonly found in HVAC systems. Proper installation of new service openings is dependent on the use of the right tool(s) by trained personnel. Nothing in this Standard is intended to prevent the use of new methods, materials, or technologies in the installation and closure of service openings, provided that they meet the requirements prescribed by this Standard.

Poorly constructed service openings may have a negative impact on the HVAC system. An air duct system, when improperly altered, may compromise the system's structural integrity and fire-rating integrity. Improperly installed service openings may act as a site for duct leakage. An improperly created or sealed service opening may affect indoor air quality by serving as a conduit that can expose both the HVAC system and the indoor environment to contaminants. These potential threats to the safety of the building and its occupants are just two of the reasons for this Standard.

In some areas, the creation of a service opening in an HVAC system may require special licensure from the state or locality. Most state construction industries are regulated by a licensing board or commission authorized by the state government, and such organizations should be contacted directly for information about a particular state's requirements.

This Standard includes a new chapter in the appendix titled *Guidelines for Constructing Service Openings in HVAC Systems*. The information provided in this chapter is intended as a guideline to assist in the further understanding of HVAC service system opening construction methods, but its contents are not considered requirements under this Standard unless specified below.

It is highly recommended users of this document consult applicable federal, state and local laws and regulations. NADCA does not, by the publication of this document, intend to urge action that is not in compliance with applicable laws and this document must never be construed as doing so. The most stringent requirements of this Standard and applicable federal, state, and local regulation must apply to the assessment, cleaning, or restoration of HVAC systems. The disclaimer at the conclusion of this document provides additional important information regarding use of this standard.

Assessment, Cleaning, and Restoration of HVAC Systems

ACR 2006

Introduction

Maintaining clean heating, ventilation and air-conditioning (HVAC) systems is an important part of sustaining acceptable indoor air quality (IAQ). When an HVAC system is a source of contaminants introduced into occupied spaces, properly performed system cleaning services should take place to reduce or eliminate contaminant introduction.

Contaminants in HVAC systems may take many forms. Common contaminants include dust particles, active bacterial or fungal growth, debris from rusted HVAC components, man-made vitreous fibers, mold spores, and other items.

Experience has shown that very few (if any) HVAC systems are free of all particulate. In fact, particle deposition on component surfaces starts before the HVAC system is even installed. Airborne particles in factory settings and assembly areas are likely to settle on air-handling components and fiber glass insulation, as well as adhere to the surface of metal components.

The original installation process will subject the HVAC system to even more contamination. Construction sites contain a significant amount of airborne concrete dust, gypsum dust, sand particles, biological particulate aerosols and many other airborne contaminants in the ambient air. These particles often settle on or within the HVAC system during construction.

After the HVAC system is installed and its operation begins, the particulate accumulation process continues throughout the life of the system. Poor design, installation and maintenance practices, low-efficiency air filtration, air flow bypass, inadequate or infrequent preventative maintenance practices, humid conditions, and many other factors will result in contaminated HVAC systems. HVAC systems may also serve to transport and redistribute unwanted particles from other sources in the building.

HVAC cleaning services have been available since the early 1900s. However, it was not until the 1970s that growing public concern for better IAQ led to an understanding of the importance of cleaning HVAC system components. Public awareness has increased ever since. Greater demand for HVAC cleaning resulted in dramatic growth for the HVAC system cleaning industry both for firms offering service, as well as those providing research and knowledge of HVAC system cleaning and its impact on indoor air quality and system performance. This ultimately led to the creation of industry standards, training and certification programs for HVAC system cleaning professionals.

ACR 2006 is the fourth edition of NADCA's standard for HVAC system cleaning. The first edition, NADCA Standard 1992-01, raised the performance bar for the industry by establishing the first method to verify post-cleaning cleanliness levels. The second edition, ACR 2002, built on the principles established in NADCA Standard 1992-01, but included many additional provisions for evaluating cleanliness before cleaning as well as requirements for how to perform cleaning services.

ACR 2005, the third edition, went further than any previous NADCA standard. It covered the same essential elements of assessment and cleaning detailed in the previous documents and also provides more detailed requirements for managing HVAC system cleaning projects, including clearly defined conditions that require cleaning. ACR 2005 was revised such that its requirements were in accordance with the latest standard for mold remediation published by the Institute of Inspection, Cleaning and Restoration Certification (IICRC), S520 - *Standard and Reference Guide for Professional Mold Remediation*. By working in cooperation with representatives from IICRC and other industry organizations to update the ACR standard, the 2005 edition was a standard that could be utilized not only as a standard for professional HVAC system cleaning contractors, but also as a comprehensive reference source for consumers, facility administrators, engineers, mold restoration contractors, general contractors, architects, or HVAC project design consultants.

ACR 2005 was written for commercial, industrial, healthcare, marine and residential applications. The Standard represented NADCA’s continued commitment to being the HVAC cleaning industry’s authoritative source for information related to HVAC system cleaning and restoration. ACR 2005 reflected a national and international collaboration of indoor environmental professionals, HVAC professionals, remediation, restoration and cleaning organizations all working together to create a document that was globally relevant in today’s society.

The fourth edition, ACR 2006, incorporates everything from ACR 2005, and includes an extensive protocol for cleaning coils. In addition, *Standard 05, Requirements for the Installation of Service Openings in HVAC Systems*, has been incorporated into ACR 2006. The result is a comprehensive standard that goes beyond previous editions to provide for superior HVAC system cleaning and restoration.

1 General

1.1 Scope

This standard defines procedures for assessing the cleanliness of HVAC systems and for determining when cleaning is required.

This standard sets acceptable criteria for the safe and effective cleaning and restoration of HVAC systems and components. It also defines environmental engineering principles necessary to control the migration of HVAC system particulate.

This standard provides test methods for verifying HVAC component cleanliness upon the completion of a cleaning project. This standard defines procedures necessary to allow HVAC system cleaning work to be performed in accordance with the requirements of IICRC S520, *Standard and Reference Guide for Professional Mold Remediation*.

The requirements set forth in this document address cleaning, building use, contaminant type, worker and occupant health and safety, and project monitoring.

This standard identifies construction methods and material performance criteria for the safe and effective creation and installation of new service openings used to facilitate the inspection and cleaning of HVAC systems.

1.2 Purpose

It is the intent of this document to provide consumers and specifiers of HVAC system cleaning and restoration services with information needed to help ensure that cleaning is performed to acceptable standards and in such a manner that the services contribute to improved system cleanliness and/or system performance.

This standard also defines the requirements necessary to construct and install service openings in HVAC systems.

1.3 Application

ACR 2006 provides standards and guidance for industry professionals, HVAC cleaning and restoration service providers, building owners and others who manage HVAC systems.

The requirements of this standard apply to all classifications of buildings, except as otherwise specified herein.

2 Definitions

Abrasion: A surface loss of material due to friction.

Access: The ability to gain entry to the interior of the air duct or HVAC component.

Access Door: Fabricated metal barrier (hatch) by which a service opening is accessed or closed.

Adhered Substance: A material, such as mastic, that is not removable by direct contact vacuuming.

ACGIH: American Conference of Governmental Industrial Hygienists.

Adhered Particulate: Any material not intended or designed to be present in an HVAC system, and which must be dislodged in order to be removed.

Aerosols: Solid or liquid airborne particles.

AIHA: American Industrial Hygiene Association.

Air Duct: A passageway for distribution and extraction of air, excluding plenums not installed in accordance with SMACNA Standards (See *ASHRAE Terminology of Heating, Ventilation, Air Conditioning & Refrigeration*, 1991).

Air Duct Covering: Materials such as insulation and banding used to cover the external surface of a duct.

Air Duct Lining: Generally refers to fiber glass or other matting affixed to the interior surfaces of the air ducts for thermal insulation and noise attenuation.

Air Filtration Device (AFD): A portable or transportable, self-contained blower assembly designed to move a defined volume of air equipped with one or more stages of particulate filtration. Depending on the mode of use, an AFD that filters (usually HEPA) and re-circulates air is referred to as an "air scrubber." One that filters air and creates negative pressure is referred to as a "negative air machine."

Air-handling Unit (AHU): A packaged assembly, usually connected to ductwork, that moves air and may also clean and condition the air.

> Central-station Air-handling Unit: factory-made, encased assembly consisting of the fan or fans and other necessary equipment, that perform one or more of the functions of circulating, cleaning, heating, cooling, humidifying, dehumidifying, and mixing of air; does not include a heating or cooling source.
>
> Cooling-heating Unit: unit that includes means for cooling and heating, and which may also include means for other air-handling unit functions.

Cooling Unit: unit that includes means for cooling and which may also include means for other air-handling unit functions.

Heating unit: unit that includes means for heating, and which may also include means for other air-handling unit functions.

Make-up air unit: factory-assembled fan-heater or cooling/dehumidifying unit that supplies tempered fresh air to replace air that is exhausted. Centrifugal or axial fans are used with direct gas-fired, electric, or water heater sections.

Ventilating unit: unit with means to provide ventilation, and which may also include means for other air-handling unit functions (See ASHRAE *Terminology of Heating, Ventilating, Air Conditioning, and Refrigeration*, 1991).

Air Scrubber: An air filtration device (AFD) using HEPA filtration configured to re-circulate air within a defined space.

Air Sweeping: A process that uses a pressurized air source combined with either handheld blowguns or a hose with a remote nozzle attachment to move particulate and debris within an HVAC system during cleaning.

ASCS: Air Systems Cleaning Specialist. The ASCS designation is awarded by NADCA to industry professionals who satisfactorily complete a written certification examination testing knowledge of HVAC systems, cleaning standards and best practices.

Ambient Air Cleaning: The process of removing particulate from indoor air outside of the HVAC system.

Antimicrobial: Describes an agent that kills or inactivates microorganisms or suppresses their growth (See ASTM E35.15)

Antimicrobial Surface Treatments: Chemical or physical agent applied to, or incorporated into materials that suppresses microbial growth.

Assessment: A comprehensive review and evaluation of the HVAC system, or representative portions thereof, to make a preliminary determination of which general forms of contamination are present and to document the overall system cleanliness level.

ASHRAE: American Society of Heating, Refrigerating, and Air-Conditioning Engineers.

ASTM International: American Society for Testing and Materials.

Bioaerosols: Airborne particles of biological origin.

Biological Contaminants: Bacteria, fungi (mold and mildew), spores, viruses, animal dander, mites, insects, pollen, and the by-products of these elements.

Cleaning: The removal of visible particulate and biologicals to a level defined within this document.

Closure: (1) An access door or panel installed on the air duct or air-handling unit to create a permanent seal. (2) Device or material used in closing a service opening.

Closure Panel: Sheet metal, or other appropriate material used for permanently closing a service opening.

Coatings: See “Surface Treatments.”

Coils: Devices inside an HVAC system that temper and/or dehumidify the air handled by the HVAC system. These include heat exchangers with or without extended surfaces through which water, ethylene glycol solution, brine, volatile refrigerant, or steam is circulated for the purpose of total cooling (sensible cooling plus latent cooling) or sensible heating of a forced-circulation air stream (See ASHRAE 33-78 and ARI 410-91).

Collection Device: A HEPA-filtered machine designed primarily to collect debris, filter particulate and discharge air back to the indoor environment, or a fan driven non-HEPA-filtered machine that is designed to collect debris, and then filter particulate while discharging the air outside the building envelope.

Conditions: For the purpose of this standard, Conditions 1, 2, and 3 are defined for indoor environments relative to mold. Definitions for each Condition are as follows:

Condition 1 (normal ecology): An indoor environment that may have settled spores, fungal fragments or traces of actual growth whose identity, location and quantity is reflective of a normal fungal ecology for an indoor environment (See IICRC S520).

Condition 2 (settled spores and trace growth): An indoor environment, which is primarily contaminated with settled spores that were dispersed directly or indirectly from a Condition 3 area, and which may have traces of actual growth (See IICRC S520).

Condition 3 (actual growth): An indoor environment contaminated with the presence of actual mold growth and associated spores. Actual growth includes growth that is active or dormant, visible or hidden (See IICRC S520).

Constant Air Volume System: An air-handling system involving a continuous level of airflow.

Contact Vacuum: A Collection Device, usually portable, that uses a nylon brush nozzle attached to the end of its inlet air hose. The brush head is applied directly to a surface for cleaning.

Containment Area: An engineered space within a work area designed to control the migration of contaminants to adjacent areas during assessment or cleaning procedures.

Contaminant: Any substance not intended to be present that is located within the HVAC system.

Converging 45 Degree Cut: Applies to the angle of the cut when removing a section of ductboard to create an opening. Provides for resealable fit when re-installing the section for closure (sometimes referred to as a “pumpkin cut”).

Crossbreak: Diagonal bends made in metal panels to increase rigidity and decrease flexibility.

Debris: Non-adhered substances not intended to be present within the HVAC system.

DOP Testing: The percentage removal of 0.3 micrometer particles of dioctylphthalate (DOP) or equivalent used to rate high-efficiency air filters, those with efficiencies above 98%.

Double Wall Duct: Sheet metal duct usually constructed with an inner perforated liner sandwiching fibrous glass insulation.

Duct Access Door: Fabricated metal barrier (hatch) by which a service opening is accessed or closed. Designed for permanent installation. May be available pre-fabricated in a variety of sizes and configurations. Most utilize cam locks for securing the removable door from the permanently installed doorframe. Types of Duct Access Doors are listed below:

Flush Mount - fabricated door and door frame which extends into the duct and is externally flush with the outside duct wall.

Surface Mount - fabricated door and door frame which extends out from the surface of the outside duct wall.

Hinged - fabricated door and doorframe attached together with a hinge.

Sandwich - two-part closure device in which the two sides are mechanically fastened together on both sides of the duct wall at the perimeter of the service opening.

Spin Door - round access door and door frame installed by spinning the door frame into a round opening.

Ductwork: A system of passageways for distribution and extraction of air, excluding plenums not installed in accordance with SMACNA Standards (See *ASHRAE Terminology of Heating, Ventilation, Air Conditioning & Refrigeration*, 1991).

EPA: United States Environmental Protection Agency.

Flame Spread Index: The Flame Spread Index refers to the sustained combustion classification of a material as listed in NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials.*

Flange: Outer rim of an access door frame provided to attach the frame to the duct.

HEPA: High Efficiency Particulate Air. To be called a true HEPA filter, or certified HEPA filter the filter must have a documented filtration efficiency of 99.97% at 0.3 micron-sized particles.

Highly Recommended: When the term *highly recommended* is used in this document, it means the practice or procedure is a component of the accepted “standard of care” to be followed, though not mandatory by regulatory requirement.

HVAC System: The heating, ventilation, and air conditioning (HVAC) system includes any interior surface of the facility’s air distribution system for conditioned spaces and/or occupied zones. This includes the entire heating, air-conditioning, and ventilation system from the points where the air enters the system to the points where the air is discharged from the system. The return air grilles, return air ducts to the air-handling unit (AHU), the interior surfaces of the AHU, mixing box, coil compartment, condensate drain pans, humidifiers and dehumidifiers, supply air ducts, fans, fan housing, fan blades, air wash systems, spray eliminators, turning vanes, filters, filter housings, reheat coils, and supply diffusers are all considered part of the HVAC system. The HVAC system may also include other components such as dedicated exhaust and ventilation components and make-up air systems.

IAQA: Indoor Air Quality Association.

Indoor Environmental Professional (IEP): An individual who is qualified by education, training and experience to perform an assessment of the fungal ecology of property, systems and contents at the job site, create a sampling strategy, sample the indoor environment, interpret laboratory data, determine Condition 1, 2 and 3 status for the purpose of establishing a scope of work and verify the return of the fungal ecology to a Condition 1 status (See IICRC S520).

Inspection: A gathering of information for use in making determinations and assessments.

IKECA: International Kitchen Exhaust Cleaning Association.

Laser Particle Counter: Sophisticated instruments for measuring particle concentrations down to the sub-micron level.

MERV: Minimum Efficiency Reporting Value.

Mastic: Material used to caulk, seal, or cement gaps and cracks in air duct connections and joints.

Mechanical Agitation Device: A tool used to dislodge or move contaminants and debris within the HVAC system.

Mechanical Cleaning: Physical removal of contaminants and debris not intended to be present from internal HVAC system surfaces.

Mechanically Fasten: To affix two or more objects together through the use of screws, clamps, locks, or straps. (Contrast with mastic or tape.)

Microbiocide: Chemical or physical agent that kills microorganisms (ASTM E35.15)

Mold Contaminated: The presence of indoor mold growth and/or mold spores, whose identity, location and amplification are not reflective of a normal fungal ecology for an indoor environment, and which may produce adverse health effects and cause damage to materials, and adversely affect the operation or function of building systems.

MSDS: Material Safety Data Sheet.

Must: When the term *must* is used in this document, it means that the practice or procedure is mandatory due to natural law or regulatory requirements, including occupational, public health and other relevant regulations, and is therefore a component of the accepted “standard of care” to be followed.

NFPA: National Fire Protection Association.

Negative Air Machine: A HEPA-filtered air filtration device designed primarily for collecting particulate and limiting particulate migration while controlling workspace pressure differentials. These machines may or may not be ducted outside the building envelope.

Non-adhered Substance: Any material not intended or designed to be present in an HVAC system, and which can be removed by contact vacuuming.

Non-porous HVAC System Surface: Any surface of the HVAC system in contact with the air stream that cannot be penetrated by water or air, such as sheet metal, aluminum foil, or polymetric film used to line flexible duct.

NAIMA: North American Insulation Manufacturers Association.

OSHA: United States Occupational Safety and Health Administration.

Panel: (1) Fabricated section of metal making up the structural shell of a piece of mechanical equipment. (2) Patch of sheet metal used for closing a service opening.

Particulate: Any non-adhered substance present in the HVAC system that can be removed by contact vacuuming.

Permanent: The life of the system.

Plastic Plug: Round polyethylene cap used to close 1"-3" openings in sheet metal duct. (Note: the materials used in the manufacture of these devices often exceed the indices for flame spread and smoke spread as set forth in NFPA 90A & 90B).

Porous HVAC System Surface: Any surface of the HVAC system in contact with the air stream that is capable of penetration by either water or air. Examples include fiber glass duct liner, fiber glass duct board, wood, and concrete.

Preliminary Determination: A conclusion drawn from the collection, analysis and summary of information obtained during an initial inspection and evaluation to identify areas of moisture intrusion and actual or potential mold growth (IICRC S520).

Pressure Drop: (1) Loss in pressure, as from one end of a refrigerant line to the other, from friction, static, heat, etc.; (2) Difference in pressure between two points in a flow system, usually caused by frictional resistance to fluid flow in a conduit, filter or other flow system (See

ASHRAE Terminology of Heating, Ventilation, Air Conditioning, & Refrigeration, 1991).

Recommended: When the term *recommended* is used in this document, it means the practice or procedure is advised or suggested.

Regulated Hazardous Materials: This includes any substances such as asbestos or lead that are regulated under applicable national, state and local regulations.

Requirement: Mandatory practice for compliance with this standard.

Restoration: To bring back to, or put back into, a former or original state.

Seal: To make secure against leakage by a fastener, coating, or filler.

Sealant: A fastener, coating, or filler used to seal against air leakage.

Service Panel: Fabricated piece of metal making up a part of the structural shell of a piece of mechanical equipment. Often allows for entry to service equipment.

Shall: (See "Must")

Shiplap Tool: Specialized cutting tool for fabricating fibrous glass board.

Should: Indicates a recommendation, or that which is advised by this standard, but is not mandatory (See "Highly Recommended").

Sleeve Collar: Fabricated door frame extension used to install typical surface-mount access doors in fibrous glass ductboard.

SMACNA: Sheet Metal and Air Conditioning Contractors' National Association.

Source Removal: See "Mechanical Cleaning."

Stain: A remaining discoloration on the HVAC system surface after contact vacuuming, which cannot be removed.

Standard of Care: Practices common to reasonably prudent members of the trade who are recognized in the industry as qualified and competent.

Surface Comparison Testing: A test used to determine the cleanliness of both non-porous (metal) and porous (fiber glass) HVAC component surfaces (See Section 13.2 of this standard).

Surface Treatment (non-antimicrobial): Coating or treatment designed to repair surface defects or modify surface characteristics

TVOC: Total volatile organic compounds.

Thermal Acoustic Materials: HVAC insulation materials designed for sound and temperature control.

UL: Underwriters Laboratories, Inc.

Vacuum Collection Equipment: See "Collection Device."

Visibly Clean: A condition in which the interior surfaces of the HVAC system are free of non-adhered substances and debris.

Visual Inspection: Visual examination with the naked eye of the cleanliness of the HVAC system.

Wet Process Cleaning: Any method of mechanical cleaning of HVAC components that utilizes water and/or liquid chemicals as part of the process (i.e. power washing, steam cleaning, hand washing).

3 Determining the Need for HVAC System Cleaning and Restoration

It is highly recommended that HVAC systems be cleaned when an HVAC cleanliness inspection indicates that the system is contaminated with a significant accumulation of particulate or if microbial contamination conditions have reached either Condition 2 or Condition 3. If the preliminary inspection shows that HVAC system performance is compromised due to contamination build-up, cleaning is highly recommended.

Often HVAC system components collect significant amounts of debris and particulate during construction activities within a building. It is highly recommended that newly installed HVAC systems or HVAC systems undergoing renovation be verified clean, and protected before the system is permitted to operate. It is highly recommended that consistent HVAC system inspections be part of a building's overall indoor air quality management program.

3.1 HVAC Cleanliness Inspection Schedule

HVAC systems should be routinely inspected for cleanliness by visual means. Table 1 provides a recommended inspection schedule for major HVAC components within different building use classifications.

The inspection intervals specified in Table 1 are minimum recommendations. The need for more frequent cleanliness inspections is subject to numerous environmental, mechanical and human factors. Geographic regions with climates having higher humidity, for example, will warrant HVAC system inspections on a more frequent basis, due to the increased potential for microbial amplification.

If the inspection of an HVAC unit's air-handling components reveals contamination, then supply and return ductwork must be inspected during that same inspection time rather than in accordance with the intervals specified in Table 1.

Table 1
HVAC Cleanliness Inspection Schedule
(Recommended Intervals)

Building Use Classification (See Section 4.1)	Air-handling Unit	Supply ductwork	Return ductwork / Exhaust
Industrial	1 year	1 year	1 year
Residential	1 year	2 years	2 years
Light Commercial	1 year	2 years	2 years
Commercial	1 year	2 years	2 years
Healthcare	1 year	1 year	1 year
Marine	1 year	2 years	2 years

3.2 HVAC System Component Inspections

The cleanliness inspection should include air-handling units and representative areas of the HVAC system components and ductwork. In HVAC systems that include multiple air-handling units, a representative sample of the units should be inspected. If the inspection is being conducted as part of a mold remediation project in accordance with IICRC Standard S520, then all components of the HVAC system must be inspected.

The cleanliness inspection must be conducted without negatively impacting the indoor environment through excessive disruption of settled dust, microbial amplification or other debris. In cases where mold contamination is suspected, and/or in sensitive environments where even small amounts of contaminant may be of concern, environmental engineering control measures must be implemented and the services of an Indoor Environmental Professional (IEP) are highly recommended to determine the overall impact on the indoor environment.

3.2.1 AHU Inspections

The air-handling unit (AHU) cleanliness inspection should consider all components within the unit, including filters and air bypass, heating and cooling coils, condensate pans, condensate drain lines, humidification systems, acoustic insulation, fans and fan compartments, dampers, door gaskets and general unit integrity.

3.2.2 Supply Duct Inspections

The supply duct cleanliness inspection should consider a representative portion of supply system components including, but not limited to, supply ducts, controls, mixing/ control boxes, reheat coils and other internal components.

3.2.3 Return Duct Inspections

The return duct cleanliness inspection should consider a representative portion of return system components including, but not limited to, return ducts, dampers, return plenums, make-up air plenums and grilles.

3.3 Inspecting for Mold Contamination

It is highly recommended the HVAC system cleanliness inspection include a preliminary determination of the level of mold contamination (Condition 1, 2 or 3) and other biological activity. The inspection should evaluate the air-handling unit, humidifier and other representative system components.

HVAC systems should be inspected at least twice annually when they include supplemental humidification or when they are located within a hot and humid climate.

3.3.1 Preliminary Determination for Mold

After the initial HVAC system component inspection, a preliminary determination must be made by the person performing the inspection regarding potential mold contamination. Making a determination involves the collection, analysis and summary of information to identify areas of moisture accumulation and potential mold growth. A preliminary determination may indicate the need for further assessment by an IEP and/or other appropriate professionals (See IICRC S520).

3.3.2 Surface Mold Growth

If the preliminary determination indicates a small, isolated area of mold growth on a surface layer of condensation on painted walls or non-porous surfaces, and mold growth has not occurred in concealed areas, the use of an IEP generally is not necessary and the mold usually can be removed as part of a regular HVAC maintenance program (See IICRC S520).

3.3.3 Limited Mold Growth

If the preliminary determination indicates a limited amount of visible mold confined to a specific area, (e.g. a small area of a mechanical system that is not in the path of the major air circulation system of the structure), the use of an IEP may or may not be necessary and the restorer or remediator's professional judgment is needed in making appropriate recommendations (See IICRC S520).

3.3.4 Extensive Mold Growth

If the preliminary determination indicates extensive mold growth that is visible, hidden or suspected as a result of a chronic or lingering moisture problem, it is highly recommended that the extent of microbial growth or Condition (1-3) to which areas of the HVAC system are mold-contaminated be determined. It is highly recommended that this determination be made by a thorough assessment performed by an IEP before starting remediation. However, in some circumstances where Condition 3 contamination has been determined and the entire HVAC system is located within the contaminated area, or when the scope of work can be determined without sampling, testing or independent IEP inspection, then engagement of an IEP during the preliminary determination process may not be necessary. Further, some loss mitigation services (e.g., water damage restoration) may be initiated before or while assessing conditions and/or remediation processes (See IICRC S520).

If mold or biological sampling is performed, it must be in accordance with established industry standards and guidelines.

3.4 HVAC Inspector Qualifications

It is highly recommended that a qualified HVAC inspector be used to determine the preliminary state of HVAC system cleanliness. At minimum, such personnel should have a verifiable working knowledge of basic HVAC system design, fundamental HVAC engineering practices, current industry HVAC cleaning and restoration techniques, and applicable industry standards. Individuals who are inspecting for microbial contamination should be qualified to determine Conditions 1, 2 and 3.

3.5 Conditions Requiring Cleaning

It is highly recommended HVAC system cleaning be performed when any of the following conditions are found during the HVAC Cleanliness Inspection.

3.5.1 HVAC System Contamination

If significant accumulations of contaminants or debris are visually observed within the HVAC system, then cleaning is necessary. Likewise, if evidence of active fungal colonization is visually observed or confirmed by analytical methods, then cleaning is required. If the system has been confirmed by an IEP to be at Condition

2 or Condition 3 status then the system must be cleaned.

If the HVAC system discharges visible particulate into the occupied space, or a contribution of airborne particles from the HVAC system into the indoor ambient air is confirmed, then cleaning is highly recommended.

See the guideline to this standard for discussion of the Particle Profiling (PP) procedure, which may be used to confirm if non-visible contaminants are being introduced into the indoor environment via the HVAC system.

3.5.2 Compromised Performance

Cleaning is highly recommended for heat exchange coils, cooling coils, air flow control devices, filtration devices, and air-handling equipment determined to have restrictions, blockages, or contamination deposits that may cause system performance inefficiencies, air flow degradation, or that may significantly affect the design intent of the HVAC system.

3.5.3 Indoor Air Quality Management

Indoor air quality management plans that include periodic cleaning and maintenance are highly recommended to minimize recurring contamination within HVAC systems. It is highly recommended that special consideration be given to buildings or residences with sensitive populations such as individuals with compromised immune systems, and specialized environments or buildings with sensitive building contents or critical processes.

3.6 HVAC System Engineering Assessment

It is highly recommended that in addition to an HVAC cleanliness inspection, a complete engineering assessment of the design and condition of the entire HVAC system be considered depending on the conditions that exist in the project. This is especially important if temperature and/or relative humidity conditions cannot be maintained within the spaces in compliance with the requirements of ASHRAE Standards 62.1 or 62.2; if temperatures, relative humidity or airflow varies between different areas of the building; or, if the mechanical components are not in good condition and/or repair. There are four primary reasons this HVAC System Engineering Assessment is important to the success of a remediation project:

- The original system design may not have been adequate to maintain optimal indoor environmental (or psychrometric) conditions in the building;
- Expansions, renovations or changes of use of the original space may have rendered the HVAC system design inadequate for the current needs of the building and its occupants;
- The system may not have been installed as designed, or commissioned so as to assure that its operation met the design objectives; and
- Mechanical deterioration and/or physical damage to system components may have degraded their performance to the point where they cannot provide the necessary level of air flow or capacity.

The description of what constitutes an adequate engineering evaluation of HVAC system condition and capacity is beyond the scope of this standard. It is recommended that qualified engineering professionals or HVAC contractors be consulted for such an evaluation.

4 Project Evaluation and Recommendation

When contamination is identified or other criteria triggering cleaning in Section 3 are met, it is highly recommended a project evaluation take place prior to initiating cleaning work. The project evaluation includes three steps: 1) determining the building usage by classification; 2) identifying the type of contamination present in the HVAC system; and 3) conducting an indoor environmental impact survey.

The HVAC contamination type and the environmental impact survey must include a visual evaluation of representative sections of the HVAC components and the occupied spaces served by the HVAC system. This evaluation serves to visually inspect conditions within the HVAC system and verify the overall physical integrity of system components and surfaces.

Information collected from the project evaluation should be used to define the scope of the cleaning and restoration project, cleaning techniques to be employed, the environmental engineering controls required for the workspace, and any unique project requirements.

4.1 Building Use Classification

Classifying the type of building and its uses is an important part of project evaluation. Cleaning methods, project specifications, environmental engineering controls, and cleanliness verification methods may vary among different buildings. Building classifications are listed in Sections 4.1.1 to 4.1.8 of this standard. If the HVAC system restoration project is being conducted as part of a larger mold remediation project, it is recommended the building's usage classification be determined by an IEP to assess the overall impact of the contamination present and the corrective cleaning actions specified to remediate the contamination.

4.1.1 Industrial

Buildings classified as *industrial use* include any facility housing the manufacture, fabrication, processing, handling, and storage of materials or products.

4.1.2 Residential

Buildings classified as *residential use* include stand-alone homes, apartment buildings, and condominiums where people reside.

4.1.3 Light Commercial

Buildings classified as *light commercial use* include space with a constant volume HVAC system up to, and including, 10 tons cooling or equivalent heating capacity, or 4000 CFM nominal air flow, whichever is greater.

4.1.4 Commercial

Buildings classified as *commercial use* include space with an HVAC system of greater than 10 tons, or equivalent heating capacity, or 4000 CFM nominal air flow, whichever is greater.

4.1.4.1 Restaurants

The patron seating areas and employee workspaces within restaurants are classified as *commercial use*.

Kitchen exhaust systems designed to remove grease-laden vapor rising from cooking appliances are not covered by this standard and should be cleaned in accordance with NFPA Standard 96 and IKECA Guidelines and Best Practices.

4.1.5 Healthcare

Buildings classified as *healthcare use* include any facility that either serves as a hospital, out-patient care, doctor's office, nursing home, extended care, or any other facility with a population of individuals with compromised immune systems.

4.1.6 Marine

The *marine use* classification includes ships or floating vessels with passenger or crew cabins, manufacturing, processing, material handling, and storage.

4.1.7 Special Use Areas

Special use areas include facilities with clean rooms, laboratories, or other areas with specific requirements for environmental control.

4.1.8 Multi-use Buildings

In some cases, multiple building use classification types may exist within a single facility. For example, an industrial facility may have general office space, a clean room, and a manufacturing area. Projects within multi-use buildings must use appropriate environmental engineering controls as specified within this standard for each building classification type.

In the event two or more building classifications are encountered on one project, then the more stringent of the applicable environmental engineering controls must apply when isolation cannot be maintained between areas with different building use classifications.

4.2 HVAC Contamination Type

Cleaning methods, project specifications, environmental engineering controls, and cleanliness verification methods may vary depending on the type of contaminants found within a building and its HVAC system. Recognizing the type of contaminants present and the type of HVAC system(s) within the building are important parts of the overall project evaluation.

The HVAC systems, including air-handling units and representative areas of the HVAC system components and ductwork, must be evaluated for contamination type and levels.

An HVAC system component is considered contaminated when evidence of significant particulate debris and/or visual microbial growth exists. A system is considered to have microbial contamination when the HVAC cleanliness evaluation identifies microbial growth through visual inspection and/or analytical verification.

An HVAC system that is part of a building that has been classified as having Condition 3 mold contamination does not require further evaluation of the contaminants by an IEP for restoration to commence.

It is highly recommended that any individual taking and interpreting samples from the interior of HVAC systems be an IEP with specific training in taking samples from within such systems.

4.2.1 Air-handling Units

The air-handling unit contamination evaluation should consider representative sections of components within the unit, including but not limited to filters and air bypass, heat and cooling coils, condensate pans, condensate drain lines, humidification systems, acoustic insulation, fans and fan compartments, door gaskets, and general unit integrity.

4.2.2 Supply and Return Ductwork

The supply duct contamination evaluation should consider a representative portion of supply system components including, but not limited to, supply ducts, mixing/control boxes, flexible type ductwork, thermal-acoustical lining condition, reheat coils and other duct components.

The return duct contamination evaluation should consider a representative portion of all return system components including, but not limited to, return ducts, dampers, return plenums, thermal-acoustic lining condition, make-up air plenums and grilles.

4.3 Indoor Environmental Impact Survey

The activities associated with HVAC system inspection, system cleaning, and potential restoration of HVAC components, have the ability to adversely influence a building's indoor environment. Of primary concern is the disturbance of settled particulate and the potential for disturbed particles to be released into occupied areas.

It is highly recommended that engineering controls be used to manage the general workspace environment during cleaning and restoration work. Such controls will serve specifically to keep HVAC contaminants from entering indoor spaces. An indoor environmental impact survey is highly recommended to help determine appropriate environmental engineering controls for a project.

5 Environmental Engineering Controls

To the extent feasible, engineering controls must be used to assure worker safety and health, and to prevent cross-contamination. These engineering controls may include, but are not limited to source control, isolation barriers, pressure differentials, dust suppression methods, HEPA vacuuming and filtration, detailed cleaning, temperature and humidity control, and a sanitary approach.

During HVAC system cleaning procedures, appropriate environmental engineering controls must be established to control contaminants associated with the project from migrating to other spaces in the building. When disrupting biological contaminants within a mechanical system, the use of an IEP may be necessary to design the appropriate engineering and environmental controls to protect the indoor environment.

The effectiveness of environmental engineering controls may be demonstrated through the use of monitoring devices such as laser particle counters, digital pressure differential manometers, and other analytical or measuring devices. Monitoring is highly recommended in buildings containing sensitive environments or contents, when occupants have special health considerations, or when biological contaminants are being disturbed within a mechanical system.

5.1 HVAC Duct Pressurization

HVAC ducts must be kept at an appropriate pressure differential relative to surrounding indoor occupant spaces during all cleaning procedures and as may be required during assessment activities. It is highly recommended pressure differential be achieved through the use of a negative air machine or HEPA filtered vacuum collection equipment. Pressurization differential requirements apply to projects taking place within all building use classifications. It must be possible to demonstrate and document pressurization differential procedures.

Should field conditions allow for possible cross contamination via make-up air to a negatively pressured interior HVAC zone or duct, suitable provisions must be utilized to prevent such cross contamination.

5.1.1 Vacuum Collection Equipment and Negative Air Machines

Vacuum collection equipment and/or a negative air machine must be used to establish pressure differentials in the portion of the HVAC system being serviced relative to the surrounding area. It is highly recommended the device be operated in close proximity to the connection point of the HVAC component being serviced. HVAC openings must be temporarily sealed and opened as required to maintain an appropriate pressure differential throughout the mechanical system. Installation of subsequent service openings in the portion of the HVAC system being cleaned must be performed while the system is under the appropriate pressure differential.

Negative air machines must not be used to collect large quantities of debris unless designed for that purpose.

5.1.2 Pressure Differential Requirements

A continuous pressure differential must be maintained between the portion of the HVAC ductwork system being cleaned and surrounding indoor occupant spaces. The pressure differential in those portions of the HVAC system undergoing cleaning should be verified at representative locations during the cleaning process.

5.2 Work Site Containment

Physical activities within an indoor environment are likely to cause a temporary rise in airborne particles. Work site containment must be used to create a barrier between the work site and the rest of the building, reducing the opportunity for particles to cross contaminate other areas. In some cases the mechanical system will be completely isolated from the work site before work begins. The necessity for mechanical system isolation will be identified during the environmental engineering controls inspection. When mechanical systems are isolated from the rest of the environment it is highly recommended that the need for supplemental heating or cooling be evaluated for the project.

The extent of work site containment controls employed on a particular cleaning project is dependent upon the building use classification, HVAC system contamination evaluation, and indoor environmental impact survey. The guideline section of this standard describes several different types of containment systems and the conditions under which they may be applicable. It is highly recommended that work site containment controls be determined in cooperation with an IEP when Condition 2 or 3 mold remediation is taking place within other areas of the building.

5.3 Decontaminating Remediation Equipment

Tools, equipment, and instrumentation brought onto the work site must be clean and must not introduce contaminants into the indoor environment or HVAC system. All equipment must be in safe working order upon arrival at a job site. All equipment must be serviced as needed throughout a project to limit possible cross contamination from poor hygiene, and/or unsafe operating conditions for service personnel and building occupants. These requirements apply to all cleaning projects.

Tools and equipment must be cleaned and decontaminated before being transported into an uncontaminated area.

At the end of a project, tools and equipment must be cleaned and decontaminated before being removed to another area.

Tools and equipment must be cleaned and dried carefully before being returned to storage.

5.3.1 Equipment Hygiene Inspection

In cases of severe microbial growth (Condition 3), or where hazardous substances are known to be present within the HVAC system, or on projects taking place within healthcare facilities, there must be an on-site hygiene/integrity inspection of vacuum collection equipment prior to commencement of work. The building owner or his representative should conduct the inspection.

5.3.2 Operational Condition

All equipment must be maintained in good working order, consistent with applicable OSHA requirements, including, but not limited to vacuum collection equipment, power tools, pressurized air sources, electrical power cords and plugs, ground fault protection devices, vacuum collection hoses, fluid and pneumatic lines, manual and mechanical rotary brush systems, pneumatic cleaning systems, ductwork zoning devices, ladders, staging equipment, and hand tools.

5.3.3 Vacuum Equipment Filtration

When using vacuum collection equipment exhausting within the building envelope, it is required the equipment utilize HEPA filtration with 99.97% collection efficiency at 0.3 micron particle size. This requirement applies to all cleaning projects.

5.3.3.1 Work Site Filtration Efficiency Certification

In cases of severe microbial growth (Condition 3), or where hazardous substances are known to be present within the HVAC system, or on projects taking place within healthcare facilities, filter certification by DOP testing of HEPA-filtered collection equipment at the work site is highly recommended prior to commencement of work.

5.4 Smoke and/or Fire Detection Equipment

Cleaning activities must not impair, alter or damage any smoke and fire detection equipment located within the facility, or attached to and serving the HVAC system. When required, temporary modifications, alterations, deactivation and reactivation of smoke and fire detection equipment, special permits, code-required notification, or other communications are the responsibility of the facility owner or the owner's designated representative.

5.4.1 Temporary Controls

Conditions may require temporarily disabling detection equipment to avoid damage and/or false alarms. When temporary controls are used, confirmation that all such devices were properly functioning must be documented, and if needed, confirmed through testing.

5.4.1.1 Authority Notification

When detection equipment is deactivated, disabled or reactivated, it is the responsibility of the facility owner or his representative to inform the authority having jurisdiction about detection equipment status.

5.4.1.2 Safety Plan

When detection equipment is off-line, disabled, and subsequently reactivated, it is the responsibility of the facility owner or his representative to develop a plan for assuring safe operation of the building during such periods. The safety plan must conform to life safety regulations. The plan must define the responsibilities of each organization's designated representative involved with executing the plan for the duration of the HVAC system cleaning project.

5.5 Pressure Differentials

Pressure differentials are used to manage airflow. The use of pressure differentials is a matter of professional judgment. If pressure differentials are used, it is highly recommended contaminated areas be negatively pressurized relative to unaffected or clean areas of the building to prevent cross contamination.

The impact of HVAC cleaning activities on building pressurization and depressurization must be considered for all buildings. Potential hazards and adverse conditions resulting from dynamic building pressurization or depressurization might include back-drafting, extinguishing and/or flame roll-out of combustion appliances, altered fume-hood exhausts, adjacent thermal and relative humidity conditions, introduction of outdoor pollutants, and other problems.

Appropriate environmental engineering controls must be employed to safeguard the building environment and to control equipment that could be adversely affected by dynamic building pressurization or depressurization during HVAC system cleaning processes.

5.6 Control of Product Emission

Products used in HVAC cleaning and restoration projects may lead to the offgassing of objectionable emissions even when properly used. All products used must comply with any local, regional, or national standards and/or laws regulating the use of such agents. Cleaning agents, antimicrobials, or other chemicals must be applied in accordance with the manufacturer's written recommendations for proper handling, usage, and disposal. Antimicrobials must be properly registered for use in HVAC systems by the EPA, or the applicable governing agencies and used in accordance with their registration listing specifically for HVAC applications.

Any application of cleaning agents, antimicrobials, or other chemical agents must be performed in such a manner as to prevent employee and occupant exposure and cross-contamination.

5.7 Removal and Disposal of Contaminated Materials

All contaminated materials removed from the HVAC system must be properly contained to prevent cross-contamination. Removed debris should be double-bagged and sealed in 6-mil polyethylene bags. Materials deemed to be hazardous by governmental agencies must be handled in strict accordance with any applicable local, regional, or national codes.

All vacuum collection devices used in the contaminant removal process must be sealed prior to relocation or removal from the building. Any activity requiring the opening of contaminated vacuum collection equipment on site, such as servicing or filter maintenance, must be performed in a negatively pressurized containment area or outside the building.

It is recommended that bagged materials be placed inside a secure dumpster or transport vehicle immediately after removing them from the building. They must be handled carefully while moving them to the disposal container or site. Respirators are not required outside while transporting double-bagged materials. It is highly recommended that bags not be dropped, thrown or handled roughly. If wrapped disposal materials rupture outside the containment, transporting workers must don appropriate PPE immediately, secure the area from public access, initiate clean up (HEPA vacuuming), and contain the debris. It is recommended that dumpsters with debris be protected from scavengers and kept secured.

Non-regulated mold-contaminated ductwork components and other materials (i.e., those that do not contain asbestos, lead or other restricted waste) usually can be disposed in normal landfills as compost or construction waste. Generally, no special disposal provisions are recommended for mold-contaminated materials; however, local disposal ordinances may apply. Placing "mold" labels on bags and wrapped materials is recommended to discourage individuals from opening or removing them from the disposal site. It is recommended that label language be factual, not reactionary *(See IICRC S520).*

5.8 Project Planning

Project planning is required for all HVAC system cleaning projects. The project plan must address the following areas:

- Strategic monitoring plan
- Scope of work
- Trades involved and their work tasks
- Acceptable work hours
- Number of individuals to be working on the project
- Project schedule
- Certifications for equipment
- Methods to be used for the project
- Cleaning and other chemicals to be used
- Safety plans
- MSDS documents
- Materials and other documentation needed to allow for the monitoring firm or individual to complete their task.

5.8.1 Sequence of HVAC System Cleaning in Condition 2 and Condition 3 Environments

In buildings or areas of a structure determined to have Condition 2 or 3 microbial contamination, it is recommended to delay remediation of the HVAC system until other building mold remediation is complete, in order to avoid recontamination of the system. If this is not possible, then it is highly recommended that portions of the system exposed to or impacted by general remediation activities either be blocked off or isolated as soon as they are cleaned, re-inspected and then cleaned again if needed after demolition and reconstruction activities are complete. It may be necessary to provide for temporary heating, cooling and other environmental control for areas that are undergoing remediation if they are isolated from the building HVAC system. Often, the quality of make-up air drawn through the containment will provide satisfactory conditions. In other cases, supplemental heating, cooling or dehumidification systems can be used to provide environmental control in the spaces undergoing remediation. It is highly recommended that where supplemental systems are used inside of critical containments, they be decontaminated, bagged or wrapped prior to being removed from the workspace.

5.9 Ambient Air Cleaning

Ambient air cleaning is a supplemental engineering control to provide ambient airborne particle reduction during and immediately after HVAC cleaning work.

Ambient air cleaning is recommended for projects taking place within residential, light commercial, industrial and marine buildings. Ambient air cleaning is highly recommended for all commercial, healthcare and special use buildings.

5.9.1 Filtration Efficiency and Air Exchanges

Negative air machines or ambient air cleaners used for indoor airborne particle reduction must utilize HEPA filtration with 99.97% collection efficiency at 0.3 micrometers or greater.

Air cleaning should provide a minimum of four (4) air changes per hour in the work area or must lower indoor particle level in the work area to the documented background level.

5.10 Controlling Vapors or Emissions from Cleaning and Coating

A review of the types of chemicals to be used and the vapors they emit must be made before the project starts. Adequate provisions must be made to control occupant and worker exposure. Controls to exhaust chemical emissions from cleaning activities should be analyzed for their impact on building pressurization (See Section 5.5).

5.11 Notification and Documentation

It is highly recommended the building owner or owner's authorized representative be notified prior to the contractor bringing new products or materials into the building. These products include but are not limited to: antimicrobials, cleaning agents, coil cleaning chemicals, mastics, spray glue, coatings, sealants, and any new HVAC system components. The contractor must have applicable MSDS readily available for all chemicals that will be used during the course of the project.

6 HVAC System Cleaning

This section defines the minimum requirements necessary to render the HVAC system and its components clean through the removal of surface contaminants and deposits.

The HVAC system includes all interior surfaces of the facility's air distribution system that service conditioned spaces and/or occupied zones. This includes the entire heating, air-conditioning and ventilation system from the points where air enters the system, to the final point of discharge prior to entering the conditioned environment. The return air grilles, return air ducts to the AHU, the interior surfaces of the AHU, mixing boxes, coil compartment, condensate drain pans, humidifiers and dehumidifiers, supply air ducts, fans, fan housings, fan blades, air wash systems, spray eliminators, turning vanes, filters, filter housings, reheat coils, flexible ductwork and supply diffusers are all considered part of the HVAC system. The HVAC system may also include other components such as dedicated exhaust and ventilation components and make-up air systems.

6.1 Mechanical Cleaning Methodology

The HVAC system must be cleaned using mechanical cleaning methods designed to dislodge and extract contaminants from within the HVAC system components. Mechanical cleaning techniques employ sizeable vacuum collection units, portable vacuum collection units, mechanical agitation systems, hand brushing tools, pressurized air sources, pressurized water sources, plus other tools and equipment to dislodge attached particulate and debris and convey it to a collection device in a safe and controlled manner.

6.1.1 Collection Devices

It is highly recommended that mechanical cleaning techniques of duct systems incorporate the use of collection devices of sufficient capacity to create a consistent pressure differential between the ductwork being cleaned and the surrounding area. These machines must be operated continuously during cleaning. Collection devices must be used to convey and collect debris and prevent cross migration of dislodged particulate during the mechanical cleaning process.

A vacuum collection device must be connected to the HVAC component being cleaned through pre-engineered openings. The vacuum collection device must be of sufficient capacity that containment of debris and the protection of the indoor environment are maintained.

6.1.1.1 Capture Velocity

When the collection device is used to convey and capture contaminants, it must maintain a sufficient velocity and pressure differential in the portion of the mechanical system being cleaned, as defined in *ACGIH Industrial Ventilation: A Manual of Recommended Practice,* to keep loosened particulate entrained and prevent settling while it is conveyed to the vacuum collection device. Table 2 defines velocities necessary for various types of materials.

Table 2
Velocity Requirements for Contaminant Removal

Nature of Contaminant	**Examples**	**Design Velocity in fpm**
Very fine light dust	Cotton lint, wood flour, litho powder	2500-3000
Dry dusts & powders	Fine rubber dust, Bakelite molding powder dust, jute lint, cotton dust, shavings (light), soap dust, leather shavings	3000-4000
Average industrial dust	Grinding dust, buffing lint (dry), wool jute dust, shoe dust, granite dust, silica flour, general material handling, brick cutting, clay dust, foundry (general), limestone dust, packaging and weighing asbestos dust in textile industries	3500-4000
Heavy dusts	Sawdust (heavy & wet), metal turnings, foundry tumbling barrels and shake out, sand blast dust, wood blocks, hog waste, brass turnings, cast iron boring dust, lead dust	4000-4500
Reprinted from ACGIH's *Industrial Ventilation: A Manual of Recommended Practice, 23rd Ed.*		

6.1.2 Mechanical Agitation

Dislodging contaminants from duct system components must be accomplished through mechanical agitation techniques. Mechanical agitation techniques requires the use of mechanical agitation devices to dislodge debris adhered to interior HVAC system surfaces, such that debris may be safely conveyed to vacuum collection devices. Agitation devices may include cable driven brush systems, compressed air systems, power water wash systems, pneumatic and electric driven brushes, and hand tools such as contact vacuum brushes.

6.1.3 Contact Vacuuming

Contact vacuuming utilizing HEPA-filtered equipment must be performed in designated areas of the HVAC system. Cleaning must be performed by the application of the vacuum in combination with a brush attachment directly to the contaminated surface.

It is highly recommended the HVAC component being remediated using HEPA contact vacuuming also be negatively pressurized using a vacuum collection device.

6.1.4 Power Washing, Steam Cleaning and Wet Cleaning

Power washing, steam cleaning, or any other form of wet process cleaning of HVAC system components must not damage the components. It is highly recommended that cleaning agents or water not be applied to porous HVAC system components.

All HVAC components requiring wet process cleaning must be cleaned in accordance with the chemical manufacturer's written instructions and applicable federal, state, and local regulations. On occasion, treatments designed to inhibit growth or re-soiling may be applied following cleaning. These should be applied according to manufacturer's directions. Normally, these will not be rinsed off following application.

6.2 Component Cleaning

Cleaning methods must be employed such that all HVAC system components must be visibly clean and capable of passing cleanliness verification tests (See Section 13).

Dampers and any air-directional mechanical devices inside the HVAC system must have their position marked prior to cleaning and, upon completion, must be restored to their marked position.

Registers, grilles, diffusers, and other air distribution devices must be cleaned and restored to their previous position.

6.2.1 Air Handling Units, Terminal Units (control boxes, dual duct boxes, etc.), Blowers, and Exhaust Fans

It is highly recommended that air-handling unit (AHU) internal surfaces, condensate collectors and drains be cleaned by mechanical scrubbing methods. An appropriate drainage system with sufficient capacity must be in place and pre-tested prior to beginning wet cleaning procedures. All air-handling components such as coils, blower wheels, blower housings and related components must be cleaned. During wet cleaning, it is highly recommended that precautions be taken to assure that fiber glass insulation and other porous materials do not get wet.

Evaporator coils, blowers, blower housings, and drain pans will likely require multiple cleanings when attempting to remediate mold contamination. Areas expected to be cleaned should include blowers, fan housings, plenums (except ceiling supply and open return plenums), scrolls, blades, vanes, shafts, baffles, dampers and drive assemblies. It is highly recommended all visible surface contamination deposits be removed in accordance with this standard.

6.2.2 Duct Systems

Duct systems must be cleaned to remove all visible contaminants and be capable of passing cleanliness verification tests (See section 13). Inaccessible areas must be accessed by service openings constructed in the system that are large enough to accommodate mechanical cleaning procedures (See Section 6.4).

6.3 Service Openings

Service openings must be made as required to satisfactorily perform assessment, cleaning and restoration procedures.

All service openings must comply with ACR 2006 Section 14, *Requirements for the Installation of Service Openings in HVAC Systems*, applicable UL and NFPA standards, as well as national, state, and local requirements.

7 Coil Surface Cleaning

It is Highly Recommended that all portions of each coil assembly be cleaned. Both upstream and downstream sides of each coil section must be accessed for cleaning. Where limited access is provided between close proximity or zero-tolerance heating coils in an AHU, cleaning may require removal and/or replacement.

7.1 Coil Inspection and Cleaning Process

For the purposes of this standard a coil is defined as an evaporator, chilled water, hydronic, steam, hot gas or heat pipe which is located within the air stream of an HVAC system for the purposes of indoor environmental control.

The process begins with an inspection. The substances deposited on the coil help determine the initial selection of the cleaning protocol. There are two (2) categories of coil cleaning. Coil reconditioning will utilize Type-1 or Type-2 cleaning methods. Both Types require usage of HEPA filtered negative air machines when exhausting within an occupied space. HEPA filters are recommended, but not required, when machines are exhausted outside of building.

Negative air machines must be operated continuously during the complete coil reconditioning process. The coil must be physically isolated from the duct system during the cleaning process to ensure disrupted particulate does not migrate to or redeposit on unintended areas.

7.2 Coil Inspections

7.2.1 Preliminary Coil Inspection– A visual inspection of the coil and drain pan shall be conducted prior to cleaning a coil. The data gathered from the preliminary inspection will determine whether or not Type 1 or Type 2 cleaning is required. If it is determined the coil cannot be properly cleaned through Type 1 methods, Type 2 methods are required. When the preliminary visual inspection reveals suspect microbial matter on any portion of the coil or drain pan, Type 2 cleaning methods are required. When the metal fins of the evaporator coil are deteriorating or showing signs of corrosion or excessive metal loss, replacement is recommended. When the inspection reveals that any surfaces of the coil or drain pan cannot be accessed for cleaning, it is highly recommended that the coil be removed for cleaning.

7.2.2 Type 1 Post Cleaning Inspection

This inspection is required after any Type 1 coil cleaning has been completed. If debris still remains on the coil after Type 1 cleaning, Type 2 cleaning is required.

7.2.3 Type 2 Post Cleaning Inspection

Type 2 inspections are conducted after completion of any Type 2 cleaning methods. If debris still remains on the coil after Type 2 cleaning, the process should be repeated. When debris cannot be removed using Type 2 cleaning methods, replacement may be necessary.

7.2.4 Measuring the Effectiveness of Cleaning Efforts

Visual observations of coil surfaces can be misleading. Therefore a static pressure drop should be obtained before and after the cleaning process to demonstrate the effectiveness of such efforts. This type of measurement, which can be performed using a magnehelic gauge, or manometer, is a more accurate indicator for the presence of debris that has either been removed or remains within the coil.

Ideally, the reconditioning efforts should result in a static pressure drop sufficient to allow the HVAC system to operate within 10% of its nominal, and/or design (if known) volumetric flow, which if needed can be verified by an appropriate air test and balance procedure. However it should be understood that other factors such as air leakage, fan blade condition, compromised duct, permanently impacted coils (which are not capable of being fully cleaned) and other factors, can have an effect on the overall static capability and subsequent performance of the HVAC system.

7.3 Type 1 and Type 2 Coil Cleaning Methods

7.3.1 Type 1 Coil Cleaning

Type 1 methods of coil cleaning are appropriate for removing loose dust, dirt or debris collected upon evaporator coil surfaces. Physical removal of debris is accomplished through a variety of methods which may include:

- HEPA filtered contact vacuuming the coil surfaces with a vacuum capable of generating a minimum of -40 inches water lift. HEPA filtered contact vacuuming must be used in conjunction with the evaporator coil being maintained with a negative pressure differential to the general work environment.
- Contact vacuuming may require the use of crevice tools and brushes.
- Brushes may be used for penetrating between coil fins and up to the first row of refrigerant tubes without damaging the fins.
- Compressed air accelerator guns and wands may be used to dislodge debris embedded between the evaporator coil fins without damaging the fins.
- Evaporator fin combs and fin straightening tools designed to restore the evaporator coil fins after initial cleaning

7.3.2 Type 2 Coil Cleaning

Type 2 cleaning methods are appropriate for removing adhered debris on all coil, drain pan and drain line surfaces. Type 2 cleaning should be performed after non-adhered particulate has been removed using Type 1 methods. Type 2 cleaning may include the following methods:

- All methods under Type 1
- It is not always possible to remove all motors and electrical equipment from the coil area. However, it is always possible to either remove, isolate and/or protect electrical equipment.
- Application of coil cleaning products. (Must be used in accordance with the manufacturer's product labeling.)
- Usage of electric chemical coil cleaner application equipment.
- Usage of water washing at normal water line pressure.

- Usage of mechanically pressurized water washing equipment.
- Usage of hot water or steam cleaning equipment.
- Employing HEPA filtered wet contact vacuums or standard wet contact vacuum equipment located outdoors.
- Temporary Drainage systems for chemical cleaning processes with sufficient capacity to capture and discharge wastewater from the cleaning process.
- Creating temporary barriers to ensure that fiberglass insulation and other porous materials will not get wet or come in contact with chemical applications. At no time should any porous materials surrounding the coil section being cleaned become saturated with liquids, chemicals or water.
- * Coils that cannot be effectively cleaned in place should be removed from the mechanical system for cleaning.
- The condensate drain pan and drain line must be cleaned, reconditioned and completely flushed. The condensate drain pan must be inspected to verify proper drainage operation before and after cleaning.
- **Note**: Cleaning methods and products must be pre-tested and determined not to cause damage to, or erosion of, the coil surface or fins, and must conform to coil manufacturer recommendations when available. In order to limit damage to coils it is recommended that only coil cleaning solutions that are as close to ph neutral as possible are used. It is highly recommended that coils be thoroughly rinsed with fresh water in order to remove coil cleaner residue from the coil surfaces.

  *As of July 1, 1992, Section 608 of the US EPA's Clean Air Act prohibits individuals from knowingly venting ozone-depleting compounds (generally CFCs and HCFCs) used as refrigerants into the atmosphere while maintaining, servicing, repairing, or disposing of air-conditioning or refrigeration equipment (appliances).

7.4 Electric Resistance Coils

When cleaning electric resistance coils, the power source to the coils must be deenergized and locked out/tagged out in accordance with OSHA Standards.

8 Remediation of Mold and Other Biological Contamination

This section defines processes for remediating mold and other biological contamination within an HVAC system. It is highly recommended the remediation plan for mold decontamination include removal of contaminated materials or employ aggressive cleaning techniques when removal is impractical. Removal of contaminated porous HVAC system materials is recommended (See ACGIH *Bioaerosols: Assessment and Control,* 1999*).*

8.1 Cleaning Methods

Surface cleaning must be performed using mechanical agitation methods to remove particulate, debris, nutrient sources and surface contamination. Mechanically cleaned surfaces must be capable of passing cleanliness verification methods as defined in this standard (See Section 13).

8.2 Removal of Mold Contaminated Porous Materials

It is highly recommended that porous materials with actual fungal growth (Condition 3) be removed. The exposed non-porous substrate underneath the porous materials must be mechanically cleaned and treated before new replacement material is installed.

When removal of all Condition 3 contaminated porous material cannot be performed, partial removal to the greatest extent possible should take place. This must be followed by surface cleaning of remaining material using mechanical cleaning methods.

8.3 Surface Treatments

It is highly recommended mechanical cleaning procedures be performed on porous HVAC materials prior to the application of any surface treatments such as mechanical repair coatings. Surface treatments may be used to restore the integrity of material surfaces only as an interim control measure, and must not be used as a substitute for mechanical cleaning or complete removal. Surface treatments must only be applied after confirming the system has been cleaned, utilizing the cleanliness verification tests as defined in this standard (See Section 13).

8.3.1 Antimicrobial Surface Treatments and Coatings

Use of antimicrobial treatments and/or coating products may be considered only after mechanical surface cleaning has been performed and the need for such treatment has been deemed necessary.

When used, antimicrobial treatments or coatings must be applied in strict accordance with the manufacturer's written recommendations or EPA registration listing.

Any antimicrobial product used in an HVAC system must be specifically registered by the EPA or other applicable regulatory agency for use in HVAC systems, have undergone a comprehensive risk assessment for such use, and contain specific and detailed label directions. If the label directions cannot be followed completely, use must be avoided.

9 Fiber Glass Duct System Components

It is highly recommended that fiber glass duct liner or duct board present in equipment or ductwork be cleaned with HEPA contact vacuuming equipment, or other appropriate equipment. The components being cleaned must be under a consistent negative pressure differential to the surrounding work area. Fiber glass materials that become wet with cleaning fluids or water during cleaning should be reassessed and potentially discarded after the incident has occurred.

It is highly recommended that the mechanical cleaning methods selected for duct liner or fiber glass duct board not create abrasions, breaks or tears to fiber glass liner or duct board surfaces. Cleaning methods used must be capable of rendering the system visibly clean in accordance with this standard and capable of passing applicable cleanliness verification requirements (See Section 13).

Thermal acoustic internal fiber glass liner, and other thermal acoustic liner areas with visual signs of degradation, such as delaminating, abrasions, breaks, or tears may be treated with the appropriate repair products only after mechanical cleaning has been performed. If repairs are not practical or desired, it is highly recommended that damaged materials be removed and replaced.

9.1 Resurfacing Fiber Glass Surfaces

Resurfacing of thermal acoustic fiber glass components such as duct liner or duct board within the HVAC system should be considered if the materials show visual signs of abrasion or degradation or if the project requires a change of the fiber glass' original surface to a smoother surface for reduction of the fiber glass' ability to capture and collect particulate. An assessment must be made to determine whether the surface of the component will provide a strong, bondable surface for the coating material after undergoing proper mechanical cleaning.

Fiber glass materials determined to be too unstable to support a resurfacing product in accordance with manufacturer's written instructions or which are not capable of providing a long-term, bondable surface are beyond restoration. In such cases removal and replacement of the damaged porous material is highly recommended.

Fiber glass duct system materials with stable and consistent surface integrity may not need resurfacing. The benefits of resurfacing should be evaluated on a case-by-case basis.

9.1.1 Coatings and Insulation Repair Products

All resurfacing agents for use on surfaces within the HVAC system must be classified as having a flame-spread rating acceptable under industry standards including UL Standard 723 or ASTM E-84, or applicable local codes.

Resurfacing products must be applied in strict accordance with the manufacturer's written instructions. Prior to coating application, all surfaces upon which a re-surfacing coating or agent are to be applied must be properly cleaned and capable of passing the cleanliness verification requirements of this standard (See Section 13).

Treatment of rusted surfaces must only be performed after mechanical cleaning and proper preparation of the surfaces to be treated.

In no case must a coating or adhesive be applied prior to, or in lieu of, mechanical cleaning methods, or prior to cleanliness verification.

9.2 Damaged Fiber Glass Material

When there is evidence of damage, deterioration, delaminating, friable material, mold growth, biological reservoirs or excessive moisture accumulation such that cleaning or resurfacing cannot restore fiber glass materials, it is highly recommended that these materials be replaced.

In the event fiber glass materials must be replaced, all replacement materials must conform to applicable industry codes and standards, including those of UL, ASTM and SMACNA.

9.2.1 Thermal-Acoustic HVAC Insulation Replacement

All metal surfaces of the duct system that have undergone removal of degraded fiber glass duct liner or duct board insulation or thermal acoustic material, must have the base surface scraped clean and must be free of loose, visible debris prior to installation of new insulation. In the event the fiber glass removal was due to mold contamination the base surface should be cleaned to a Condition 1 status prior to reapplying any fiber glass insulating products.

Installation of thermal-acoustic HVAC insulation common to the air stream must comply with the following requirements as well as applicable SMACNA and NAIMA Standards.

All materials used for insulation replacement within the HVAC system must meet or exceed the specifications of the original materials or current applicable codes. Installation of the replacement materials must comply in strict accordance with the manufacturer's written recommendations.

All transverse joints of the replacement insulation must be properly sealed with an appropriate mastic product or fitted with metal nosing at each longitudinal joint in accordance with applicable industry standards.

Following completion of the installation of replacement materials, all new fiber glass surfaces must be capable of meeting NADCA cleanliness verification requirements. Fiber glass thermal-acoustic insulation materials may require mechanical cleaning following installation to meet NADCA cleanliness verification requirements (See Section 13).

10 Restoration and Repair of Mechanical Systems

Restoration of HVAC system components is the process of preparation, refurbishment, resurfacing, repair, or replacement of any surface common to the air stream. Restoration procedures must only be performed after mechanical cleaning.

Air side surfaces of HVAC systems found to be compromised during the HVAC cleanliness evaluation or during cleaning must be documented for restoration or replacement to industry standards, as required.

HVAC system components subjected to catastrophic events such as fire, smoke, flood, or water-damage must be subject to restoration procedures. Component degradation that results in compromised system performance must be corrected through restoration procedures if possible. HVAC component replacement must take place if cleanliness levels specified in this standard cannot be achieved through mechanical cleaning and restoration methods.

10.1 Non-Porous Material Restoration

When the surface conditions of non-porous components following cleaning reveal a surface that will contribute particulate and/or odors to the air stream and/or adversely affect the quality of the air moving through the system, restoration should be performed.

10.2 Porous Material Restoration

Cleaning, restoration, and removal of porous insulation are described in Section 8 of this standard.

10.3 External HVAC System Insulation

In those areas where accessing the system and/or ductwork requires the removal of external insulation and/or vapor barriers, these areas must be restored to their original functional, thermal, and vapor retardant integrity upon completion of the work and prior to system reactivation.

10.4 Flooding/Water-Damage

All HVAC system surfaces and components subjected to water-damage due to flooding must be evaluated and categorized according to industry-recognized methods to determine salvageability and restoration. Of particular importance is determining the category of water causing the damage, as defined in IICRC Standard S500 for professional water damage restoration. To a large extent, the category of water entering the HVAC system will dictate methods of cleaning and environmental engineering controls.

Any system components and/or ducts deemed salvageable must be thoroughly cleaned.

10.5 Fire/Smoke Damage

All HVAC system components subjected to heat and smoke must be evaluated for restoration. Any components and/or surfaces unable to withstand proper mechanical cleaning and restoration are deemed beyond salvage and must be replaced.

All porous surfaces subjected to fire/smoke damage must be evaluated following proper mechanical cleaning for friability and odor retention. Any areas assessed as friable must be replaced or resurfaced.

Following cleaning, any component surface exhibiting damage due to heat exposure must be restored to an acceptable condition or replaced.

10.6 HVAC System Repair

HVAC components requiring repair due to pre-existing damage or degradation that are discovered during the cleaning process must be documented and brought to the attention of the building owner or representative.

No cleaning process must be performed that will damage a properly designed, installed, and structurally sound HVAC system and its components, or negatively affect the performance, operation, or normal life expectancy of the system.

Repair or replacement of malfunctioning mechanical devices is not included in the scope of this standard. Restoration does not include the sealing of air leaks within duct systems.

11 Project Monitoring

It is recommended that every HVAC system cleaning project specification include a monitoring plan. The plan must conform to the environmental engineering controls defined in Section 5 of the ACR Standard.

The process of developing a monitoring plan should involve the building owner or representative. The planning process must consider the following issues:

- Protection for building occupants and contractor's employees during HVAC system cleaning.
- Protection of sensitive equipment, building contents and the need for containment zones in addition to those required in Section 5 of this standard.
- Protection and deactivation of building safety controls such as fire and/or smoke detectors and the implications for occupant safety and false alarms.

11.1 Project Monitoring Plan Elements

When applicable, the following project monitoring items should be incorporated in the implementation of a typical monitoring plan.

- Document project startup orientation meeting for contractor and subcontractor job superintendents.
- Document the type of equipment to be introduced to the work site.
- Verify acceptable hygiene condition of the equipment prior to introducing the equipment into the work site.
- Monitor indoor environmental conditions so that the occupants will not be adversely affected by the cleaning work. This may be performed by an IEP.
- Monitor containment zone isolation effectiveness.
- Monitor that only the chemicals and materials which have been approved for use on the specific project are brought on site.
- Monitor the use of personal safety equipment.
- Monitor the effectiveness of the cleaning methods in accordance with the project specifications and the ACR standard.
- Document areas that have been cleaned.
- Monitor proper closure methods for service openings.
- Provide project close-out documentation.

13 Health and Safety

The U.S. Occupational Safety and Health Act of 1970 provides requirements for workplace safety and health. The Act is administered by the Occupational Safety and Health Administration (OSHA) under the United States Department of Labor (DOL). The scope of HVAC system cleaning projects can vary so much, that it is impossible for the ACR standard to address compliance with 29 CFR 1910 and 29 CFR 1926 in a complete manner.

12.1 Cleaning Contractors

Cleaning contractors must comply with all applicable federal, state and local requirements for protecting the health and safety of their employees, building occupants, the general public and the environment.

The contractor must comply with all applicable OSHA regulations. If the requirements of this standard and OSHA regulations are not in agreement, then the more strict requirements must always apply. In the United States, applicable OSHA regulations include, but are not limited to, the following:

- 29 CFR 1910.146 Permit Required Confined Spaces
- 29 CFR 1910.134 Respiratory Protection
- 29 CFR 1910.1200 Hazard Communication
- 29 CFR 1910.147 Control of Hazardous Energy
- 29 CFR 1926 Subpart M - Fall Protection
- 29 CFR 1910 Subpart I - Personal Protective Equipment (1910.132 to 1910.139)

The contractor should also be aware of other standards and guidelines affecting both particulate removal and mold or biological removal procedures. Applicable standards and guidelines include:

- IICRC S500, *Standard and Reference Guide for Professional Water Damage Restoration*

- IICRC S520, *Standard and Reference Guide for Professional Mold Remediation*
- *Mold Remediation in Schools and Commercial Buildings*, EPA Publication 402-K-01-001
- *A Brief Guide to Mold, Moisture, and Your Home*, EPA Publication #402-K-02-003
- *Guidelines on Assessment and Remediation of Fungi in Indoor Environments*, New York City Department of Health & Mental Hygiene, Bureau of Environmental & Occupational Disease Epidemiology
- ASHRAE Standard 62-1989, *Ventilation for Acceptable Indoor Air Quality*
- Indoor Air Quality Association *Guideline 01*

13 Verification of HVAC System Cleanliness

It is highly recommended that the cleanliness verification be performed directly after an HVAC system component has been cleaned and prior to the component being used in operation. All verification tests must be conducted prior to the application of any surface treatments of the component's surface. This post-cleaning verification process applies to all porous and non-porous components within the HVAC system. The verification inspection is not intended to determine the reduction in biological levels. In order to measure the appropriate reduction in biological contamination it is highly recommended that the IICRC S520 mold remediation standard be used in combination with these verification procedures.

The HVAC system cleanliness verification is not designed to determine if an HVAC system needs to be cleaned. In order to determine if an HVAC system needs cleaning see Section 3 of this standard.

Methods of cleanliness verification are described below.

13.1 Method 1 - Visual Inspection

A visual inspection of porous and non-porous HVAC system components must be used to assess that the HVAC system is visibly clean. An interior surface is considered visibly clean when it is free from non-adhered substances and debris. If a component is visibly clean then no further cleanliness verification methods are required.

If the Method 1 - Visual Inspection is inconclusive regarding acceptable particulate reduction, then Method 2 - Surface Comparison Testing must be performed (See Section 13.2).

13.2 Method 2 - Surface Comparison Testing

The Surface Comparison Test can be used to determine cleanliness of both non-porous (metal) and porous (fiber glass) HVAC component surfaces. The component's surface conditions are evaluated by comparing visible characteristics of the test surface before and after implementing a specific procedure of contact vacuuming as defined in Section 13.2.2.

13.2.1 Contact Vacuum Equipment Criteria

The testing contact vacuum must be HEPA filtered and capable of achieving a minimum of -40 inches of water gauge. The contact vacuum should be fitted with a 2.5" round nylon brush attached to a 1.5" diameter vacuum hose.

13.2.2 Test Method

The vacuum brush should be attached to the contact vacuum and the device should be running. The brush must be passed over the surface test area four (4) times, with the brush depressed against the surface being tested using light to moderate pressure (as used in routine cleaning).

When the procedure described above has been completed, a comparison must be made to determine if the visible characteristics of the surface have changed significantly. The HVAC component surface is considered to be clean when there is no significant visible difference in the surface characteristics.

If surface comparison testing is inconclusive, then the Method 3 - NADCA Vacuum Test protocol may be used to make a final cleanliness determination. The Method 3 test procedure can be used for non-porous system components only. The NADCA Vacuum Test does not apply to porous system components.

13.3 Method 3 - NADCA Vacuum Test

The NADCA Vacuum Test is used for scientifically evaluating remaining particulate levels of cleaned, non-porous HVAC component surfaces. Using this procedure, a template (See Section 13.3.1.4) is applied to the suspect component's airside surface. A vacuum cassette with filter media is attached to a calibrated air pump and the open face of the filter cassette is passed over two 2 cm x 25 cm openings within the template. At no time can any portion of the vacuum cassette directly contact the component surface being tested. The template is specifically designed to allow the cassette to ride above the surface being tested. Airflow is accelerated through a narrow opening between the template and the test surface of the component, allowing any latent remaining particulate from the component's surface to be dislodged through increased velocity and impinged onto the filter media within the vacuum cassette. After this procedure is complete the cassette is prepared and weighed to determine the amount of total debris collected on the filter media.

13.3.1 Test Components

13.3.1.1 Air Pump

An air sampling pump capable of drawing 15 liters per minute through a cassette containing 37 mm matched weight filters (two 0.8 micrometer pore size mixed cellulose ester (MCE) filters in series) must be used.

13.3.1.2 Filter Media

Filter media within the vacuum cassette must be 37 mm mixed cellulose ester (MCE) matched weight filters (0.8 micrometer pore size preloaded in three-piece cassette).

13.3.1.3 Calibration Device

The air pump must be calibrated using a calibration device that is accurate to ±5% at 15 liters per minute.

13.3.1.4 Template

The template must be 15 mil thick (0.381 mm) and must provide a 100 cm^2 sampling area consisting of two 2 cm x 25 cm slots at least 2.5 cm apart.

The standard size openings for the NADCA Vacuum Test Template are 2 centimeters in width by 25 centimeters in length. At times, templates with slots of this size may not fit in a space where testing is necessary or desired. Slots of other sizes may be utilized, subject to the specifications herein.

The template opening size and shape can vary provided that (1) the total area to be sampled is equal to 100 square centimeters; (2) the maximum width of the opening does not exceed 3.7 centimeters, so that the sample cassette will not touch the surface being sampled; and (3) the minimum opening width is greater than or equal to 2.0 centimeters.

13.3.2 Sampling Method

Secure the template to the surface to be sampled so that it will not shift position during sample collection. The template must lay flat against the surface to be sampled. The surface to be sampled must be dry. The air-handler must not be running when the sampling is being conducted.

Remove protective plugs from the cassette. Cassettes should be wrapped with shrink tape. Attach the outlet end of the cassette to the air pump tubing.

Adjust air flow using an appropriate calibration device to 15 liters per minute. Once the flow rate is calibrated, remove the clear plastic inlet cover, making sure that the retainer ring (middle section) stays in place.

Vacuum the open area of the template by sliding the cassette from one end of each template opening to the other. The cassette must be moved at a rate not greater than 5 cm per second. The edges of the cassette must always rest on the template. The cassette must not touch the duct surface. Each template's openings must be vacuumed twice (once in each direction).

Throughout the vacuum process, hold the cassette so that it touches the template surface, with no downward pressure being applied.

After the template's openings have been vacuumed twice, put the clear plastic cover back on the cassette. The vacuum pump may now be turned off. Then replace the plugs.

Label the cassette and record the area of the surface sampled. The cassette may now be prepared and weighed to determine the amount of debris collected on the filter media. Analysis based on the National Institute for Occupational Safety and Health (NIOSH) Method 0500 (total nuisance dust) must be used.

Scale sensitivity should be equal to or greater than 0.7 milligram and must be calibrated in accordance with the manufacturer's written recommendations. Results must be reported in milligrams per 100 square centimeters (mg/100 cm^2) of sampling area.

Generally, samples are sent to a laboratory for testing, however, sampling equipment is capable of being brought on the work site. It is highly recommended that samples be taken by an IEP and analyzed by an accredited laboratory.

13.3.3 Acceptable Cleanliness Level

To be considered clean by the NADCA Vacuum Test, the net weight of the debris collected on the filter media must not exceed 0.75 mg/100 cm^2.

14 Requirements for the Installation of Service Openings in HVAC Systems

14.1 Applicable Documents

The following documents of the issue currently in effect form a part of this standard to the extent specified herein.

14.1.1. NADCA Publications

- National Air Duct Cleaners Association, Washington, DC.
- *Introduction to HVAC System Cleaning Services,* 1995.

14.1.2. UL Publications

Underwriters Laboratories, Inc.

- UL 181*, Factory-Made Air Ducts and Air Connectors,* 1995.
- UL 181A*, Closure Systems for Use with Rigid Air Ducts and Air Connectors,* 1994*.*
- UL 181B*, Closure Systems for Use with Flexible Air Ducts and Air Connectors,* 1995.
- UL 723, *Test for Surface Burning Characteristics of Building Materials,* 1996.

14.1.3. NFPA Publications

National Fire Protection Association, Batterymarch Park, Qunicy, MA

- NFPA 90A*, Installation of Air Conditioning and Ventilating Systems*, 1993.
- NFPA 90B*, Warm Air Heating and Air Conditioning Systems*, 1993.

14.1.4. SMACNA Publications

Sheet Metal and Air Conditioning Contractors National Association, Inc., Chantilly, VA

- *HVAC Duct Construction Standards-Metal & Flexible*, 1985.
- *Fibrous Glass Duct Construction Standards*, 1992.

14.1.5. NAIMA Publications

North American Insulation Manufacturers Association, Alexandria, VA

- *Fibrous Glass Ductliner Standard*, 1994.
- *Cleaning Fibrous Glass Insulated Air Duct Systems*, 1993.

14.2 General Requirements

The requirements shown below apply universally to both removable duct access doors and permanent panels:

Service openings installed into the system shall not degrade the structural, thermal, or functional integrity of the system.

Service openings shall be closed in an air- tight manner such that no apparent leakage inward or outward is detectable.

Service openings shall not hinder, restrict, or alter the airflow within the duct.

Service opening construction materials and methods must be in compliance with industry standards and local codes, using materials acceptable under those standards and codes.

Materials used in the fabrication of duct access doors and permanent panels shall be those classified for flammability and smoke spread if the material is exposed to the internal airstream. These materials are classified as having a flame-spread rating of not over 25 without evidence of continued progressive combustion and a smoke-developed rating of not over 50, as determine by *UL 723.*

Metals used in the fabrication and installation of duct access doors and permanent panels shall be resistant to atmospheric corrosion and shall not be used in combinations that will cause galvanic action which might deteriorate any part of the system formed from such material.

All materials used in the fabrication of service openings shall be suitable for continuous exposure to the temperature and humidity conditions of air within the HVAC system.

All tapes used in the installation and closure of service openings shall meet the requirements of *UL-181A* and be properly labeled as such.

Air duct coverings shall not be installed so as to conceal or prevent use of any service opening.

Where a service opening is necessary in an air duct located above the ceiling of a fire-rated floor/roof-ceiling assembly, access shall be provided in the ceiling and shall be designed and installed so as not to reduce the fire resistance rating of the ceiling.

All service openings shall comply with applicable UL and NFPA standards, as well as local and state codes.

14.3 Permanent Closure Panels

Closure panel seals shall be permanent.

Metal panels used for closing service openings in the HVAC system shall be of a like gauge or heavier.

Metal panels used for closing service openings shall be mechanically fastened (screwed,riveted, welded, or clamped) every 4" on center. The panel shall overlap the ductwork surfaces by a minimum of 1" on all sides.

Metal panels used for closing service openings shall be sealed with gaskets, caulking, mastic, or suitable tape.

14.4 Removable Duct Access Doors

Duct access door frames and jamb seals shall be permanent.

Metals used in the fabrication of removable duct access doors for installation into the air duct system shall be 24 gauge minimum. The gauge of the duct access door shall be based on the pressure class of the duct system.

14.5 Fibrous Glass System Service Openings

Service openings installed in fibrous glass portions of a system must be constructed and closed in such a manner that there are no exposed fibrous glass edges within the system common to the airstream.

Any insulation removed during the installation of a service opening must be replaced (with insulation of the same thickness) or repaired so that there are no breaks or openings that would form paths for heat loss or gain, or for water vapor condensation to occur.

14.6 Drilled 1" Service Openings

Drilled 1" service openings must be closed with materials having a flame-spread rating of not over 25 without evidence of continued progressive combustion and a smoke-developed rating of not over 50.

Any exposed fibrous glass edges within the duct should be sealed with no breaks or gaps in the insulation.

14.7 Flexible Duct Systems

Service openings shall not be made in flexible ductwork.

Reference Documents

Air Conditioning and Refrigeration Institute

ARI 410-91 Forced Circulation Air Cooling and Air Heating Coils, 1991.

Air Movement & Control Association

AMCA-99-86, Standards Handbook, 1986.

American Conference of Governmental Hygienists

Bioaerosols: Assessment and Control, 1999.

Industrial Ventilation: A Manual of Recommended Practice, 23rd Edition, 1998.

American Industrial Hygiene Association

Field Guide for the Determination of Biological Contaminants in Environmental Samples, 1996.

American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)

ASHRAE 33-78, Methods of Testing Forced Circulation Air-Cooling and Air-Heating Coils, 1978.

ASHRAE 62-1989, Ventilation for Acceptable Indoor Air Quality, 1989.

ASHRAE Fundamentals Handbook, Terms and Definitions, 2001.

ASTM International

E84-00a Standard Test Method for Surface Burning Characteristics of Building Materials.

C1071–00 Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material)

Indoor Air Quality Association (IAQA)

Guideline 01

Institute of Inspection, Cleaning and Restoration Certification (IICRC)

IICRC S500, Standard and Reference Guide for Professional Water Damage Restoration, 1999.

IICRC S520 Standard and Reference Guide for Professional Mold Remediation, 2003.

International Kitchen Exhaust Cleaning Association (IKECA)

Guidelines and Best Practices, 2004.

National Air Duct Cleaners Association (NADCA)

NADCA Standard 03, Requirements for Testing Vacuum Collection Equipment, 2001.

NADCA Standard 05, Requirements for the Installation of Service Openings in HVAC Systems, 1997.

Understanding Microbial Contamination in HVAC Systems, 1996.

National Fire Protection Association

NFPA 90 A, Installation of Air Conditioning and Ventilation Systems, 1993.

NFPA 90B, Warm Air Heating and Air Conditioning Systems, 1993.

NFPA 96, Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations, 2001.

NFPA 255, Standard Method of Test of Surface Burning Characteristics of Building Materials.

National Institute for Occupational Safety and Health

Manual of Analytical Methods, Third Edition, February 1984.

New York City Department of Health, Environmental Occupational Disease Epidemiology

Guidelines on Assessment and Remediation of Fungi in Indoor Environments, 2000.

North American Insulation Manufacturers Association

Fibrous Glass Duct Construction Standards (Fifth Edition).

Cleaning Fibrous Glass Insulated Duct Systems (2002 Edition)

Sheet Metal and Air Conditioning Contractors National Association (SMACNA)

HVAC Duct Construction Standards – Metal and Flexible, Second Edition, 1995.

Fibrous Glass Duct Construction Standards, Sixth Edition, 1992.

Underwriter Laboratories, Inc.

UL 181, Factory-Made Air Ducts and Air Connectors, 1995.

UL 181A, Closure Systems for Use with Rigid Air Ducts and Air Connectors, 1994.

UL 181B, Closure Systems for Use with Flexible Air Ducts and Air Connectors, 1995.

UL 723, Test for Surface Burning Characteristics of Building Materials, 1996.

United States Environmental Protection Agency (EPA)

Building Air Quality, December 1991.

Mold Remediation in Schools and Commercial Buildings, March 2001.

Guideline to Assessment, Cleaning, and Restoration of HVAC Systems *ACR 2006*

The following guideline provides supplementary reference information for users of ACR 2006. The material contained within the guideline does not carry the official status of a standard, and the guideline recommendations are not mandatory under ACR 2006. However, the two sections compliment one another and should always be considered in tandem.

Chapter 1
Containment Engineering Strategies

Containment engineering strategies are used to isolate a workspace from other areas of a building. Most containment engineering strategies involve creating barriers or pressure differentials that prevent the unintended migration of airborne particulate into non-intended zones. Depending on the usage classification of a building and the type of contaminants within the HVAC system, several different containment engineering strategies may be employed. Four levels of work site containment controls are described below. The requirements for each level increase in stringency. The highest levels of containment engineering are applicable to areas where significant mold or other biological growth exists, or where the building use classification mandates special protection, as in a healthcare facility.

As new information comes forth regarding mold and biological contaminants and their affect on human health, the containment engineering strategies recommended below may require enhancements. These containment engineering strategies are specifically designed with respect to protecting the indoor environment, contractors and occupants from HVAC component cleaning and duct cleaning processes.

Level 1 Containment – Minimum Engineering Controls

Level 1 Containment is applicable to HVAC system cleaning in buildings classified as residential, industrial, light commercial and marine, provided that there is no known mold or biological contamination. If mold or biological contamination is known to exist, Level 2 Containment may apply. The following protective actions are required under Level 1 Containment strategies.

- Protective Coverings – Clean, protective coverings must be used within each work area. Protective coverings must extend beyond the work area to provide protection of flooring, equipment, and furniture whenever necessary.

- Cleaning Equipment – Inlet openings on all vacuum collection devices and negative air machines must be properly sealed during transport and when the equipment is not in use. Vacuum hose openings must be sealed during transport. All tools, equipment, and equipment components that enter the HVAC system from an occupied space must be wet-wiped, HEPA vacuumed, or sealed in a disposable polyethylene bag during removal from the HVAC system.

- Cross Contamination Control – Suitable provisions must be made to control contaminant discharge from the HVAC system and cross contamination into occupied space during the cleaning process. This may require temporary sealing of existing duct joints, seams and other system components.

Level 2 Containment – Work Area Containment without Decontamination Unit

Level 2 Containment may be applicable to HVAC system cleaning in any building use classification when mold or biological contamination is known to exist within the system. In cases when microbial amplification covers a surface area greater than 5 square feet, Level 3 Containment must be used. Level 2 Containment is the minimum level of containment appropriate to a healthcare facility. All of the Level 1 Containment requirements apply to Level 2 Containment areas. In addition, the following protective actions are required under Level 2 Containment strategies:

- Work Above Ceilings – Above ceiling work area must be completely isolated from occupied spaces within containment barriers utilizing 6-mil fire retardant polyethylene sheeting or equivalent. These barriers must be sealed airtight where they meet the ceiling, floor, and walls.
- Containment Area Floor – The containment must have a two-layer floor utilizing 6-mil fire retardant polyethylene or equivalent. The floor material must extend at least 6 inches (15.2 centimeters) up the containment side walls. The floor material must be sealed to side walls with two layers of duct tape in an airtight manner.
- Containment Area Access – A vertical cut in the containment side wall must provide access into the containment area. This vertical cut must begin no less than 6 inches (15.2 centimeters) from the floor and must be at least 5 feet (1.5 meters) long. The entrance must be entirely covered by two flaps (one on each side of the polyethylene).
- Negative Pressure – The containment area should be kept under negative pressure at all times to the degree feasible. Negative pressure must be sufficient to prevent migration of particulate material out of the containment area. Exhaust from the device providing negative pressure must be HEPA filtered. If this device does not exhaust directly outdoors, it must be possible to verify that there is no leakage through or around the HEPA filter.
- Dismantling – Interior surfaces of the containment enclosure must be wet-wiped or HEPA vacuumed before moving or dismantling the containment enclosure.

Level 3 Containment - Work Area Containment with Single Chamber Decontamination Unit

Level 3 Containment may be applicable to HVAC system cleaning in buildings where severe cases of microbial amplification or hazardous substances are known to exist within the HVAC system or indoor environment. Level 3 Containment is commonly the level of containment appropriate to healthcare facility cleaning projects, including those where microbial contamination may not exist. All of the Level 1 Containment and Level 2 Containment requirements apply to Level 3 Containment areas. In addition, the following protection actions are required under Level 3 Containment strategies:

- HEPA-filtered negative air machines may be utilized as a supplement to containment techniques described herein to control ambient airborne particulate levels.
- Decontamination Facility – A single chamber decontamination facility must be utilized in conjunction with the containment area. The decontamination chamber must be attached and sealed directly to the containment area. The decontamination chamber must be separated from the containment area by double flaps of 6-mil fire retardant polyethylene sheeting or equivalent. The flaps must be attached at

the top and one side. The decontamination chamber must utilize double flaps for its opening to the non-work area.

- Monitoring Requirements – Level 3 containment areas must be monitored for negative pressure on a continuous basis by using an instrument sensitive enough to detect a loss of negative pressure. Background monitoring for total particulate must be performed prior to set-up of containment to establish baseline airborne total particulate concentrations. It is recommended that monitoring also be conducted during set-up of containment. Real time monitoring for total particulate must be conducted on a regular basis to ensure that particulate is not escaping the containment. If airborne particulate levels exceed background levels, work must cease until airborne particulate levels are reduced to background levels and the cause of problem is found and corrected.

Level 4 Containment - Work Area Containment with 2-Chamber Decontamination Unit

Level 4 Containment may be applicable to HVAC system cleaning work sites harboring hazardous substances or those within a healthcare facility. All of the Level 1, Level 2, and Level 3 Containment requirements apply to Level 4 Containment areas. In addition, the following protective actions are required under Level 4 Containment strategies:

- Decontamination Facility – A decontamination facility as described for a Level 3 Containment area must be utilized, except that the decontamination facility must consist of two chambers. Each chamber must be constructed according to the requirements described for a Level 3 Containment area.

- Monitoring Requirements – Monitoring requirements described for a Level 3 Containment area must apply. In addition, the containment must have a constant recording pressurization monitor with an alarm.

HVAC Components Engineering Controls

Maintaining a pressure differential within HVAC system ductwork may not provide a satisfactory engineering control to prevent the migration of particles when cleaning certain system components such as air-handling units, control boxes, induction units, and other heating or cooling apparatus. Therefore, it is highly recommended that alternative engineering controls for cleaning activities on these HVAC system components be used. The type of engineering controls required for such components will vary depending on the size and type of component, the classification of building the HVAC system is located within, and the types of contaminants known to be present within the HVAC system.

An HVAC component with internal surface area being cleaned of not greater than 3 square meters (32.3 ft^2) and located within the occupied space must be cleaned utilizing a HEPA filtered contact vacuum and/or wet wiping. When an HVAC component of internal surface area greater than 3 square meters (32.3 ft^2) and located within the occupant space is being cleaned, the work area where the component is located must be placed into Level 2 Containment. However, if the minimum negative face velocity of the work area service opening in the component being cleaned is at least 100 feet/minute (30.5 meters/minute), then Level 2 Containment is not required.

In cases where the HVAC system component is known to contain severe microbial amplification or hazardous substances, or when the building being cleaned is a healthcare facility or other sensitive environment, isolation of the equipment from the occupant space must be maintained using Level 2 Containment at a minimum. Higher levels of containment may be necessary depending on the classification of building and contaminants known to be present.

Equipment Redundancy

Loss of containment caused by equipment failure can be avoided or minimized by providing redundant equipment. Equipment redundancy is required on projects taking place within healthcare facilities as well as on projects where severe mold or biological growth or hazardous substances are known to exist within the HVAC system. When equipment redundancy is specified by the project plan, the following criteria must apply:

- Secondary equipment, which is equal or greater in capability, is to be staged on the production site creating redundant operations to meet the engineering, safety and containment minimum requirements. It is highly recommended that all secondary equipment meet or exceed the same requirements as the primary equipment. All equipment specified for redundancy purposes will be in the same location as the primary equipment and pre-tested for operation. Redundant equipment must be specified as either concurrent operation or non-concurrent operation.

- Under concurrent operation, the redundant equipment must be fully operational while the primary equipment is functioning. Loss of either piece of equipment should not alter the containment, engineering controls or safety protocols of the project to a point less than the minimum requirements.

- Under non-concurrent operation, the redundant equipment is not required to be operational while the primary equipment is functioning. The secondary equipment must be wired, contained, isolated, vented, secured, and fully prepared for immediate operation if failure of the primary equipment occurs.

In cases where the redundant equipment is connected to an emergency power source, the building owner or representative must approve the use of that power source.

Chapter 2
Particle Profiling (PP) Procedures

Purpose: The Particle Profiling Procedure is a screening tool which may be used to assess to what extent if any the HVAC system is contributing or introducing undesired particles to the indoor ambient air.

When properly applied and interpreted, this procedure can provide basic information for the investigator to better understand supply air particle concentration and composition (within the limitations of the collection procedure and lab analysis) of the conditioned (supply) air.

Overview: This sampling protocol establishes the amount of respirable (using laser particle counting technology) and countable (using microscopic analysis) particles in the return space (before filtration at the apparatus occurs) compared to the amount of particles distributed out of the supply ducts. This data is compared to the expected particle removal efficiency of the air filter. Results obtained from this procedure are interpreted by the investigator to determine if certain sources of contamination are likely originating from within the HVAC system and are subsequently contributing these undesired agents or particles to the indoor ambient air.

The protocol is a useful screening method that uses actual field measurements to assess the performance of the existing HVAC air filtration, and potential air by-pass as well as to assess the ability of the HVAC system to distribute certain undesirable particles into the indoor ambient air. Using the pre-cleaning data, the procedure can also be used as part of the final quality control/quality assurance plan to assess the effectiveness of cleaning efforts. The procedure is for use in general office environments. In the case of clean rooms, hospitals, critical care environments, and similar sensitive environments, modifications and more detailed enhancements should be made.

Individuals performing the procedure need to have a comprehensive knowledge of HVAC systems, environmental testing, data interpretation and associated HVAC components. In particular, the individual must have a comprehensive knowledge of air filter efficiency and outside air ventilation design to properly perform and interpret the data that is collected. It is highly recommended that the person or company conducting the procedure not be financially connected with any potential remediation company anticipating performing remediation or cleaning activities. In general, it is highly recommended the procedure be performed by a qualified and experienced indoor environmental professional (IEP) with experience in HVAC systems.

The Procedure includes the following components:

- **Visual Observations of the HVAC system:** The technician performing the procedure must observe the air-conditioning system interior for settled debris, air by-pass at the air filter bank and air by-pass in the return duct or equipment cabinet. The observations must be documented with notes and/or photo images.

- **Particle Measurements:** Particle measurements must be taken at the return air and supply air registers. A laser particle counter that has the ability to enumerate individual particle sizes and show a printout of the results must be used. The measurements must be plotted on a filter chart, which may be found in applicable ASHRAE documents (i.e., MERV test or dust spot tests).

- **Air Sampling:** Air samples using a fungal spore trap must be taken from the ambient air (inside and outside the building) and from the supply air. The fungal spore trap needs to be analyzed by a qualified laboratory. The analysis should include, at minimum, the type and quantity of fungal spores, man-made vitreous fibers (fibrous glass), and opaque particles.

- **Surface Sampling:** Surface samples using sticky tape must be procured from locations inside the HVAC system. A laboratory must determine if fungal germination is or has occurred by analyzing the samples.

- **Air Temperature and Relative Humidity Readings:** Temperature and humidity measurements must be obtained indoors and compared to requirements set forth in ASHRAE Standard 55.

Location of the outdoor air ventilation must be properly accounted for when using the procedure. Detailed requirements for the analytical procedures listed above are contained in the following sections.

Particle Measurements

Particle measurements should be taken using a 6-channel laser particle counter operating at a flow rate of 0.1 CFM.

Three (3) samples must be taken at the return air entering the air-handling unit. Samples must also be taken at approximately 50% of the supply air outlets. For more aggressive sampling, one (1) sample should be procured at a supply outlet during start up of the indoor fan, and one (1) sample should be taken while lightly tapping on the side of the duct.

The particle size range to be studied includes the following: 0.3, 0.5, 0.7, 1.0, 2.0, and 5.0 micrometers (µm). The coincidence error is less than 5% at 2×10^6 particles/cu. ft.

The particle counter must be properly prepared before sampling occurs. The following actions must be performed:

1. Check battery level to ensure unit does not become non-operational during sampling.
2. Program time and date to current settings.
3. Turn printer option on.
4. Turn machine on, attach purge filter, and run in concentration (CONCEN) mode for 1 minute. At the end of 1 minute, print the particle count taken with the purge filter on and stop the unit.
5. Replace the purge filter with the sampling probe.

The laser particle counter should be zero counted and purged each day prior to use (the manufacturer's instructions should be followed for this procedure. The laser particle counter should be factory calibrated and serviced in accordance with the manufacturer's recommendations (once a year).

When performing the sampling, the following procedures must be followed in sequence:

1. Set unit to desired number of samples (enough for a representative sample).

2. Set period to 1 minute.
3. Set hold time based on accessibility to sampling locations.
4. Enable print mode.
5. Set location to a representative number.
6. Place counter in an area representative of the return air.
7. Run sampler in auto mode for length of preprogrammed time.
8. Remove sampling probe and replace with isokinetic probe.
9. Set the number of samples equal to the number taken in the return air.
10. Set location to a representative number.
11. Sample in the supply ducts by placing the isokinetic tube into the register openings, a different register per sample.
12. Continue this for the duration of the sample.

The data collected may be used to calculate the percentage increase or decrease in particulate measured in the air. The calculations must be performed using the following formula:

$$\%\ \text{Increase or Decrease} = 100 \left(\frac{\text{Supply Air}}{\text{Return Air}} - 1 \right)$$

Once the calculations are completed, the data should be plotted on a modified ASHRAE filter efficiency performance chart.

Air Sampling

Air sampling for fungal spores must be performed using spore trap sampling procedures and a fungal spore trap. The pump used in this procedure must be operated at a properly calibrated flow rate as recommended by the cassette manufacturer.

Prior to sampling, a field calibration should be performed using a standard calibrated rotometer (with a cassette attached).

One (1) sample must be taken of the ambient indoor air. One (1) sample must be taken of the supply air. One (1) sample must be taken of the return air.

The following sampling procedure must be followed:

1. The fungal spore trap should be attached to the pump and the inlet cover or seal tape removed.

2. The sampling pump/cassette should be placed in the appropriate location at the return air, supply air and in the ambient air and operated for a period of time as recommended by the cassette manufacturer or as required to obtain the necessary results. Supply air samples should be obtained underneath a supply air vent in a manner that prevents mixing with ambient air, and should be located in an air stream that is operating at the same approximate static pressure as the pump discharge. Return samples should be obtained with the outside air accounted for in order to provide a true representation of filter performance.

Spores will be identified and enumerated within analytical limitations. Concentrations are reported in spores per cubic meter. Analysis shall be by direct microscopic analysis by a qualified laboratory.

Surface Sampling

Surface samples must be taken to determine if fungal amplification is occurring within the HVAC system. Samples must be taken using sticky tape mounted to a slide.

One (1) must be taken from the return duct. Two (2) samples must be taken from the air-handling unit. Two (2) samples must be taken from the supply plenum, or supply duct (depending upon accessibility).

The following procedures must be followed when performing the sampling:

1. Technician should wear clean examination gloves during the handling of all components (slides and tape).
2. The "sticky" tape should be impinged on the area to be sampled.
3. The tape should then be placed on a slide, properly labeled, and stored as not to cross-contaminate the samples.

The presence of spores and/or hyphal elements will be identified by direct microscopic analysis by a qualified laboratory.

Conclusions

The observations and data collected must be reviewed to determine if significant debris is present in the HVAC system, or if a fungal reservoir or other undesired contaminant (which can significantly affect the quality of the indoor air) exists in the HVAC system. Positive determinations indicate a need for cleaning. Likewise, if the analytical data demonstrates the HVAC system is introducing unwanted contaminants at undesired or unacceptable levels, then cleaning is necessary.

If temperature and humidity conditions exceed the ASHRAE acceptable range, this indicates the need for an engineering study to correct deficiencies.

Chapter 3
Guidelines for Constructing Service Openings in HVAC Systems

Opening & Closing Externally Insulated Sheet Metal Air Ducts

When creating a service opening in externally-wrapped sheet-metal ducts, the external insulation should be cut on three sides, and folded out of the way, if the service opening is to be sealed with a closure panel. (If a permanent access door is to be installed in the service opening, all four sides of the external wrap should be cut and the insulation removed and discarded.) The sheet-metal should then be cut with industry-specific tools in such a manner as to leave the edges straight, free of burrs, bends, and deflections.

The closure panel must be of the same material and gauge (or heavier) as the duct wall to which it will be attached. If either dimension of the panel meets or exceeds 18", the panel must be fabricated with cross breaks.

When installing a closure panel, a bead of caulking/mastic must be applied around the edge of the opening, and the panel is then placed over the opening. Gasketing may be used in place of caulking/mastic. The panel must overlap the duct wall edges by a minimum of 1” on all sides. Secure the closure panel to the duct wall with screws or other mechanical fasteners 4" O.C. If an approved tape is to be used to seal the closure panel, rather than a sealant, the tape should be applied after the installation of the mechanical fasteners.

The external insulation should then be re-installed in its original position and fastened with staples and approved tape or mastic in such a manner that the vapor barrier is restored.

Drilled openings in the sheet metal duct from 1"-3" in diameter are approved for use. If the material used to close these service openings is common to the interior of the duct and subsequently, common to the airstream, those materials shall have a flame-spread rating of not over 25 without evidence on continued progressive combustion and a smoke-developed rating of not over 50.

Opening & Closing of Lined Sheet Metal Air Ducts

When opening internally lined sheet-metal ducts, the openings should be made in such a manner as to provide straight sheet metal edges free of burrs, bends, or deflections. Discard the removed sheet-metal section as this will be replaced with a closure panel. The closure panel shall overlap the service opening by a minimum of 1" on all sides when installed.

Using a template 2" smaller in each dimension of the finished closure panel, mark the duct and cut the sheet metal. Discard the sheet metal. Using a sharp knife, cut out the piece of duct liner to match the size of the service opening and discard it as well.

When closing this opening, the closure panel shall have a new piece of duct liner glued and pinned to the closure panel. Use an approved coating or an approved duct liner adhesive meeting requirements of ASTM916 for all exposed edges created when the duct liner was cut. If the duct is lined with a rigid liner board insulation, it can be reused if it is deemed mechanically sound.

Apply a bead of sealant or mastic around the opening and mechanically fasten the closure panel to the duct wall with screws 4" O.C. Ensure that there are no breaks in the sealant. If an approved tape is to be used to seal the closure panel, rather than a sealant, the tape should be applied **after** the installation of the mechanical fasteners.

Drilled 1" service openings shall be closed with materials having a flame-spread rating of not over 25 without evidence of continued progressive combustion and a smoke-developed rating of not over 50. Any exposed fibrous glass edges within the duct should be sealed with no breaks or gaps in the insulation.

Opening and Closing Fibrous Glass Ducts

If the opening is to be less than the full height of the duct, the service openings should be made using either a straight knife or a shiplap tool to cut a converging 45 degree angle on all four sides. If the opening is to be full height, determine which of the longitudinal joints (top or bottom) will serve as the “hinge” for the opening.

Make converging 45 degree cuts along the remaining three sides. This section of the duct can either be lifted up or dropped down out of the way, dependent on the location of the cut. Along the corners of the duct the cuts should only be made through the facing of the duct.

Before re-installing the original section of duct, apply an approved ductliner adhesive meeting ASTM C 916 requirements to all cut edges of the section and the opening. Re-install the section to its original position. Seal all sides of the original cuts with approved closure methods and materials. If tape is to be used it shall meet the criteria of UL181A, part I or II, for fiber glass ductboard. The ductboard surfaces to which the tape will be applied must be clean and dry. Dust, dirt, oil, grease, and moisture may result in bonding failure. Follow the tape manufacturer’s recommendations.

Opening & Closing Flexible Ducts

Due to the nature of flexible ducting it is not possible or feasible to install service openings in it. The recommended methods of accessing flexible ducts are as follows:

(1) Disconnect either or both ends of the flexible duct from the duct plenum or trunklines, the equipment, the grilles, or the registers. Upon completion of the cleaning/inspection, re-connect the flex duct to the metal collar with plastic closure straps or metal hose clamps. Seal the connection with tape compliant with UL 181B, Part I, or mastic compliant with UL 181B, Part II. Check for local compliance as codes vary from state-to-state.

(2) Cut cleanly through the flexible duct to produce two separate openings for inspection/cleaning. Upon completion, insert the properly sized sheet metal connecting sleeve and reconnect the two ends. Complete the closure as in (1) above.

(3) When replacing flexible ductwork, it is required that contractors follow all manufacturers’ instructions for proper installation.

Important Information

The guidelines shown above are not necessarily inclusive of all methods of service opening construction. The provisions of this Standard are not intended to prevent the use of any material, method or system not specifically addressed herein, provided that such material, method, or system meets the flame and smoke criteria of this Standard and all other criteria of locally adopted codes.

No matter the type of duct construction, it is important that service openings be constructed in a manner that facilitates a proper closure that meets the requirements set forth in the above Standard.

Contractors inexperienced in the actual physical creation of service openings are recommended to seek professional training prior to attempting any procedures described herein.

Chapter 4
International HVAC System Cleaning Resources

Several organizations around the world dedicate all or a portion of their efforts toward HVAC system cleaning. The knowledge and experience of these organizations is shared globally through such forums as the International Council on Ventilation Hygiene (ICVH) and NADCA.

The documents listed in this section encompass a portion of the most significant standards and guidelines related to HVAC system cleaning produced by industry worldwide. Their applicability may be limited to the nations or areas for which they were originally intended.

Japan

Japan Air Duct Cleaners Association (JADCA)
JADCA Publications

- *JADCA Technological Standard, 1990.*
- *The Point of Diagnosis and Evaluation of Air Duct Cleaning, 1991.*
- *The Actual State and the Cleaning Management of the Duct System, 1992.*
- *The Guide to Cleaning and Management of the Kitchen Exhaust Duct System, 1995.*
- *The Special Report, "Duct Contamination," 1997.*
- *Textbook of Certification Program for Air System Cleaning Specialists, 1999.*

JADCA Research Reports

- JADCA-01 *Methods to Evaluate the Duct Cleaning Efficiency, 1997.*
- JADCA-02 *Light Transmission Measurement Method, 1997.*
- JADCA-03 *Measurement of Dust Generation, 1997.*
- JADCA-04 *Field Investigation on the Effects of Duct Cleaning on Indoor Air Quality with Measured Results of TVOC and Perceived Air Quality, 1997.*

Related Laws in Japan

- Ministry of Health and Welfare, The Laws for Maintenance of Sanitation in Buildings, 1970.

Sweden

- *Checking the Performance of Ventilation Systems*, The Swedish National Board of Housing, Building and Planning. General Guidelines 1992:3E.

United Kingdom

- *TR17 Guide to Good Practice: Cleanliness of Ventilation Systems*

United States of America
National Air Duct Cleaners Association (NADCA)

- *Introduction to HVAC System Cleaning Services (Guideline), 2001.*
- *General Specifications for the Cleaning of Commercial Heating, Ventilating and Air Conditioning Systems, 2001.*

DISCLAIMER

The Standards Committee of the National Air Duct Cleaners Association (NADCA) developed NADCA ACR 2006. It is intended to establish the minimally acceptable criteria for Heating, Ventilation and Air Conditioning (HVAC) hygiene assessments, project design, cleaning, and verification. This standard is based on the collective experience of members of the industry, but is not intended to be either exhaustive or inclusive of all pertinent requirements. The information provided in this standard is offered in good faith and believed to be reliable, but is made WITHOUT WARRANTY, EXPRESSED OR IMPLIED, AS TO THE MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ANY OTHER MATTER.

The provisions are not intended to be directed to any particular product or contractor, nor are they claimed to satisfy all current legal, health and safety, or performance requirements related to contractual relationships for Heating, Ventilation and Air Conditioning (HVAC) system cleaning projects. Following this standard does not guarantee compliance with any regulation, nor safe, satisfactory, or complete performance of HVAC system cleaning. Users are cautioned that the existing HVAC system design, installation, maintenance history, building design, occupancy and maintenance play a significant role in managing indoor air quality. Thus, users of this document should understand the limitations with use of this document in an attempt to mitigate indoor environmental problems. The information upon which this standard is based is subject to change, which may invalidate any or all of the information contained herein.

NADCA, its members and contributors do not assume any responsibility for the user's compliance with any applicable laws and regulations, nor for any persons relying on the information contained in this standard. NADCA does not endorse proprietary products, methods, or individual HVAC system cleaning companies.

It should be noted that this standard does not specifically address the protocols for service when potentially hazardous, regulated materials are likely to be present in HVAC systems. Such potentially hazardous, regulated materials include, but are not limited to, asbestos, lead and other chemical and biological contaminants. This standard does not address such situations for two reasons. First, the worker safety and public safety aspects of operations involving hazardous materials are, in many cases, governed by legal requirements imposed by the Occupational Safety and Health Administration, the United States Environmental Protection Agency and various state and local agencies. Second, unless HVAC system cleaners are engaged specifically to perform hazardous material decontamination, the building owner and/or occupant should bear responsibility for any consequences of encountering unexpected hazardous materials.

FORM TO REQUEST FORMAL INTERPRETATIONS OF NADCA STANDARD ACR 2006

Mail to: Chairman, Standards Committee
National Air Duct Cleaners Association
1518 K Street, NW
Suite 503
Washington, DC 20005
PHONE (202) 737-2926
FAX (202) 347-8847

NAME: ______________________________ *E-MAIL:* ______________________________

COMPANY: ____

ADDRESS: ____

CITY, STATE, POSTAL CODE ______________________________ *COUNTRY* ______________

PHONE ______________________________ *FAX* ______________________________

PLEASE INDICATE ORGANIZATION REPRESENTED, IF ANY ______________________________

Section / Paragraph ____

QUESTION (attach another sheet if necessary):

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I hereby grant NADCA all and full rights in copyright, to this request for interpretation. I understand that I acquire no rights in any publication of NADCA in which this request for interpretation may be published.

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Signature (required)