

TO: Jan Shawyer – Port of Tacoma

FROM: Mike Byers, Geoff Saunders – CRETE Consulting, Inc.

PROJECT: 1940 East 11<sup>th</sup> Street Warehouse

SUBJECT: Results of Small-Scale Paint Removal Study

DATE: April 7, 2014

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This memorandum presents the results of a small-scale study to evaluate the effectiveness of various removal techniques and media to remove polychlorinated biphenyl (PCB)-containing paint from the exterior and interior concrete walls of the Port of Tacoma's warehouse building at 1940 East 11<sup>th</sup> Street. PCB-containing paint was identified in various locations during regulated building material surveys in 2012 (Pioneer 2012A, B). Because it was believed that the PCBs within the paint could leach into the underlying concrete, a paint removal study was conducted from February 17 to 20, 2014 by CRETE Consulting, Inc. (CRETE). The rationale and methods for the study are documented in *PCB Building Material Work Plan* (Attachment A). Following paint removal by blasting or grinding, surface concrete samples were collected to evaluate the efficacy of the different blasting and grinding techniques on PCB removal from the underlying concrete.

CRETE contracted Crystal Soda Blast to remove paint from 3 exterior and 1 interior painted-concrete wall locations using two different removal techniques (grinding and blasting) and four different media: diamond grinding and blasting with sand, soda, and dry ice. Test locations, shown on Figure 1, were selected to correspond with historical locations having the greatest total PCB concentrations in wall paint (Pioneer 2012A, B).

At each location a baseline concrete sample was collected prior to the blasting or grinding. Each removal technique was then applied to an area approximately 18" x 18" until the paint was no longer visible and only the underlying concrete remained. Following the blasting or grinding, a sample of the underlying concrete was collected from each of the locations exposed by the different removal techniques.

The baseline sample and the post-blasting/grinding samples were collected by adopting the guidelines set forth in the Standard Operating Procedure for Sampling Porous Surfaces for PCBs (EPA 2011). Samples were collected by drilling a roto-hammer into the concrete wall approximately 0.5 inches deep. Multiple holes (about 9 per sample) were drilled until a sufficient sample volume was produced from the drill shavings. The paint/concrete powder mixtures produced by the drilling were collected in a tray affixed to the wall immediately below the drilling location and then transferred to appropriately laboratory glassware (Attachment B; photo log). The drill, drill bit, and sample collection tray were decontaminated between each sample.

## Health and Safety

At each location, Crystal Soda Blast constructed a wood-frame containment structure completely wrapped and sealed with plastic sheeting, including the floor, to contain all blasting/grinding media and waste. The containment structure was further enhanced by creating a negative pressure environment within the containment structure to create an inward flow of air so that airborne particles and blasting media were fully contained. All blasting and grinding work occurred within this temporary structure. After blasting/grinding, the plastic of the containment structure was carefully folded inward and, along with the waste resulting from the blasting/grinding, placed in a 55-gallon drum for disposal. Personal protective equipment and sampling items were also placed in 55-gallon drums for disposal.

After completion of all of the blasting work, a representative sample of the drummed material was collected and placed in a Ziploc bag for laboratory analysis of Toxicity Leaching Characteristic (TCLP) PCBs for disposal characterization (Attachment C).

Blasting personnel wore a fully-encapsulated suit with a supplied air full-face respirator. EMB Consulting conducted personal air monitoring and ambient air monitoring both inside and outside of the temporary structure during field activities. Personal air monitoring was conducted for PCBs (released from blasting/grinding on the paint and concrete surfaces) and metals (nickel and cobalt potentially released from grinding/blasting media, lead from paint). Area monitoring was conducted for silica, carbon dioxide, PCBs, and metals (EMB 2014). All results were either undetected or below their applicable permissible exposure limits (PELs), with the exception of respirable crystalline silica (sourced from concrete) within the enclosure structure. However, personnel inside of the enclosure structure were protected with a full face respirator with supplied air (Attachment D).

## Deviations from Work Plan

One interior and three exterior wall locations were selected to coincide with historical locations with the highest total PCB concentrations in paint. However, windows on the north side of the building precluded construction of an enclosure system at the location selected for Exterior sample 3 (Ext\_Y3). The window is sunken with the frame (not flush with the exterior of the building); therefore, the top of the enclosure could not be sealed in this location. Exterior location 3 was moved around the corner to the eastern side of the building (Figure 1) so that a fully sealed enclosure could be constructed around the location.

Rainy weather on the first day of blasting (February 17) prevented collection of a dry concrete sample following post-blasting drilling. Therefore, although the baseline sample at Ext\_Y1 was collected on February 17, the other samples were collected on February 19 (field notes in Attachment C). The samples for all other locations were collected on the same day that the blasting occurred.

Visual observations of the wall surfaces after blasting at Ext\_Y1 revealed that the dry ice application was not effective at completely removing all of the paint (Attachment B). The other techniques: sand and soda blasting and diamond grinding sufficiently removed paint and a very small amount of the underlying concrete surface material, based on visual observations. Because the dry ice application

blasting could not fully remove the PCB-containing paint as observed at the first location, it was not used at the remaining locations.

## Results

Analytical Resources, Inc. of Tukwila, WA analyzed all samples for PCB Aroclors by EPA Method 8082. Aroclor® 1254 was detected in each sample; all other Aroclors were undetected. Table 1 summarizes the total PCB data, and Table 2 contains all of the individual Aroclor data and other sample details. Appendix D contains the laboratory report.

## Quality Assurance

One field replicate (Int\_G11\_BASE) was collected and analyzed for PCB Aroclors. It had a 5% relative percent difference from the parent sample (Int\_G1\_BASE), well within the goal of less than 20% relative percent difference, demonstrating that field and laboratory precision were acceptable (Table 2).

## Conclusions

The blasting techniques were 40 to 99% effective (relative to the concentration in the respective baseline sample) at reducing total PCB concentrations on the painted concrete surfaces (Table 1). At the two exterior locations with the greatest baseline total PCB concentrations (4,600 and 2,900 mg/kg), post-removal total PCBs after sand blasting and diamond grinding averaged 124 mg/kg and 168 mg/kg, respectively. Interior post-removal samples, which had much lower baseline total PCB concentrations than exterior locations (interior baseline total PCBs = 200 mg/kg), post-removal total PCBs were 26 mg/kg (sand blasting) and 16 mg/kg (diamond grinding). However, all samples after paint removal contained total PCBs above 1 mg/kg, the EPA cleanup level required to dispose of concrete without restrictions (40 CFR 761.61).

Ten of the thirteen post-removal samples exceeded the Toxic Substances Control Act (TSCA) level of 50 mg/kg total PCBs (40 CFR 761.61). Once the paint (the source of the PCBs in the building surfaces) is removed, the building material is considered a PCB Remediation Waste. Disposal of PCB remediation waste is determined by total PCB concentrations (defined in 40 CFR 761.61):

- Equal to, or greater than 50 mg/kg - disposal as a hazardous waste at a subtitle C facility
- Less than 50 mg/kg - disposed of in a Subtitle D facility,
- Less than 1 mg/kg - may be recycled or reused (no restrictions when concentrations are below 1 mg/kg).

Based on the results of the small-scale study, full-scale paint removal would significantly reduce PCB concentrations on building material. However, reductions would not be sufficient to permit recycling or reuse without restrictions. Results of the small scale study suggest that portions of the exterior walls would remain at a total PCB concentration above 50 mg/kg and would require disposal as a hazardous waste. It is very unlikely that any of the post-blasting PCB concentrations would be low enough to allow unrestricted use (recycling for example) of the remaining concrete. Some internal walls could be

disposed of at a subtitle D facility if they did not share a surface with an exterior wall. Only a few landfills are approved to accept hazardous waste (Subtitle C), which is typically disposed of at a cost 3 or 4 times higher than Subtitle D waste. To delineate Subtitle D and C waste, extensive sampling would need to be conducted, and the data would need to be submitted to EPA for approval. The blasting material would be disposed of as a PCB bulk product waste at a Subtitle D facility. The components to consider when evaluating if paint removal is a viable alternative include:

- Cost and time to present a risk-based approach package to EPA in which verification sampling protocol are defined
- Cost and time to implement blasting on the building concrete surfaces that contain PCBs – includes full containment and scaffolding of the walls and negative air handling
- Cost and time to complete the verification sampling and characterization of the remaining building concrete walls after blasting
- Cost to segregate the building walls into waste streams (Subtitle C and D) during building demolition
- Waste disposal at both Subtitle C and D facilities.

If the paint is not removed from the building material, EPA classifies the entire waste stream as a PCB bulk product waste. EPA regulations allow this waste stream to be disposed of at a Subtitle D landfill that is permitted to accept PCB bulk product waste. Under this disposal option there is less EPA reporting and sampling required and there is no requirement for segregation of waste streams during demolition.

The cost of paint removal, paired with the higher handling and disposal cost of Subtitle C waste and the additional sampling and reporting to EPA, does not make full-scale paint removal an economical option in our opinion. The results show that paint removal will not result in significant amounts of concrete that can be recycled (below 1 ppm total PCBs) and that paint removal will probably result in significant amounts of concrete that will need to be handled and disposed of as a Subtitle C waste (greater than 50 ppm total PCBs). It is our opinion that the Port should pursue designation of the building as a PCB bulk product waste without any paint removal.

## References

EMB 2014. Air Monitoring Plan. Building Material Field Investigations. Port of Tacoma 1940 E. 11th Street. February 2014.

EPA 2011. Standard Operating Procedure for Sampling Porous Surfaces for Polychlorinated Biphenyls (PCBs), Revision 4. Environmental Protection Agency. May 5, 2011.

Pioneer 2012A. Brown & Haley Building Materials Characterization Sampling. Pacific Crest Environmental, LLC. Pioneer Technologies Corporation. March 29, 2012.

Pioneer 2012B. 1940 East 11<sup>th</sup> Street Building Materials and Soil/Sediment Characterization Sampling. Pioneer Technologies Corporation. June 6, 2012.

## Attachments

Attachment A PCB Building Material Work Plan

Attachment B Photo Log

Attachment C Analytical Resources Inc. Laboratory Reports

Attachment D Air Monitoring Results

**Table 1. Effectiveness of Paint Removal**

| Interior/<br>Exterior | Area     | Blasting Material      | Sample ID          | Total PCBs<br>(mg/kg) | Total PCB<br>Percent<br>Reduction from<br>Baseline |
|-----------------------|----------|------------------------|--------------------|-----------------------|--|
| Exterior              | Yellow 1 | baseline - no blasting | Ext_Y1_BASE        | <b>4,600</b>          | ---  |
|                       |          | dry ice (DI)           | Ext_Y1_DI_20140219 | <b>1,200</b>          | 74%  |
|                       |          | sand (SA)              | Ext_Y1_SA_20140219 | <b>160</b>            | 97%  |
|                       |          | soda (SO)              | Ext_Y1_SO_20140219 | <b>290</b>            | 94%  |
|                       |          | diamond (DM)           | Ext_Y1_DM_20140219 | <b>270</b>            | 94%  |
| Exterior              | Yellow 2 | baseline - no blasting | Ext_Y2_BASE        | <b>2,900</b>          | ---  |
|                       |          | sand (SA)              | Ext_Y2_SA_20140219 | <b>89</b>             | 97%  |
|                       |          | soda (SO)              | Ext_Y2_SO_20140219 | <b>98</b>             | 97%  |
|                       |          | diamond (DM)           | Ext_Y2_DM_20140219 | <b>65</b>             | 98%  |
| Exterior              | Yellow 3 | baseline - no blasting | Ext_Y3_BASE        | <b>750</b>            | ---  |
|                       |          | sand (SA)              | Ext_Y3_SA_20140219 | 7.3                   | 99%  |
|                       |          | soda (SO)              | Ext_Y3_SO_20140219 | <b>57</b>             | 92%  |
|                       |          | diamond (DM)           | Ext_Y3_DM_20140219 | <b>95</b>             | 87%  |
| Interior              | Gray 1   | baseline - no blasting | Int_G1_BASE        | <b>200</b>            | ---  |
|                       |          | baseline - no blasting | Int_G11_BASE       | <b>210</b>            | ---  |
|                       |          | sand (SA)              | Int_G1_SA_20140220 | 26                    | 87%  |
|                       |          | soda (SO)              | Int_G1_SO_20140220 | <b>120</b>            | 40%  |
|                       |          | diamond (DM)           | Int_G1_DM_20140220 | 16                    | 92%  |

**Bold** – exceeds TSCA level of 50 mg/kg total PCBs.

Total PCBs is the sum of detected Aroclors.

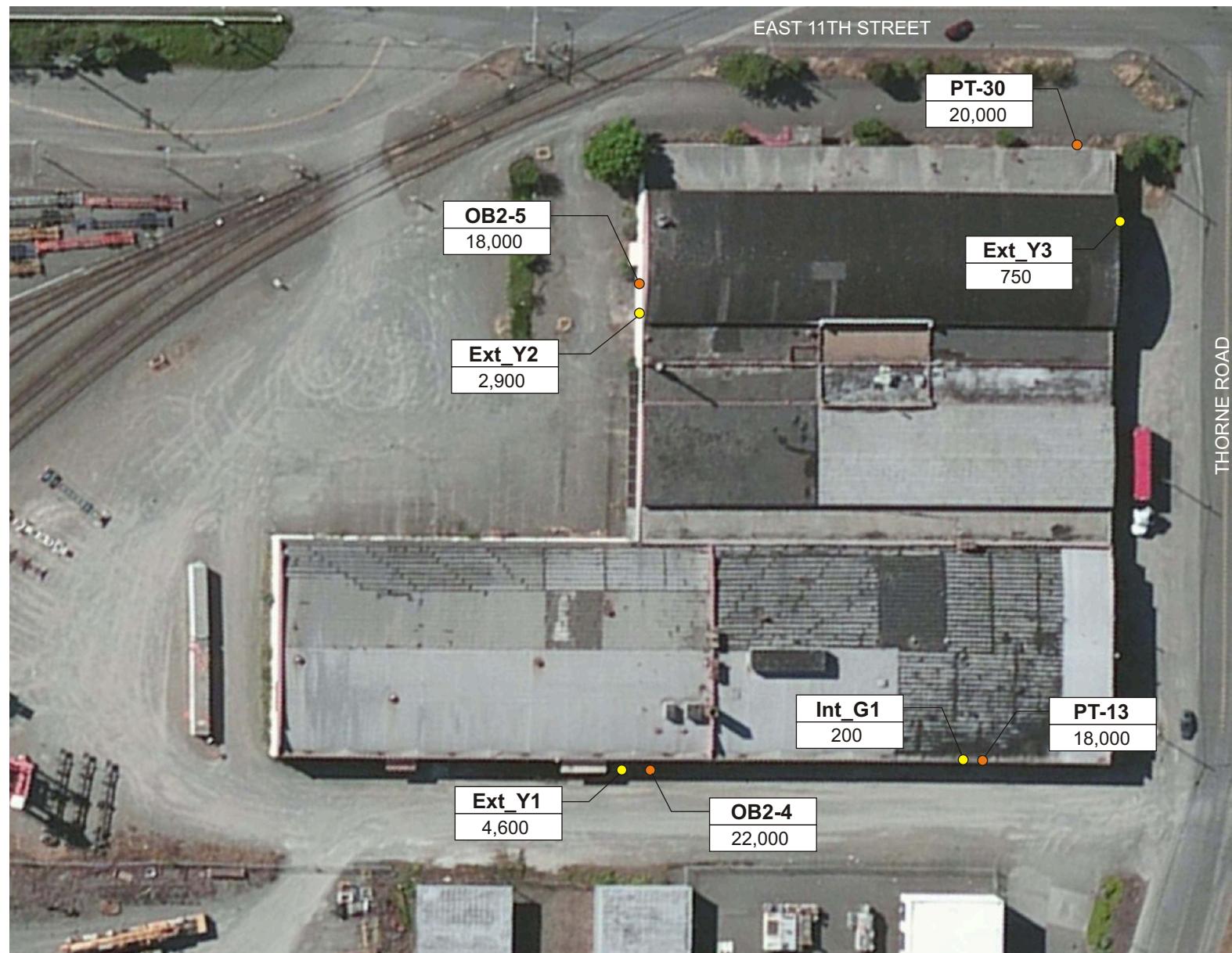
**Table 2. PCB Data**  
**1940 E. 11th Warehouse PCB-Containing Paint Removal Pilot Study**

| Interior/<br>Exterior  | Area     | Blasting Material      | Sample ID          | Sample Collection Date | Sample Collection Time | Duration of<br>Blasting                          | Blasting Intensity/<br>Notes  | Analytical Data (mg/kg dw) |              |              |              |              |              |              | Blasting Effectiveness<br>Total PCB Percent<br>Reduction from Baseline | Relative<br>Percent<br>Difference |    |
|--|----------|------------------------|--------------------|------------------------|------------------------|--|---|----------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--|-----------------------------------|----|
|  |          |                        |                    |                        |                        |  |   | Aroclor 1016               | Aroclor 1221 | Aroclor 1232 | Aroclor 1242 | Aroclor 1248 | Aroclor 1254 | Aroclor 1260 | Total PCBs<br>(detected only)  |                                   |    |
| Exterior   | Yellow 1 | baseline - no blasting | Ext_Y1_BASE        | 2/17/2014              | 11:30                  | not recorded; about 4 minutes for all techniques | minimal success with removing paint, only surficial layer removed; did not continue at other exterior locations<br>area blasted on 2-18-14 but wet weather conditions precluded collection of dry samples; collected samples on 2-19-14 | 200 u                      | 200 u        | 200 u        | 200 u        | 400 u        | <b>4,600</b> | 400 u        | <b>4,600</b>   |                                   |    |
|  |          | dry ice (DI)           | Ext_Y1_DI_20140219 | 2/19/2014              | 13:43                  |  |   | 82 u                       | 82 u         | 82 u         | 82 u         | 120 u        | <b>1,200</b> | 82 u         | <b>1,200</b>   | 74%                               |    |
|  |          | sand (SA)              | Ext_Y1_SA_20140219 | 2/19/2014              | 13:52                  |  |   | 17 u                       | 17 u         | 17 u         | 17 u         | 42 u         | <b>160</b>   | 17 u         | <b>160</b>   | 97%                               |    |
|  |          | soda (SO)              | Ext_Y1_SO_20140219 | 2/19/2014              | 14:00                  |  |   | 42 u                       | 42 u         | 42 u         | 42 u         | 42 u         | <b>290</b>   | 42 u         | <b>290</b>   | 94%                               |    |
|  |          | diamond (DM)           | Ext_Y1_DM_20140219 | 2/19/2014              | 13:35                  |  |   | 41 u                       | 41 u         | 41 u         | 41 u         | 41 u         | <b>270</b>   | 41 u         | <b>270</b>   | 94%                               |    |
| Exterior   | Yellow 2 | baseline - no blasting | Ext_Y2_BASE        | 2/19/2014              | 8:30                   |  | doubled blasting time to determine if any difference in removal   | 100 u                      | 100 u        | 100 u        | 100 u        | 310 u        | <b>2,900</b> | 260 u        | <b>2,900</b>   |                                   |    |
|  |          | sand (SA)              | Ext_Y2_SA_20140219 | 2/19/2014              | 9:58                   |  |   | 8.2 u                      | 8.2 u        | 8.2 u        | 8.2 u        | 12 u         | <b>89</b>    | 8.2 u        | <b>89</b>  | 97%                               |    |
|  |          | soda (SO)              | Ext_Y2_SO_20140219 | 2/19/2014              | 10:05                  |  |   | 17 u                       | 17 u         | 17 u         | 17 u         | 17 u         | <b>98</b>    | 17 u         | <b>98</b>  | 97%                               |    |
|  |          | diamond (DM)           | Ext_Y2_DM_20140219 | 2/19/2014              | 9:50                   |  |   | 16 u                       | 16 u         | 16 u         | 16 u         | 16 u         | <b>65</b>    | 16 u         | <b>65</b>  | 98%                               |    |
| Exterior   | Yellow 3 | baseline - no blasting | Ext_Y3_BASE        | 2/19/2014              | 10:50                  |  | doubled blasting time to determine if any difference in removal   | 41 u                       | 41 u         | 41 u         | 41 u         | 82 u         | <b>750</b>   | 52 u         | <b>750</b>   |                                   |    |
|  |          | sand (SA)              | Ext_Y3_SA_20140219 | 2/19/2014              | 11:55                  |  |   | 1.6 u                      | 1.6 u        | 1.6 u        | 1.6 u        | 1.6 u        | <b>7.3</b>   | 1.6 u        | <b>7.3</b>   | 99%                               |    |
|  |          | soda (SO)              | Ext_Y3_SO_20140219 | 2/19/2014              | 12:05                  |  |   | 17 u                       | 17 u         | 17 u         | 17 u         | 17 u         | <b>57</b>    | 17 u         | <b>57</b>  | 92%                               |    |
|  |          | diamond (DM)           | Ext_Y3_DM_20140219 | 2/19/2014              | 12:15                  |  |   | 17 u                       | 17 u         | 17 u         | 17 u         | 17 u         | <b>95</b>    | 17 u         | <b>95</b>  | 87%                               |    |
| Interior   | Gray 1   | baseline - no blasting | Int_G1_BASE        | 2/20/2014              | 9:30                   |  | field replicate   | 40 u                       | 40 u         | 40 u         | 40 u         | 40 u         | <b>200</b>   | 40 u         | <b>200</b>   |                                   |    |
|  |          | baseline - no blasting | Int_G11_BASE       | 2/20/2014              | 9:40                   |  |   | 40 u                       | 40 u         | 40 u         | 40 u         | 40 u         | <b>210</b>   | 40 u         | <b>210</b>   |                                   | 5% |
|  |          | sand (SA)              | Int_G1_SA_20140220 | 2/20/2014              | 11:10                  |  |   | 8 u                        | 8 u          | 8 u          | 8 u          | 8 u          | <b>26</b>    | 8 u          | <b>26</b>  | 87%                               |    |
|  |          | soda (SO)              | Int_G1_SO_20140220 | 2/20/2014              | 11:00                  |  |   | 16 u                       | 16 u         | 16 u         | 16 u         | 24 u         | <b>120</b>   | 16 u         | <b>120</b>   | 40%                               |    |
|  |          | diamond (DM)           | Int_G1_DM_20140220 | 2/20/2014              | 10:50                  |  |   | 8.1 u                      | 8.1 u        | 8.1 u        | 8.1 u        | 8.1 u        | <b>16</b>    | 8.1 u        | <b>16</b>  | 92%                               |    |
|  |          |                        |                    |                        |                        |  |   | TCLP (µg/L)                |              |              |              |              |              |              |  |                                   |    |
| All Waste Material for dangerous waste characterization (blasting media and paint chips) |          | Drum_POT1940_2014020   | 2/20/2014          | 14:00                  | n/a                    |  |   | 2 u                        | 2 u          | 2 u          | 2 u          | 4 u          | 2 u          | 2 u          | ND   |                                   |    |

Note: some results were flagged by ARI as "Y", meaning they were undetected at an elevated reporting limit. All undetected results are entered here with a "u".

Bold results are detected. Blue bold total PCBs exceed the TSCA level of 50 mg/kg.

Edited on March 10, 2014 by N. Ott



4/7/2014



## **Attachment A**

### **PCB Building Material Work Plan**

# **PCB Building Material Work Plan**

## **1940 E. 11<sup>th</sup> Street Abatement, Remediation & Deconstruction Project**

**Project Number: 013PT-002**

**Prepared for:**  
**The Port of Tacoma**

**February 3, 2014**

**Prepared by:**



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# PCB Building Material Work Plan

## 1940 E. 11<sup>th</sup> Street Abatement, Remediation & Deconstruction Project

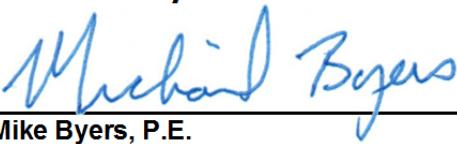
Project Number: 013PT-002

Prepared for:  
The Port of Tacoma

Prepared by:

  
\_\_\_\_\_  
Jamie C. Stevens, P.E.

Reviewed by:

  
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Mike Byers, P.E.

February 3, 2014

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- A2: 1940 East 11<sup>th</sup> Street Building Materials Characterization Sampling
- A3: 1940 East 11<sup>th</sup> Street Building Additional Soil Characterization Sampling
- A4: Port of Tacoma, 1940 East 11th Street Building Direct-Push PCB Groundwater Sampling
- A5: 1940 East 11<sup>th</sup> Street Building Soil Excavation Sampling and Documentation
- A6: 2005 Letter documenting Near Surface Soil Investigation 1940 East 11<sup>th</sup>

## Appendix B Standard Operating Procedures

# 1 Introduction

CRETE Consulting, Inc. (CRETE) has prepared this Polychlorinated Biphenyl (PCB) Building Materials Work Plan (Work Plan) for the Port of Tacoma's (Port) 1940 East 11<sup>th</sup> Street project (project; Figure 1). This work is authorized as part of a Professional Services Agreement between CRETE and the Port titled 1940 E 11<sup>th</sup> Street Abatement, Remediation & Deconstruction Engineering Services. This Work Plan evaluates historical PCB data and provides recommendations for additional PCB data collection at the project to provide input into a PCB management and abatement plan that will be used to develop site cleanup and building demolition/disposal details. This Work Plan provides recommendations for evaluation of building materials and of shallow PCB soil contamination immediately around the building. Soil contamination is thought to have resulted from leaching and flaking of the PCB-containing building paint. Potential soil and groundwater contamination on the site is outside of the focus of this study and is being evaluated and detailed by reports prepared by the previous property owner.

An 117,000-square foot, two-story vacant building occupies the majority of the 1940 East 11<sup>th</sup> Street property (Figure 1). The last tenant of the building was Brown & Haley, and several previous investigations referred to the building as the "Brown & Haley Building". This project is part of the Sound Mattress Site which is under the Washington State Department of Ecology (Ecology) Voluntary Cleanup Program (VCP); Project No. SW0857, Facility/Site No. 1232087.

## 1.1 Site Background

Several historical reports describe the site's history and environmental sampling. The summary presented here is based on information in Pacific Crest's *Data Gaps Investigation Report* for the Former Sound Mattress and Felt Property (PCE 2010).

- Prior to 1948, the property was vacant and undeveloped.
- In 1948, Washington Steel Products (Washington Steel) constructed the northern portion of the existing building. Washington Steel extended the building with additions in 1950 and 1953.
- Between 1948 and 1959, Washington Steel manufactured hardware, including enameled metal drawers, knobs, pulls and hinges.
- In 1959, Ekco Products Company (Ekco) purchased Washington Steel, and in 1965 American Home Products Corporation purchased Ekco.
- In 1964, Sound Mattress and Felt purchased the property and continued to lease the building to American Home Products Corporation through 1967, when that lease ended.
- In 1965, Sound Mattress leased a portion of the building to Brown & Haley for commercial activities associated with the sale and distribution of Brown & Haley

candy. However, a 1991 Phase 1 Environmental Site Assessment states that Brown & Haley occupied the building starting in 1962 (Saltbush 1991).

- In 2006, the Port purchased the property from Sound Mattress and continued to lease it to Brown & Haley.
- Brown & Haley vacated the property in 2010, and it has since remained vacant.

## 2 Previous PCB Investigation Summary

The current understanding of PCB nature and extent in building materials, soil and catch basin sediment is summarized from historical reports (Table 1). Many of the available historical reports focus on chlorinated solvent contamination in site soil and groundwater and do not discuss any PCB analyses.

In 2012 and 2013 Pioneer Technologies Corporation (Pioneer) conducted four PCB investigations, identified as Phase 1, Phase 2, Phase 3 and the groundwater investigation. These four investigations are summarized below, and these reports are included in Appendix A. Limited soil removal activities conducted on the site in 2005 and 2012 are also summarized below. The reports documenting these activities are also included in Appendix A.

**Table 1 Historical Reports**

| Report Date    | Title   | Author                                 |
|----------------|---|--|
| April 2013     | Port of Tacoma, 1940 East 11 <sup>th</sup> Street Building Direct-Push PCB Groundwater Sampling                                       | Pioneer Technologies Corporation       |
| April 2013     | Draft FS. Sound Mattress and Felt Company   | Pacific Crest Environmental            |
| September 2012 | 1940 East 11 <sup>th</sup> Street Building Soil Excavation Sampling and Documentation   | Pioneer Technologies Corporation       |
| August 2012    | 1940 East 11 <sup>th</sup> Street Building Additional Soil Characterization Sampling  | Pioneer Technologies Corporation       |
| June 2012      | 1940 East 11 <sup>th</sup> Street Building Materials and Soil/Sediment Characterization Sampling                                      | Pioneer Technologies Corporation       |
| March 2012     | Brown & Haley Building Materials Characterization Sampling  | Pioneer Technologies Corporation       |
| April 2010     | Data Gap Investigation Report. Former Sound Mattress and Felt Company   | Pacific Crest Environmental            |
| March 2010     | Regulated Building Materials Assessment Report  | Argus Pacific                          |
| December 2009  | Remedial Investigation Report, Sound Felt and Mattress Property, 1940 East 11 <sup>th</sup> Street, Tacoma, Washington, FS ID 1232087 | Pacific Crest Environmental            |
| July 2009      | Results of Organic Vapor Sampling at Brown and Haley Candy Distribution Facility  | Stephen Frost                          |
| March 2009     | Asbestos Assessment   | Argus Pacific                          |
| February 2006  | Phase 1 ESA Brown & Haley Warehouse   | Nowicki Environmental Services         |
| September 2005 | Letter re: Near Surface Soil Investigation, 1940 East 11 <sup>th</sup>  | Environmental Management Services, LLC |
| October 2001   | Addendum to Request for NFA Brown and Haley Facility  | Sound Earth Strategies                 |
| July 2001      | Request for NFA Brown and Haley Facility  | Sound Earth Strategies                 |
| November 1991  | Phase 1 ESA Sound Mattress and Felt Company   | Saltbush Environmental Services        |

## 2.1 Investigation Methods and Removal Activities

### 2.1.1 Phase 1 - March 2012

Phase 1 investigation activities focused on characterizing building paint, coatings, drywall and caulk for PCB contamination. Associated field work was conducted on March 21, 2012 and is detailed in the Pioneer report *1940 East 11<sup>th</sup> Street Building Materials and Soil/Sediment Characterization Sampling* (Pioneer 2012A; Appendix A1).

Ten discrete grab samples were collected from painted/coated surfaces or caulking materials and analyzed for PCB Aroclors. Sample locations were based on a visual inventory of the building's interior and exterior surfaces, and samples were selected to represent the overall building material present. Figures 2 and 3 present the Phase 1 and Phase 2 (discussed below) sampling locations for the 1<sup>st</sup> floor interior/exterior and 2<sup>nd</sup> floor interior/exterior building materials, respectively.

### 2.1.2 Phase 2 - April 2012

Phase 2 investigation activities focused on analyzing PCBs in additional building paint, coating, drywall and caulk samples, as well as in shallow surface soil (from 0 to 6 inches below ground surface [bgs]) and catch basin sediment. The field work was conducted on April 24-26, 2012 and is detailed in *1940 East 11<sup>th</sup> Street Building Materials and Soil/Sediment Characterization Sampling* (Pioneer 2012B; Appendix A2).

The following samples were analyzed for PCB Aroclors:

- 50 discrete grab samples of building paint, coating, drywall and caulk from both the interior and exterior of the building (Figures 2 and 3)
- 18 surface soil samples collected immediately adjacent to the building (Figure 4)
- 8 "step out" samples collected approximately 3 feet from the building (Figure 4)
- 3 surface soil samples collected from low-lying depressions along the southwestern side of the building (Figure 4)
- 8 sediment samples collected from onsite catch basins (Figure 5).

### 2.1.3 Phase 3 - July 2012

Phase 3 investigation activities were conducted based on the results of Phase 2 and focused on collecting PCB soil samples from shallow (0-6 inches bgs), intermediate (6-12 inches bgs) and deep (12-18 inches bgs) depths. The field work was conducted on July 19 and 20, 2012 and detailed in the *1940 East 11<sup>th</sup> Street Building Additional Soil Characterization Sampling* (Pioneer 2012C; Appendix A3). The following samples (Figure 4) were analyzed for PCB Aroclors:

- 16 shallow soil samples and 3 intermediate soil samples from 16 locations not previously sampled
- 5 intermediate subsurface soil samples and 3 deep subsurface soil samples collected from locations previously sampled during Phase 2.

## 2.1.4 Groundwater Investigation - March 2013

In 2013 Pioneer conducted a PCB groundwater investigation, collecting one sample from each of four temporary wells installed with a direct-push drill rig (Figure 6). The field work was conducted on March 29, 2013 and is detailed in *Port of Tacoma, 1940 East 11<sup>th</sup> Street Building Direct-Push PCB Groundwater Sampling* (Pioneer 2013; Appendix A4). Results of the groundwater sampling investigation are not discussed in this report.

## 2.1.5 Previous Removals

In 2005 a limited soil removal and sampling event was conducted to address hydraulic fluid released by Tacoma Transload (Figure 8; EMS 2005). Hydraulic fluid was associated with the storage and maintenance of heavy lifting equipment at the site. Samples were collected from the gravel parking lot and in access areas outside of the building footprint and were analyzed for petroleum hydrocarbons. Excavated soil was stockpiled and sampled. One stockpile sample was analyzed for PCBs, which were not detected above the laboratory reporting limit of 0.1 mg/kg (for individual Aroclors). The 2005 letter documenting the removal indicates that excavated soil was transported off-site and disposed of at a licensed sub-title D disposal facility (EMS 2005; Appendix A6).

In August 2012 approximately 23 cubic yards of soil were excavated from the southwestern portion of the parking lot, around sample location SL-20 (Figure 4). Removal in this area was conducted to target soil in the open gravel parking lot above MTCA Level A Unrestricted Land Use cleanup standards. Six sidewall samples and two floor samples were collected from the 1-foot deep excavation. Figure 7 shows the approximate removal area and total PCBs in both the excavated soil and the remaining floor/sidewall soil. Excavated soil is currently secured and stockpiled on site. Data tables, laboratory reports, and field notes documenting removal efforts are included in Appendix A5. (Pioneer 2012D).

## 2.2 PCB Data Summary

### 2.2.1 Building Materials

Total PCBs are present throughout building surfaces/coatings and caulk above the Toxic Substances Control Act (TSCA)-regulated level of 50 mg/kg (Figures 2 and 3, Appendices A1 and A2):

- 21 of 60 samples exceed the TSCA-regulated total PCB level of 50 mg/kg. The average concentration of these 21 samples is 5,693 mg/kg.
- The highest total PCB concentrations were detected in exterior yellow paint (BH\_OB2\_4\_032112, BH\_OB2\_5\_032112, and POT\_BH\_PT\_30\_0\_0\_042512), exterior black caulking (POT\_BH\_CK\_10\_0\_0\_042512) and interior grey paint (POT\_BH\_PT\_13\_0\_0\_042512). The concentrations of these 5 samples ranged from 7,700 (POT\_BH\_CK\_10\_0\_0\_042512) to 22,000 mg/kg (BH\_OB2\_4\_032112).

A 1991 Phase 1 Environmental Site Assessment discusses PCB contamination in and around transformer vaults (Saltbush 1991). Sampling conducted in 2012 identified total PCBs in the paint collected from electrical panels (POT\_BH\_PT\_15\_0\_0\_04512) at a concentration of 220 mg/kg.

## 2.2.2 Soil

Soil samples characterize the building perimeter, 3-foot 'step-out' locations, and the southwestern portion of the parking lot (Figures 4 and 5, Appendices A2 and A3). Total PCBs were compared to the total PCB MTCA Method A Unrestricted Land Use soil screening level of 1.0 mg/kg:

- 34 shallow samples (0-6 inches bgs) – PCBs were detected in all samples, and total PCBs ranged from 0.012 (SL-26) to 220 mg/kg (SL-07). The average concentration was 12 mg/kg. Excluding the 2 TSCA-level samples (SL-07 at 220 mg/kg and SL-11 at 51 mg/kg), the average detected concentration is 4.3 mg/kg. Thirteen of the 34 samples exceed the PCB MTCA Method A soil screening level.
- 8 intermediate samples (6-12 inches bgs) – PCBs were detected in all samples, and total PCBs range from 0.26 (SL-15) to 7 mg/kg (SL-7). The average concentration is 2.4 mg/kg. Five of the eight samples exceed the PCB MTCA Method A soil screening level.
- 3 deep soil samples (12-18 inches bgs) – PCBs were detected in all samples, and total PCBs range from 0.53 (SL-01) to 5.2 mg/kg (SL-05). The average concentration is 2.5 mg/kg. Two of the three samples exceed the PCB MTCA Method A soil screening level.

## 2.2.3 Catch Basin Data

Eight sediment samples were collected from the nine catch basins located on the western and northern sides of the property (Figure 5, Appendix A2).

PCBs were detected in all eight samples. Total PCBs ranged from 0.082 (POT\_BH\_CB\_01\_0\_0\_042412) to 3.8 mg/kg (POT\_BH\_CB\_03\_0\_0\_042412). The average concentration was 1.1 mg/kg. Of the eight detections, six are above the Commencement Bay Near Shore Tide Flats Superfund Site PCB Sediment Quality Objective of 0.3 mg/kg, and two are above the MTCA Method A Unrestricted Land Use PCB Soil Cleanup level of 1 mg/kg.

In August 2012 sediment was removed, using a vacuum truck, from nine site catch basins. Sediment from the August 2012 removal is currently stockpiled on site. Filter fabric was placed in each of the catch basins. Details of this work are included in Appendix A5.

## 3 Data Gaps and Recommendations

### 3.1 PCB Building Materials

Previous building material sampling efforts, as described in Section 2, have characterized a large proportion of the building materials; however, the following data gaps remain:

- Ecology Dangerous Waste – composite sampling of PCB-containing building materials is recommended to assess PCB concentrations to satisfy Ecology Dangerous Waste regulations (Washington Administrative Code 173-303).
- Roof material – roof material and roof paint have not been adequately characterized to support decisions related to PCB handling and disposal.

To assist with evaluation of PCB-containing paint removal technologies, the following additional sampling is recommended to support decision related to PCB handling and disposal (room designators are based on the Building Layout Plan dated December 16, 2013 [Figure 9]).

- White paint on exterior and interior walls of offices in the area of Rooms 8 through 27 has not been adequately characterized.
- Grey floor paint in Room 52 and red floor paint in the boiler room (Room 61) has not adequately characterized.
- Pink/salmon wall paint in Rooms 57 and 58 and yellow wall paint in bathrooms (Room 92 to 94) has not adequately characterized.

### 3.2 Soil

Previous PCB soil sampling efforts, as described in Section 2, have been focused along and near (3-feet offset) the perimeter of the building and in low drainage areas in the gravel parking area. Sample collection has been limited to 1.5 feet bgs and has been focused on soil that was previously identified as containing PCBs leached or flaked from PCB-containing building paint. Although, limited samples have been collected from outside of the building footprint, shallow PCB soil contamination sourced from the building paint has been adequately delineated for cleanup purposes. Soil contamination that is not related to leaching/flaking of the building paint may be present, and it is anticipated to be characterized by the previous property owner.

#### 3.2.1 Parking Areas

A shallow PCB-contaminated soil removal occurred in August 2012. Soil was removed until confirmation samples indicated that the impacted area had been removed. The potential for deeper contamination in the parking area is being addressed by the previous property owner and is, therefore, not addressed in this Work Plan.

### 3.2.2 Sub-Slab and Drainage Areas

Historical records indicate that portions of the building slab were not always covered by concrete, and they show several sumps and low points within the building. Potential contamination below the building slab and foundation is being evaluated by the previous property owner as part of their cleanup efforts on the site and not part of this study.

## 3.3 Catch Basin Sediment

Catch basin sediment was removed in August 2012, and filter fabric was placed in each of the catch basins (Pioneer 2012D; Appendix A5). Catch basins should be inspected if they are not currently on a routine inspection program. If sediment is present it should be removed with a vacuum truck. The filter fabric should be replaced in any site catch basins where it shows signs of wear or deterioration. No additional sampling is recommended.

## 4 Field Work Plan

This section is the field work plan for a PCB-paint removal study, for further characterization of the regulated building materials identified in Section 3.1, and for characterization of building debris and an evaluation of catch basins. This section does not include soil or groundwater sampling activities.

### 4.1 PCB Paint Removal Small-Scale Study

The purpose of this study is to determine if PCB-contaminated paint can be economically removed from the building concrete to a level that will render the total PCB concentrations in the remaining concrete below 50 mg/kg. CRETE will conduct a small-scale study to compare the efficacy of different abrasive approaches to removing PCB-laden paint and residual PCBs from building walls and flooring in select areas where total PCBs exceed the TSCA level of 50 mg/kg (Pioneer 2012A, B). The small-scale test locations will include:

- The yellow painted exterior concrete walls. This yellow paint is nearly universal on all exterior walls. Up to three representative locations will be tested.
- Interior concrete wall in the area of sample PT-13 collected on 4/25/2012 identified as grey paint. One location will be tested.

Although the general approach for removal is similar no matter what abrasive material is used, it is expected that some media will be better at removing the paint than others, and the overall desire will be to remove the PCB paints in the shortest amount of time and using a material that will contribute the least to the overall waste stream. CRETE will work with the blasting subcontractor to determine the best abrasive method which may include:

- dry ice blasting
- sandblasting
- soda blasting
- diamond grinding
- recyclable steel shot blasting (if this is viable).

A baseline sample for PCB testing will be collected from each location prior to starting the small-scale study. Upon removal of the painted surface by each of the approaches, samples will be collected and tested for PCBs and compared to the baseline data. The various paint removal approaches will be applied for differing durations and at various forces in an effort to determine an optimal paint removal strategy. Removal goals will be based on visual inspection of paint removal (per 761.79(b)(3)(ii)(B)). The efficiency of PCB removal will be determined by comparing the percentage of PCB reduction (baseline vs. post-removal concentration at each location) to the level of effort (time, power, etc.) needed to remove the paint. The engineering and health and safety controls required for each material will also be factored into the final decision.

All concrete samples (baseline and post removal samples) will be collected following EPA's Standard Operating Procedure for sampling porous surfaces for PCBs (EPA 2011; Appendix B). To collect concrete samples, a one-inch diameter (or smaller) carbide drill bit attached to a portable roto-hammer will be used to generate a fine concrete powder. Samples will be collected at ½-inch depth intervals with the initial surface sample being from 0- to ½-inch depth. Multiple holes located closely adjacent to each other may be needed to generate sufficient sample volume for analyses. Surface samples (0 – ½ inch) are planned for all areas. Sampling deeper than ½ inch may occur depending on observations during the surface sampling. A clean catch surface will be used to collect the falling powder below the drill. That powder will be combined with any concrete powder within the drill hole(s). The powder will be homogenized and placed in appropriate glassware for laboratory analysis.

The drill bit will be decontaminated between each sample location (not between adjacent holes drilled for a single sample). Gloves will be disposed after each sample is collected.

A single contractor under contract to CRETE will mobilize to the site with all equipment and material necessary to test each abrasive material selected. It is anticipated that two full days will be required for the testing. The program will retain flexibility to quickly adapt to conditions that become evident as the testing proceeds. For example, if one blasting material is found to be ineffective at the first location, it will likely not be carried forward to other locations. The blasting contractor will determine the most efficient combination of test parameters (material, time, power level/nozzle strength), and these parameters will be adjusted as the investigation proceeds. All sample areas will be contained within a pressurized environment with filtration. Select workers will wear air sampling badges during the small-scale study to evaluate PCB inhalation exposure. These samples will help determine conditions to be expected during full-scale implementation.

## 4.2 Regulated Building Materials

Collection of additional regulated building material samples, for PCB analysis, is recommended in the following areas (Figure 10):

- White wall paint on exterior walls of offices and interior of some offices in the area of Rooms 8 through 27 (up to 4 samples)
- Grey floor paint in Room 52 (1 sample)
- Pink/salmon wall paint in Rooms 57 and 58 (2 samples)
- Yellow wall paint in Rooms 92 to 94 (1 sample)
- Red floor paint in boiler room, Room 61 (1 sample)
- Roof (1 composite sample and 1 sample of silver paint).

Bulk samples of paint and caulk will be collected according ASTM Method E1729: *SOP for Field Collection of Dried Paint Sample for Subsequent Lead Determination*, with the following protocol:

- Wear a new pair of disposable gloves for each sample.

- Label sample container with its identification number. Record sample identification number, type of material, material description, substrate, location, date/time, and any other relevant observations on a sampling field form.
- Extract sample using a clean knife or hammer and chisel to cut out or scrape off approximately 50 grams of the material.
- Place sample in labeled glass or plastic laboratory-supplied jar with lid and tightly seal.
- Wipe the exterior of the container with a wet wipe to remove any material that may have adhered to it during sampling.
- Decontaminate sample tools between each sample.
- Discard gloves and wet wipes as municipal solid waste.

### 4.3 Building Debris

In addition to these samples, composite building debris samples are recommended in order to characterize the anticipated waste stream (during demolition) and define disposal requirements. Based on the homogenous nature of the building debris, 5-10 representative samples are proposed for the building. Sample collection will follow Ecology's sampling and waste characterization guidance<sup>1</sup>. This sampling method includes the following steps:

- Identify different building components for demolition across the entire waste stream.
- Wear a new pair of disposable gloves for each sample.
- Collect aliquots of each component using a power drill, or by removing portions of the component. Aliquots will be selected to ensure that the resulting composite sample will be truly representative of the component.
- To collect concrete aliquots, a one-inch diameter (or smaller) carbide drill bit attached to a portable roto-hammer will be used to generate a fine concrete powder. Samples will be collected from a 0- to ½-inch depth. A clean catch surface will be used to collect the falling powder below the drill. The drill bit will be decontaminated between each sample location.
- Mix the aliquots together in proportion to their percent by weight in the total quantity of debris being removed.
- Place sample in labeled glass or plastic laboratory-supplied jar with lid and tightly seal.
- Record sample identification number, type of material, material description, substrate, location, date/time, and any other relevant observations on a sampling field form.

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<sup>1</sup> [http://www.ecy.wa.gov/programs/hwtr/manage\\_waste/identify\\_by\\_sampling\\_demo\\_debris.html](http://www.ecy.wa.gov/programs/hwtr/manage_waste/identify_by_sampling_demo_debris.html)

- Wipe the exterior of the container with a wet wipe to remove any material that may have adhered to it during sampling.
- Decontaminate sample tools between each sample.
- Discard gloves and wet wipes as municipal solid waste.

## 4.4 Catch Basins

No additional sampling or investigation is recommended for the existing site Catch Basins. It is recommended that all site catch basins be inspected and that any sediment present be removed and filter fabric replaced if it shows signs of degradation or wear.

## 4.5 Sample Handling and Custody

Sampling containers (Table 2) will be filled to minimize head space, and will be appropriately labeled and stored prior to shipment or delivery to the laboratory. Reusable sampling equipment such as stainless steel spoons and bowls shall be decontaminated between sample locations (not between individual locations composing a composite sample).

Samples must be packed to prevent damage to the sample containers and labeled to allow sample identification. All samples must be packaged so that they do not leak, break, vaporize or cause cross-contamination of other samples. Each individual sample must be properly labeled and identified. When refrigeration is required for sample preservation, samples must be kept cool, by means of ice packs in coolers, during the time between collection and final packaging.

All samples must be clearly identified immediately upon collection. Each sample container label will list:

- Client and project name
- A unique sample description/sample ID
- Sample collection date and time.

Additionally, the sample container label may include:

- Sampler's name or initials
- Indication of addition of preservative, if applicable
- Analyses to be performed.

Chain-of-custody procedures are intended to document sample possession from the time of collection, through analysis, to disposal. Chain-of-custody forms must document transfers of sample custody. A sample is considered to be under custody if it is in one's possession, view, or in a designated secure area. The chain-of-custody record will include, at a minimum, the following information:

- Client and project name
- Sample collector's name

- Sampler's company mailing address and telephone number
- Designated recipient of data (name, email, and telephone number)
- Analytical laboratory's name and city
- Description of each sample (i.e., unique identifier and matrix)
- Date and time of collection
- Quantity of each sample or number of containers
- Type of analysis required
- Requested turn-around times
- Date and method of shipment.

When transferring custody, both the staff relinquishing custody of samples and the staff receiving custody of samples will sign, date, and note the time on the form. If samples are to leave the collector's possession for shipment to the laboratory, the subsequent packaging procedures will be followed. All samples will be stored appropriately by the laboratory.

All samples will be transported under chain-of-custody procedures to Analytical Resources Inc. (ARI) in Tukwila, Washington. All samples will be analyzed for PCB content using EPA Method 8082: PCBs by Gas Chromatography on standard turn around. ARI is accredited by the Washington State Department of Ecology and by the National Environmental Lab Accreditation program as administered by the National Laboratory Accreditation Committee for analysis of PCB Aroclors by EPA Method 8082.

**Table 2 Analytes, Reporting Limits, Methods and Sample Containers**

| Analytes     | Analytical Method | Method Reporting Limit | Media                      | Sample Container    | Laboratory |
|--------------|-------------------|------------------------|----------------------------|---------------------|------------|
| PCB Aroclors | EPA Method 8082A  | 0.8 mg/kg              | Concrete, Paint and Debris | 4-ounce amber glass | ARI        |

Notes:

Sample containers can be modified by laboratory.

mg/kg = milligrams per kilograms

## 5 Quality Objectives and Criteria

The overall data quality objective for this project is to develop and implement procedures that will ensure the collection of representative data of known and acceptable quality. The QA procedures and measurements that will be used for this project are based on EPA, and Ecology guidance (EPA 2001, 2006; Ecology 2011). Parameters related to precision, accuracy or bias, representativeness, completeness, and comparability (PARCC) are commonly used to assess the quality of environmental data. Table 3 summarizes the sample measurement quality objectives, which are discussed in more detail in the following sections.

**Table 3 Sample Measurement Quality Objectives**

| Parameter    | Method                        | Precision<br>(RPD) | Accuracy | Completeness | Preservation/<br>Storage |
|--------------|-------------------------------|--------------------|----------|--------------|--------------------------|
| EPA Aroclors | EPA Method<br>SW846-<br>8082A | 20%                | n/a      | 95%          | Cool/0-6°C               |

Note: RPD = relative percent difference.

### 5.1 Precision

Precision is a measure of how closely one result matches another result expected to have the same value. Field precision is estimated by collecting one duplicate sample for every ten field samples per sample media. Field precision is determined by the relative percent difference (RPD) between a parent sample and its duplicate.

Laboratory precision can be measured through the evaluation of laboratory control samples/duplicates (LCS/ LCSD). The laboratory will perform the analysis of 1 set of LCS/LCSD samples for every 20 field samples per sample media. Laboratory precision will be evaluated by the RPD between LCS/LCSD samples.

$$RPD = \frac{ABS(R1-R2)}{(R1+R2)/2} \times 100$$

Where:

R1 = Sample result or recovery for spiked compound

R2 = Duplicate sample result or recovery for spiked compound duplicate

For calculation of RPD using field duplicates, sample and duplicate sample results used will be the calculated totals (total PCBs) as opposed to the individual Aroclors.

### 5.2 Accuracy

Accuracy is an expression of the degree to which a measured or computed value represents the true value. Accuracy may be expressed as a percentage of the true or reference value for reference material or as spike recovery from matrix spike/matrix spike

duplicate (MS/MSD) samples. The RPD between the MS and MSD is used to evaluate laboratory precision. The following equations are used to express accuracy:

- For reference materials:
  - Percent of true value = (measured value/true value) x 100
- For spiked samples:
  - Percent recovery =  $(SQ - NQ)/(S) \times 100$

SQ = quantity of spike or surrogate found in sample

NQ = quantity found in native (unspiked) sample

S = quantity of spike or surrogate added to native sample

The performance of the method will be monitored using surrogate compounds. Surrogate standards are added to all samples, method blanks, matrix spikes and calibration standards.

## 5.3 Representativeness

Representativeness is the degree to which data from the project accurately represent a particular characteristic of the environmental matrix which is being tested. Representativeness of samples is ensured by adherence to standard field sampling protocols and standard laboratory protocols. The design of the sampling scheme and number of samples provides a representativeness of each matrix being sampled.

## 5.4 Comparability

Comparability is the qualitative similarity of one data set to another (i.e., the extent to which different data sets can be combined for use). Comparability will be addressed through the use of field and laboratory methods that are consistent with methods and procedures recommended by EPA.

## 5.5 Completeness

Completeness is a measure of the amount of data that is determined to be valid in proportion to the amount of data collected. Completeness will be calculated as follows:

Completeness =  
(number of valid measurements/ total number of data points planned) x 100

Completeness will be calculated for each matrix type. The data quality objective (DQO) for completeness for all analytes from all units is 90%. Data that have been qualified as estimated (J qualified) will be considered valid for the purpose of assessing completeness. Data that have been qualified as rejected will not be considered valid for the purpose of assessing completeness, and these data will not be used to evaluate excavation completion.

## 5.6 Laboratory QC Procedures

Additional laboratory QC procedures will be evaluated to provide supplementary information regarding overall quality of the data, performance of instruments and measurement systems and sample-specific matrix effects.

QC samples and procedures are specified in each method protocol. All QC requirements will be completed by the laboratory as described in the protocols, including the following (as applicable to each analysis):

- Instrument tuning
- Initial calibration
- Initial calibration verification
- Continuing calibration
- Calibration or instrument blanks
- Method blanks
- LCS/LCSD
- Internal standards
- Surrogate spikes
- Serial dilutions
- MS/MSD.

## 5.7 Quality Control

### 5.7.1 Laboratory Quality Control

Internal quality control procedures are designed to ensure the consistency and continuity of data. A routine QC protocol is an essential part of the analytical process. The minimum requirements for each analytical run are described here. Additional description of laboratory QA/QC procedures can be found in the laboratory's QA manual. A project narrative detailing analytical results must accompany all data packages submitted by the laboratory.

- **Initial and continuing calibration:** A calibration standard will be analyzed each time an instrument is calibrated. The instruments used to perform the analyses will be calibrated, and the calibrations will be verified as required by EPA methodologies. For example, a standard five-point initial calibration will be utilized to determine the linearity of response with the gas chromatograph/electron capture detection. Once calibrated, the system must be verified every 12 hours. All relative response factors, as specified by the analytical method, must be greater than or equal to 0.05. All relative standard deviations, as specified by the analytical method, must be less than or equal to 30 percent for the initial calibration and less than or equal to 25 percent for the continuing calibration.
- **Laboratory control sample:** The LCS is an analyte-free water or solid phase sample that is spiked with target analytes of known concentration. The LCS will be processed through the entire method procedure, and the results will be

examined for target analyte recovery (accuracy). Precision evaluations will be generated using an LCSD. The LCS/LCSD results will be used as a fall-back position by the laboratory in cases where the MS/MSD has failed to achieve acceptable recovery and/or precision. Inability to obtain acceptable LCS results will be directly related to an inability to generate acceptable results for any sample. One LCS/LCSD pair will be analyzed for each extraction batch.

- **Method blank analysis:** The method blank is utilized to rule out laboratory-introduced contamination by reagents or method preparation. Concentrations of compounds detected in the blank will be compared to the samples. Any concentration of common laboratory contaminants (i.e., phthalates, acetone, methylene chloride, or 2-butanone) in a sample lower than 10 times that found in the blank will be considered a laboratory contaminant. For other contaminants, any compounds detected at concentrations lower than five times that found in the blank will be considered laboratory contamination (EPA 2008). Values reported for the method blanks are expected to be below the detection limits for all compounds, except the common laboratory contaminants. Deviations from this must be explained in the laboratory project narrative(s). One method blank will be analyzed for each extraction/digestion batch
- **Matrix spike analysis:** An MS is the addition of a known amount of target analyte to a sample. Comparison of target analyte concentration in the spiked sample to that in the unspiked sample (background) using the equation in Section A7.2 is used to determine accuracy (the ability of the test to provide measured results matching the true concentration). Precision is determined with an MS/MSD pair (RPD equation in Section A7.1). One MS/MSD will be analyzed in every 20 samples.
- **Surrogate evaluations:** Surrogate recovery is a QC measure used in organics analyses. Surrogates are compounds added to every sample at the initiation of preparation to monitor the success of the sample preparation on an individual sample basis (accuracy). Although some methods have established surrogate recovery acceptance criteria that are part of the method or contract compliance, for the most part, acceptable surrogate recoveries need to be determined by the laboratory. Recoveries of surrogates will be calculated for all samples, blanks and QC samples. Acceptance limits will be listed for each surrogate and sample type and will be compared against the actual result by the data validator.
- **Laboratory management review:** The Laboratory QA Officer will review all analytical results prior to final external distribution (preliminary results will be reported before this review). If the QA Officer finds that the data meet project quality requirements, the data will be released as “final” information. Data which are not acceptable will be held until the problems are resolved, or the data will be flagged appropriately.

### **5.7.2 Data Review, Verification and Validation**

EPA method control limits for surrogate and MS recoveries will be used to determine data quality. If surrogate or MS recoveries are not within their method-specific control limits, the analysis must be repeated. If the re-analyzed values are within required limits and holding times, they will be reported as true values. If, in the repeated analysis, the values are still outside required limits, the data will be identified and the data validator will verify the representativeness of the data following EPA guidelines. Laboratory analysts are responsible for reviewing calibration integrity, sample holding times, method compliance and completeness of tests, forms and log books.

### **5.7.3 Verification and Validation Methods**

Analytes detected at concentrations between the MRL and the method detection limit (MDL) will be reported with a J qualifier to indicate that the value is an estimate (i.e., the analyte concentration is below the calibration range). J-qualified data are considered valid when completeness is calculated. Undetected data will be reported at the MRL. The MRL will be adjusted by the laboratory as necessary to reflect sample dilution or matrix interference.

Verification of completeness and method compliance, as well as raw data entry and calculations by analysts will be reviewed by the Laboratory QA Officer. The Laboratory QA Officer will be responsible for checking each group or test data package for precision, accuracy, method compliance, compliance to special client requirements and completeness. The Laboratory QA Officer will also be responsible certifying that data in PDFs and EDDs are identical prior to release from the laboratory.

### **5.7.4 Field Quality Control**

Field QC samples (duplicates and rinsate blanks) are useful in identifying problems with sample collection or sample processing. A minimum of one duplicate sample will be collected from the material homogenized from every 10 field samples per sample matrix. Each field duplicate will be analyzed for the same parameters as the parent samples to evaluate heterogeneity attributable to sample handling. The RPD for homogenate duplicate samples must be below 50% for the data to be acceptable.

At least one equipment rinsate sample will be collected after equipment decontamination for every 20 samples collected per matrix. Equipment rinsate blanks will be collected for each type of sampling equipment that comes into contact with sample material, and will be analyzed for the same parameters as the samples which the equipment was used to collect.

### **5.7.5 Testing, Inspection and Maintenance**

The primary objective of an instrument/equipment testing, inspection and maintenance program is to help ensure the timely and effective completion of a measurement effort by

minimizing the downtime of crucial sampling and/or analytical equipment due to expected or unexpected component failure.

Testing, inspection and maintenance will be carried out on all field and laboratory instrumentation and equipment in accordance with manufacturer's recommendations and with professional judgment. Analytical laboratory equipment preventative testing, inspection and maintenance is addressed in the laboratory QA manual, which will be kept on file at the contracted laboratory.

As appropriate, schedules and records of calibration and maintenance of field equipment will be maintained in the field notebook. Equipment that is out of calibration or is malfunctioning will be removed from operation until it is recalibrated or repaired.

## **Instrument and Equipment Calibration and Frequency**

Field equipment used for sample collection will be subject to the following calibration requirements:

- **Identification.** Either the manufacturer's serial number or the calibration system identification number will be used to uniquely identify equipment. This identification, along with a label indicating when the next calibration is due, will be attached to the equipment. If this is not possible, records traceable to the equipment will be readily available for reference.
- **Standards.** Equipment will be calibrated, whenever possible, against reference standards having known valid relationships to nationally recognized standards (e.g., National Institute of Standards and Technology) or accepted values of natural physical constraints. If national standards do not exist, the basis for calibration will be described and documented.
- **Frequency.** Equipment will be calibrated at prescribed intervals and/or prior to use. Frequency will be based on the type of equipment, inherent stability, manufacturers' recommendations, intended use, and observation of equipment readings over the course of the field work. All sensitive equipment to be used in the field or laboratory will be calibrated or checked prior to use.
- **Records.** Calibration records (certifications, logs, etc.) will be maintained for all measuring and test equipment used.

If equipment is found to be out of calibration, the validity of previous measurements will be investigated and/or corrective action will be implemented. The laboratory Project Manager will lead the evaluation process, which will be document in the field or laboratory log book.

All laboratory calibration requirements must be met before sample analysis may begin. The laboratory will follow the calibration procedures dictated by the analytical methods to be performed. If calibration non-conformances are noted, samples will be reanalyzed under compliant calibration conditions within method-specified hold times (likely not applicable because analyses are to be expedited).

## 5.8 Special Training and Certification

Specific training requirements for performing field work, which may bring employees in contact with hazardous materials include:

- All field personnel assigned to the site must have successfully completed 40 hours of training for work (with current annual 8-hour refresher training) related to hazardous waste and emergency response (HAZWOPER) in accordance with Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) 1910.120(e). Documentation of OSHA training is required prior to personnel being permitted to work on site.
- Personnel managing or supervising work on site will also have successfully completed 8 hours of manager/supervisor training meeting the OSHA requirements specified in 29 CFR 1910.120(e)(4).
- Personnel assigned to the site must be enrolled in a medical surveillance program meeting the requirements of 29 CFR 1910.120(f). Personnel must have successfully passed an occupational physical during the past 12 months and be medically cleared to work on a hazardous waste site and capable of wearing appropriate personal protective equipment.
- Personnel performing the sampling work must have extensive knowledge, skill and demonstrated experience in the execution of the sampling methods.

## 5.9 Documents and Records

All field activities and observations will be noted in a field log book at the time they occur. Information will include personnel, date, time, station designation, sampler, types and number of samples collected, weather conditions, concurrent site activities, health and safety meetings conducted (tailgate meeting) and general observations. Any changes that occur at the site (e.g., personnel, responsibilities, deviations from this plan) and the reasons for these changes will be documented in the field log book.

All field activities and observations will be noted in a field log book during fieldwork. The descriptions will be clearly written with enough detail so that participants can reconstruct events later if necessary. Requirements for log book entries include:

- Entries will be made legibly with black (or dark) waterproof ink.
- Unbiased, accurate language will be used.
- Entries will be made while activities are in progress or as soon afterward as possible (the date and time that the notation is made should be noted, as well as the time of the observation itself).
- Each consecutive day's first entry will be made on a new, blank page.
- The date and time, based on a 24-hour (military) clock (e.g., 0900 a.m. for 9 a.m. and 2100 for 9 p.m.), will appear on each page.
- When field activity is complete, the log book will be entered into the project file.

- The person recording the information must initial and date each page of the field log book. If more than one individual makes entries on the same page, each recorder must initial and date each entry. The bottom of the page must be signed and dated by the individual who makes the last entry.

Log book corrections will be made by drawing a single line through the original entry allowing the original entry to be read. The corrected entry will be written alongside the original. Corrections will be initialed, dated and explained.

All laboratory deliverables with verifiable supporting documentation shall be submitted by the laboratory to the CRETE QA Officer. The following documents will be archived at the laboratory: 1) signed hard copies of sampling and chain-of-custody records; and 2) electronic files of analytical data including extraction and sample preparation bench sheets, raw data and reduced analytical data. The laboratory will store all laboratory documentation of sample receipt and login; sample extraction, cleanup, and analysis; and instrument output in accordance with the laboratory Standard Operating Procedure or QA manual.

PDFs of all analytical reports will be retained in the laboratory files, and at the discretion of laboratory management, the data will be stored electronically for a minimum of one year. After one year, or whenever the data become inactive, the files will be transferred to archives in accordance with standard laboratory procedure. Data may be retrieved from archives upon request.

## 6 References

EMS 2005. Letter re: Near Surface Soil Investigation, 1940 East 11<sup>th</sup>. Environmental Management Services, LLC. September 14, 2005.

EPA 2011. Standard Operating Procedure for Sampling Porous Surfaces for Polychlorinated Biphenyls (PCBs), Revision 4. Environmental Protection Agency. May 5, 2011.

PCE 2010. Data Gaps Investigation Report. Former Sound Mattress and Felt Property. Pacific Crest Environmental, LLC. August 4, 2010.

Pioneer 2012A. Brown & Haley Building Materials Characterization Sampling. Pacific Crest Environmental, LLC. Pioneer Technologies Corporation. March 29, 2012.

Pioneer 2012B. 1940 East 11<sup>th</sup> Street Building Materials and Soil/Sediment Characterization Sampling. Pioneer Technologies Corporation. June 6, 2012.

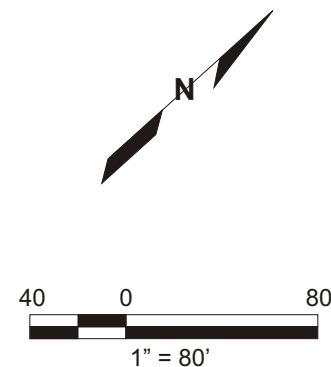
Pioneer 2012C. 1940 East 11th Street Building Additional Soil Characterization Sampling. Pioneer Technologies Corporation. August 22, 2012

Pioneer 2012D. 1940 East 11<sup>th</sup> Street Building Soil Excavation Sampling and Documentation. Port of Tacoma, WA. Pioneer Technologies Corporation. September 13, 2012.

Pioneer 2013. Port of Tacoma, 1940 East 11<sup>th</sup> Street Building Direct-Push PCB Groundwater Sampling. Pioneer Technologies Corporation. April 19, 2013.

Saltbush 1991. Phase 1 Environmental Site Assessment The 11<sup>th</sup> Street Project (Subject Site: 1940 E. 11<sup>th</sup> Street and 1160 Thorne Road Tacoma WA). Saltbush Environmental Services. November 22, 1991.

## Figures



**CRETE**  
CONSULTING, INC.

1940 EAST 11TH STREET BUILDING  
POPT OF TACOMA

DATE: 1/20/2014

DRWN: bts

SITE MAP - 1940 EAST 11TH STREET

FIGURE 1

**Figure 2 1940 East 11th Street Building 1st Floor Sample Locations and Data**

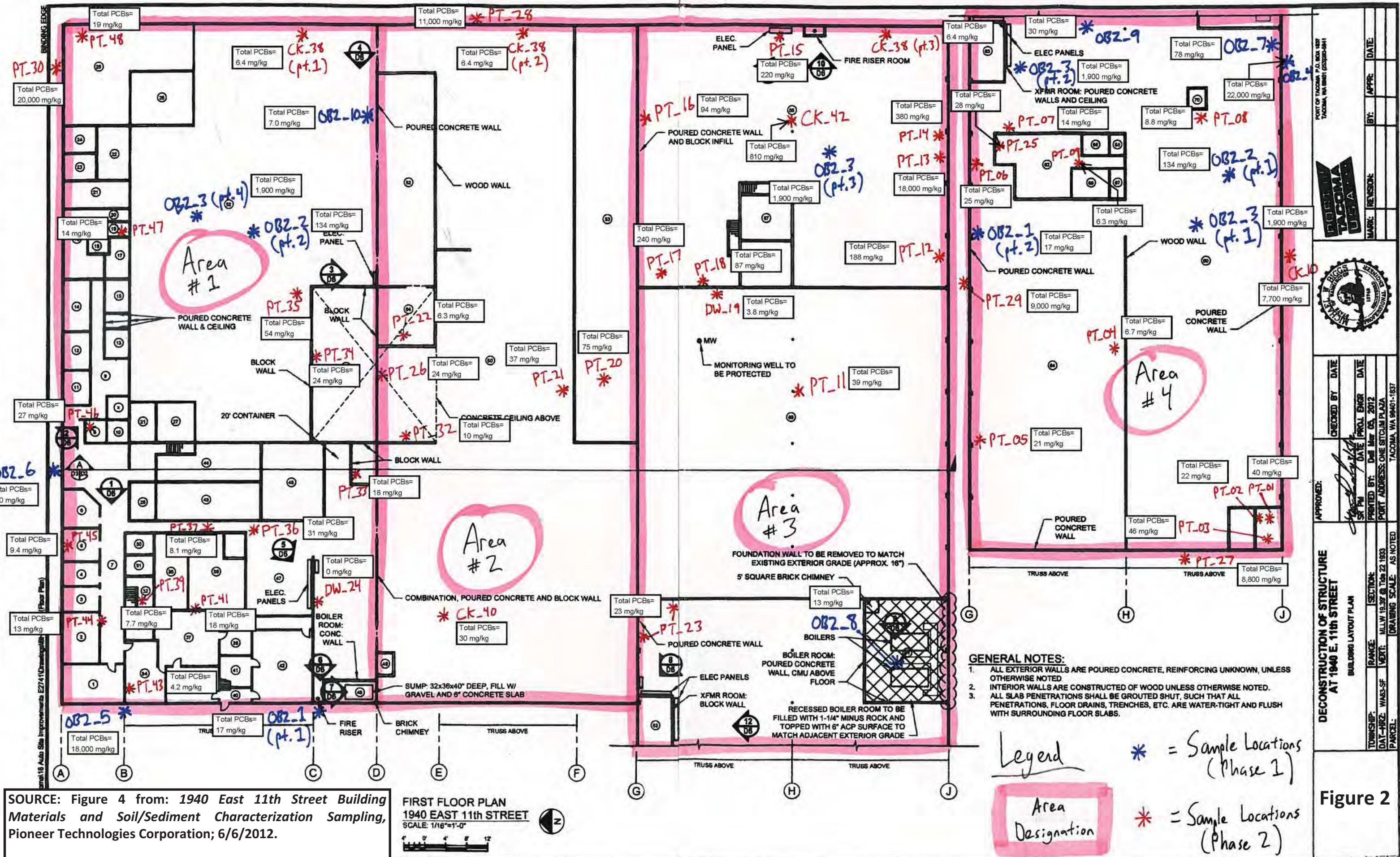
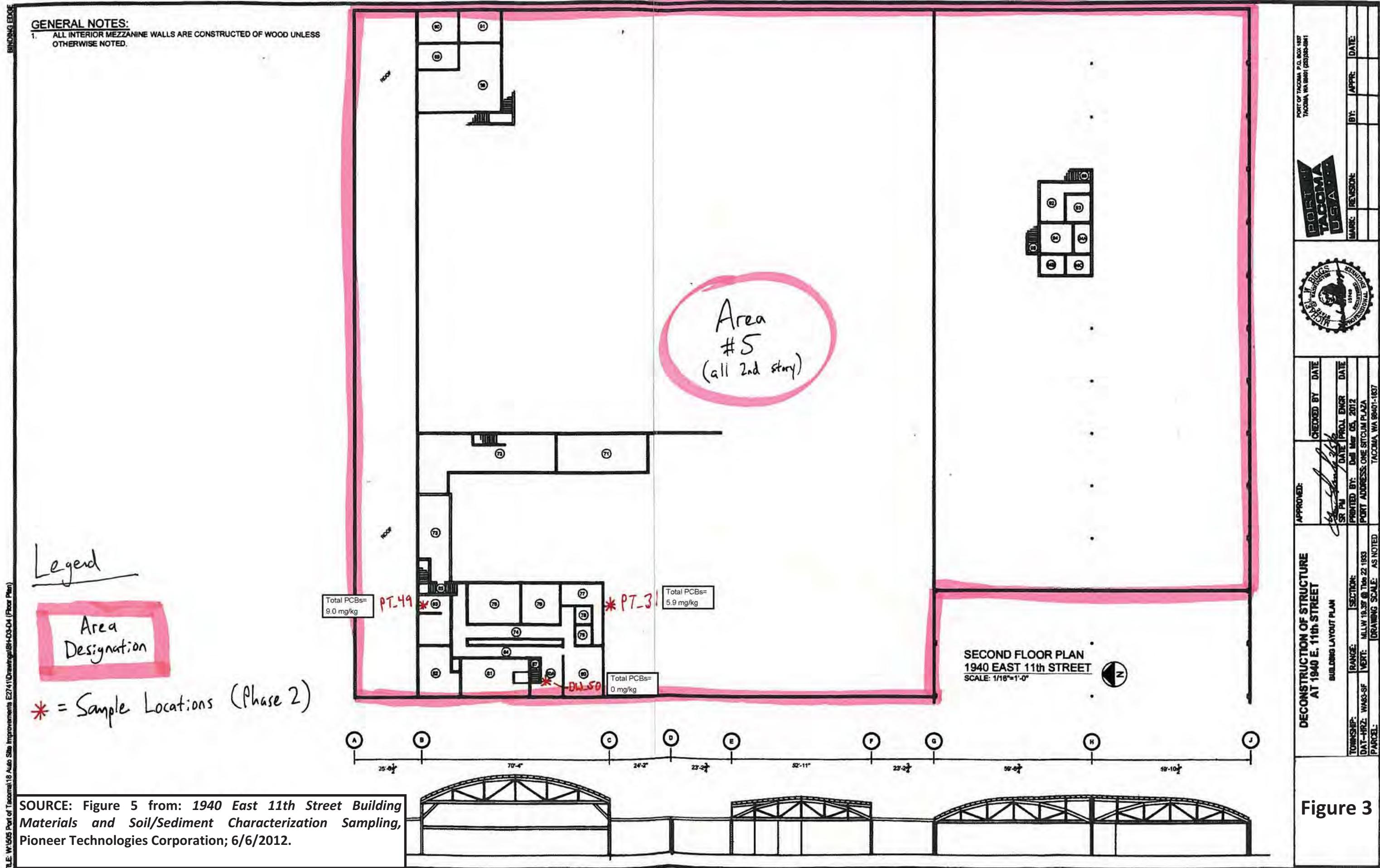


Figure 3 1940 East 11th Street Building 2nd Floor Sample Locations and Data

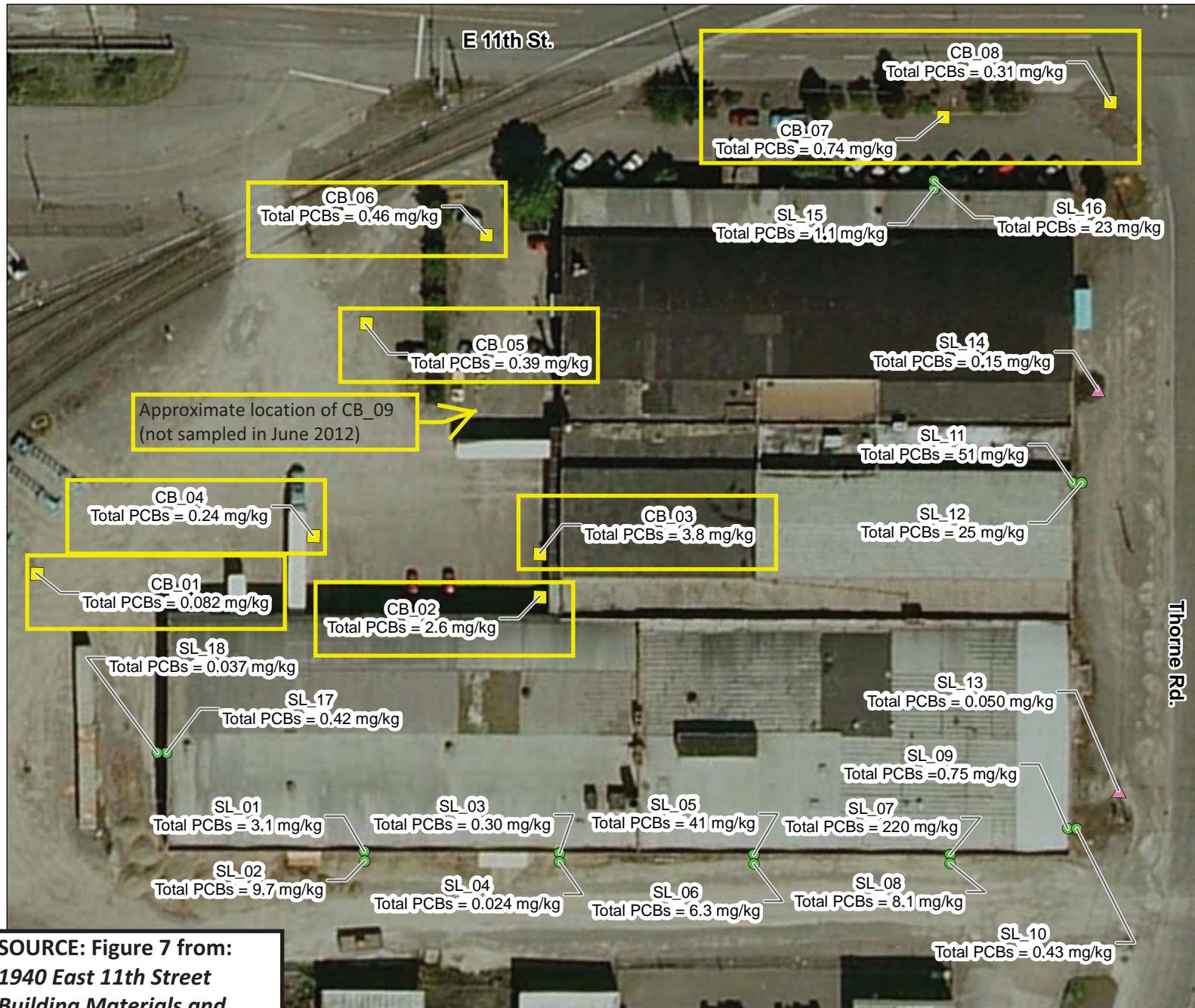




SOURCE: Figure 4 from: 1940 East 11th Street Building Materials and Soil/Sediment Characterization Sampling, Pioneer Technologies Corporation; 8/22/2012.

1940 East 11th Street Building Phase 2 and Phase 3 Soil Sample Locations and Data  
1940 East 11th Street Building Additional Soil Characterization Sampling  
Port of Tacoma, Tacoma, Washington

Figure 4



### Phase

#### Phase 2 Sample Locations

- ▲ Exterior Shallow Soil Depression Area
- Exterior Shallow Soil & Step-Outs
- Exterior Sediment Catch Basins

Notes:  
PCBs: Polychlorinated biphenyls

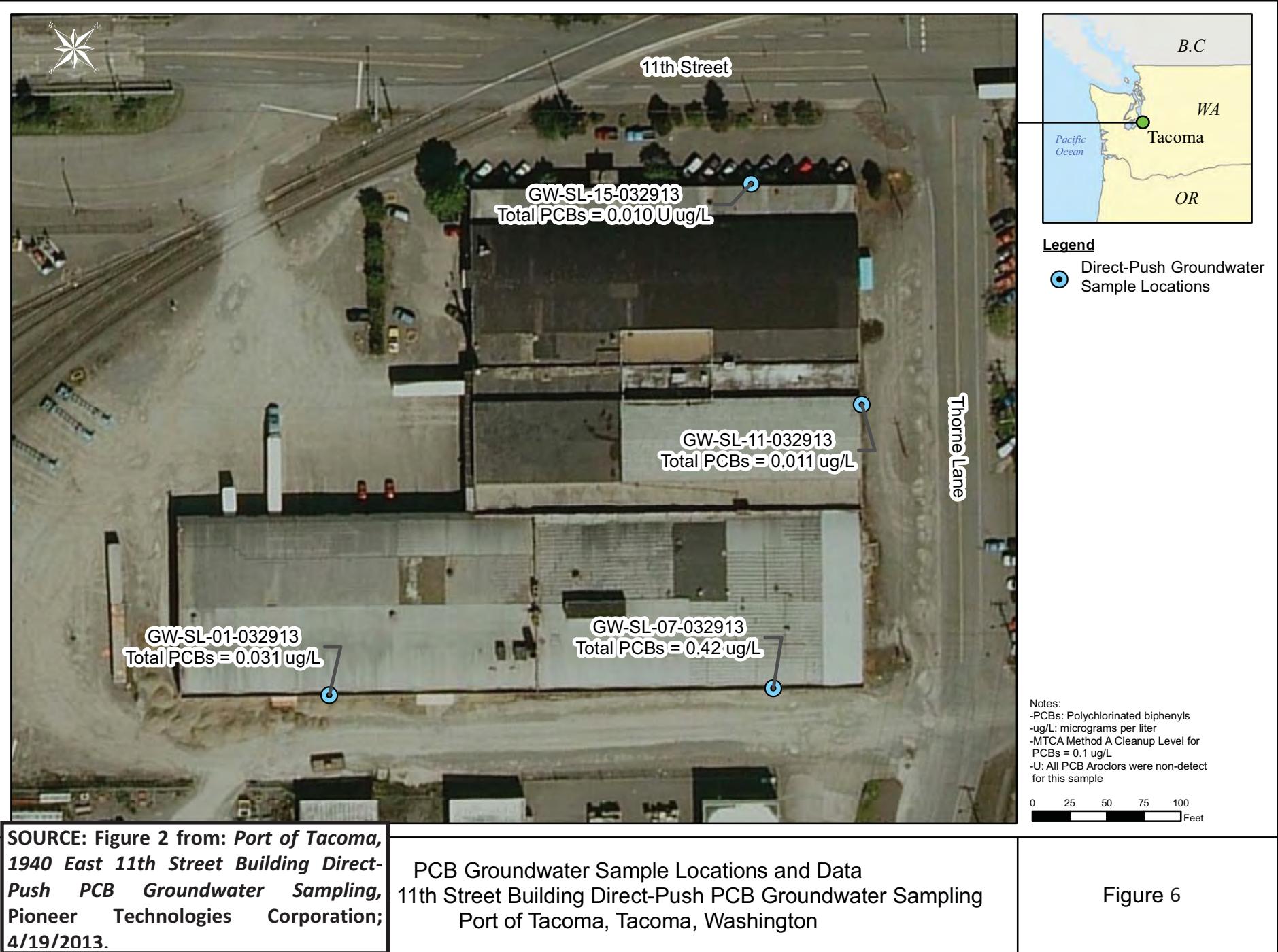
0 25 50 100  
Feet

**SOURCE: Figure 7 from:**  
**1940 East 11th Street**  
**Building Materials and**  
**Soil/Sediment**  
**Characterization Sampling,**  
**Pioneer Technologies**  
**Corporation; 6/6/2012.**

1940 East 11th Street Building Exterior Soil and Sediment Sample Locations and Data  
 1940 East 11th Street Building Materials and Soil/Sediment Characterization Sampling  
 Port of Tacoma, Tacoma, Washington

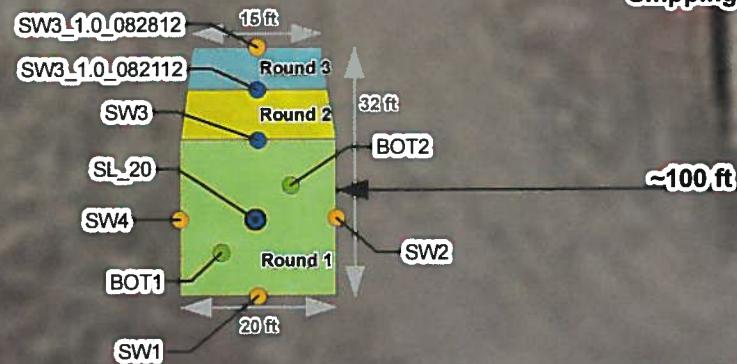
|       |           |             |
|-------|-----------|-------------|
| DWN:  | SM        | PROJECT:    |
| DATE: | June 2012 | FIGURE NO.: |

5



| Location ID    | Sample Depth (ft bgs) | Sample Type      | Total PCBs (mg/kg) | Soil Was Excavated? |
|----------------|-----------------------|------------------|--------------------|---------------------|
| SL_20          | 0-0.5                 | Characterization | 13                 | Yes                 |
| SL_20          | 0.5-1.0               | Characterization | 4.2                | Yes                 |
| SW1            | 0-0.5                 | Sidewall         | 0.15               | No - Below CUL      |
| SW2            | 0-0.5                 | Sidewall         | 0.18               | No - Below CUL      |
| SW3            | 0-0.5                 | Sidewall         | 1.6                | Yes                 |
| SW4            | 0-0.5                 | Sidewall         | 0.40               | No - Below CUL      |
| BOT1           | 1.0                   | Bottom           | 0.044              | No - Below CUL      |
| BOT2           | 1.0                   | Bottom           | 0.10               | No - Below CUL      |
| SW3 1.0 082112 | 0-1.0                 | Sidewall         | 1.6                | Yes                 |
| SW3 1.0 082812 | 0-1.0                 | Sidewall         | 0.29               | No - Below CUL      |

## Excavation Area

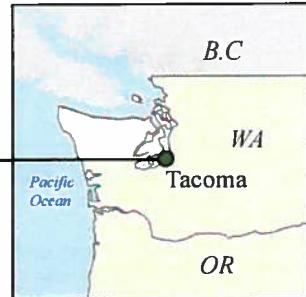


**SOURCE: Figure 3 from:**  
**1940 East 11th Street**  
**Building Soil Excavation**  
**Sampling and**  
**Documentation, Pioneer**  
**Technologies**  
**Corporation; 9/13/2012.**

Sources: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

**Soil Excavation Area and Confirmation Sample Results**  
**1940 East 11th Street Building Soil Excavation Sampling and Documentation**  
**Port of Tacoma, Tacoma, Washington**

Figure 7



### Legend

#### Soil Samples

- Confirmation - Bottom
- Confirmation - Sidewall
- Confirmation - Bottom
- Exceeded CUL (Excavated)
- Original SL\_20 Location
- Exceeded CUL (Excavated)

#### Excavations By Date

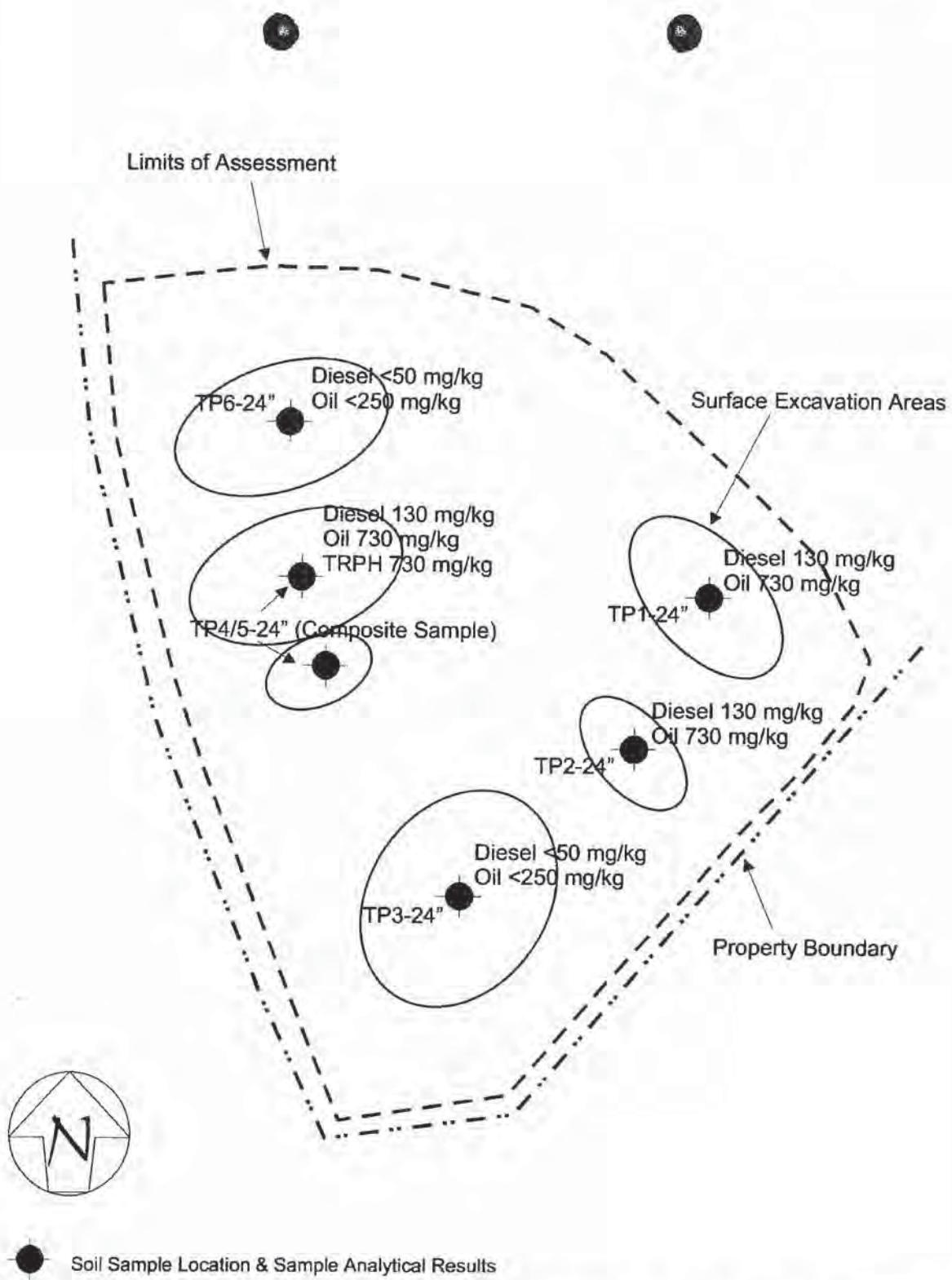
- 8/15/2012, Round 1
- 8/21/2012, Round 2
- 8/28/2012, Round 3

#### Notes:

The excavation area was advanced to 1.0 ft bgs. The excavation area shown is approximate.

Shaded cells denote samples with Total PCB concentrations greater than or equal to the CUL. CUL: MTCA Method A Soil PCB Cleanup Level (1.0 mg/kg) (WAC 173-340-740(2)) ft bgs: feet below ground surface mg/kg: milligrams per kilogram PCBs: polychlorinated biphenyls

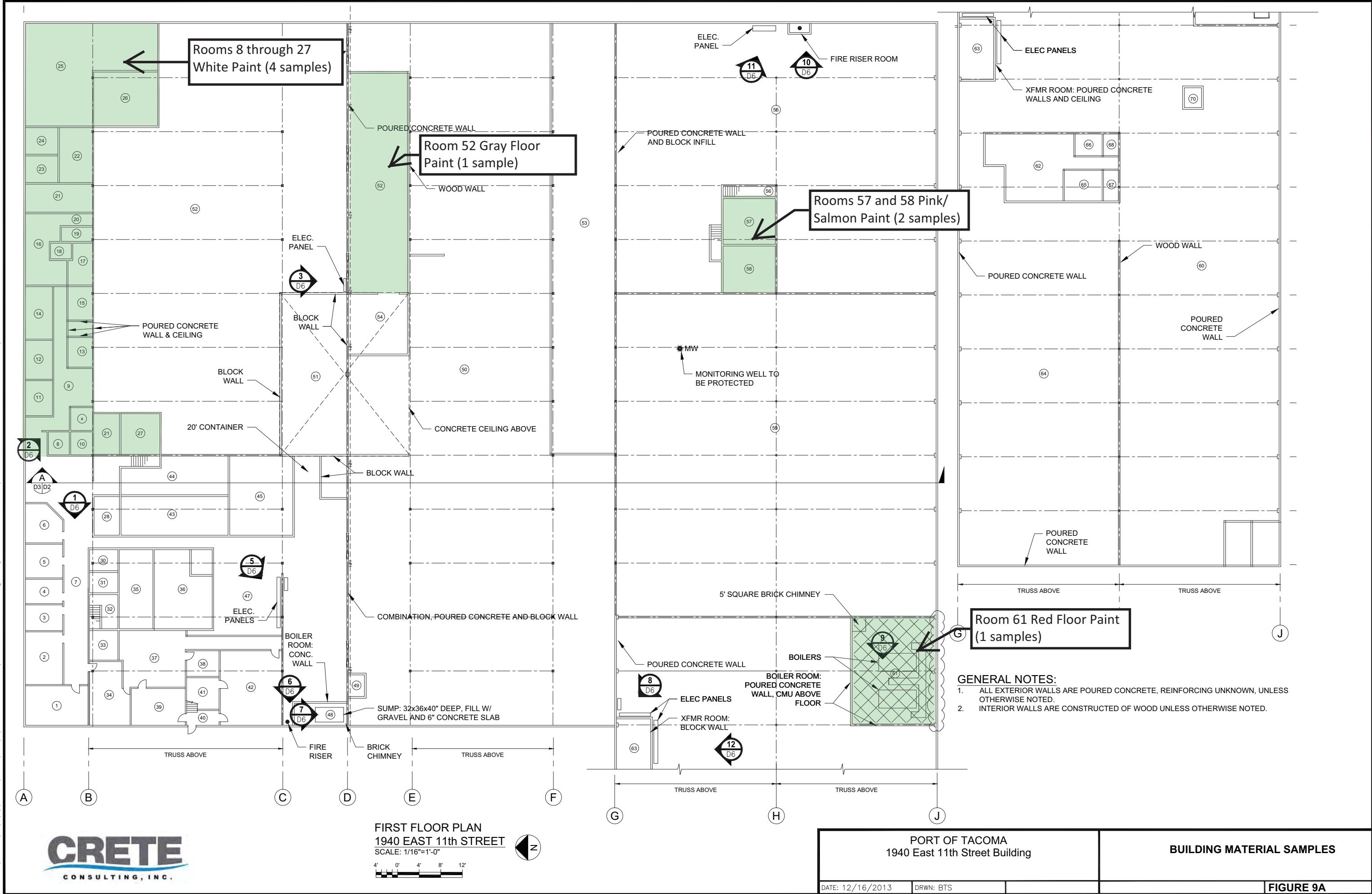
0 20 40 Feet



**SOURCE:** Figure 4 from: Letter re: Near Surface Soil Investigation, 1940 East 11<sup>th</sup>; 9/14/2005.

**Figure Title:** 2005 Near Surface Soil Investigation

**Figure 8**



**GENERAL NOTES:**  
1. ALL INTERIOR MEZZANINE WALLS ARE CONSTRUCTED OF WOOD UNLESS OTHERWISE NOTED.



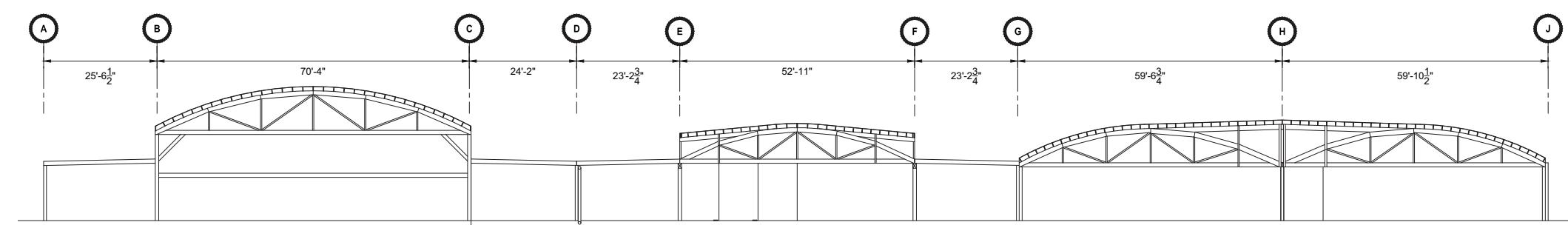
PORT OF TACOMA  
1940 East 11th Street Building

DATE: 12/16/2013 DRAWN: BIS

BUILDING MATERIAL SAMPLES

FIGURE 9B

SECTION  
1940 EAST 11th STREET  
SCALE: 1/16"=1'-0"



4/7/2014



## **Attachment B**

### **Photo Log**



Interior Blasting Containment System



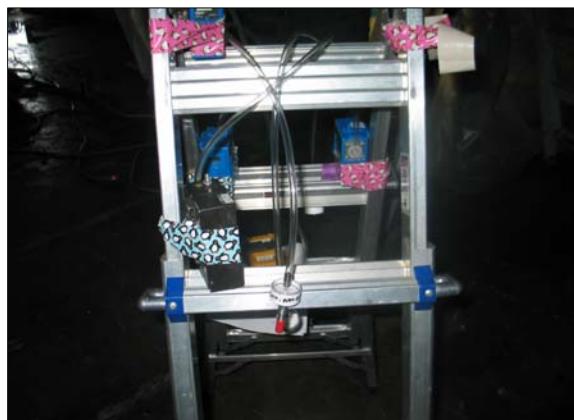
Roto-hammer used to Obtain Concrete Wall Samples



Sample Collection Pan



Personal Air Quality Monitoring System



Ambient Air Monitoring System



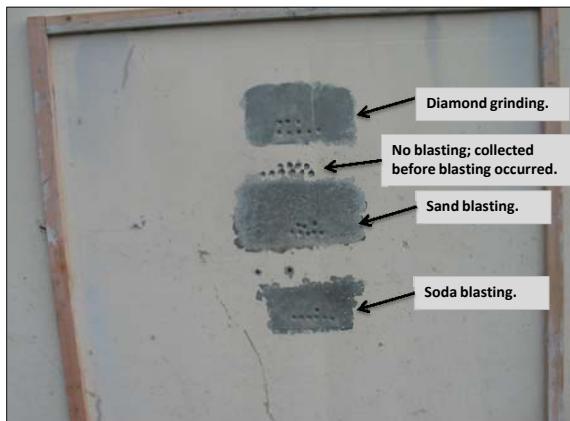
Interior Wall Concrete Sample in Collection Pan



Exterior Blasting Containment System and Personal Protective Equipment



Yellow Exterior Wall 1 (Ext\_Y1) Sample Collection Surface  
Blasting techniques indicated on wall.



Yellow Exterior Wall 2 (Ext\_Y2) Sample Collection Surface



Yellow Exterior Wall 3 (Ext\_Y3) Sample Collection Surface



Close Up of Sample Collection Drill Holes



Blast Material/Paint Chip Waste Storage

**Condition of Concrete Exterior Wall Surface after Blasting**



4/7/2014



## **Attachment C**

### **Analytical Resources Inc. Laboratory Reports**



**Analytical Resources, Incorporated**  
Analytical Chemists and Consultants

March 7, 2014

Jamie Stevens  
Crete Consulting  
100 S. King Street, Suite 240  
Seattle, Washington 98104

**RE: Client Project: POT 1940  
ARI Job No. YA18**

Dear Jamie:

Please find enclosed the original chain of custody record and the final results for the samples from the project referenced above. Eighteen concrete samples were received on February 20, 2014.

The samples were analyzed for PCBs, as requested.

The surrogate TCMX is out of control high in the original analysis of samples EXT-Y2-Base and EXT-Y1-DI20140219. The samples were re-analyzed at dilutions with surrogate recoveries diluted out of reportable ranges but within control.

The analysis proceeded without any other incident of note.

A copy of these reports will remain on file at ARI. Should you have any questions or need additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

A handwritten signature in black ink, appearing to read "Kelly Bottem".  
Kelly Bottem  
Client Services Manager  
206/695-6211  
[kellyb@arilabs.com](mailto:kellyb@arilabs.com)

Enclosures

cc: file YA18

KFB/kfb

## Chain of Custody Record & Laboratory Analysis Request

|  |                        |  |
|--|------------------------|--|
| ARI Assigned Number: <b>YAH18</b>                        | Turn-around Requested: | Page: <b>1</b> of <b>2</b>                 |
| ARI Client Company: <b>CEC CONSULTING (206) 791-2744</b> | Phone:                 | Date: <b>2/20/14</b> Ice Present? <b>Y</b> |
| Client Contact: <b>JAMIE STEVENS</b>                     | No. of Coolers:        | Cooler Temps: <b>3,0</b>                   |
| Client Project Name: <b>D-1940</b>                       | Analysis Requested     |  |

| Sample ID                     | Date    | Time                       | Matrix                         | No. Containers             | Notes/Comments  |  |
|-------------------------------|---------|----------------------------|--------------------------------|----------------------------|---|--|
|                               |         |                            |                                |                            | Analysis Requested  |  |
| EXT-Y1-BASE                   | 2/17/14 | 11:30                      | Concrete Dust                  | 1                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> |  |
| EXT-Y2-BASE                   | 2/19/14 | 8:30                       |                                | 1                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |  |
| EXT-Y3-BASE                   | 2/19/14 | 10:50                      |                                | 1                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |  |
| EXT-Y1-20140219               | 2/19/14 | 1:35                       |                                | 1                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |  |
| EXT-Y1-DI-20140219            | 2/19/14 | 1:43                       |                                | 1                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |  |
| EXT-Y1-SA-20140219            | 2/19/14 | 1:52                       |                                | 1                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |  |
| EXT-Y1-SO-20140219            | 2/19/14 | 2:00                       |                                | 1                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |  |
| EXT-Y2-DM-20140219            | 2/19/14 | 9:50                       |                                | 1                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |  |
| EXT-Y2-SA-20140219            | 2/19/14 | 9:58                       |                                | 1                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |  |
| EXT-Y2-SO-20140219            | 2/19/14 | 10:05                      |                                | 1                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |  |
| Comments/Special Instructions |         | Received by<br>(Signature) | Relinquished by<br>(Signature) | Received by<br>(Signature) |   |  |
|                               |         | Printed Name               | Printed Name                   |                            |   |  |
|                               |         | CEC CONSULTING             | A. Volgasoren                  |                            |   |  |
|                               |         | Company                    | Company                        |                            |   |  |
|                               |         | Date & Time                | Date & Time                    | Date & Time                |   |  |
|                               |         | <b>2/20/14 4:02</b>        | <b>2/20/14 11:02</b>           |                            |   |  |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

YAH18:000002





ARI Client: Crete Consulting  
COC No(s): Y A 18  NA  
Assigned ARI Job No: Y A 18

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler?  YES  NO

Were custody papers included with the cooler?  YES  NO

Were custody papers properly filled out (ink, signed, etc.)  YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)  
Time 1600 30

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 90877953

Cooler Accepted by: AN Date 3/20/14 Time. 1602

**Complete custody forms and attach all shipping documents**

**Log-In Phase:**

Was a temperature blank included in the cooler?  YES  NO

What kind of packing material was used? .. Bubble Wrap  Wet Ice  Gel Packs  Baggies  Foam Block  Paper  Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)?  YES  NO

Were all bottles sealed in individual plastic bags?  YES  NO

Did all bottles arrive in good condition (unbroken)?  YES  NO

Were all bottle labels complete and legible?  YES  NO

Did the number of containers listed on COC match with the number of containers received?  YES  NO

Did all bottle labels and tags agree with custody papers?  YES  NO

Were all bottles used correct for the requested analyses?  YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...  NA  YES  NO

Were all VOC vials free of air bubbles?  NA  YES  NO

Was sufficient amount of sample sent in each bottle?  YES  NO

Date VOC Trip Blank was made at ARI ..  NA

Was Sample Split by ARI:  NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: JM Date. 2/21/14 Time: 856

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**

By: \_\_\_\_\_ Date: \_\_\_\_\_

|   |                                      |   |   |
|---|--------------------------------------|---|---|
| <b>Small Air Bubbles</b><br>~2mm<br>• • • | <b>Peabubbles</b><br>2-4 mm<br>• • • | <b>LARGE Air Bubbles</b><br>> 4 mm<br>• • • | <b>Small</b> → "sm" (< 2 mm)<br><b>Peabubbles</b> → "pb" (2 to < 4 mm)<br><b>Large</b> → "lg" (4 to < 6 mm)<br><b>Headspace</b> → "hs" (> 6 mm) |
|   |                                      |   |   |
|   |                                      |   |   |
|   |                                      |   |   |
|   |                                      |   |   |

# Sample ID Cross Reference Report



ARI Job No: YA18  
Client: Crete Consulting  
Project Event: N/A  
Project Name: POT 1940

| Sample ID              | ARI Lab ID | ARI LIMS ID | Matrix      | Sample Date/Time | VTSR           |
|------------------------|------------|-------------|-------------|------------------|----------------|
| 1. EXT-Y1-BASE         | YA18A      | 14-2941     | Concrete Du | 02/17/14 11:30   | 02/20/14 16:02 |
| 2. EXT-Y2-BASE         | YA18B      | 14-2942     | Concrete Du | 02/19/14 08:30   | 02/20/14 16:02 |
| 3. EXT-Y3-BASE         | YA18C      | 14-2943     | Concrete Du | 02/19/14 10:50   | 02/20/14 16:02 |
| 4. EXT-Y1-DM-20140219  | YA18D      | 14-2944     | Concrete Du | 02/19/14 13:35   | 02/20/14 16:02 |
| 5. EXT-Y1-DI-20140219  | YA18E      | 14-2945     | Concrete Du | 02/19/14 13:43   | 02/20/14 16:02 |
| 6. EXT-Y1-SA-20140219  | YA18F      | 14-2946     | Concrete Du | 02/19/14 13:52   | 02/20/14 16:02 |
| 7. EXT-Y1-SO-20140219  | YA18G      | 14-2947     | Concrete Du | 02/19/14 14:00   | 02/20/14 16:02 |
| 8. EXT-Y2-DM-20140219  | YA18H      | 14-2948     | Concrete Du | 02/19/14 09:50   | 02/20/14 16:02 |
| 9. EXT-Y2-SA-20140219  | YA18I      | 14-2949     | Concrete Du | 02/19/14 09:58   | 02/20/14 16:02 |
| 10. EXT-Y2-SO-20140219 | YA18J      | 14-2950     | Concrete Du | 02/19/14 10:05   | 02/20/14 16:02 |
| 11. EXT-Y3-SO-20140219 | YA18K      | 14-2951     | Concrete Du | 02/19/14 12:05   | 02/20/14 16:02 |
| 12. EXT-Y3-SA-20140219 | YA18L      | 14-2952     | Concrete Du | 02/19/14 11:55   | 02/20/14 16:02 |
| 13. EXT-Y3-DM-20140219 | YA18M      | 14-2953     | Concrete Du | 02/19/14 12:15   | 02/20/14 16:02 |
| 14. INT-G1-SA-20140220 | YA18N      | 14-2954     | Concrete Du | 02/20/14 11:10   | 02/20/14 16:02 |
| 15. INT-G11-BASE       | YA18O      | 14-2955     | Concrete Du | 02/20/14 09:40   | 02/20/14 16:02 |
| 16. INT-G1-BASE        | YA18P      | 14-2956     | Concrete Du | 02/20/14 09:30   | 02/20/14 16:02 |
| 17. INT-G1-DM-20140220 | YA18Q      | 14-2957     | Concrete Du | 02/20/14 10:50   | 02/20/14 16:02 |
| 18. INT-G1-SO-20140220 | YA18R      | 14-2958     | Concrete Du | 02/20/14 11:00   | 02/20/14 16:02 |

Printed 02/21/14 Page 1 of 1

YA18 : 00005

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
Page 1 of 1



Sample ID: EXT-Y1-BASE  
SAMPLE

Lab Sample ID: YA18A  
LIMS ID: 14-2941  
Matrix: Concrete Dust *(Signature)*  
Data Release Authorized: *(Signature)*  
Reported: 03/06/14

Date Extracted: 02/27/14  
Date Analyzed: 03/03/14 19:42  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/17/14  
Date Received: 02/20/14

Sample Amount: 1.00 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 50.0  
Silica Gel: No

Percent Moisture: 0.5%

| CAS Number        | Analyte             | RL             | Result             |
|-------------------|---------------------|----------------|--------------------|
| 12674-11-2        | Aroclor 1016        | 200,000        | < 200,000 U        |
| 53469-21-9        | Aroclor 1242        | 200,000        | < 200,000 U        |
| 12672-29-6        | Aroclor 1248        | 400,000        | < 400,000 Y        |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>200,000</b> | <b>4,200,000 E</b> |
| 11096-82-5        | Aroclor 1260        | 400,000        | < 400,000 Y        |
| 11104-28-2        | Aroclor 1221        | 200,000        | < 200,000 U        |
| 11141-16-5        | Aroclor 1232        | 200,000        | < 200,000 U        |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                       |   |
|-----------------------|---|
| Decachlorobiphenyl    | D |
| Tetrachlorometaxylene | D |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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Sample ID: EXT-Y1-BASE  
DILUTION

Lab Sample ID: YA18A  
LIMS ID: 14-2941  
Matrix: Concrete Dust  
Data Release Authorized: *B*  
Reported: 03/06/14

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/17/14  
Date Received: 02/20/14

Date Extracted: 02/27/14  
Date Analyzed: 03/04/14 09:31  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

Sample Amount: 1.00 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 250  
Silica Gel: No

Percent Moisture: 0.5%

| CAS Number        | Analyte             | RL             | Result           |
|-------------------|---------------------|----------------|------------------|
| 12674-11-2        | Aroclor 1016        | 500,000        | < 500,000 U      |
| 53469-21-9        | Aroclor 1242        | 500,000        | < 500,000 U      |
| 12672-29-6        | Aroclor 1248        | 690,000        | < 690,000 Y      |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>500,000</b> | <b>4,600,000</b> |
| 11096-82-5        | Aroclor 1260        | 500,000        | < 500,000 U      |
| 11104-28-2        | Aroclor 1221        | 500,000        | < 500,000 U      |
| 11141-16-5        | Aroclor 1232        | 500,000        | < 500,000 U      |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                       |   |
|-----------------------|---|
| Decachlorobiphenyl    | D |
| Tetrachlorometaxylene | D |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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ANALYTICAL  
RESOURCES  
INCORPORATED

Sample ID: EXT-Y2-BASE  
SAMPLE

Lab Sample ID: YA18B  
LIMS ID: 14-2942  
Matrix: Concrete Dust  
Data Release Authorized: *R*  
Reported: 03/06/14

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/19/14  
Date Received: 02/20/14

Date Extracted: 02/27/14  
Date Analyzed: 03/03/14 20:04  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

Sample Amount: 0.97 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 25.0  
Silica Gel: No

Percent Moisture: 3.0%

| CAS Number        | Analyte             | RL             | Result             |
|-------------------|---------------------|----------------|--------------------|
| 12674-11-2        | Aroclor 1016        | 100,000        | < 100,000 U        |
| 53469-21-9        | Aroclor 1242        | 100,000        | < 100,000 U        |
| 12672-29-6        | Aroclor 1248        | 310,000        | < 310,000 Y        |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>100,000</b> | <b>2,600,000 E</b> |
| 11096-82-5        | Aroclor 1260        | 260,000        | < 260,000 Y        |
| 11104-28-2        | Aroclor 1221        | 100,000        | < 100,000 U        |
| 11141-16-5        | Aroclor 1232        | 100,000        | < 100,000 U        |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                      |      |
|----------------------|------|
| Decachlorobiphenyl   | 139% |
| Tetrachloromethylene | 111% |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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ANALYTICAL  
RESOURCES  
INCORPORATED

Sample ID: EXT-Y2-BASE  
DILUTION

Lab Sample ID: YA18B  
LIMS ID: 14-2942  
Matrix: Concrete Dust  
Data Release Authorized: *[Signature]*  
Reported: 03/06/14

Date Extracted: 02/27/14  
Date Analyzed: 03/04/14 09:53  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/19/14  
Date Received: 02/20/14

Sample Amount: 0.97 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 125  
Silica Gel: No

Percent Moisture: 3.0%

| CAS Number        | Analyte             | RL             | Result           |
|-------------------|---------------------|----------------|------------------|
| 12674-11-2        | Aroclor 1016        | 260,000        | < 260,000 U      |
| 53469-21-9        | Aroclor 1242        | 260,000        | < 260,000 U      |
| 12672-29-6        | Aroclor 1248        | 260,000        | < 260,000 U      |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>260,000</b> | <b>2,900,000</b> |
| 11096-82-5        | Aroclor 1260        | 260,000        | < 260,000 U      |
| 11104-28-2        | Aroclor 1221        | 260,000        | < 260,000 U      |
| 11141-16-5        | Aroclor 1232        | 260,000        | < 260,000 U      |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                      |   |
|----------------------|---|
| Decachlorobiphenyl   | D |
| Tetrachloromethylene | D |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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Lab Sample ID: YA18C  
LIMS ID: 14-2943  
Matrix: Concrete Dust  
Data Release Authorized: *[Signature]*  
Reported: 03/06/14

Date Extracted: 02/27/14  
Date Analyzed: 03/03/14 20:26  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/19/14  
Date Received: 02/20/14

Sample Amount: 0.97 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 10.0  
Silica Gel: No

Percent Moisture: 3.0%

| CAS Number        | Analyte             | RL            | Result           |
|-------------------|---------------------|---------------|------------------|
| 12674-11-2        | Aroclor 1016        | 41,000        | < 41,000 U       |
| 53469-21-9        | Aroclor 1242        | 41,000        | < 41,000 U       |
| 12672-29-6        | Aroclor 1248        | 82,000        | < 82,000 Y       |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>41,000</b> | <b>670,000 E</b> |
| 11096-82-5        | Aroclor 1260        | 52,000        | < 52,000 Y       |
| 11104-28-2        | Aroclor 1221        | 41,000        | < 41,000 U       |
| 11141-16-5        | Aroclor 1232        | 41,000        | < 41,000 U       |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                      |      |
|----------------------|------|
| Decachlorobiphenyl   | 118% |
| Tetrachlorometaylene | 100% |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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ANALYTICAL  
RESOURCES  
INCORPORATED

Sample ID: EXT-Y3-BASE  
DILUTION

Lab Sample ID: YA18C  
LIMS ID: 14-2943  
Matrix: Concrete Dust  
Data Release Authorized: *BS*  
Reported: 03/06/14

Date Extracted: 02/27/14  
Date Analyzed: 03/04/14 10:15  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/19/14  
Date Received: 02/20/14

Sample Amount: 0.97 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 50.0  
Silica Gel: No

Percent Moisture: 3.0%

| CAS Number        | Analyte             | RL             | Result         |
|-------------------|---------------------|----------------|----------------|
| 12674-11-2        | Aroclor 1016        | 100,000        | < 100,000 U    |
| 53469-21-9        | Aroclor 1242        | 100,000        | < 100,000 U    |
| 12672-29-6        | Aroclor 1248        | 100,000        | < 100,000 U    |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>100,000</b> | <b>750,000</b> |
| 11096-82-5        | Aroclor 1260        | 100,000        | < 100,000 U    |
| 11104-28-2        | Aroclor 1221        | 100,000        | < 100,000 U    |
| 11141-16-5        | Aroclor 1232        | 100,000        | < 100,000 U    |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                      |   |
|----------------------|---|
| Decachlorobiphenyl   | D |
| Tetrachloromethylene | D |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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ANALYTICAL  
RESOURCES  
INCORPORATED

Sample ID: EXT-Y1-DM-20140219  
SAMPLE

Lab Sample ID: YA18D  
LIMS ID: 14-2944  
Matrix: Concrete Dust  
Data Release Authorized: *BB*  
Reported: 03/06/14

Date Extracted: 02/27/14  
Date Analyzed: 03/03/14 20:48  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/19/14  
Date Received: 02/20/14

Sample Amount: 4.86 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 50.0  
Silica Gel: No

Percent Moisture: 2.9%

| CAS Number        | Analyte             | RL            | Result         |
|-------------------|---------------------|---------------|----------------|
| 12674-11-2        | Aroclor 1016        | 41,000        | < 41,000 U     |
| 53469-21-9        | Aroclor 1242        | 41,000        | < 41,000 U     |
| 12672-29-6        | Aroclor 1248        | 41,000        | < 41,000 U     |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>41,000</b> | <b>270,000</b> |
| 11096-82-5        | Aroclor 1260        | 41,000        | < 41,000 U     |
| 11104-28-2        | Aroclor 1221        | 41,000        | < 41,000 U     |
| 11141-16-5        | Aroclor 1232        | 41,000        | < 41,000 U     |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                      |   |
|----------------------|---|
| Decachlorobiphenyl   | D |
| Tetrachloromethylene | D |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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ANALYTICAL  
RESOURCES  
INCORPORATED

Sample ID: EXT-Y1-DI-20140219  
SAMPLE

Lab Sample ID: YA18E  
LIMS ID: 14-2945  
Matrix: Concrete Dust  
Data Release Authorized: *BB*  
Reported: 03/06/14

Date Extracted: 02/27/14  
Date Analyzed: 03/03/14 21:10  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/19/14  
Date Received: 02/20/14

Sample Amount: 0.97 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 20.0  
Silica Gel: No

Percent Moisture: 2.9%

| CAS Number        | Analyte             | RL            | Result             |
|-------------------|---------------------|---------------|--------------------|
| 12674-11-2        | Aroclor 1016        | 82,000        | < 82,000 U         |
| 53469-21-9        | Aroclor 1242        | 82,000        | < 82,000 U         |
| 12672-29-6        | Aroclor 1248        | 120,000       | < 120,000 Y        |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>82,000</b> | <b>1,100,000 E</b> |
| 11096-82-5        | Aroclor 1260        | 82,000        | < 82,000 U         |
| 11104-28-2        | Aroclor 1221        | 82,000        | < 82,000 U         |
| 11141-16-5        | Aroclor 1232        | 82,000        | < 82,000 U         |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                     |      |
|---------------------|------|
| Decachlorobiphenyl  | 150% |
| Tetrachlorometylène | 125% |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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Sample ID: EXT-Y1-DI-20140219  
DILUTION

Lab Sample ID: YA18E  
LIMS ID: 14-2945  
Matrix: Concrete Dust *AB*  
Data Release Authorized: *AB*  
Reported: 03/06/14

Date Extracted: 02/27/14  
Date Analyzed: 03/04/14 10:37  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/19/14  
Date Received: 02/20/14

Sample Amount: 0.97 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 100  
Silica Gel: No

Percent Moisture: 2.9%

| CAS Number        | Analyte             | RL             | Result           |
|-------------------|---------------------|----------------|------------------|
| 12674-11-2        | Aroclor 1016        | 210,000        | < 210,000 U      |
| 53469-21-9        | Aroclor 1242        | 210,000        | < 210,000 U      |
| 12672-29-6        | Aroclor 1248        | 210,000        | < 210,000 U      |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>210,000</b> | <b>1,200,000</b> |
| 11096-82-5        | Aroclor 1260        | 210,000        | < 210,000 U      |
| 11104-28-2        | Aroclor 1221        | 210,000        | < 210,000 U      |
| 11141-16-5        | Aroclor 1232        | 210,000        | < 210,000 U      |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                      |   |
|----------------------|---|
| Decachlorobiphenyl   | D |
| Tetrachlorometaylene | D |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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ANALYTICAL  
RESOURCES  
INCORPORATED

Sample ID: EXT-Y1-SA-20140219  
SAMPLE

Lab Sample ID: YA18F  
LIMS ID: 14-2946  
Matrix: Concrete Dust  
Data Release Authorized: *CR*  
Reported: 03/06/14

Date Extracted: 02/27/14  
Date Analyzed: 03/03/14 21:32  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/19/14  
Date Received: 02/20/14

Sample Amount: 4.79 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 20.0  
Silica Gel: No

Percent Moisture: 4.2%

| CAS Number        | Analyte             | RL            | Result         |
|-------------------|---------------------|---------------|----------------|
| 12674-11-2        | Aroclor 1016        | 17,000        | < 17,000 U     |
| 53469-21-9        | Aroclor 1242        | 17,000        | < 17,000 U     |
| 12672-29-6        | Aroclor 1248        | 22,000        | < 22,000 Y     |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>17,000</b> | <b>160,000</b> |
| 11096-82-5        | Aroclor 1260        | 17,000        | < 17,000 U     |
| 11104-28-2        | Aroclor 1221        | 17,000        | < 17,000 U     |
| 11141-16-5        | Aroclor 1232        | 17,000        | < 17,000 U     |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                       |       |
|-----------------------|-------|
| Decachlorobiphenyl    | 118%  |
| Tetrachlorometaxylene | 98.0% |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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Lab Sample ID: YA18G  
LIMS ID: 14-2947  
Matrix: Concrete Dust  
Data Release Authorized: *B*  
Reported: 03/06/14

Date Extracted: 02/27/14  
Date Analyzed: 03/03/14 21:54  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/19/14  
Date Received: 02/20/14

Sample Amount: 4.81 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 50.0  
Silica Gel: No

Percent Moisture: 3.8%

| CAS Number        | Analyte             | RL            | Result         |
|-------------------|---------------------|---------------|----------------|
| 12674-11-2        | Aroclor 1016        | 42,000        | < 42,000 U     |
| 53469-21-9        | Aroclor 1242        | 42,000        | < 42,000 U     |
| 12672-29-6        | Aroclor 1248        | 42,000        | < 42,000 U     |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>42,000</b> | <b>290,000</b> |
| 11096-82-5        | Aroclor 1260        | 42,000        | < 42,000 U     |
| 11104-28-2        | Aroclor 1221        | 42,000        | < 42,000 U     |
| 11141-16-5        | Aroclor 1232        | 42,000        | < 42,000 U     |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                      |   |
|----------------------|---|
| Decachlorobiphenyl   | D |
| Tetrachlorometaylene | D |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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ANALYTICAL  
RESOURCES  
INCORPORATED

Sample ID: EXT-Y2-DM-20140219  
SAMPLE

Lab Sample ID: YA18H  
LIMS ID: 14-2948  
Matrix: Concrete Dust  
Data Release Authorized: *BB*  
Reported: 03/06/14

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/19/14  
Date Received: 02/20/14

Date Extracted: 02/27/14  
Date Analyzed: 03/03/14 22:59  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

Sample Amount: 4.84 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 20.0  
Silica Gel: No

Percent Moisture: 3.2%

| CAS Number        | Analyte             | RL            | Result        |
|-------------------|---------------------|---------------|---------------|
| 12674-11-2        | Aroclor 1016        | 16,000        | < 16,000 U    |
| 53469-21-9        | Aroclor 1242        | 16,000        | < 16,000 U    |
| 12672-29-6        | Aroclor 1248        | 16,000        | < 16,000 U    |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>16,000</b> | <b>65,000</b> |
| 11096-82-5        | Aroclor 1260        | 16,000        | < 16,000 U    |
| 11104-28-2        | Aroclor 1221        | 16,000        | < 16,000 U    |
| 11141-16-5        | Aroclor 1232        | 16,000        | < 16,000 U    |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                       |       |
|-----------------------|-------|
| Decachlorobiphenyl    | 99.5% |
| Tetrachlorometaxylene | 82.5% |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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Sample ID: EXT-Y2-SA-20140219  
SAMPLE

Lab Sample ID: YA18I  
LIMS ID: 14-2949  
Matrix: Concrete Dust  
Data Release Authorized: *AB*  
Reported: 03/06/14

Date Extracted: 02/27/14  
Date Analyzed: 03/03/14 23:21  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/19/14  
Date Received: 02/20/14

Sample Amount: 4.88 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 10.0  
Silica Gel: No

Percent Moisture: 2.4%

| CAS Number        | Analyte             | RL           | Result          |
|-------------------|---------------------|--------------|-----------------|
| 12674-11-2        | Aroclor 1016        | 8,200        | < 8,200 U       |
| 53469-21-9        | Aroclor 1242        | 8,200        | < 8,200 U       |
| 12672-29-6        | Aroclor 1248        | 12,000       | < 12,000 Y      |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>8,200</b> | <b>82,000 E</b> |
| 11096-82-5        | Aroclor 1260        | 8,200        | < 8,200 U       |
| 11104-28-2        | Aroclor 1221        | 8,200        | < 8,200 U       |
| 11141-16-5        | Aroclor 1232        | 8,200        | < 8,200 U       |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                      |       |
|----------------------|-------|
| Decachlorobiphenyl   | 108%  |
| Tetrachlorometaylene | 87.8% |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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Sample ID: EXT-Y2-SA-20140219  
DILUTION

Lab Sample ID: YA18I  
LIMS ID: 14-2949  
Matrix: Concrete Dust  
Data Release Authorized: *BB*  
Reported: 03/06/14

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/19/14  
Date Received: 02/20/14

Date Extracted: 02/27/14  
Date Analyzed: 03/05/14 11:45  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

Sample Amount: 4.88 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 50.0  
Silica Gel: No

Percent Moisture: 2.4%

| CAS Number        | Analyte             | RL            | Result        |
|-------------------|---------------------|---------------|---------------|
| 12674-11-2        | Aroclor 1016        | 41,000        | < 41,000 U    |
| 53469-21-9        | Aroclor 1242        | 41,000        | < 41,000 U    |
| 12672-29-6        | Aroclor 1248        | 41,000        | < 41,000 U    |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>41,000</b> | <b>89,000</b> |
| 11096-82-5        | Aroclor 1260        | 41,000        | < 41,000 U    |
| 11104-28-2        | Aroclor 1221        | 41,000        | < 41,000 U    |
| 11141-16-5        | Aroclor 1232        | 41,000        | < 41,000 U    |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                     |   |
|---------------------|---|
| Decachlorobiphenyl  | D |
| Tetrachlorometylène | D |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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ANALYTICAL  
RESOURCES  
INCORPORATED

Sample ID: EXT-Y2-SO-20140219  
SAMPLE

Lab Sample ID: YA18J  
LIMS ID: 14-2950  
Matrix: Concrete Dust  
Data Release Authorized: *BS*  
Reported: 03/06/14

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/19/14  
Date Received: 02/20/14

Date Extracted: 02/27/14  
Date Analyzed: 03/03/14 23:43  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

Sample Amount: 4.80 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 20.0  
Silica Gel: No

Percent Moisture: 4.2%

| CAS Number        | Analyte             | RL            | Result        |
|-------------------|---------------------|---------------|---------------|
| 12674-11-2        | Aroclor 1016        | 17,000        | < 17,000 U    |
| 53469-21-9        | Aroclor 1242        | 17,000        | < 17,000 U    |
| 12672-29-6        | Aroclor 1248        | 17,000        | < 17,000 U    |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>17,000</b> | <b>98,000</b> |
| 11096-82-5        | Aroclor 1260        | 17,000        | < 17,000 U    |
| 11104-28-2        | Aroclor 1221        | 17,000        | < 17,000 U    |
| 11141-16-5        | Aroclor 1232        | 17,000        | < 17,000 U    |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                      |       |
|----------------------|-------|
| Decachlorobiphenyl   | 112%  |
| Tetrachloromethylene | 92.5% |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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ANALYTICAL  
RESOURCES  
INCORPORATED

Sample ID: EXT-Y3-SO-20140219  
SAMPLE

Lab Sample ID: YA18K  
LIMS ID: 14-2951  
Matrix: Concrete Dust  
Data Release Authorized: *OB*  
Reported: 03/06/14

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/19/14  
Date Received: 02/20/14

Date Extracted: 02/27/14  
Date Analyzed: 03/04/14 00:05  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

Sample Amount: 4.81 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 20.0  
Silica Gel: No

Percent Moisture: 3.8%

| CAS Number        | Analyte             | RL            | Result        |
|-------------------|---------------------|---------------|---------------|
| 12674-11-2        | Aroclor 1016        | 17,000        | < 17,000 U    |
| 53469-21-9        | Aroclor 1242        | 17,000        | < 17,000 U    |
| 12672-29-6        | Aroclor 1248        | 17,000        | < 17,000 U    |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>17,000</b> | <b>57,000</b> |
| 11096-82-5        | Aroclor 1260        | 17,000        | < 17,000 U    |
| 11104-28-2        | Aroclor 1221        | 17,000        | < 17,000 U    |
| 11141-16-5        | Aroclor 1232        | 17,000        | < 17,000 U    |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                       |       |
|-----------------------|-------|
| Decachlorobiphenyl    | 115%  |
| Tetrachlorometaxylene | 93.5% |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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ANALYTICAL  
RESOURCES  
INCORPORATED

Sample ID: EXT-Y3-SA-20140219  
SAMPLE

Lab Sample ID: YA18L  
LIMS ID: 14-2952  
Matrix: Concrete Dust  
Data Release Authorized: *BB*  
Reported: 03/06/14

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/19/14  
Date Received: 02/20/14

Date Extracted: 02/27/14  
Date Analyzed: 03/04/14 10:58  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

Sample Amount: 4.86 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 2.00  
Silica Gel: No

Percent Moisture: 3.1%

| CAS Number        | Analyte             | RL           | Result       |
|-------------------|---------------------|--------------|--------------|
| 12674-11-2        | Aroclor 1016        | 1,600        | < 1,600 U    |
| 53469-21-9        | Aroclor 1242        | 1,600        | < 1,600 U    |
| 12672-29-6        | Aroclor 1248        | 1,600        | < 1,600 U    |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>1,600</b> | <b>7,300</b> |
| 11096-82-5        | Aroclor 1260        | 1,600        | < 1,600 U    |
| 11104-28-2        | Aroclor 1221        | 1,600        | < 1,600 U    |
| 11141-16-5        | Aroclor 1232        | 1,600        | < 1,600 U    |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                      |       |
|----------------------|-------|
| Decachlorobiphenyl   | 91.5% |
| Tetrachloromethylene | 86.5% |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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ANALYTICAL  
RESOURCES  
INCORPORATED

Sample ID: EXT-Y3-SA-20140219  
MATRIX SPIKE

Lab Sample ID: YA18L  
LIMS ID: 14-2952  
Matrix: Concrete Dust  
Data Release Authorized: *RS*  
Reported: 03/06/14

Date Extracted: 02/27/14  
Date Analyzed: 03/04/14 00:49  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/19/14  
Date Received: 02/20/14

Sample Amount: 4.84 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 10.0  
Silica Gel: No

Percent Moisture: 3.1%

| CAS Number        | Analyte             | RL           | Result        |
|-------------------|---------------------|--------------|---------------|
| 12674-11-2        | Aroclor 1016        | 1,600        | ---           |
| 53469-21-9        | Aroclor 1242        | 1,600        | < 1,600 U     |
| 12672-29-6        | Aroclor 1248        | 1,600        | < 1,600 U     |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>1,600</b> | <b>11,000</b> |
| 11096-82-5        | Aroclor 1260        | 1,600        | ---           |
| 11104-28-2        | Aroclor 1221        | 1,600        | < 1,600 U     |
| 11141-16-5        | Aroclor 1232        | 1,600        | < 1,600 U     |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                       |       |
|-----------------------|-------|
| Decachlorobiphenyl    | 111%  |
| Tetrachlorometaxylene | 88.2% |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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Sample ID: EXT-Y3-SA-20140219  
MATRIX SPIKE DUP

Lab Sample ID: YA18L  
LIMS ID: 14-2952  
Matrix: Concrete Dust  
Data Release Authorized: *J*  
Reported: 03/06/14

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/19/14  
Date Received: 02/20/14

Date Extracted: 02/27/14  
Date Analyzed: 03/04/14 01:11  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

Sample Amount: 4.85 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 10.0  
Silica Gel: No

Percent Moisture: 3.1%

| CAS Number        | Analyte             | RL           | Result        |
|-------------------|---------------------|--------------|---------------|
| 12674-11-2        | Aroclor 1016        | 1,600        | ---           |
| 53469-21-9        | Aroclor 1242        | 1,600        | < 1,600 U     |
| 12672-29-6        | Aroclor 1248        | 1,600        | < 1,600 U     |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>1,600</b> | <b>11,000</b> |
| 11096-82-5        | Aroclor 1260        | 1,600        | ---           |
| 11104-28-2        | Aroclor 1221        | 1,600        | < 1,600 U     |
| 11141-16-5        | Aroclor 1232        | 1,600        | < 1,600 U     |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                      |       |
|----------------------|-------|
| Decachlorobiphenyl   | 112%  |
| Tetrachlorometaylene | 91.2% |

Sample ID: EXT-Y3-DM-20140219  
SAMPLE

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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Lab Sample ID: YA18M  
LIMS ID: 14-2953  
Matrix: Concrete Dust  
Data Release Authorized: *B*  
Reported: 03/06/14

Date Extracted: 02/27/14  
Date Analyzed: 03/04/14 01:32  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/19/14  
Date Received: 02/20/14

Sample Amount: 4.78 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 20.0  
Silica Gel: No

Percent Moisture: 4.7%

| CAS Number        | Analyte             | RL            | Result        |
|-------------------|---------------------|---------------|---------------|
| 12674-11-2        | Aroclor 1016        | 17,000        | < 17,000 U    |
| 53469-21-9        | Aroclor 1242        | 17,000        | < 17,000 U    |
| 12672-29-6        | Aroclor 1248        | 17,000        | < 17,000 U    |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>17,000</b> | <b>95,000</b> |
| 11096-82-5        | Aroclor 1260        | 17,000        | < 17,000 U    |
| 11104-28-2        | Aroclor 1221        | 17,000        | < 17,000 U    |
| 11141-16-5        | Aroclor 1232        | 17,000        | < 17,000 U    |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                      |       |
|----------------------|-------|
| Decachlorobiphenyl   | 120%  |
| Tetrachloromethylene | 98.5% |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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Sample ID: INT-G1-SA-20140220  
SAMPLE

Lab Sample ID: YA18N  
LIMS ID: 14-2954  
Matrix: Concrete Dust  
Data Release Authorized: *B*  
Reported: 03/06/14

Date Extracted: 02/27/14  
Date Analyzed: 03/04/14 11:42  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/20/14  
Date Received: 02/20/14

Sample Amount: 4.98 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 10.0  
Silica Gel: No

Percent Moisture: 0.9%

| CAS Number        | Analyte             | RL           | Result        |
|-------------------|---------------------|--------------|---------------|
| 12674-11-2        | Aroclor 1016        | 8,000        | < 8,000 U     |
| 53469-21-9        | Aroclor 1242        | 8,000        | < 8,000 U     |
| 12672-29-6        | Aroclor 1248        | 8,000        | < 8,000 U     |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>8,000</b> | <b>26,000</b> |
| 11096-82-5        | Aroclor 1260        | 8,000        | < 8,000 U     |
| 11104-28-2        | Aroclor 1221        | 8,000        | < 8,000 U     |
| 11141-16-5        | Aroclor 1232        | 8,000        | < 8,000 U     |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                      |       |
|----------------------|-------|
| Decachlorobiphenyl   | 112%  |
| Tetrachloromethylene | 94.0% |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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Sample ID: INT-G11-BASE  
SAMPLE

Lab Sample ID: YA180  
LIMS ID: 14-2955  
Matrix: Concrete Dust  
Data Release Authorized: *BB*  
Reported: 03/06/14

Date Extracted: 02/27/14  
Date Analyzed: 03/04/14 03:00  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/20/14  
Date Received: 02/20/14

Sample Amount: 4.98 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 50.0  
Silica Gel: No

Percent Moisture: 0.9%

| CAS Number        | Analyte             | RL            | Result         |
|-------------------|---------------------|---------------|----------------|
| 12674-11-2        | Aroclor 1016        | 40,000        | < 40,000 U     |
| 53469-21-9        | Aroclor 1242        | 40,000        | < 40,000 U     |
| 12672-29-6        | Aroclor 1248        | 40,000        | < 40,000 U     |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>40,000</b> | <b>210,000</b> |
| 11096-82-5        | Aroclor 1260        | 40,000        | < 40,000 U     |
| 11104-28-2        | Aroclor 1221        | 40,000        | < 40,000 U     |
| 11141-16-5        | Aroclor 1232        | 40,000        | < 40,000 U     |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                       |   |
|-----------------------|---|
| Decachlorobiphenyl    | D |
| Tetrachlorometaxylene | D |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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ANALYTICAL  
RESOURCES  
INCORPORATED

Sample ID: INT-G1-BASE  
SAMPLE

Lab Sample ID: YA18P  
LIMS ID: 14-2956  
Matrix: Concrete Dust  
Data Release Authorized: *BB*  
Reported: 03/06/14

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/20/14  
Date Received: 02/20/14

Date Extracted: 02/27/14  
Date Analyzed: 03/04/14 03:22  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

Sample Amount: 4.96 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 50.0  
Silica Gel: No

Percent Moisture: 0.9%

| CAS Number        | Analyte             | RL            | Result         |
|-------------------|---------------------|---------------|----------------|
| 12674-11-2        | Aroclor 1016        | 40,000        | < 40,000 U     |
| 53469-21-9        | Aroclor 1242        | 40,000        | < 40,000 U     |
| 12672-29-6        | Aroclor 1248        | 40,000        | < 40,000 U     |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>40,000</b> | <b>200,000</b> |
| 11096-82-5        | Aroclor 1260        | 40,000        | < 40,000 U     |
| 11104-28-2        | Aroclor 1221        | 40,000        | < 40,000 U     |
| 11141-16-5        | Aroclor 1232        | 40,000        | < 40,000 U     |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                      |   |
|----------------------|---|
| Decachlorobiphenyl   | D |
| Tetrachloromethylene | D |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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Sample ID: INT-G1-DM-20140220  
SAMPLE

Lab Sample ID: YA18Q  
LIMS ID: 14-2957  
Matrix: Concrete Dust *Y*  
Data Release Authorized: *Y*  
Reported: 03/06/14

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/20/14  
Date Received: 02/20/14

Date Extracted: 02/27/14  
Date Analyzed: 03/04/14 03:44  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

Sample Amount: 4.93 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 10.0  
Silica Gel: No

Percent Moisture: 1.6%

| CAS Number        | Analyte             | RL           | Result        |
|-------------------|---------------------|--------------|---------------|
| 12674-11-2        | Aroclor 1016        | 8,100        | < 8,100 U     |
| 53469-21-9        | Aroclor 1242        | 8,100        | < 8,100 U     |
| 12672-29-6        | Aroclor 1248        | 8,100        | < 8,100 U     |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>8,100</b> | <b>16,000</b> |
| 11096-82-5        | Aroclor 1260        | 8,100        | < 8,100 U     |
| 11104-28-2        | Aroclor 1221        | 8,100        | < 8,100 U     |
| 11141-16-5        | Aroclor 1232        | 8,100        | < 8,100 U     |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                       |       |
|-----------------------|-------|
| Decachlorobiphenyl    | 96.0% |
| Tetrachlorometaxylene | 81.2% |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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Sample ID: INT-G1-SO-20140220  
SAMPLE

Lab Sample ID: YA18R  
LIMS ID: 14-2958  
Matrix: Concrete Dust  
Data Release Authorized: *B*  
Reported: 03/06/14

Date Extracted: 02/27/14  
Date Analyzed: 03/04/14 04:06  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/20/14  
Date Received: 02/20/14

Sample Amount: 4.94 g-dry-wt  
Final Extract Volume: 40.0 mL  
Dilution Factor: 20.0  
Silica Gel: No

Percent Moisture: 1.3%

| CAS Number        | Analyte             | RL            | Result         |
|-------------------|---------------------|---------------|----------------|
| 12674-11-2        | Aroclor 1016        | 16,000        | < 16,000 U     |
| 53469-21-9        | Aroclor 1242        | 16,000        | < 16,000 U     |
| 12672-29-6        | Aroclor 1248        | 24,000        | < 24,000 Y     |
| <b>11097-69-1</b> | <b>Aroclor 1254</b> | <b>16,000</b> | <b>120,000</b> |
| 11096-82-5        | Aroclor 1260        | 16,000        | < 16,000 U     |
| 11104-28-2        | Aroclor 1221        | 16,000        | < 16,000 U     |
| 11141-16-5        | Aroclor 1232        | 16,000        | < 16,000 U     |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                      |       |
|----------------------|-------|
| Decachlorobiphenyl   | 117%  |
| Tetrachloromethylene | 93.5% |

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Extraction Method: SW3580A  
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ANALYTICAL  
RESOURCES  
INCORPORATED

Sample ID: MB-022714  
METHOD BLANK

Lab Sample ID: MB-022714  
LIMS ID: 14-2952  
Matrix: Concrete Dust  
Data Release Authorized: *BN*  
Reported: 03/06/14

Date Extracted: 02/27/14  
Date Analyzed: 03/03/14 18:36  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: NA  
Date Received: NA

Sample Amount: 5.00 g  
Final Extract Volume: 40.0 mL  
Dilution Factor: 1.00  
Silica Gel: No

Percent Moisture: NA

| CAS Number | Analyte      | RL  | Result  |
|------------|--------------|-----|---------|
| 12674-11-2 | Aroclor 1016 | 800 | < 800 U |
| 53469-21-9 | Aroclor 1242 | 800 | < 800 U |
| 12672-29-6 | Aroclor 1248 | 800 | < 800 U |
| 11097-69-1 | Aroclor 1254 | 800 | < 800 U |
| 11096-82-5 | Aroclor 1260 | 800 | < 800 U |
| 11104-28-2 | Aroclor 1221 | 800 | < 800 U |
| 11141-16-5 | Aroclor 1232 | 800 | < 800 U |

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**PCB Surrogate Recovery**

|                      |       |
|----------------------|-------|
| Decachlorobiphenyl   | 94.0% |
| Tetrachloromethylene | 90.8% |

**SW8082/PCB SOIL/SOLID/SEDIMENT SURROGATE RECOVERY SUMMARY**

Matrix: Concrete Dust

 QC Report No: YA18-Crete Consulting  
 Project: POT 1940

| <b>Client ID</b>       | <b>DCBP</b>  | <b>DCBP</b>    | <b>TCMX</b>  | <b>TCMX</b>    | <b>TOT</b> | <b>OUT</b> |
|------------------------|--------------|----------------|--------------|----------------|------------|------------|
|                        | <b>% REC</b> | <b>LCL-UCL</b> | <b>% REC</b> | <b>LCL-UCL</b> |            |            |
| EXT-Y1-BASE            | D            | 22-168         | D            | 28-106         | 0          |            |
| EXT-Y1-BASE DL         | D            | 22-168         | D            | 28-106         | 0          |            |
| EXT-Y2-BASE            | 139%         | 22-168         | 111%*        | 28-106         | 1          |            |
| EXT-Y2-BASE DL         | D            | 22-168         | D            | 28-106         | 0          |            |
| EXT-Y3-BASE            | 118%         | 22-168         | 100%         | 28-106         | 0          |            |
| EXT-Y3-BASE DL         | D            | 22-168         | D            | 28-106         | 0          |            |
| EXT-Y1-DM-20140219     | D            | 22-168         | D            | 28-106         | 0          |            |
| EXT-Y1-DI-20140219     | 150%         | 22-168         | 125%*        | 28-106         | 1          |            |
| EXT-Y1-DI-20140219 DL  | D            | 22-168         | D            | 28-106         | 0          |            |
| EXT-Y1-SA-20140219     | 118%         | 22-168         | 98.0%        | 28-106         | 0          |            |
| EXT-Y1-SO-20140219     | D            | 22-168         | D            | 28-106         | 0          |            |
| EXT-Y2-DM-20140219     | 99.5%        | 22-168         | 82.5%        | 28-106         | 0          |            |
| EXT-Y2-SA-20140219     | 108%         | 22-168         | 87.8%        | 28-106         | 0          |            |
| EXT-Y2-SA-20140219 DL  | D            | 22-168         | D            | 28-106         | 0          |            |
| EXT-Y2-SO-20140219     | 112%         | 22-168         | 92.5%        | 28-106         | 0          |            |
| EXT-Y3-SO-20140219     | 115%         | 22-168         | 93.5%        | 28-106         | 0          |            |
| MB-022714              | 94.0%        | 51-127         | 90.8%        | 49-110         | 0          |            |
| LCS-022714             | 97.0%        | 51-127         | 93.0%        | 49-110         | 0          |            |
| LCSD-022714            | 90.5%        | 51-127         | 85.8%        | 49-110         | 0          |            |
| EXT-Y3-SA-20140219     | 91.5%        | 22-168         | 86.5%        | 28-106         | 0          |            |
| EXT-Y3-SA-20140219 MS  | 111%         | 22-168         | 88.2%        | 28-106         | 0          |            |
| EXT-Y3-SA-20140219 MSD | 112%         | 22-168         | 91.2%        | 28-106         | 0          |            |
| EXT-Y3-DM-20140219     | 120%         | 22-168         | 98.5%        | 28-106         | 0          |            |
| INT-G1-SA-20140220     | 112%         | 22-168         | 94.0%        | 28-106         | 0          |            |
| INT-G11-BASE           | D            | 22-168         | D            | 28-106         | 0          |            |
| INT-G1-BASE            | D            | 22-168         | D            | 28-106         | 0          |            |
| INT-G1-DM-20140220     | 96.0%        | 22-168         | 81.2%        | 28-106         | 0          |            |
| INT-G1-SO-20140220     | 117%         | 22-168         | 93.5%        | 28-106         | 0          |            |

Medium Level Control Limits

Prep Method: SW3580A

Log Number Range: 14-2941 to 14-2958

Sample ID: LCS-022714  
LCS/LCSD

Lab Sample ID: LCS-022714

LIMS ID: 14-2952

Matrix: Concrete Dust

Data Release Authorized: *✓*

Reported: 03/06/14

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: NA

Date Received: NA

Date Extracted LCS/LCSD: 02/27/14

Sample Amount LCS: 5.00 g-dry-wt

LCSD: 5.00 g-dry-wt

Date Analyzed LCS: 03/03/14 18:58

Final Extract Volume LCS: 40.0 mL

LCSD: 40.0 mL

Instrument/Analyst LCS: ECD7/JGR

Dilution Factor LCS: 1.00

LCSD: ECD7/JGR

LCSD: 1.00

GPC Cleanup: No

Silica Gel: No

Sulfur Cleanup: Yes

Acid Cleanup: Yes

Percent Moisture: NA

Florisil Cleanup: No

| Analyte      | LCS  | Spike<br>Added-LCS | LCS<br>Recovery | LCSD | Spike<br>Added-LCSD | LCSD<br>Recovery | RPD  |
|--------------|------|--------------------|-----------------|------|---------------------|------------------|------|
| Aroclor 1016 | 3670 | 4000               | 91.8%           | 3410 | 4000                | 85.2%            | 7.3% |
| Aroclor 1260 | 3380 | 4000               | 84.5%           | 3120 | 4000                | 78.0%            | 8.0% |

**PCB Surrogate Recovery**

|                       | LCS   | LCSD  |
|-----------------------|-------|-------|
| Decachlorobiphenyl    | 97.0% | 90.5% |
| Tetrachlorometaxylene | 93.0% | 85.8% |

Results reported in  $\mu\text{g}/\text{kg}$  (ppb)

RPD calculated using sample concentrations per SW846.

ORGANICS ANALYSIS DATA SHEET  
PCB by GC/ECD Method SW8082A  
Page 1 of 1

ANALYTICAL  
RESOURCES  
INCORPORATED

Sample ID: EXT-Y3-SA-20140219  
MS/MSD

Lab Sample ID: YA18L  
LIMS ID: 14-2952  
Matrix: Concrete Dust  
Data Release Authorized: *JH*  
Reported: 03/06/14

Date Extracted MS/MSD: 02/27/14  
Date Analyzed MS: 03/04/14 00:49  
MSD: 03/04/14 01:11  
Instrument/Analyst MS: ECD7/JGR  
MSD: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: Yes  
Acid Cleanup: Yes  
Florisil Cleanup: No

QC Report No: YA18-Crete Consulting  
Project: POT 1940

Date Sampled: 02/19/14  
Date Received: 02/20/14

Sample Amount MS: 4.84 g-dry-wt  
MSD: 4.85 g-dry-wt  
Final Extract Volume MS: 40 mL  
MSD: 40 mL  
Dilution Factor MS: 10.0  
MSD: 10.0  
Silica Gel: No

Percent Moisture: 3.1%

| Analyte      | Sample   | MS   | Spike<br>Added-MS | MS<br>Recovery | MSD  | Spike<br>Added-MSD | MSD<br>Recovery | RPD  |
|--------------|----------|------|-------------------|----------------|------|--------------------|-----------------|------|
| Aroclor 1016 | < 1600 U | 4200 | 4130              | 102%           | 4390 | 4120               | 107%            | 4.4% |
| Aroclor 1260 | < 1600 U | 4800 | 4130              | 116%           | 5020 | 4120               | 122%            | 4.5% |

Results reported in  $\mu\text{g}/\text{kg}$  (ppb)  
RPD calculated using sample concentrations per SW846.



**Analytical Resources, Incorporated**  
Analytical Chemists and Consultants

March 4, 2014

Jamie Stevens  
Crete Consulting  
100 S. King Street, Suite 240  
Seattle, Washington 98104

**RE: Client Project: POT 1940  
ARI Job No. YA16**

Dear Jamie:

Please find enclosed the original chain of custody record and the final results for the samples from the project referenced above. One solid sample was received on February 20, 2014. The sample was analyzed for TCLP PCBs, as requested.

These analyses proceeded without any other incident of note.

The matrix spike surrogate DCBP is out of control high. The spike recoveries are in control and no further corrective action was taken.

A copy of these reports will remain on file at ARI. Should you have any questions or need additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

  
Kelly Bottem  
Client Services Manager  
206/695-6211  
[kellyb@arilabs.com](mailto:kellyb@arilabs.com)

Enclosures

cc: file YA16

KFB/kfb

## Chain of Custody Record & Laboratory Analysis Request



**Analytical Resources, Incorporated**  
Analytical Chemists and Consultants  
4611 South 134th Place, Suite 100  
Tukwila, WA 98168  
206-695-6200 206-695-6201 (fax)

### Notes/Comments

Alayatis nequesteu

**Limits of Liability:** API will perform all requested services in accordance with appropriate methodology following API Standard Operating Procedures and the API Quality Assurance Program. This program meets standards for the industry. The total liability of API, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by API release API from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-

**Sample Retention Policy:** All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

# Sample ID Cross Reference Report



ARI Job No: YA16  
Client: Crete Consulting  
Project Event: N/A  
Project Name: PoT 1940

| Sample ID                | ARI<br>Lab ID | ARI<br>LIMS ID | Matrix      | Sample Date/Time | VTSR           |
|--------------------------|---------------|----------------|-------------|------------------|----------------|
| 1. DRUM-POT1940-20140220 | YA16A         | 14-2911        | Solid       | 02/20/14 14:00   | 02/20/14 16:03 |
| 2. DRUM-POT1940-20140220 | YA16B         | 14-2912        | TCLP Extrac | 02/20/14 14:00   | 02/20/14 16:03 |

Printed 02/20/14 Page 1 of 1

YA16 : 00003



# Cooler Receipt Form

ARI Client: Crete Consulting  
COC No(s): NA  
Assigned ARI Job No: YAL6

## Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?  YES  NO  
Were custody papers included with the cooler?  YES  NO  
Were custody papers properly filled out (ink, signed, etc.)  YES  NO  
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)  
Time: 1602 30 Temp Gun ID#: 9087795  
If cooler temperature is out of compliance fill out form 00070F  
Cooler Accepted by: AN Date: 3/20/14 Time: 1602

**Complete custody forms and attach all shipping documents**

## Log-In Phase:

Was a temperature blank included in the cooler?  YES  NO  
What kind of packing material was used?  Bubble Wrap  Wet Ice  Gel Packs  Baggies  Foam Block  Paper  Other: NA  
Was sufficient ice used (if appropriate)?  YES  NO  
Were all bottles sealed in individual plastic bags?  YES  NO  
Did all bottles arrive in good condition (unbroken)?  YES  NO  
Were all bottle labels complete and legible?  YES  NO  
Did the number of containers listed on COC match with the number of containers received?  YES  NO  
Did all bottle labels and tags agree with custody papers?  YES  NO  
Were all bottles used correct for the requested analyses?  YES  NO  
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...  YES  NO  
Were all VOC vials free of air bubbles?  YES  NO  
Was sufficient amount of sample sent in each bottle?  YES  NO  
Date VOC Trip Blank was made at ARI NA

Was Sample Split by ARI  NA  YES Date/Time: 2/20/14 Equipment: NA Split by: NA

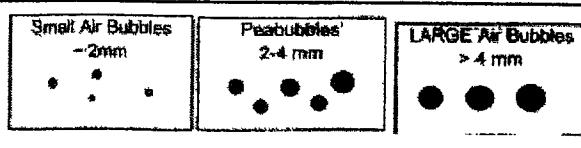
Samples Logged by: AN Date: 2/20/14 Time: 1737

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

### Additional Notes, Discrepancies, & Resolutions:

By: \_\_\_\_\_ Date: \_\_\_\_\_



|                                   |
|-----------------------------------|
| Small → "sm" (< 2 mm )            |
| Peabubbles → "pb" ( 2 to < 4 mm ) |
| Large → "lg" ( 4 to < 6 mm )      |
| Headspace → "hs" ( > 6 mm )       |

ORGANICS ANALYSIS DATA SHEET  
TCLP PCB by GC/ECD Method SW8082A  
Extraction Method: SW3510C  
Page 1 of 1

Sample ID: DRUM-POT1940-20140220  
SAMPLE

Lab Sample ID: YA16B  
LIMS ID: 14-2912  
Matrix: TCLP Extract  
Data Release Authorized: MW  
Reported: 03/04/14

QC Report No: YA16-Crete Consulting  
Project: PoT 1940

Date Sampled: 02/20/14  
Date Received: 02/20/14

Date Extracted: 02/26/14  
Date Analyzed: 03/03/14 17:08  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: No

Sample Amount: 100 mL  
Final Extract Volume: 10 mL  
Dilution Factor: 1.00  
Silica Gel: No  
Acid Cleanup: No

| CAS Number | Analyte      | RL  | Result  |
|------------|--------------|-----|---------|
| 12674-11-2 | Aroclor 1016 | 2.0 | < 2.0 U |
| 53469-21-9 | Aroclor 1242 | 2.0 | < 2.0 U |
| 12672-29-6 | Aroclor 1248 | 4.0 | < 4.0 Y |
| 11097-69-1 | Aroclor 1254 | 2.0 | < 2.0 U |
| 11096-82-5 | Aroclor 1260 | 2.0 | < 2.0 U |
| 11104-28-2 | Aroclor 1221 | 2.0 | < 2.0 U |
| 11141-16-5 | Aroclor 1232 | 2.0 | < 2.0 U |
| 37324-23-5 | Aroclor 1262 | 2.0 | < 2.0 U |
| 11100-14-4 | Aroclor 1268 | 2.0 | < 2.0 U |

Reported in  $\mu\text{g/L}$  (ppb)

**PCB Surrogate Recovery**

|                      |       |
|----------------------|-------|
| Decachlorobiphenyl   | 115%  |
| Tetrachlorometaylene | 92.2% |

ORGANICS ANALYSIS DATA SHEET  
TCLP PCB by GC/ECD Method SW8082A  
Extraction Method: SW3510C  
Page 1 of 1

Sample ID: DRUM-POT1940-20140220  
MATRIX SPIKE

Lab Sample ID: YA16B  
LIMS ID: 14-2912  
Matrix: TCLP Extract  
Data Release Authorized: *MW*  
Reported: 03/04/14

QC Report No: YA16-Crete Consulting  
Project: PoT 1940

Date Sampled: 02/20/14  
Date Received: 02/20/14

Date Extracted: 02/26/14  
Date Analyzed: 03/03/14 17:30  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: No

Sample Amount: 100 mL  
Final Extract Volume: 10 mL  
Dilution Factor: 1.00  
Silica Gel: No  
Acid Cleanup: No

| CAS Number | Analyte      | RL  | Result  |
|------------|--------------|-----|---------|
| 12674-11-2 | Aroclor 1016 | 2.0 | ---     |
| 53469-21-9 | Aroclor 1242 | 2.0 | < 2.0 U |
| 12672-29-6 | Aroclor 1248 | 30  | < 30 Y  |
| 11097-69-1 | Aroclor 1254 | 2.0 | < 2.0 U |
| 11096-82-5 | Aroclor 1260 | 2.0 | ---     |
| 11104-28-2 | Aroclor 1221 | 2.0 | < 2.0 U |
| 11141-16-5 | Aroclor 1232 | 2.0 | < 2.0 U |
| 37324-23-5 | Aroclor 1262 | 2.0 | < 2.0 U |
| 11100-14-4 | Aroclor 1268 | 2.0 | < 2.0 U |

Reported in  $\mu\text{g}/\text{L}$  (ppb)

**PCB Surrogate Recovery**

|                      |       |
|----------------------|-------|
| Decachlorobiphenyl   | 127%  |
| Tetrachlorometaylene | 98.5% |

ORGANICS ANALYSIS DATA SHEET  
TCLP PCB by GC/ECD Method SW8082A  
Extraction Method: SW3510C  
Page 1 of 1

Sample ID: MB-022614  
METHOD BLANK

Lab Sample ID: MB-022614  
LIMS ID: 14-2912  
Matrix: TCLP Extract  
Data Release Authorized: *MW*  
Reported: 03/04/14

QC Report No: YA16-Crete Consulting  
Project: PoT 1940

Date Sampled: NA  
Date Received: NA

Date Extracted: 02/26/14  
Date Analyzed: 03/03/14 16:03  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: No

Sample Amount: 100 mL  
Final Extract Volume: 10 mL  
Dilution Factor: 1.00  
Silica Gel: No  
Acid Cleanup: No

| CAS Number | Analyte      | RL  | Result  |
|------------|--------------|-----|---------|
| 12674-11-2 | Aroclor 1016 | 2.0 | < 2.0 U |
| 53469-21-9 | Aroclor 1242 | 2.0 | < 2.0 U |
| 12672-29-6 | Aroclor 1248 | 2.0 | < 2.0 U |
| 11097-69-1 | Aroclor 1254 | 2.0 | < 2.0 U |
| 11096-82-5 | Aroclor 1260 | 2.0 | < 2.0 U |
| 11104-28-2 | Aroclor 1221 | 2.0 | < 2.0 U |
| 11141-16-5 | Aroclor 1232 | 2.0 | < 2.0 U |
| 37324-23-5 | Aroclor 1262 | 2.0 | < 2.0 U |
| 11100-14-4 | Aroclor 1268 | 2.0 | < 2.0 U |

Reported in  $\mu\text{g}/\text{L}$  (ppb)

**PCB Surrogate Recovery**

|                       |       |
|-----------------------|-------|
| Decachlorobiphenyl    | 100%  |
| Tetrachlorometaxylene | 92.2% |

**SW8082/PCB WATER SURROGATE RECOVERY SUMMARY**

Matrix: TCLP Extract

QC Report No: YA16-Crete Consulting  
Project: PoT 1940

| <u>Client ID</u>         | <u>DCBP</u>  | <u>DCBP</u>    | <u>TCMX</u>  | <u>TCMX</u>    | <u>TOT</u> | <u>OUT</u> |
|--------------------------|--------------|----------------|--------------|----------------|------------|------------|
|                          | <u>% REC</u> | <u>LCL-UCL</u> | <u>% REC</u> | <u>LCL-UCL</u> |            |            |
| MB-022614                | 100%         | 41-111         | 92.2%        | 40-118         | 0          |            |
| LCS-022614               | 104%         | 41-111         | 90.2%        | 40-118         | 0          |            |
| DRUM-POT1940-20140220    | 115%         | 29-118         | 92.2%        | 38-118         | 0          |            |
| DRUM-POT1940-20140220 MS | 127%*        | 29-118         | 98.5%        | 38-118         | 1          |            |

Prep Method: SW3510C  
Log Number Range: 14-2912 to 14-2912

ORGANICS ANALYSIS DATA SHEET  
TCLP PCB by GC/ECD Method SW8082A  
Page 1 of 1

Sample ID: DRUM-POT1940-20140220  
MATRIX SPIKE

Lab Sample ID: YA16B  
LIMS ID: 14-2912  
Matrix: TCLP Extract  
Data Release Authorized: *MW*  
Reported: 03/04/14

QC Report No: YA16-Crete Consulting  
Project: PoT 1940

Date Sampled: 02/20/14  
Date Received: 02/20/14

Date Extracted: 02/26/14  
Date Analyzed: 03/03/14 17:30  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: No

Sample Amount: 100 mL  
Final Extract Volume: 10 mL  
Dilution Factor: 1.00  
Silica Gel: No  
Acid Cleanup: No

| Analyte      | Sample | Matrix Spike | Spike Added | Recovery |
|--------------|--------|--------------|-------------|----------|
| Aroclor 1016 | < 2.00 | 59.2         | 50.0        | 118%     |
| Aroclor 1260 | < 2.00 | 52.6         | 50.0        | 105%     |

Results reported in  $\mu$ g/L

ORGANICS ANALYSIS DATA SHEET  
TCLP PCB by GC/ECD Method SW8082A  
Page 1 of 1

Sample ID: LCS-022614  
LAB CONTROL

Lab Sample ID: LCS-022614  
LIMS ID: 14-2912  
Matrix: TCLP Extract  
Data Release Authorized: *MW*  
Reported: 03/04/14

Date Extracted: 02/26/14  
Date Analyzed: 03/03/14 16:24  
Instrument/Analyst: ECD7/JGR  
GPC Cleanup: No  
Sulfur Cleanup: No

QC Report No: YA16-Crete Consulting  
Project: PoT 1940

Date Sampled: NA  
Date Received: NA

Sample Amount: 100 mL  
Final Extract Volume: 10 mL  
Dilution Factor: 1.00  
Silica Gel: No  
Acid Cleanup: No

| Analyte      | Lab Control | Spike Added | Recovery |
|--------------|-------------|-------------|----------|
| Aroclor 1016 | 43.9        | 50.0        | 87.8%    |
| Aroclor 1260 | 44.2        | 50.0        | 88.4%    |

**PCB Surrogate Recovery**

|                      |       |
|----------------------|-------|
| Decachlorobiphenyl   | 104%  |
| Tetrachloromethylene | 90.2% |

Results reported in  $\mu\text{g}/\text{L}$

4/7/2014



## **Attachment D**

### **Air Monitoring Results**



## **AIR MONITORING RESULTS PILOT TESTS FOR PCB PAINT REMOVAL**

**PORT OF TACOMA  
1940 EAST 11<sup>TH</sup> STREET  
TACOMA, WASHINGTON**

**March 14, 2014**

## Table of Contents

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## Attachments

### *Tables*

*Analytical Results – ALS Laboratories and DCM Science Laboratory, Inc.*

*Instrument Results – MultiRae IR with Carbon Dioxide Sensor*

*Material Safety Data Sheets*

## 1.0 Introduction

During the week of February 17, 2014, CRETE Consulting, LLC (CRETE) initiated a series of pilot tests to evaluate the efficiency and feasibility of paint removal techniques as part of the 1940 E 11th Street Port of Tacoma project. Several paint coatings on the building exterior and interior have been found to contain polychlorinated biphenyls (PCBs). The paint removal pilot tests were conducted as part of the overall project to manage the PCBs during building deconstruction.

EMB Consulting, LLC (EMB) conducted worker personal and area air monitoring for potential contaminants of concern (COCs) during the paint removal pilot tests. Some of the potential COCs are related to building materials that would be disturbed during paint removal, such as the paint and concrete substrate. Other potential COCs would be released from the removal media proposed, such as from grinding wheels or blast media.

This report provides a summary of the methods, results, and conclusions for the air monitoring conducted during pilot testing of paint removal techniques. The results of air monitoring are summarized in tables attached to this report. In addition, laboratory certificates of analysis and instrument data from the sampling events are included. The Material Safety Data Sheets (MSDSs) for the removal media are also provided with this report.

## 2.0 Potential Contaminants of Concern

The Port of Tacoma provided the following reports that document the presence and location of PCB- and lead-containing paints on the building interior and exterior.

*Argus Pacific, Regulated Building Materials Assessment, Brown and Haley Building, 1940 East 11<sup>th</sup> Street, Port of Tacoma, March 15, 2010.*

*Pioneer Technologies Corporation, Memo from Stacy Munson to Bill Evans (Port of Tacoma), Brown & Haley Building Materials Characterization Sampling, March 29, 2012.*

*Pioneer Technologies Corporation, Memo from Stacy Munson to Bill Evans (Port of Tacoma), 1940 East 11th Street Building Materials and Soil/Sediment Characterization Sampling, June 6, 2012.*

The identified potential COCs that could be released during the pilot tests from existing building materials include PCBs and lead in paint and crystalline silica from the building concrete in masonry units or poured concrete walls and surfaces.

CRETE contracted with Crystal Soda Blast to conduct the paint removal pilot test operations. Crystal Soda Blast provided the following MSDSs for the products to be used. The identified potential COCs that could be released from the removal media are listed in parentheses.

- Pearl Abrasive Company, Diamond Cutting Wheel, January 1, 2014 (nickel, cobalt, nuisance dust)
- Green Diamond Sand Products, August 1, 2007 (amorphous silica, nickel, nuisance dust)
- Reliant Dry Ice, Carbon Dioxide (Dry Ice), March 8, 2010 (carbon dioxide [CO<sub>2</sub>])
- Church & Dwight Company, Inc., ARMEX Blast Media, February 14, 2008 (no hazardous substances, nuisance dust only)

## 3.0 Methods

This section provides a summary of the air monitoring methods used for this project.

### 3.1 ***Monitoring Set Up***

Personal air monitoring was conducted on the worker conducting the pilot test inside containment and the CRETE worker outside containment for the following potential COCs.

- PCBs
- Metals, limited to cobalt, lead, and nickel

Area air monitoring was conducted during the pilot test inside containment on a stationary ladder for the following potential COCs.

- Crystalline Silica, Respirable Fraction
- Amorphous Silica, Total Mass
- Amorphous Silica, Respirable Fraction
- Carbon Dioxide

Area air monitoring was conducted during the pilot test immediately outside containment on a stationary ladder for the following potential COCs.

- PCBs
- Metals, limited to cobalt, lead, and nickel
- Crystalline Silica, Respirable Fraction
- Amorphous Silica, Total Mass
- Amorphous Silica, Respirable Fraction

### **3.2 PCBs**

Based on the presence of PCBs in paint, the following samples were collected for PCB analysis:

- Personal sample on Geoff Saunders (CRETE) during concrete drilling at Exterior Location 1 on February 17 and 18, 2014 (Ext-PCB1-021714 and Ext-PCB4-021814)
- Personal sample on Dan Mark (Crystal Soda Blast) during paint removal pilot tests inside containment at Exterior Location 1 on February 18, 2014 (Ext-PCB2-021814)
- Area sample immediately outside containment during paint removal pilot tests at Exterior Location 1 on February 18, 2014 (Ext-PCB3-021814)
- Personal sample on Dan Mark (Crystal Soda Blast) during paint removal pilot tests inside containment at Interior Location 1 on February 20, 2014 (Int-PCB5-022014)
- Quality control method and media blank (Int-PCB6-022014)

Samples for PCB analysis were collected and analyzed in accordance with the National Institute for Occupational Safety and Health (NIOSH) Method 5503 for PCBs. This method uses a pump calibrated to a target flow rate of between 0.05 and 0.20 liters per minute. The sampling media is a florisil sorbent in a glass tube. Samples were sent to ALS Laboratories in Salt Lake City, Utah for analysis. ALS Laboratories is accredited by the American Industrial Hygiene Association (AIHA).

### **3.3 Metals**

Based on the presence of lead in paint and cobalt and nickel in paint removal media, the following metals samples were collected for metals analysis:

- Personal sample on Geoff Saunders (CRETE) during concrete drilling at Exterior Location 1 on February 17 and 18, 2014 (Ext-Met1-021714 and Ext-Met5-021814)
- Personal sample on Dan Mark (Crystal Soda Blast) during paint removal pilot tests inside containment at Exterior Location 1 on February 18, 2014 (Ext-Met2-021814)
- Area sample immediately outside containment during paint removal pilot tests at Exterior Location 1 on February 18, 2014 (Ext-Met3-021814)
- Quality control method and media blank (Ext-Met4-021714)

Samples for metal analysis (cobalt, lead, and nickel) were collected and analyzed in accordance with NIOSH Method 7300 for metals. This method uses a pump calibrated

to a target flow rate of approximately 2 liters per minute. The sampling media is a mixed cellulose ester fiber (MCEF) filter in a 37-millimeter styrene cassette. Samples were sent to ALS Laboratories in Salt Lake City, Utah for analysis.

### **3.4 Silica**

Based on the concrete substrate throughout the building, crystalline silica was identified as a potential COC. In addition, sandblasting media which contains only amorphous silica according to the MSDS. Both crystalline and amorphous silica were identified as COCs during this air monitoring project.

The following respirable crystalline silica samples were collected. Only respirable crystalline silica samples were collected since DOSH PELs are based on exposure to the respirable fraction only.

- Area sample inside containment during paint removal pilot tests at Exterior Location 1 on February 18, 2014 (InCont-RCS-021814)
- Area sample immediately outside containment during paint removal pilot tests at Exterior Location 1 on February 18, 2014 (OutCont-RCS-021814)

The following amorphous silica samples were collected. DOSH PELs are available for both total and respirable amorphous silica.

- Area sample inside containment during paint removal pilot tests at Exterior Location 1 on February 18, 2014 (InCont-ATS-021814)
- Area sample immediately outside containment during paint removal pilot tests at Exterior Location 1 on February 18, 2014 (OutCont-ATS-021814)
- Area sample inside containment during paint removal pilot tests at Exterior Location 1 on February 18, 2014 (InCont-ARS-021814)
- Area sample immediately outside containment during paint removal pilot tests at Exterior Location 1 on February 18, 2014 (OutCont-ARS-021814)

Samples for crystalline silica analysis were collected and analyzed in accordance with NIOSH Method 7500 for crystalline silica. Samples for amorphous silica analysis were collected and analyzed in accordance with NIOSH Method 7501 for amorphous silica. For both methods, the respirable fraction was collected using an aluminum cyclone. The methods both use a pump calibrated to a target flow rate of approximately 2.0 (total) and 1.7 (respirable) liters per minute. The sampling media was a polyvinyl chloride (PVC) filter in a 37-millimeter styrene cassette. Samples were sent to DCM Science Laboratories in Wheat Ridge, Colorado for analysis. DCM Science Laboratories is accredited by the AIHA for silica analysis.

### **3.5 Carbon Dioxide**

Based on the use of dry ice blasting as a proposed removal technique, CO<sub>2</sub> monitoring was conducted. Air monitoring for CO<sub>2</sub> was conducted using a MultiRae IR direct-read instrument installed with a CO<sub>2</sub> sensor. The meter was set to datalog one-minute

averages for CO<sub>2</sub>. The instrument was pre-calibrated by Pine Environmental on February 14, 2014 and post-calibrated by Pine Environmental on February 21, 2014.

For this study, the MultiRae instrument was set up inside containment, located two to three feet behind the worker conducting blasting. The instrument was positioned on a ladder at approximately four feet above ground surface. At completion of fieldwork, project data was downloaded to a personal computer.

## **4.0 Results**

The results of air monitoring for each potential COC are provided below.

### **4.1 PCBs**

Air monitoring data for PCB samples are summarized on Table 1 attached to this report. Laboratory certificates of analysis for ALS are also included as an attachment.

In one sample (INT-PCB5-021814), PCB Aroclor 1248 was detected at 0.0048 mg/m<sup>3</sup>, which is two orders of magnitude below the DOSH PEL for PCBs of 0.5 mg/m<sup>3</sup>. No other Aroclors were detected in that sample, and PCBs were not detected at or above laboratory limits of detection any other sample collected for this project. The laboratory limits of detection for all PCB Aroclors are below the DOSH PELs for PCBs.

A media and method blank was submitted to ALS Laboratory for analysis for PCBs for quality control. The sample did not contain PCBs at or above the laboratory limit of detection.

### **4.2 Metals**

Air monitoring data for cobalt, lead, and nickel for all samples are summarized on Table 2 attached to this report. Laboratory certificates of analysis for ALS are also included as an attachment.

None of the metals was detected at or above the laboratory limited of detection. The limit of detection is below the DOSH PELs for all metals analyzed.

A media and method blank was submitted to ALS Laboratory for analysis for cobalt, lead, and nickel for quality control. The sample did not contain the metals at or above the laboratory limit of detection.

### **4.3 Silica**

Air monitoring results for silica are summarized on Table 3 attached to this report. Certificates of analysis from DCM Science are also included as an attachment.

For respirable crystalline silica from building concrete substrate, the COC was detectable in containment at a concentration of 0.713 mg/m<sup>3</sup>. This value is more than seven times the DOSH PEL for respirable crystalline silica of 0.1 mg/m<sup>3</sup>.

Respirable crystalline silica outside containment was not detected at or above the laboratory limit of detection. The laboratory limit of detection for respirable crystalline silica is below the DOSH PEL for that material.

For silica present in the blasting media, total amorphous silica was detectable in both samples, from inside the containment during active blasting and outside the containment during active blasting. The concentration of total amorphous silica measured was below the DOSH PEL in both samples. For the measurement inside containment, the measured concentration was 0.09 mg/m<sup>3</sup> and the concentration measured outside containment was 0.05 mg/m<sup>3</sup>. The DOSH PEL for total amorphous silica is 6.0 mg/m<sup>3</sup>.

For respirable silica present in the blasting media, respirable amorphous silica, was detectable in both samples, from inside the containment during active blasting and outside the containment during active blasting. The concentration of respirable amorphous silica measured was below the DOSH PEL. For the measurement inside containment, the measured concentration was 0.34 mg/m<sup>3</sup> and the concentration measured outside containment was 0.09 mg/m<sup>3</sup>. The DOSH PEL for respirable amorphous silica is 3.0 mg/m<sup>3</sup>.

A media and method blank was submitted to DCM Science for analysis for silica for quality control. The sample did not contain amorphous silica at or above the laboratory limit of detection.

#### **4.4 Carbon Dioxide**

Air monitoring results for CO<sub>2</sub> are summarized on Table 4 attached to this report. A summary of the instrument data is also included with this report. Average CO<sub>2</sub> concentrations inside containment were below the DOSH PEL.

### **5.0 Conclusions**

Based on the results of this study, I have formulated the following conclusions regarding respiratory hazards presented by the PCB paint removal techniques conducted for this project.

- The largest potential exposure appears to be from the concrete substrate in the form of respirable crystalline silica when the paint was removed. PCBs were detected, but below the DOSH PEL. Metals (cobalt, lead, and nickel) were not detected in the pilot test samples. CO<sub>2</sub> was detected above background, but below the DOSH PEL.
- Any use of these data for design of future activities should consider the limitations of the air monitoring conducted during the pilot study. Results may be significantly different if used in different areas, on a larger scale operation, for a longer duration, and under different conditions.
- Any blasting or paint removal should be conducted with an awareness of potential exposures to COCs from both the building materials and removal media. This study indicates that crystalline silica from the building concrete substrate is likely the largest hazard for respiratory exposures. If paint removal

will be conducted as part of the building deconstruction, air monitoring during the project will be required to verify that the proper PPE and controls are in place. If one of the methods is selected for remediation, continue the use of full-face air purifying respirator with a p-100 filter until air monitoring data are available to determine potential exposures under actual project conditions.

## **TABLES**

**Table 1 Polychlorinated Biphenyls (PCBs) in Air****Port of Tacoma****Paint Removal Pilot Test****1940 East 11th Street****Tacoma, Washington**

| Sample ID       | Sample Date | Location and Target Activity   | Volume (liters of air) | PCBs         | Result                    | DOSH PEL (8hr TWA)    |
|-----------------|-------------|--|------------------------|--------------|---------------------------|-----------------------|
| Ext-PCB1-021714 | 02/17/14    | Exterior Location 1<br><br>Geoff Saunders (CRETE)<br>Concrete Drilling<br><br>10:30 to 11:53<br>83 minutes | 5.44                   | Aroclor 1016 | <0.0018 mg/m <sup>3</sup> | 0.5 mg/m <sup>3</sup> |
|                 |             |  |                        | Aroclor 1260 | <0.0018 mg/m <sup>3</sup> |                       |
|                 |             |  |                        | Aroclor 1221 | <0.0018 mg/m <sup>3</sup> |                       |
|                 |             |  |                        | Aroclor 1232 | <0.0018 mg/m <sup>3</sup> |                       |
|                 |             |  |                        | Aroclor 1242 | <0.0018 mg/m <sup>3</sup> |                       |
|                 |             |  |                        | Aroclor 1248 | <0.0018 mg/m <sup>3</sup> |                       |
|                 |             |  |                        | Aroclor 1254 | <0.0018 mg/m <sup>3</sup> |                       |
|                 |             |  |                        | Aroclor 1262 | <0.0018 mg/m <sup>3</sup> |                       |
|                 |             |  |                        | Aroclor 1268 | <0.0018 mg/m <sup>3</sup> |                       |
|                 |             |  |                        | Total PCBs   | ND mg/m <sup>3</sup>      |                       |

**Table 1 Polychlorinated Biphenyls (PCBs) in Air****Port of Tacoma****Paint Removal Pilot Test****1940 East 11th Street****Tacoma, Washington**

| Sample ID       | Sample Date | Location and Target Activity  | Volume<br>(liters of air) | PCBs   | Result   | DOSH PEL<br>(8hr TWA) |
|-----------------|-------------|---|---------------------------|--|--|-----------------------|
| Ext-PCB2-021814 | 02/18/14    | Exterior Location 1<br><br>Dan Mark (Crystal Soda Blast)<br>Blasting - inside containment<br><br>12:50 to 14:29<br>99 minutes | 19.70                     | Aroclor 1016<br>Aroclor 1260<br>Aroclor 1221<br>Aroclor 1232<br>Aroclor 1242<br>Aroclor 1248<br>Aroclor 1254<br>Aroclor 1262<br>Aroclor 1268<br>Total PCBs | <0.00051 mg/m <sup>3</sup><br><0.00051 mg/m <sup>3</sup><br>ND mg/m <sup>3</sup> | 0.5 mg/m <sup>3</sup> |

**Table 1 Polychlorinated Biphenyls (PCBs) in Air****Port of Tacoma****Paint Removal Pilot Test****1940 East 11th Street****Tacoma, Washington**

| Sample ID       | Sample Date | Location and Target Activity  | Volume (liters of air) | PCBs   | Result   | DOSH PEL (8hr TWA)    |
|-----------------|-------------|---|------------------------|--|--|-----------------------|
| Ext-PCB3-021814 | 02/18/14    | Exterior Location 1<br><br>Area Sample<br>Blasting - outside containment<br><br>11:52 to 14:22<br>150 minutes | 28.43                  | Aroclor 1016<br>Aroclor 1260<br>Aroclor 1221<br>Aroclor 1232<br>Aroclor 1242<br>Aroclor 1248<br>Aroclor 1254<br>Aroclor 1262<br>Aroclor 1268<br>Total PCBs | <0.00035 mg/m <sup>3</sup><br><0.00035 mg/m <sup>3</sup><br>ND mg/m <sup>3</sup> | 0.5 mg/m <sup>3</sup> |

**Table 1 Polychlorinated Biphenyls (PCBs) in Air****Port of Tacoma****Paint Removal Pilot Test****1940 East 11th Street****Tacoma, Washington**

| Sample ID       | Sample Date | Location and Target Activity   | Volume<br>(liters of air) | PCBs         | Result                    | DOSH PEL<br>(8hr TWA) |
|-----------------|-------------|--|---------------------------|--------------|---------------------------|-----------------------|
| Ext-PCB4-021814 | 02/18/14    | Exterior Location 1<br><br>Geoff Saunders (CRETE)<br>Concrete Drilling<br><br>12:55 to 14:28<br>93 minutes | 6.18                      | Aroclor 1016 | <0.0016 mg/m <sup>3</sup> | 0.5 mg/m <sup>3</sup> |
|                 |             |  |                           | Aroclor 1260 | <0.0016 mg/m <sup>3</sup> |                       |
|                 |             |  |                           | Aroclor 1221 | <0.0016 mg/m <sup>3</sup> |                       |
|                 |             |  |                           | Aroclor 1232 | <0.0016 mg/m <sup>3</sup> |                       |
|                 |             |  |                           | Aroclor 1242 | <0.0016 mg/m <sup>3</sup> |                       |
|                 |             |  |                           | Aroclor 1248 | <0.0016 mg/m <sup>3</sup> |                       |
|                 |             |  |                           | Aroclor 1254 | <0.0016 mg/m <sup>3</sup> |                       |
|                 |             |  |                           | Aroclor 1262 | <0.0016 mg/m <sup>3</sup> |                       |
|                 |             |  |                           | Aroclor 1268 | <0.0016 mg/m <sup>3</sup> |                       |
|                 |             |  |                           | Total PCBs   | ND mg/m <sup>3</sup>      |                       |

**Table 1 Polychlorinated Biphenyls (PCBs) in Air****Port of Tacoma****Paint Removal Pilot Test****1940 East 11th Street****Tacoma, Washington**

| Sample ID       | Sample Date | Location and Target Activity  | Volume<br>(liters of air) | PCBs                                    | Result | DOSH PEL<br>(8hr TWA) |
|-----------------|-------------|---|---------------------------|---|--------|-----------------------|
| Int-PCB5-022014 | 02/20/14    | Interior Location 1<br><br>Dan Mark (Crystal Soda Blast)<br>Blasting - inside containment<br><br>09:35 to 10:40<br>65 minutes | 12.42                     | Aroclor 1016 <0.00081 mg/m <sup>3</sup> |        |                       |

**Table 1 Polychlorinated Biphenyls (PCBs) in Air****Port of Tacoma****Paint Removal Pilot Test****1940 East 11th Street****Tacoma, Washington**

| Sample ID       | Sample Date | Location and Target Activity | Volume (liters of air) | PCBs         | Result           | DOSH PEL (8hr TWA)    |
|-----------------|-------------|------------------------------|------------------------|--------------|------------------|-----------------------|
| INT-PCB6-022014 | 02/20/14    | Method and Media Blank       | 0.00                   | Aroclor 1016 | <0.010 ug/sample | 0.5 mg/m <sup>3</sup> |
|                 |             |                              |                        | Aroclor 1260 | <0.010 ug/sample |                       |
|                 |             |                              |                        | Aroclor 1221 | <0.010 ug/sample |                       |
|                 |             |                              |                        | Aroclor 1232 | <0.010 ug/sample |                       |
|                 |             |                              |                        | Aroclor 1242 | <0.010 ug/sample |                       |
|                 |             |                              |                        | Aroclor 1248 | <0.010 ug/sample |                       |
|                 |             |                              |                        | Aroclor 1254 | <0.010 ug/sample |                       |
|                 |             |                              |                        | Aroclor 1262 | <0.010 ug/sample |                       |
|                 |             |                              |                        | Aroclor 1268 | <0.010 ug/sample |                       |
|                 |             |                              |                        | Total PCBs   | ND               |                       |

mg/m<sup>3</sup>

Milligrams per cubic meter of air

ug/sample

Micrograms per sample

DOSH PEL

Division of Occupational Safety and Health Permissible Exposure Limits for Airborne Contaminants, Chapter 296-841 WAC

8 hr TWA

8-hour time-weighted average

ND

Not detected at or above laboratory limit of detection.

**Table 2 Metals in Air****Port of Tacoma****Paint Removal Pilot Test****1940 East 11th Street****Tacoma, Washington**

| Sample ID       | Sample Date | Location and Target Activity  | Volume (liters of air) | Metal  | Result                      | DOSH PEL (8hr TWA)              |
|-----------------|-------------|---|------------------------|--------|-----------------------------|---------------------------------|
| Ext-Met1-021714 | 02/17/14    | Exterior Location 1<br><br>Geoff Saunders (CRETE)<br>Concrete Drilling<br><br>10:30 to 11:53<br>83 minutes                    | 180.53                 | Cobalt | <0.00012 mg/m <sup>3</sup>  | 0.05 mg/m <sup>3</sup>          |
|                 |             |   |                        | Lead   | <0.0021 mg/m <sup>3</sup>   | 0.05 mg/m <sup>3</sup>          |
|                 |             |   |                        | Nickel | <0.00021 mg/m <sup>3</sup>  | 0.1 (soluble) mg/m <sup>3</sup> |
| Ext-Met2-021814 | 02/18/14    | Exterior Location 1<br><br>Dan Mark (Crystal Soda Blast)<br>Blasting - inside containment<br><br>12:50 to 14:29<br>99 minutes | 225.23                 | Cobalt | <0.00010 mg/m <sup>3</sup>  | 0.05 mg/m <sup>3</sup>          |
|                 |             |   |                        | Lead   | <0.0017 mg/m <sup>3</sup>   | 0.05 mg/m <sup>3</sup>          |
|                 |             |   |                        | Nickel | <0.00017 mg/m <sup>3</sup>  | 0.1 (soluble) mg/m <sup>3</sup> |
| Ext-Met3-021814 | 02/18/14    | Exterior Location 1<br><br>Area Sample<br>Blasting - outside containment<br><br>11:52 to 14:22<br>150 minutes                 | 304.50                 | Cobalt | <0.000074 mg/m <sup>3</sup> | 0.05 mg/m <sup>3</sup>          |
|                 |             |   |                        | Lead   | <0.0012 mg/m <sup>3</sup>   | 0.05 mg/m <sup>3</sup>          |
|                 |             |   |                        | Nickel | <0.00012 mg/m <sup>3</sup>  | 0.1 (soluble) mg/m <sup>3</sup> |
| Ext-Met4-021714 | 02/17/14    | Method and Media Blank  | 0.00                   | Cobalt | <0.023 ug/sample            | 0.05 mg/m <sup>3</sup>          |
|                 |             |   |                        | Lead   | <0.38 ug/sample             | 0.05 mg/m <sup>3</sup>          |
|                 |             |   |                        | Nickel | <0.038 ug/sample            | 0.1 (soluble) mg/m <sup>3</sup> |

**Table 2 Metals in Air****Port of Tacoma****Paint Removal Pilot Test****1940 East 11th Street****Tacoma, Washington**

| Sample ID       | Sample Date | Location and Target Activity   | Volume<br>(liters of air) | Metal  | Result                      | DOSH PEL<br>(8hr TWA)           |
|-----------------|-------------|--|---------------------------|--------|-----------------------------|---------------------------------|
| Ext-Met5-021814 | 02/18/14    | Exterior Location 1<br><br>Geoff Saunders (CRETE)<br>Concrete Drilling<br><br>12:55 to 14:28<br>93 minutes | 230.64                    | Cobalt | <0.000098 mg/m <sup>3</sup> | 0.05 mg/m <sup>3</sup>          |
|                 |             |  |                           | Lead   | <0.0016 mg/m <sup>3</sup>   | 0.05 mg/m <sup>3</sup>          |
|                 |             |  |                           | Nickel | <0.00016 mg/m <sup>3</sup>  | 0.1 (soluble) mg/m <sup>3</sup> |

mg/m<sup>3</sup>

Milligrams per cubic meter of air

ug/sample

Micrograms per sample

DOSH PEL

Division of Occupational Safety and Health Permissible Exposure Limits for Airborne Contaminants, Chapter 296-841 WAC

8 hr TWA

8-hour time-weighted average

**Table 3 Silica in Air****Port of Tacoma****Paint Removal Pilot Test****1940 East 11th Street****Tacoma, Washington**

| Sample ID          | Sample Date | Location and Target Activity  | Volume (liters of air) | Silica                         | Result                   | DOSH PEL (8hr TWA)    |
|--------------------|-------------|---|------------------------|--------------------------------|--------------------------|-----------------------|
| InCont-RCS-021814  | 02/18/14    | Exterior Location 1<br>Area Sample<br>Blasting - Inside Containment<br>11:38 to 14:21<br>163 minutes  | 392.83                 | Crystalline Silica, Respirable | 0.713 mg/m <sup>3</sup>  | 0.1 mg/m <sup>3</sup> |
| InCont-ATS-021814  | 02/18/14    | Exterior Location 1<br>Area Sample<br>Blasting - Inside Containment<br>11:38 to 14:21<br>163 minutes  | 330.89                 | Amorphous Silica, Total        | 0.09 mg/m <sup>3</sup>   | 6.0 mg/m <sup>3</sup> |
| InCont-ARS-021814  | 02/18/14    | Exterior Location 1<br>Area Sample<br>Blasting - Inside Containment<br>11:38 to 14:21<br>163 minutes  | 282.81                 | Amorphous Silica, Respirable   | 0.34 mg/m <sup>3</sup>   | 3.0 mg/m <sup>3</sup> |
| OutCont-RCS-021814 | 02/18/14    | Exterior Location 1<br>Area Sample<br>Blasting - Outside Containment<br>11:52 to 14:22<br>150 minutes | 345.00                 | Crystalline Silica, Respirable | <0.005 mg/m <sup>3</sup> | 0.1 mg/m <sup>3</sup> |
| OutCont-ATS-021814 | 02/18/14    | Exterior Location 1<br>Area Sample<br>Blasting - Outside Containment<br>11:52 to 14:22<br>150 minutes | 305.25                 | Amorphous Silica, Total        | 0.05 mg/m <sup>3</sup>   | 6.0 mg/m <sup>3</sup> |
| OutCont-ARS-021814 | 02/18/14    | Exterior Location 1<br>Area Sample<br>Blasting - Outside Containment<br>11:52 to 14:22<br>150 minutes | 246.75                 | Amorphous Silica, Respirable   | 0.09 mg/m <sup>3</sup>   | 3.0 mg/m <sup>3</sup> |

**Table 3 Silica in Air****Port of Tacoma****Paint Removal Pilot Test****1940 East 11th Street****Tacoma, Washington**

| Sample ID | Sample Date | Location and Target Activity | Volume (liters of air) | Silica                  | Result | DOSH PEL (8hr TWA)    |
|-----------|-------------|------------------------------|------------------------|-------------------------|--------|-----------------------|
| Blank     | 02/18/14    | Media and Method Blank       | 0.00                   | Amorphous Silica, Total | ND     | 6.0 mg/m <sup>3</sup> |

mg/m<sup>3</sup> *Milligrams per cubic meter of air*mg/sample *Milligrams per sample*DOSH PEL *Division of Occupational Safety and Health Permissible Exposure Limits for Airborne Contaminants, Chapter 296-841 WAC*8 hr TWA *8-hour time-weighted average*ND *Not Detected at or above laboratory limit of detection.*

**Table 4 Carbon Dioxide****Port of Tacoma****Paint Removal Pilot Test****1940 East 11th Street****Tacoma, Washington**

| Sample ID     | Sample Date | Location and Target Activity   | CO2 Level (8hr TWA) | Peak CO2 Level | DOSH PEL (8hr TWA) | Ambient Air Level CO2 |
|---------------|-------------|--|---------------------|----------------|--------------------|-----------------------|
| InCont-021814 | 02/18/14    | Exterior Location 1<br>Area Sample<br>Blasting - Inside Containment<br>Approximate Time<br>07:00 to 14:12<br>432 Minutes | 3,360 ppm           | 9,923 ppm      | 5,000 ppm          | 300 to 500 ppm        |

*ppm**Parts per Million**DOSH PEL**Division of Occupational Safety and Health Permissible Exposure Limits for Airborne Contaminants, Chapter 296-841 WAC**8 hr TWA**8-hour time-weighted average**CO2**Carbon Dioxide*

**ANALYTICAL RESULTS  
ALS LABORATORIES  
DCM SCIENCE LABORATORIES, INC**



## ANALYTICAL REPORT

Report Date: March 05, 2014

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Workorder: **34-1405707**

Client Project ID: EMB Consulting, LLC 022514

Purchase Order: NA

Project Manager: Paul Pope

### Analytical Results

| Sample ID: <b>Ext-PCB1-021714</b>            | Collected: 02/17/2014                               |                   |                |
|--|---|-------------------|----------------|
| Lab ID: 1405707001                           | Received: 02/25/2014                                |                   |                |
| <b>Method:</b> NIOSH 5503 Mod.               | <b>Media:</b> SKC 226-39, Florisil Tube<br>50/100mg |                   |                |
| <b>Sampling Parameter: Air Volume 5.44 L</b> |   |                   |                |
| Analyte                                      | ug/sample   | mg/m <sup>3</sup> | RL (ug/sample) |
| Aroclor 1016                                 | <0.010  | <0.0018           | 0.010          |
| Aroclor 1260                                 | <0.010  | <0.0018           | 0.010          |
| Aroclor 1221                                 | <0.010  | <0.0018           | 0.010          |
| Aroclor 1232                                 | <0.010  | <0.0018           | 0.010          |
| Aroclor 1242                                 | <0.010  | <0.0018           | 0.010          |
| Aroclor 1248                                 | <0.010  | <0.0018           | 0.010          |
| Aroclor 1254                                 | <0.010  | <0.0018           | 0.010          |
| Aroclor 1262                                 | <0.010  | <0.0018           | 0.010          |
| Aroclor 1268                                 | <0.010  | <0.0018           | 0.010          |

| Sample ID: <b>Ext-PCB2-021814</b>            | Collected: 02/18/2014                               |                   |                |
|--|---|-------------------|----------------|
| Lab ID: 1405707002                           | Received: 02/25/2014                                |                   |                |
| <b>Method:</b> NIOSH 5503 Mod.               | <b>Media:</b> SKC 226-39, Florisil Tube<br>50/100mg |                   |                |
| <b>Sampling Parameter: Air Volume 19.7 L</b> |   |                   |                |
| Analyte                                      | ug/sample   | mg/m <sup>3</sup> | RL (ug/sample) |
| Aroclor 1016                                 | <0.010  | <0.00051          | 0.010          |
| Aroclor 1260                                 | <0.010  | <0.00051          | 0.010          |
| Aroclor 1221                                 | <0.010  | <0.00051          | 0.010          |
| Aroclor 1232                                 | <0.010  | <0.00051          | 0.010          |
| Aroclor 1242                                 | <0.010  | <0.00051          | 0.010          |
| Aroclor 1248                                 | <0.010  | <0.00051          | 0.010          |
| Aroclor 1254                                 | <0.010  | <0.00051          | 0.010          |
| Aroclor 1262                                 | <0.010  | <0.00051          | 0.010          |
| Aroclor 1268                                 | <0.010  | <0.00051          | 0.010          |



## ANALYTICAL REPORT

Workorder: **34-1405707**

Client Project ID: EMB Consulting, LLC 022514

Purchase Order: NA

Project Manager: Paul Pope

### Analytical Results

| Sample ID: <b>Ext-PCB3-021814</b>             | Collected: 02/18/2014                               |                   |                |
|---|---|-------------------|----------------|
| Lab ID: 1405707003                            | Received: 02/25/2014                                |                   |                |
| <b>Method:</b> NIOSH 5503 Mod.                | <b>Media:</b> SKC 226-39, Florisil Tube<br>50/100mg |                   |                |
| <b>Sampling Parameter: Air Volume 28.43 L</b> |   |                   |                |
| Analyte                                       | ug/sample   | mg/m <sup>3</sup> | RL (ug/sample) |
| Aroclor 1016                                  | <0.010  | <0.00035          | 0.010          |
| Aroclor 1260                                  | <0.010  | <0.00035          | 0.010          |
| Aroclor 1221                                  | <0.010  | <0.00035          | 0.010          |
| Aroclor 1232                                  | <0.010  | <0.00035          | 0.010          |
| Aroclor 1242                                  | <0.010  | <0.00035          | 0.010          |
| Aroclor 1248                                  | <0.010  | <0.00035          | 0.010          |
| Aroclor 1254                                  | <0.010  | <0.00035          | 0.010          |
| Aroclor 1262                                  | <0.010  | <0.00035          | 0.010          |
| Aroclor 1268                                  | <0.010  | <0.00035          | 0.010          |

| Sample ID: <b>Ext-PCB4-021814</b>            | Collected: 02/18/2014                               |                   |                |
|--|---|-------------------|----------------|
| Lab ID: 1405707004                           | Received: 02/25/2014                                |                   |                |
| <b>Method:</b> NIOSH 5503 Mod.               | <b>Media:</b> SKC 226-39, Florisil Tube<br>50/100mg |                   |                |
| <b>Sampling Parameter: Air Volume 6.18 L</b> |   |                   |                |
| Analyte                                      | ug/sample   | mg/m <sup>3</sup> | RL (ug/sample) |
| Aroclor 1016                                 | <0.010  | <0.0016           | 0.010          |
| Aroclor 1260                                 | <0.010  | <0.0016           | 0.010          |
| Aroclor 1221                                 | <0.010  | <0.0016           | 0.010          |
| Aroclor 1232                                 | <0.010  | <0.0016           | 0.010          |
| Aroclor 1242                                 | <0.010  | <0.0016           | 0.010          |
| Aroclor 1248                                 | <0.010  | <0.0016           | 0.010          |
| Aroclor 1254                                 | <0.010  | <0.0016           | 0.010          |
| Aroclor 1262                                 | <0.010  | <0.0016           | 0.010          |
| Aroclor 1268                                 | <0.010  | <0.0016           | 0.010          |

| Sample ID: <b>Int-PCB5-022014</b>             | Collected: 02/20/2014                               |                   |                |
|---|---|-------------------|----------------|
| Lab ID: 1405707005                            | Received: 02/25/2014                                |                   |                |
| <b>Method:</b> NIOSH 5503 Mod.                | <b>Media:</b> SKC 226-39, Florisil Tube<br>50/100mg |                   |                |
| <b>Sampling Parameter: Air Volume 12.42 L</b> |   |                   |                |
| Analyte                                       | ug/sample   | mg/m <sup>3</sup> | RL (ug/sample) |
| Aroclor 1016                                  | <0.010  | <0.00081          | 0.010          |
| Aroclor 1260                                  | <0.010  | <0.00081          | 0.010          |
| Aroclor 1221                                  | <0.010  | <0.00081          | 0.010          |
| Aroclor 1232                                  | <0.010  | <0.00081          | 0.010          |
| Aroclor 1242                                  | <0.010  | <0.00081          | 0.010          |

Results Continued on Next Page



## ANALYTICAL REPORT

Workorder: **34-1405707**  
Client Project ID: EMB Consulting, LLC 022514  
Purchase Order: NA  
Project Manager: Paul Pope

### Analytical Results

| Sample ID: <b>Int-PCB5-022014</b>             | Collected: 02/20/2014                               |                   |                |
|---|---|-------------------|----------------|
| Lab ID: 1405707005                            | Received: 02/25/2014                                |                   |                |
| <b>Method:</b> NIOSH 5503 Mod.                | <b>Media:</b> SKC 226-39, Florisil Tube<br>50/100mg |                   |                |
| <b>Sampling Parameter:</b> Air Volume 12.42 L |   |                   |                |
| Analyte                                       | ug/sample   | mg/m <sup>3</sup> | RL (ug/sample) |
| Aroclor 1248                                  | <b>0.060</b>  | <b>0.0048</b>     | 0.010          |
| Aroclor 1254                                  | <0.010  | <0.00081          | 0.010          |
| Aroclor 1262                                  | <0.010  | <0.00081          | 0.010          |
| Aroclor 1268                                  | <0.010  | <0.00081          | 0.010          |

| Sample ID: <b>Int-PCB6-022014</b>         | Collected: 02/20/2014                               |                   |                |
|---|---|-------------------|----------------|
| Lab ID: 1405707006                        | Received: 02/25/2014                                |                   |                |
| <b>Method:</b> NIOSH 5503 Mod.            | <b>Media:</b> SKC 226-39, Florisil Tube<br>50/100mg |                   |                |
| <b>Sampling Parameter:</b> Air Volume 0 L |   |                   |                |
| Analyte                                   | ug/sample   | mg/m <sup>3</sup> | RL (ug/sample) |
| Aroclor 1016                              | <0.010  | NA                | 0.010          |
| Aroclor 1260                              | <0.010  | NA                | 0.010          |
| Aroclor 1221                              | <0.010  | NA                | 0.010          |
| Aroclor 1232                              | <0.010  | NA                | 0.010          |
| Aroclor 1242                              | <0.010  | NA                | 0.010          |
| Aroclor 1248                              | <0.010  | NA                | 0.010          |
| Aroclor 1254                              | <0.010  | NA                | 0.010          |
| Aroclor 1262                              | <0.010  | NA                | 0.010          |
| Aroclor 1268                              | <0.010  | NA                | 0.010          |

### Report Authorization

| Method          | Analyst          | Peer Review   |
|-----------------|------------------|---------------|
| NIOSH 5503 Mod. | Mila V. Potekhin | Nadjla Borges |

### Laboratory Contact Information

ALS Environmental  
960 W Levoy Drive  
Salt Lake City, Utah 84123

Phone: (801) 266-7700  
Email: alsut.lab@ALSGlobal.com  
Web: www.alsslcc.com



## ANALYTICAL REPORT

Workorder: **34-1405707**

Client Project ID: EMB Consulting, LLC 022514

Purchase Order: NA

Project Manager: Paul Pope

### General Lab Comments

The results provided in this report relate only to the items tested.

Samples were received in acceptable condition unless otherwise noted.

Samples have not been blank corrected unless otherwise noted.

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ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

| Testing Sector                                  | Accreditation Body (Standard)                                       | Certificate Number | Website  |
|---|---|--------------------|--|
| Environmental                                   | ACCLASS (DoD ELAP)  | ADE-1420           | <a href="http://www.aclasscorp.com">http://www.aclasscorp.com</a>  |
|   | Utah (NELAC)  | DATA1              | <a href="http://health.utah.gov/lab/labimp/">http://health.utah.gov/lab/labimp/</a>  |
|   | Nevada  | UT00009            | <a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>  |
|   | Oklahoma  | UT00009            | <a href="http://www.deq.state.ok.us/CSDnew/">http://www.deq.state.ok.us/CSDnew/</a>  |
|   | Iowa  | IA# 376            | <a href="http://www.iowadnr.gov/InsideDNR/RegulatoryWater.aspx">http://www.iowadnr.gov/InsideDNR/RegulatoryWater.aspx</a>                              |
|   | Florida (TNI)   | E871067            | <a href="http://www.dep.state.fl.us/labs/bars/sas/qa/">http://www.dep.state.fl.us/labs/bars/sas/qa/</a>  |
|   | Texas (TNI)   | T104704456-11-1    | <a href="http://www.tceq.texas.gov/field/qa/lab_accred_certif.html">http://www.tceq.texas.gov/field/qa/lab_accred_certif.html</a>                      |
| Industrial Hygiene                              | AIHA (ISO 17025 & AIHA IHLAP/ELLAP)                                 | 101574             | <a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>  |
| Lead Testing:<br>CPSC<br>Soil, Dust, Paint ,Air | ACCLASS (ISO 17025, CPSC)<br>AIHA (ISO 17025, AIHA ELLAP and NLLAP) | ADE-1420<br>101574 | <a href="http://www.aclasscorp.com">http://www.aclasscorp.com</a><br><a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a> |
| Dietary Supplements                             | ACCLASS (ISO 17025)   | ADE-1420           | <a href="http://www.aclasscorp.com">http://www.aclasscorp.com</a>  |

### Definitions

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity.

LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.

ND = Not Detected, Testing result not detected above the LOD or LOQ.

NA = Not Applicable.

\*\* No result could be reported, see sample comments for details.

< This testing result is less than the numerical value.

( ) This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.



# ANALYTICAL REPORT

Report Date: March 04, 2014

Elisabeth Black  
EMB Consulting, LLC.  
P.O. Box 5171 or  
3607 219th Street, SW  
Lynnwood, WA 98036

E-mail: [EMBlackconsult@gmail.com](mailto:EMBlackconsult@gmail.com)

Workorder: **34-1405708**

Client Project ID: EMB Consulting, LLC 022514 2

Purchase Order: NA

Project Manager: Paul Pope

## Analytical Results

| Sample ID: <b>Ext-Met1-021714</b> | Collected: 02/17/2014                          |                   |                 |                |
|-----------------------------------|--|-------------------|-----------------|----------------|
| Lab ID: 1405708001                | Received: 02/25/2014                           |                   |                 |                |
| <b>Method:</b> NIOSH 7300 Mod.    | <b>Media:</b> MCE Filter                       |                   |                 |                |
|                                   | <b>Sampling Parameter:</b> Air Volume 180.53 L |                   |                 |                |
| Analyte                           | ug/sample                                      | mg/m <sup>3</sup> | LOD (ug/sample) | RL (ug/sample) |
| Cobalt                            | <0.023   | <0.00012          | 0.023           | 0.075          |
| Lead                              | <0.38  | <0.0021           | 0.38            | 1.3            |
| Nickel                            | <0.038   | <0.00021          | 0.038           | 0.13           |
| Sample ID: <b>Ext-Met2-021814</b> | Collected: 02/18/2014                          |                   |                 |                |
| Lab ID: 1405708002                | Received: 02/25/2014                           |                   |                 |                |
| <b>Method:</b> NIOSH 7300 Mod.    | <b>Media:</b> MCE Filter                       |                   |                 |                |
|                                   | <b>Sampling Parameter:</b> Air Volume 225.23 L |                   |                 |                |
| Analyte                           | ug/sample                                      | mg/m <sup>3</sup> | LOD (ug/sample) | RL (ug/sample) |
| Cobalt                            | <0.023   | <0.00010          | 0.023           | 0.075          |
| Lead                              | <0.38  | <0.0017           | 0.38            | 1.3            |
| Nickel                            | <0.038   | <0.00017          | 0.038           | 0.13           |
| Sample ID: <b>Ext-Met3-021814</b> | Collected: 02/18/2014                          |                   |                 |                |
| Lab ID: 1405708003                | Received: 02/25/2014                           |                   |                 |                |
| <b>Method:</b> NIOSH 7300 Mod.    | <b>Media:</b> MCE Filter                       |                   |                 |                |
|                                   | <b>Sampling Parameter:</b> Air Volume 304.5 L  |                   |                 |                |
| Analyte                           | ug/sample                                      | mg/m <sup>3</sup> | LOD (ug/sample) | RL (ug/sample) |
| Cobalt                            | <0.023   | <0.000074         | 0.023           | 0.075          |
| Lead                              | <0.38  | <0.0012           | 0.38            | 1.3            |
| Nickel                            | <0.038   | <0.00012          | 0.038           | 0.13           |



## ANALYTICAL REPORT

Workorder: **34-1405708**  
Client Project ID: EMB Consulting, LLC 022514 2  
Purchase Order: NA  
Project Manager: Paul Pope

### Analytical Results

| Sample ID: <b>Ext-Met4-021714</b> | Collected: 02/17/2014   |  |                 |                |
|-----------------------------------|---|--|-----------------|----------------|
| Lab ID: 1405708004                | Received: 02/25/2014  |  |                 |                |
| <b>Method:</b> NIOSH 7300 Mod.    | <b>Media:</b> MCE Filter<br><b>Sampling Parameter:</b> Air Volume 0 L |  |                 |                |
|                                   |   | <b>Prepared:</b> 02/27/2014<br><b>Analyzed:</b> 02/28/2014 |                 |                |
| Analyte                           | ug/sample   | mg/m <sup>3</sup>  | LOD (ug/sample) | RL (ug/sample) |
| Cobalt                            | <0.023  | NA   | 0.023           | 0.075          |
| Lead                              | <0.38   | NA   | 0.38            | 1.3            |
| Nickel                            | <0.038  | NA   | 0.038           | 0.13           |

| Sample ID: <b>Ext-Met5-021814</b> | Collected: 02/18/2014  |  |                 |                |
|-----------------------------------|--|--|-----------------|----------------|
| Lab ID: 1405708005                | Received: 02/25/2014   |  |                 |                |
| <b>Method:</b> NIOSH 7300 Mod.    | <b>Media:</b> MCE Filter<br><b>Sampling Parameter:</b> Air Volume 230.64 L |  |                 |                |
|                                   |  | <b>Prepared:</b> 02/27/2014<br><b>Analyzed:</b> 02/28/2014 |                 |                |
| Analyte                           | ug/sample  | mg/m <sup>3</sup>  | LOD (ug/sample) | RL (ug/sample) |
| Cobalt                            | <0.023   | <0.000098  | 0.023           | 0.075          |
| Lead                              | <0.38  | <0.0016  | 0.38            | 1.3            |
| Nickel                            | <0.038   | <0.00016   | 0.038           | 0.13           |

### Comments

#### Quality Control: NIOSH 7300 Mod. - (HBN: 122318)

The LCS 377925 beryllium, chromium, molybdenum, and zinc recoveries and the LCSD 377926 chromium and zinc recoveries were high outside of current LCS limits but were within method limits of +/- 20% so the data was reported as is without further comment.

### Report Authorization

| Method          | Analyst        | Peer Review    |
|-----------------|----------------|----------------|
| NIOSH 7300 Mod. | Peter P. Steen | Penny A. Foote |

### Laboratory Contact Information

ALS Environmental  
960 W Levoy Drive  
Salt Lake City, Utah 84123

Phone: (801) 266-7700  
Email: alsit.lab@ALSGlobal.com  
Web: www.alssl.com



## ANALYTICAL REPORT

Workorder: **34-1405708**

Client Project ID: EMB Consulting, LLC 022514 2

Purchase Order: NA

Project Manager: Paul Pope

### General Lab Comments

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| Environmental                                   | ACCLASS (DoD ELAP)  | ADE-1420           | <a href="http://www.aclasscorp.com">http://www.aclasscorp.com</a>  |
|   | Utah (NELAC)  | DATA1              | <a href="http://health.utah.gov/lab/labimp/">http://health.utah.gov/lab/labimp/</a>  |
|   | Nevada  | UT00009            | <a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>  |
|   | Oklahoma  | UT00009            | <a href="http://www.deq.state.ok.us/CSDnew/">http://www.deq.state.ok.us/CSDnew/</a>  |
|   | Iowa  | IA# 376            | <a href="http://www.iowadnr.gov/InsideDNR/RegulatoryWater.aspx">http://www.iowadnr.gov/InsideDNR/RegulatoryWater.aspx</a>                              |
|   | Florida (TNI)   | E871067            | <a href="http://www.dep.state.fl.us/labs/bars/sas/qa/">http://www.dep.state.fl.us/labs/bars/sas/qa/</a>  |
|   | Texas (TNI)   | T104704456-11-1    | <a href="http://www.tceq.texas.gov/field/qa/lab_accred_certif.html">http://www.tceq.texas.gov/field/qa/lab_accred_certif.html</a>                      |
| Industrial Hygiene                              | AIHA (ISO 17025 & AIHA IHLAP/ELLAP)                                 | 101574             | <a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>  |
| Lead Testing:<br>CPSC<br>Soil, Dust, Paint ,Air | ACCLASS (ISO 17025, CPSC)<br>AIHA (ISO 17025, AIHA ELLAP and NLLAP) | ADE-1420<br>101574 | <a href="http://www.aclasscorp.com">http://www.aclasscorp.com</a><br><a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a> |
| Dietary Supplements                             | ACCLASS (ISO 17025)   | ADE-1420           | <a href="http://www.aclasscorp.com">http://www.aclasscorp.com</a>  |

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LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.

ND = Not Detected, Testing result not detected above the LOD or LOQ.

NA = Not Applicable.

\*\* No result could be reported, see sample comments for details.

< This testing result is less than the numerical value.

( ) This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.



12421 W. 49TH AVENUE, UNIT #6  
WHEAT RIDGE, CO 80033 (303) 463-8270

CRYSTALLINE SILICA ANALYSIS (XRD)  
NIOSH 7500 METHOD - PAGE 1 OF 1

CLIENT:  
EMB CONSULTING  
P.O. BOX 5171  
LYNNWOOD, WA 98046

ANALYSIS DATE: 2-26-14  
REPORTING DATE: 2-28-14  
RECEIPT DATE: 2-25-14  
CLIENT JOB NO.: NONE GIVEN  
PROJECT TITLE: NONE GIVEN  
DCMSL PROJECT: EMBC4

| DCM NO. | CLIENT SAMPLE NO. | VOLUME (L) | DUST (1) (mg) | DUST CONCENTRATION (mg/m3) | MEASURED QUARTZ (mg) | QUARTZ (mg/m3) | QUARTZ % | OSHA PEL (mg/m3) | % EXPOSURE |
|---------|-------------------|------------|---------------|----------------------------|----------------------|----------------|----------|------------------|------------|
| -1      | 136564            | 345        | 0.054         | 0.157                      | BLD                  | BLD            | BLD      | 5.000            | 3.13       |
| -2      | 136569            | 393        | 8.290         | 21.103                     | 0.2801               | 0.713          | 3.38     | 1.859            | 1135.10    |

(1) DUST IS CONSIDERED RESPIRABLE BASED ON SAMPLING METHOD. SAMPLES MUST BE COLLECTED USING A CYCLONE DEVICE TO BE CONSIDERED RESPIRABLE.

BLD - BELOW THE ESTIMATED LIMIT OF DETECTION FOR THE METHOD (LESS THAN 0.005mg).

THE SAMPLES WERE WEIGHED WITH A METTLER AE240 AND/OR AT20 MICROBALANCE WITH A REPORTING LIMIT OF  $\pm 0.02$ mg AND/OR  $\pm 0.009$ mg RESPECTIVELY. THE BALANCES ARE CERTIFIED WITHIN INSTRUMENT SPECIFICATIONS AND TRACEABLE TO NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

THE SAMPLES WERE ANALYZED USING THE NIOSH 7500 METHOD AND OSHA METHOD ID-142. PRE-WEIGHED FILTERS WERE WEIGHED TO DETERMINE TOTAL DUST COLLECTED ON THE FILTERS. THE FILTERS WERE PLACED IN PORCELAIN CRUCIBLES AND ASHED FOR 2 HOURS AT 600°C. THE ASHED RESIDUE WAS DEPOSITED ON 25mm SILVER FILTERS AND ANALYZED IN CONJUNCTION WITH PREPARED STANDARDS OF CRYSTALLINE SILICA. CALIBRATION CURVES ARE ESTABLISHED FOR CRYSTALLINE SILICA USING NIST AND NIOSH STANDARD REFERENCE MATERIALS. SAMPL INTENSITIES WERE CALCULATED RELATIVE TO CALIBRATION CURVES. THE QUANTITATIVE DETECTION LIMIT OF CRYSTALLINE SILICA FOR THIS METHOD IS 0.005mg (5ug). THE COEFFICIENT OF VARIATION OF THIS METHOD AS STATED BY NIOSH 7500 IS 0.09 FOR CONCENTRATIONS BETWEEN 0.025mg AND 2.5mg. ALL CALCULATIONS ARE BASED UPON THOSE IN NIOSH 7500, OSHA AND MSHA METHODS.

THE FILTER MATERIAL WAS PREPARED AND SCANNED BY X-RAY DIFFRACTION USING A SLOW SCAN RATE TO DETERMINE THE PHASES OF CRYSTALLINE SILICA PRESENT IN THE SAMPLES. CRISTOBALITE AND TRIDYMITE WERE NOT IDENTIFIED IN THE SAMPLES. THEREFORE, THE TOTAL CONCENTRATION OF CRYSTALLINE SILICA IS DERIVED FROM THE CONCENTRATION OF QUARTZ. THE DETECTION LIMIT FOR THE THREE SILICA PHASES USING THE SCANNING PROCEDURE IS 0.005mg.

THE RESULTS ARE BLANK CORRECTED. THE BLANK FROM EMBC5 WAS USED WITH THIS GROUP OF SAMPLES.

THE SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MAY NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN APPROVAL OF THE LABORATORY.



RON SCHOTT, ANALYST


**S·C·I·E·N·C·E**  
 LABORATORY, INC.  
 12421 W. 49<sup>th</sup> Avenue, Unit #6  
 Wheat Ridge, CO 80033

(303) 463-8270/(800) 852-7340  
 (303) 463-8267 – fax

Date/Time Received \_\_\_\_\_ DCMSL Group No. \_\_\_\_\_ DCMSL Log No. \_\_\_\_\_  
 Field Data Sheet/Chain of Custody

Samples Submitted By:

Company: EMB Consulting Job/P.O. # \_\_\_\_\_  
 Address: PO Box 5171  
Lynnwood, WA 98046 Project Title \_\_\_\_\_

Contact: Elizabeth Black  
 Phone: 206-952-2395  
 Fax: \_\_\_\_\_  
 Cell/Pager: \_\_\_\_\_

Archive: All samples are archived for  
 6 months unless other  
 arrangements are made.  
 E-Mail embblackconsult@gmail.com

Turnaround Time Requested:

Standard (3 to 5 Business Days) [ ] 2 Hour Rush (Asbestos Only)  
 24 Hour Rush [ ] Other \_\_\_\_\_

Procedure Requested:

|          |                  |                       |                        |
|----------|------------------|-----------------------|------------------------|
| ASBESTOS | XRD              | OTHER                 |                        |
| Bulk [ ] | Standard EPA [X] | Respirable Silica [ ] | Optical Microscopy [ ] |
| [ ]      | Progressive [ ]  | Bulk Silica [ ]       | Gravimetric [ ]        |
| [ ]      | Point Count [ ]  | Scan & Search [ ]     | SEM [ ]                |
| [ ]      | Other [ ]        | Other [ ]             | Other [ ]              |

Air [ ] NIOSH 7400  
 [ ] OSHA ID-160  
 [ ] Other

ADDITIONAL INFORMATION NJ DSH 7500

| Client Sample No.:               | Sample Date   | Air Volume<br>(liters) | Other Information               |
|----------------------------------|---------------|------------------------|---------------------------------|
| <u>1 Out Cont - RCS - 021814</u> | <u>021814</u> | <u>345</u>             | <u>Respirable</u> <u>136564</u> |
| <u>2 In Cont - RCS - 021814</u>  | <u>021814</u> | <u>392.83</u>          | <u>Respirable</u> <u>136565</u> |
| 3                                |               |                        |                                 |
| 4                                |               |                        |                                 |
| 5                                |               |                        |                                 |
| 6                                |               |                        |                                 |
| 7                                |               |                        |                                 |
| 8                                |               |                        |                                 |
| 9                                |               |                        |                                 |
| 10                               |               |                        |                                 |

|                  |              |                      |                      |
|------------------|--------------|----------------------|----------------------|
| Relinquished By: | Date/Time    | Received By:         | Date/Time            |
| <u>E. Black</u>  | <u>15:00</u> | <u>Wendy McBride</u> | <u>2-25-14 10:30</u> |



12421 W. 49TH AVENUE, UNIT #6  
WHEAT RIDGE, CO 80033 (303) 463-8270

AMORPHOUS SILICA ANALYSIS (XRD)  
NIOSH 7501 METHOD - PAGE 1 OF 1

CLIENT:  
EMB CONSULTING  
P.O. BOX 5171  
LYNNWOOD, WA 98046

ANALYSIS DATE: 2-27-14  
REPORTING DATE: 2-28-14  
RECEIPT DATE: 2-25-14  
CLIENT JOB NO.: NONE GIVEN  
PROJECT TITLE: NONE GIVEN  
DCMSL PROJECT: EMBC5

| DCM NO. | CLIENT SAMPLE NO. | DUST (1) (mg) | VOLUME (L) | DUST CONCENTRATION (mg/m3) | MEASURED AMORPHOUS SILICA (OPAL C) (mg) | MEASURED AMORPHOUS SILICA (OPAL C) % | MEASURED AMORPHOUS SILICA (OPAL C) (mg/m3) |
|---------|-------------------|---------------|------------|----------------------------|---|--------------------------------------|--|
| -1      | 136561            | 0.014         | 305        | 0.046                      | 0.0139                                  | 99.29                                | 0.05                                       |
| -2      | 136562            | 0.030         | 247        | 0.122                      | 0.0232                                  | 77.33                                | 0.09                                       |
| .       | 136563            | <0.001        | 0          | -                          | N/A                                     | N/A                                  | N/A  |
| -4      | 136567            | 8.698         | 283        | 30.756                     | 0.0948                                  | 1.09                                 | 0.34                                       |
| -5      | 136568            | 0.030         | 331        | 0.091                      | 0.0296                                  | 98.67                                | 0.09                                       |

(1) DUST IS CONSIDERED RESPIRABLE BASED ON SAMPLING METHOD. SAMPLES MUST BE COLLECTED USING A CYCLONE DEVICE TO BE CONSIDERED RESPIRABLE

THE SAMPLES WERE WEIGHED WITH A METTLER AE240 AND/OR AT20 MICROBALANCE WITH A REPORTING LIMIT OF  $\pm 0.02\text{mg}$  AND/OR  $\pm 0.009\text{mg}$  RESPECTIVELY. THE BALANCES ARE CERTIFIED WITHIN INSTRUMENT SPECIFICATIONS AND TRACEABLE TO NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

BLD - BELOW THE ESTIMATED LIMIT OF DETECTION FOR THE METHOD (LESS THAN 0.005mg).

THE SAMPLES WERE ANALYZED USING THE NIOSH 7501 METHOD. PRE-WEIGHED FILTERS WERE WEIGHED TO DETERMINE TOTAL DUST COLLECTED ON THE FILTERS. THE FILTERS WERE ASHED FOR 6 HOURS AT 1,100°C TO CONVERT AMORPHOUS SiO<sub>2</sub> TO OPAL C. THE ASHED RESIDUE WAS DEPOSITED ON 25mm SILVER FILTERS AND ANALYZED IN CONJUNCTION WITH PREPARED STANDARDS OF CRYSTALLINE SILICA. CALIBRATION CURVES ARE ESTABLISHED FOR CRYSTALLINE SILICA USING NIST AND NIOSH STANDARD REFERENCE MATERIALS. SAMPLE INTENSITIES WERE CALCULATED RELATIVE TO CALIBRATION CURVES. THE QUANTITATIVE DETECTION LIMIT OF CRYSTALLINE SILICA FOR THIS METHOD IS 0.010mg (10 $\mu\text{g}$ ). THE COEFFICIENT OF VARIATION OF THIS METHOD AS STATED IN NIOSH 7501 IS 0.09 FOR CONCENTRATIONS BETWEEN 0.025mg AND 2.5mg. ALL CALCULATIONS ARE BASED UPON THOSE IN NIOSH 7501, OSHA AND MSHA METHOD

THE RESULTS ARE BLANK CORRECTED

THE SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MAY NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN APPROVAL OF THE LABORATORY



  
RON SCHOTT, ANALYST

LAB # 101526


  
 12421 W. 49<sup>th</sup> Avenue, Unit #6  
 Wheat Ridge, CO 80033

(303) 463-8270/(800) 852-7340  
 (303) 463-8267 - fax

Date/Time Received \_\_\_\_\_ DCMSL Group No. \_\_\_\_\_ DCMSL Log No. \_\_\_\_\_

Field Data Sheet/Chain of Custody

Samples Submitted By:

Company: Em B Carson Consulting Job/P.O. # \_\_\_\_\_  
 Address: P.O. Box 5171  
Lynnwood, WA 98046 Project Title \_\_\_\_\_

Contact: Elizabeth Black  
 Phone: 206.915.2395  
 Fax: \_\_\_\_\_  
 Cell/Pager: \_\_\_\_\_

Archive: All samples are archived for  
 6 months unless other  
 arrangements are made.  
 E-Mail embblackconsult@gmail.com

Turnaround Time Requested:

Standard (3 to 5 Business Days)  2 Hour Rush (Asbestos Only)  
 24 Hour Rush  Other \_\_\_\_\_

Procedure Requested:

| ASBESTOS                      | XRD                                   | OTHER                                      |   |
|-------------------------------|---------------------------------------|--|---|
| Bulk <input type="checkbox"/> | Standard EPA <input type="checkbox"/> | Respirable Silica <input type="checkbox"/> | Optical Microscopy <input type="checkbox"/> |
| <input type="checkbox"/>      | Progressive <input type="checkbox"/>  | Bulk Silica <input type="checkbox"/>       | Gravimetric <input type="checkbox"/>        |
| <input type="checkbox"/>      | Point Count <input type="checkbox"/>  | Scan & Search <input type="checkbox"/>     | SEM <input type="checkbox"/>                |
| <input type="checkbox"/>      | Other <input type="checkbox"/>        | Other <input type="checkbox"/>             | Other <input type="checkbox"/>              |

Air  NIOSH 7400 ADDITIONAL INFORMATION NIOSH 7501  
 OSHA ID-160 Amorphous Silica  
 Other \_\_\_\_\_

| Client Sample No.:        | Sample Date | Air Volume (Liters) | Other Information |
|---------------------------|-------------|---------------------|-------------------|
| 1 Out Cont - ATS - D21814 | 02-18-14    | 305.25              | total 136561      |
| 2 In Cont - ATS - D21814  | "           | 336.89              | total 136561      |
| 3 Out Cont - ARS - D21814 | "           | 246.75              | 136562            |
| 4 In Cont - ARS - D21814  | "           | 282.81              | 136561            |
| 5                         |             |                     | respirable        |
| 6                         |             |                     |                   |
| 7 Black                   |             |                     | 136563            |
| 8                         |             |                     |                   |
| 9                         |             |                     |                   |
| 10                        |             |                     |                   |

| Relinquished By:       | Date/Time       | Received By:         | Date/Time            |
|------------------------|-----------------|----------------------|----------------------|
| <u>Elizabeth Black</u> | <u>02-21-14</u> | <u>Wendy McBride</u> | <u>2-25-14 10:30</u> |

**INSTRUMENT RESULTS  
MULTIRAE IR WITH CARBON DIOXIDE SENSOR**

Instrument: Multi-gas Monitor (IR) Serial Number: 900139  
User ID: 00000001 Site ID: 00000001  
Data Points: 432 Data Type: Avg Sample Period: 60 sec  
Last Calibration Time: 01/17/2014 14:16  
Start At: 02/18/2014 07:00 End At: 02/18/2014 14:12

=====

=====

| Sensor:            | VOC(ppm) | CO2(ppm) | LEL(%) | OXY(%)    |
|--------------------|----------|----------|--------|-----------|
| High Alarm Levels: | 200.0    | 100.0    | 20000  | 20.0 30.0 |
| Low Alarm Levels:  | 25.0     | 50.0     | 15000  | 10.0 15.0 |
| STEL Alarm Levels: | 100.0    | 25.0     | 18000  |           |
| TWA Alarm Levels:  | 25.0     | 10.0     | 15000  |           |

=====

=====

| Sensor:          | VOC(ppm) | CO2(ppm) | LEL(%) | OXY(%) |
|------------------|----------|----------|--------|--------|
| Peak Data Value: |          | 9923     |        | 20.9   |
| Min Data Value:  |          | 593      |        | 20.5   |
| TWA Data Value:  |          | 3024     |        |        |
| AVG Data Value:  |          | 3360     |        |        |

## **MATERIAL SAFETY DATA SHEETS**

# MATERIAL SAFETY DATA SHEET

## I. PRODUCT IDENTIFICATION

TRADE NAME (as labeled) Diamond Cutting Wheel  
MANUFACTURER'S NAME: Pearl Abrasive Company  
Address (complete mailing address) 6832 E. Slauson Avenue  
Commerce, CA 90040  
Phone number for additional Information: (562) 927-5561  
Date prepared or revised: January 1, 2014

## II. HAZARDOUS INGREDIENTS

| Chemical Names | CAS Numbers | Percent* | Exposure limits in air (give units) |          |
|----------------|-------------|----------|-------------------------------------|----------|
|                |             |          | ACGIH TLV                           | OSHA PEL |
| Diamond        | 7782-40-3   | <1       | 1mg/m3                              | _____    |
| Nickel         |             | 99-100   |                                     | _____    |
| Cobalt Alloy   |             |          | 0.05mg/m3                           | _____    |

It should be noted that use of this product generates dust, particles and fumes both from this product and from the material being worked on. Safety precautions for this product and for the product being worked on should be reviewed and used.

## III. PHYSICAL PROPERTIES

|                              |  |                                      |      |
|------------------------------|--|--------------------------------------|------|
| Vapor Density (air = 1)      | N.A.   | Melting point or range, *F           | N.A. |
| Specific Gravity             | 9-10   | Boiling point or range, *F           | N.A. |
| Solubility Water             | Negligible                                   | Evaporation rate (butyl acetate = 1) | N.A. |
| Vapor Pressure, mmHg at 20*C | N.A.   |                                      |      |
| Appearance and Odor          | No odor – color depends on specific product. |                                      |      |

HOW TO DETECT THIS SUBSTANCE\* (warming properties of substance as a gas, vapor, dust or mist)

None

\* Note a required category

NOTE: all required categories should be addressed. If any item is not applicable, or no information is available, the space must be marked to indicate that.

This voluntary form is provided by CAL/OSHA to assist MSDS preparers and users. Any format may be used as long as it contains all the information.

NAIF – NO APPLICABLE INFORMATION FOUND

N.A. – NOT APPLICABLE

---

#### IV. FIRE AND EXPLOSION

---

Flash Point, \*F (give method)      N.A.

Auto ignition temperature, \*F      N.A.

Flammable limits in air, volume %      lower level (LEL) N.A.      Upper Level (UEL) N.A.

Fire extinguishing materials:

water spray       carbon dioxide      \_\_\_\_\_ other  
 foam       dry chemical

Specific firefighting procedures:      Wear self contained breathing apparatus.

Unusual fire and explosion hazards:      None

---

#### V. HEALTH HAZARD INFO.

---

SYMPTOMS OF OVEREXPOSURE for each potential route of exposure.

Inhaled:      Coughing may result with exposure to dust.

Contact with skin or eyes:      Dust may cause Irritation of skin and eyes.

Absorbed through skin:      N.A.

Swallowed:      N.A.

---

HEALTH EFFECTS OR RISKS FROM EXPOSURE. Explain in lay terms. Attach extra pages if more space is needed

Acute: During use (grinding) coughing and shortness of breath may occur. May cause irritation to eyes.

Chronic: Repeated use (grinding) may affect breathing capacity.

---

FIRST AID:      EMERGENCY PROCEDURES

Eye Contact:      Wash with large amounts of water. If Irritation persists, obtain first aid and medical assistance.

Skin Contact:      Wash affected areas with soap and water.

Inhaled:      Remove to fresh air.

Swallowed:      N.A.

---

SUSPECTED CANCER AGENT?

NO: This product's Ingredients are not found in the lists below.  
YES:

Federal OSHA       NTP       IARC

---

California employers using Cal/OSHA-registered carcinogens must register with Cal/OSHA. The Cal/OSHA and Federal OSHA carcinogen lists are similar.

---

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Personnel with breathing difficulties, may experience increased shortness of breath.

---

## VI. REACTIVITY DATA

---

Stability:  stable  unstable

Incompatibility (materials to avoid): None

Hazardous decomposition products (including combustion products):

During use, fire may generate CO, CO2, NOx and other toxic gases

Hazardous Polymerization:  May occur  Will not occur

Conditions to avoid: None

---

## VII. SPILL, LEAK AND DISPOSAL PROCEDURES

---

Spill response procedures (include employee protection measures):

Use cleanup procedure to prevent spreading of dust.

Preparing wastes for disposal (container types, neutralization, etc.)

Disposal of waste in a manner consistent with applicable federal, state and local laws.

NOTE: Byproducts of use need to be disposed of lawfully.

NOTE: Dispose of all waste accordance with the federal, state and local regulations

---

## VIII. SPECIAL HANDLING INFORMATION

---

Ventilation and engineering controls: Employ adequate ventilation. See OSHA 29 CFR 1910.94 and 29 CFR 1910.100

Respiratory protection (type): Employ toxic dust respirator.

Eye Protection (type): Employ safety goggles.

Gloves (specify material): Use gloves for general hand protection.

Other clothing equipment: Wear flame retardant clothing. Grinding or cutting may cause elevated sound levels, use ear protection during operation.

Work practices, hygienic practices: N.A.

Other handling/storage requirement: N.A.

Protective measures during maintenance of contaminated equipment.

Use respiratory and eye protection.



MATERIAL SAFETY  
DATA SHEET

**SECTION I - PRODUCT IDENTIFICATION**

|                      |                             | HMIS                |
|----------------------|-----------------------------|---------------------|
| Manufacturer's Name: | Green Diamond Sand Products | Health - O          |
| Telephone:           | (541) 874-3111              | Flammability - O    |
| Address:             | PO Box D, Riddle, OR 97469  | Reactivity - O      |
| Date Prepared:       | August 1, 2007              | Protective Gear - K |

**SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION**

| Hazardous Components<br>(Specific Chemical ID -<br>Common Names) | CAS No.     | ACGIH TLV | OSHA PEL  |
|--|-------------|-----------|-----------|
| SiO <sub>2</sub> (Silicates)                                     | 112926-00-8 | 10 mg/m3  | 10 mg/m3  |
| MgO (Magnesium Oxide)  | 1309-48-4   | 10 mg/m3  | 10 mg/m3  |
| Fe <sub>2</sub> O <sub>3</sub> (Iron Oxide)                      | 1309-37-1   | 10 mg/m3* | 10 mg/m3  |
| Al <sub>2</sub> O <sub>3</sub> (Aluminum Oxide)                  | 1344-28-1   | 10 mg/m3  | 10 mg/m3  |
| CaO (Calcium Oxide)  | 1305-78-8   | 2 mg/m3   | 5 mg/m3   |
| Ni (Nickel)  | 7440-02-0   | 1 mg/m3   | 1 mg/m3   |
| Cr <sub>2</sub> O <sub>3</sub> (Chromium Oxide)                  | 1308-38-9   | 10 mg/m3* | 15 mg/m3* |

\*Regulated as for nuisance particulate (dust).

**TYPICAL ANALYSIS:**

|                                    |              |  |
|------------------------------------|--------------|--|
| SiO <sub>2</sub>                   | 50.2%        |  |
| MgO                                | 31.4%        | All SiO <sub>2</sub> reported in Green |
| Fe <sub>2</sub> O <sub>3</sub>     | 15.9%        | Diamond materials is in the form of    |
| Al <sub>2</sub> O <sub>3</sub>     | 1.6%         | silicates and contains <u>no</u>       |
| CaO                                | 0.7%         | crystalline silica. Crystalline silica |
| Ni + NiO                           | <1%          | is the only form of silica suspected   |
| Cr <sub>2</sub> O <sub>3</sub>     | .1%          | of being carcinogenic.                 |
| Trace Elements & Compounds (total) | 1.5%         |  |
| <b>TOTAL</b>                       | <b>99.8%</b> |  |

**SECTION 313 SUPPLIER NOTIFICATION**

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372):

| CAS #     | Chemical Name | Percent by Weight |
|-----------|---------------|-------------------|
| 7440-02-0 | Nickel        | <.1%              |

This information should be included in all MSDSs that are copied and distributed for this material.

### SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

|  |                               |
|--|-------------------------------|
| Boiling Point:                           | NA                            |
| Vapor Pressure (mm Hg.):                 | NA                            |
| Vapor Density (AIR = 1):                 | NA                            |
| Specific Gravity (H <sub>2</sub> O = 1): | 3.0                           |
| Melting Point:                           | 2,650 Deg. F                  |
| Evaporation Rate:                        | NA                            |
| Solubility in Water:                     | Not soluble in water          |
| Appearance and Odor:                     | Green, Gray granular, no odor |

### SECTION IV - FIRE AND EXPLOSION HAZARD DATA

|                                   |      |
|-----------------------------------|------|
| Flash Point:                      | NA   |
| Flammable Limits:                 | NA   |
| Extinguishing Media:              | NA   |
| Special Fire Fighting Procedures: | None |
| Unusual Fire & Explosion Hazards: | None |

### SECTION V - REACTIVITY DATA

|   |                |
|---|----------------|
| Stability:                              | Stable         |
| Conditions to Avoid:                    | None           |
| Incompatibility (materials to avoid):   | None           |
| Hazardous Decomposition or By-Products: | None           |
| Hazardous Polymerization:               | Will not occur |
| Conditions to Avoid:                    | None           |

### SECTION VI - HEALTH HAZARD DATA

|  |   |     |
|--|---|-----|
| Route(s) of Entry:                                   | Inhalation?   | Yes |
|  | Skin?   | No  |
|  | Ingestion?  | No  |
| Health Hazards (Acute & Chronic):                    | No specific health hazards; should avoid specified limits for compounds listed in Section II. |     |
| Carcinogenicity:                                     | NTP?<br>IARC Monographs?<br>OSHA Regulated?   |     |
|  | No<br>No<br>Yes, control for compounds in Section II and for nuisance dust.                   |     |
| Sign & Symptoms of Exposure:                         | Typical of over exposure to nuisance dust.  |     |
| Medical Conditions Generally Aggravated by Exposure: | Respiratory conditions.   |     |
| Emergency & First Aid Procedures:                    | As relevant for over exposure to nuisance dust.   |     |

## SECTION VII - PRECAUTIONS FOR SAFE HANDLING & USE

Steps to be Taken in Case Material

is Released or Spilled:

Clean up with broom or vacuum.

Waste Disposal Method:

Follow federal, state, and local regulations  
for disposal as in inert solid waste.

Precautions to be Taken in Handling & Storing:

No specific precautions.

Other Precautions:

None

## SECTION VIII - CONTROL MEASURES

Respiratory Protection (Specify Type):

NIOSH/OSHA/MSHA approved particulate  
filter respirator.

Ventilation:

Yes

Local Exhaust:

Yes

Mechanical (General):

Use to meet TLV requirement if dust is  
generated.

Special:

None

Other:

None

Protective Gloves:

Yes, if handling.

Eye Protection:

Yes, safety glasses.

Other Protective Clothing or Equipment:

Appropriate apparel.

Work/Hygienic Practices:

Use material for the purpose intended and  
incorporate methods of dust control that  
are effective in maintaining airborne dust  
concentrations within the TLV.

## NOTICE

While the information included in this MSDS has been obtained from reliable sources, this information is furnished without any warranty (expressed or implied), representation, inducement, or license except that it is accurate to the best of Green Diamond Sand Products knowledge. This information is offered solely for your consideration, investigation, and verification. Any use of this information must be determined by the user to be in accordance with applicable federal, state, and local laws and regulations. Furthermore, the conditions or methods of handling, storage, use and disposal of the product are beyond the control and knowledge of Green Diamond Sand Products. Green Diamond Sand Products does not assume responsibility and expressly disclaim liability for any loss, damage, or expense arising out of or in any way connected with the handling, storage, use, or disposal of the product. Buyer assumes all risks in its use of the product.



## MATERIAL SAFETY DATA SHEET

### ***Carbon Dioxide (DRY ICE)***

#### **COMPANY INFORMATION**

**Company Name** Reliant Gases, LTD  
**Company Address** 300 N Marienfeld  
Midland, TX 79701  
**Telephone** (432)617- 4200  
**Emergency Telephone** (800) 523-5566 extension 100 or (432)559-626

#### **PRODUCT IDENTIFICATION**

| CAS#     | Chemical Name  | Percent | EINECS/ELINCS |
|----------|----------------|---------|---------------|
| 124-38-9 | Carbon Dioxide | 100     |               |

Proprietary: No NIOSH (RTECS) Number: FF6400000 Exposure Limits:  
Carbon Dioxide: 5000 ppm (9000 mg/m<sup>3</sup>)  
OSHA TWA 5000 ppm (9000 mg/m<sup>3</sup>)  
ACGIH TWA: 30,000 ppm (54,000 mg/me)  
ACGIH STREL 5000 ppm (9000 mg/m<sup>3</sup>)  
NIOSH recommended 10 hour TWA: 30,000 ppm (54,000 mg/m<sup>3</sup>)  
NIOSH recommended STEL 5000 ppm (9000 mg/m<sup>3</sup>) DFG MAK TWA: 10,000 ppm (18,000 mg/m<sup>3</sup>) DFG  
MAK 60 minute peak, momen momentary value Measurement method:  
Gas collection bag: Gas chromatography with thermal conductivity Detector: (NIOSH III #S2491)

#### **PHYSICAL & CHEMICAL INFORMATION**

**Appearance and Odor:** colorless, odorless to slightly pungent

**Boiling Point:** -109.4 F

**Melting Point:** -109.3 F

**Vapor Pressure (MM hg/70F):** 831 PSIA

**Solubility In Water:** APPRECIABLE

**Appearance, Odor & State:** At room temperature and atmospheric pressure, carbon dioxide is a colorless, odorless, slightly acidic gas. Carbon Dioxide is shipped as a liquefied gas under its own vapor pressure.

**Molecular weight:** 44.011

**Sublimation Point:** -109.3°F (-78.5°C)

**Critical temperature:** 87.6°F (30.9°C)

**Gas density (@ 70°F (21.1°C) and 1 atm):** 0.114 lb/ft<sup>3</sup> (1.832 kg/m<sup>3</sup>)

|   |   |
|---|---|
| <b>Vapor pressure</b> (@ 70°F (21.1°C)):                | <b>838 psig</b>   |
| <b>Specific volume</b> (at 70°F (21.1°C) and 1 atm):    | <b>8.74 ft<sup>3</sup>/lb (0.5457 m<sup>3</sup>/kg)</b> |
| <b>Triple point</b> (@ 60.4 psig):                      | <b>-69.9°F (-56.6°C)</b>                                |
| <b>Specific gravity</b> (Air = 1) at 70°F (21.1°C):     | <b>1.52</b>   |
| <b>Solubility in water</b> (vol / vol. at 68°F (20°C)): | <b>0.90</b>   |

## HEALTH HAZARDS

### Routes of Entry - Inhalation, Dermal, Eyes

**Health Hazard Acute and Chronic:** Concentration in excess of 1.5% carbon dioxide may cause death. At higher concentrations, displaces oxygen in air below levels necessary to support life.

**Carcinogenicity-NTP:** No

**Carcinogenicity-IARC:** No

**Carcinogenicity-OSHA:** No

**Explanation Carcinogenicity:** None

**Signs/Symptoms of Overexposure:** At concentrations >1.5%: Hyperventilation/headaches/dyspnea/perspiration. At 6-10%: Headaches/dyspnea/perspiration, tremors, visual disturbances. >10%: Unconsciousness without warning. Cryogenic burns.

**Emergency/first Aid Procedures:** Inhalation: Remove to fresh air. Assisted respirant and supplemental oxygen should be given if not breathing. Frozen tissues should be flooded/soaked with tepid water. Don't use hot water. Obtain medical attention in all cases.

### CO<sub>2</sub> EXPOSURE LIMITS -

Carbon dioxide is regulated for diverse purposes but not as a toxic substance.

- **IDLH 40,000-ppm**
- **ACGIH CO<sub>2</sub> Exposure Limits:** 5000-ppm TWA with a 30,000-ppm STEL
- **NIOSH CO<sub>2</sub> Exposure Limits:** TWA of 5,000-ppm with a 10-minute 30,000-ppm ceiling limit
- **OSHA CO<sub>2</sub> Exposure Limits:** 5,000-ppm PEL as an 8-hour TWA and a 30,000-ppm STEL

### Definitions

- **PEL** = Permissible Exposure Limit is the maximum amount or concentration that a worker may be exposed to.
- **TWA**=Time-Weighted Average is an average value of exposure over the course of an 8 hour work shift.
- **IDLH** = Immediate Danger to Life and Health

- o **STEL**= Short Term Exposure Limit is the maximum concentration of a chemical to which workers may be exposed continuously for up to 15 minutes without danger to health or work efficiency and safety .

**References:**

<http://www.osha.gov/dts/sltc/methods/inorganic/id172/id172bkr.html>  
<http://www.osha.gov/dts/sltc/methods/inorganic/id172/id172.html>  
<http://www.cdc.gov/Niosh/pel88/124-38.html>  
<http://www.cdc.gov/niosh/IDLH/124389.html>  
<http://www.cdc.gov/niosh/npg/npgd0103.html>

**HAZARD RATINGS:**

|              | NFPA              | HMIS (gas) | HMIS (liquid) |
|--------------|-------------------|------------|---------------|
| HEALTH       | 1                 | 1          | 3             |
| FLAMMABILITY | 0                 | 0          | 0             |
| REACTIVITY   | 0                 | 0          | 0             |
| SPECIAL      | SA <sup>(1)</sup> |            |               |

(1) Compressed Gas Association (CGA) recommendation to designate simple asphyxiant

**PERSONAL PROTECTION**

**Area Ventilation** - Use local exhaust and general ventilation to prevent accumulation above the acceptable exposure limits and to prevent oxygen deficiency.

**Eye protection** - Safety goggles, glasses, or face shields should be worn when handling liquid carbon dioxide to prevent contact with the eyes.

**Skin protection** - Use loose fitting insulated gloves, long sleeved shirts or coveralls, long legged trousers, or accepted clothing to protect from frostbite or cryogenic "burns".

**Respiratory protection** - When needed, use positive pressure breathing apparatus or self contained air supply systems. These should also be available for emergency use.

**Hearing protection** – Hearing protection that is of the approved variety should be worn to prevent hearing damage in the event that nearby relief valves may open unexpectedly and anytime that the lines or valves in the area may be relieved of pressure.

**Other protection** - Safety shoes or boots should be worn to protect against contact with liquid or cryogenic carbon dioxide.

**FIRST AID**

**Skin Contact** - flush the affected area with tepid water. DO NOT USE HOT WATER! A physician should be consulted promptly if the cryogenic "bum" has resulted in the blistering of the dermal surface or in deep tissue freezing.

**Eyes** - Never introduce ointments or oils into the eyes without medical advice. In case of freezing or cryogenic "burns" caused by rapidly evaporating liquid; DO NOT WASH THE EYES WITH HOT OR EVEN TEPID WATER! Remove the victim from the source of contamination. Open the eyelids wide to allow liquid to evaporate. If pain is present, refer the victim to an ophthalmologist for treatment and follow-up. If the victim cannot tolerate light, protect the eyes with a light bandage.

**Ingestion** - Treat in a manner similar to that of skin contact. Seek medical attention. Never give anything by mouth to an unconscious victim.

**Inhalation** - Prompt medical attention is mandatory in cases of overexposure to carbon dioxide. Rescue personnel should be equipped with self-contained breathing apparatus. Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given artificial resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive. Treat areas exposed to liquid carbon dioxide as "frostbite".

**GENERAL RESCUE AND FIRST AID** - In all cases of exposure, rescue personnel should use appropriate protective equipment. Victims should be immediately removed from the contaminated area. Particular attention should be given to establishing and maintaining proper respiration and cardiac function of the victims seek immediate medical help, keep victims warm and comfortable.

**Note to Physician** – There is no specific antidote. Treatment for overexposure should be directed at the control of symptoms and the clinical condition.

## **TOXICOLOGICAL INFORMATION & EXPOSURE AND EFFECTS**

### **Overexposure –**

- At 1% concentration of carbon dioxide CO<sub>2</sub> (10,000 parts per million or ppm) and under continuous exposure at that level, such as in an auditorium filled with occupants and poor fresh air ventilation, some occupants are likely to feel drowsy.
- The concentration of carbon dioxide must be over about 2% (20,000 ppm) before most people are aware of its presence unless the odor of an associated material (auto exhaust or fermenting yeast, for instance) is present at lower concentrations.
- Above 2%, carbon dioxide may cause a feeling of heaviness in the chest and/or more frequent and deeper respirations.
- If exposure continues at that level for several hours, minimal "acidosis" (an acid condition of the blood) may occur but more frequently is absent.
- **Breathing rate** doubles at 3% CO<sub>2</sub> and is four times the normal rate at 5% CO<sub>2</sub>.
- **Toxic levels of carbon dioxide:** at levels above 5%, concentration CO<sub>2</sub> is directly toxic. [At lower levels we may be seeing effects of a reduction in the relative amount of oxygen rather than direct toxicity of CO<sub>2</sub>.]

Symptoms of high or prolonged exposure to carbon dioxide include headache, increased heart rate, dizziness, fatigue, rapid breathing, visual and hearing dysfunctions. Exposure to higher levels may cause unconsciousness or death within minutes of exposure.

**Steps if Material Released/Spill:** Ventilate indoor areas well to avoid hazardous CO<sub>2</sub> concentrations. Ventilate area well and avoid contact with cold vapors/dry ice. CO<sub>2</sub> is heavy gas and will remain in low spots without assisted ventilation.

**Special Precautions for Handling of Solid Carbon Dioxide:** Do not handle solid Carbon Dioxide with bare hands. Use heavy gloves, dry ice tongs or plastic scoop or shovel. Handle blocks of dry ice carefully, as

injuries can occur if one is accidentally dropped on the feet. Containers of solid Carbon Dioxide should be stored upright and be firmly secured to prevent falling or being knocked over. Containers should be vented, to prevent the build-up of Carbon Dioxide gas. Carbon Dioxide sublimates at -78.5°C (-109.3°F); containers should be thermally insulated and kept at the lowest possible temperature to maintain the solid and avoid generation of Carbon Dioxide gas. Storage containers and equipment used with Carbon Dioxide should not be located in sub-surface or enclosed areas, unless engineered to maintain a concentration of Carbon Dioxide below the TLV (TLV=5000 ppm) in the event of a release. Solid consignment of dry ice in a gas-tight vessel can lead to catastrophic failure of the vessel by over-pressurization. Storage of dry ice should never occur in a gas-tight container.

**Skin** - Contact with liquid carbon dioxide can cause tissue freezing or frostbite and cryogenic "burns".

**Eyes** - Eye contact with solid CO<sub>2</sub> or compressed carbon dioxide should be considered as a corneal burn. Frostbite of the eye structure may also occur.

**Ingestion** - Ingestion is unlikely. Tissue contact with large quantities of carbon dioxide may cause tissue freezing and frostbite, similar to that of skin contact.

Avoid direct contact or exposure with carbon dioxide while in a cryogenic state as it may cause immediate freezing or frostbite to tissue.

Avoid areas near leaks or spills where heavy concentrations may have settled, displacing the oxygen, thus possibly causing suffocation!

## FIRE AND EXPLOSION HAZARD

**Flash Point:** No Applicable

**Auto ignition:** Nonflammable

**Flammable limits in air:** Nonflammable

**Firefighting instructions:** Use extinguishing agent suitable for surrounding fires

**Firefighting procedures** - Carbon dioxide is nonflammable and as such does not present a fire hazard. However, cylinders that are exposed to fire may rupture with explosive and violent force. Extinguish surrounding fire and keep cylinders cool by using a cold water spray applied from the maximum possible distance.

## HANDLING AND STORAGE

## Reactivity Data

**Dry ice sublimes;** if confined in a gas tight container, it will build up a pressure of 850 psig at 70° F. Do not put dry ice in an airtight container or confined space

**Stability:** Yes

**Conditions To Avoid (Stability):** Moisture

**Materials to Avoid:** Carbonic acid/salt/corrosive chemicals

**Hazardous Polymerization Occurrence:** No

**Conditions to Avoid** - Avoid trapping or sealing of liquid carbon dioxide in lines, containers, or vessels

**EXTINGUISHING MEDIA:** Carbon dioxide cannot catch fire: Use media appropriate for surrounding fire

**SPECIAL FIRE FIGHTING PROCEDURES:**

**WARNING! Frozen carbon dioxide – extremely cold solid.**

**Vapor can cause rapid suffocation.** Evacuate all personnel from danger area. Do not discharge sprays onto solid carbon dioxide. Solid carbon dioxide will freeze water rapidly. Never handle solid carbon dioxide with your bare hands. Use insulated, loose-fitting gloves and dry ice tongs, or use a dry shovel or scoop. Move packages away from fire area if without risk. Self-contained breathing apparatus may be required by rescue workers. On-site fire brigades must comply with OSHA 29 CFR 1910.156.

without the benefit of pressure release valves or rupture disks set at the proper release points. These lines, containers or vessels could otherwise rupture with extremely violent force!

Avoid contact with eyes, skin and clothing. Keep container closed. Use only with adequate ventilation. Do not puncture or incinerate container. Wash thoroughly after handling. High pressure gas. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement. Never allow any unprotected part of the body to touch uninsulated pipes or vessels that contain cryogenic liquids. Prevent entrapment of liquid in closed systems or piping without pressure relief devices. Some materials may become brittle at low temperatures and will easily fracture.

**Incompatible Materials** - None known

**Hazardous Decomposition Products** - Carbonic acid in the presence of water or moisture. Hazardous polymerization will not occur.

**Spills, leaks, or disposal procedure** - Using appropriate protective equipment, evacuate all personnel from the affected area. If the leak or spill is from a valve, try to stop the flow of CO<sub>2</sub> by closing off valves. Avoid contact with the CO<sub>2</sub>. Avoid contact with cold materials. Self-contained breathing apparatus may necessary where the oxygen has been replaced.

**Special precautions** - Keep all areas well ventilated. Never allow liquid to become entrapped in non-relieved lines, containers, or vessels. Be alert for the formation of "ice plugs" when venting lines or plumbing. Never hit or hammerer on lines or plumbing that is frozen or pressurized. Always use lines, hoses, and vessels that are designed for the safe handling of liquid carbon dioxide.

Keep container tightly closed. Keep container in a cool, well-ventilated area. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

#### **SHIPPING INFORMATION))**

**Shipping information:** Packages should be transported in a secure position in a well ventilated vehicle. Product transported in an enclosed, non ventilated compartment of a vehicle can present serious safety hazards.

**WASTE DISPOSAL METHOD:** Place outside in a protected area with good ventilaton and allow to sublime. Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, state and local regulations. If necessary, call your local supplier for assistance.

#### **Do Not Dispose of In Unsecured Dumpsters or Trash Bins**

It is better to place dry ice in a safe secure location and let sublimate

**Label Required:** Yes

**Technical Review Date:** September 1, 2004

**Label Date:** September 1, 2004

**Common Name:** Solid Carbon Dioxide/Dry Ice

**Chronic Hazard:** Yes **Acute Health Hazard:**Severe

**Contact Hazard:**Slight

**Fire Hazard:**Minimal

**Reactivity Hazard:**None

**Special Hazard Precautions:** Concentration in excess of 1.5% carbon dioxide may cause death. At higher concentrations, displaces oxygen in air below levels necessary to support life.

**Target organs:** Respiratory system, skin

**Protect Eye:** Y

**Protect Skin:** Y

**Protect Respiratory:** Y

## REGULATORY INFORMATION

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, state, and local regulations.

### US FEDERAL REGULATIONS

TSCA 8(b) inventory: Carbon Dioxide

SARA 302/304/311/312 extremely hazardous substances: No products were found.

SARA 302/304 emergency planning and notification: No products were found.

SARA 302/304/311/312 hazardous chemicals: Carbon Dioxide

SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Carbon Dioxide: Sudden Release of Pressure, Immediate (Acute) Health Hazard, Delayed (Chronic) Health Hazard

Clean Water Act (CWA) 307: No products were found.

Clean Water Act (CWA) 311: No products were found.

Clean air act (CAA) 112 accidental release prevention: No products were found.

Clean air act (CAA) 112 regulated flammable substances: No products were found.

Clean air act (CAA) 112 regulated toxic substances: No products were found.

### STATE REGULATIONS

Pennsylvania RTK: Carbon Dioxide: (generic environmental hazard)

Massachusetts RTK: Carbon Dioxide

New Jersey: Carbon Dioxide

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# CHURCH & DWIGHT CO., INC.

CONSUMER PRODUCTS • SPECIALTY PRODUCTS



## MATERIAL SAFETY DATA SHEET

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### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

#### ARMEX® BLAST MEDIA

Amlox Roll Formula  
Aviation Formula  
Composite Formula  
DSCR Grade NSN6810-00-053-0194  
Electronics Formula  
Electronics Formula P  
Flow Formula M  
Flow Formula XL  
Graffiti Formula  
HydroFlex Formula XL  
Maintenance Formula  
Maintenance Formula with SupraKleen™  
Maintenance Formula XL  
Maintenance Formula XL with SupraKleen™

#### MANUFACTURED BY:

Church & Dwight Co., Inc.  
469 N. Harrison Street  
Princeton, NJ 08543-5297

Emergency Phone:  
1-609-683-5900 (U.S.A.)

Medical Emergency Phone:  
1-888-234-1828

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

#### Chemical Ingredient

#### CAS Number

Proprietary Sodium Bicarbonate Based Mixture -  
Sodium Bicarbonate 144-55-8

Contains no hazardous ingredients at 1% or more (0.1% for carcinogens) as listed or defined in 29 CFR 1910.

### 3. HAZARDS IDENTIFICATION

#### EMERGENCY OVERVIEW

Odorless, white crystalline powder.

May generate static sparks during dry blasting with improperly grounded equipment.

Nuisance dusts

No other significant health or environmental effects associated with these products.

#### HMIS Rating

|                     |   |
|---------------------|---|
| Health              | 0 |
| Fire                | 0 |
| Reactivity          | 0 |
| Personal Protection | X |

#### Potential Health Effects

CORPORATE HEADQUARTERS: 469 North Harrison Street • Princeton, New Jersey 08543-5297 • Phone (609) 683-5900

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EYE: Not an eye irritant. Solid or dust particles may cause irritation due to mechanical action if left unwashed.

SKIN CONTACT: Not a skin irritant

INGESTION: Ingestion of small amounts (1-2 tablespoonfuls) during normal handling operations may cause abdominal discomfort but are not likely to cause injury. Ingestion of larger amounts may cause injury.

INHALATION: Non-toxic, but may aggravate pre-existing upper respiratory and lung disorders.

SUBCHRONIC EFFECTS/CARCINOGENICITY: None known. Not listed as carcinogenic by IARC, NTP, OSHA, ACGIH or NIOSH.

### 4. FIRST AID MEASURES

EYES: Immediately flush eyes with a directed stream of water for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissue. **IFF IRRITATION PERSIST GET MEDICAL ATTENTION.**

SKIN: Wash exposed areas thoroughly with soap or mild detergent and a large amount of water.

INGESTION: If large amounts are ingested, give water to drink. **Do not give anything orally to an unconscious person.** Seek medical attention.

INHALATION: If over-exposure occurs, remove to area free from risk of further exposure. Treat symptomatically. Seek medical attention if irritation persists.

NOTE TO PHYSICIAN: Ingestion of large amounts may cause systemic alkalosis. No specialized procedures. Treat for clinical symptoms.

### 5. FIRE FIGHTING MEASURES

#### FLAMMABLE PROPERTIES

FLASHPOINT: Non-flammable; non-combustible

#### FLAMMABLE LIMITS

LFL: Not applicable

UFL: Not applicable

METHOD USED: Not applicable

EXTINGUISHING MEDIA: Use extinguishing media for surrounding fire.

FIRE-FIGHTING INSTRUCTIONS: Carbon dioxide may be generated by thermal decomposition or exposure to acids. Wear self-contained breathing apparatus (SCBA) and full protective equipment (Bunker Gear).

UNUSUAL FIRE AND EXPLOSION HAZARDS: Static sparks may be generated during the blasting operation. Special consideration should be given to work areas and applications in which flammable or combustible vapors, mists, gasses or clouds of combustible dust are either present or may be released. See Section 8 and product *Static Electricity Hazard Information Bulletin* for more information.

### 6. ACCIDENTAL RELEASE MEASURES



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Scoop into clean, dry containers for disposal. Wash away uncontaminated residue with water.

### 7. HANDLING AND STORAGE

Store in original containers in a cool, dry area away from incompatible materials. Wear approved dust mask during use or if dusts are generated during handling.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**RESPIRATORY PROTECTION:** ARMEX medias alone do not represent an inhalation hazard to the user. However, the use of these medias in ARMEX Cleaning and Coating Removal Systems presents use-specific exposure potentials based on the particular system and blasting conditions employed, and the characteristics of the coating being removed.

**Abrasive Blasting:** A NIOSH approved respirator with a dust filter may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits for general exposure to ARMEX dusts above the established exposure guideline (see below), and for outdoor blasting of non-hazardous coatings. Use an abrasive blasting respirator for indoor or enclosed work, and whenever blasting hazardous coatings. Whenever possible, use appropriate engineering controls and/or containment measures during abrasive blasting to minimize exposure to airborne dusts.

**Soluble Media Injector/Power Washing:** Respiratory protection is not normally required since the media is solubilized and dusts are not typically generated during this process. Conditions where respiratory protection would be required include worker exposure to excessive mists, work involving the removal of hazardous or potentially hazardous coatings, or when working in a confined space or area with limited ventilation. When it is determined that respiratory protection is required for certain operations, use an approved air-purifying or air-supplied respirator as appropriate.

**EXPOSURE GUIDELINE:** For Particles Not Otherwise Classified (PNOC) - TLV-TWA of 10 mg/m<sup>3</sup> as a nuisance dust (ACGIH).

**PROTECTIVE GLOVES:** General purpose for handling dry product or heavy gauge when dry blasting. Impervious (preferably heavy rubber) when wet blasting.

**EYE PROTECTION:** Wear safety goggles or face shield during abrasive blasting operations.

**OTHER PROTECTIVE CLOTHING OR EQUIPMENT:** Full cover clothing is sufficient for general handling. Aprons or impervious cover for blasting operations.

**PROTECTIVE WORK/HYGIENIC PRACTICES:** No special requirements with respect to chemical exposure other than those noted above. However, when used in blasting, workers must adhere to good operating procedures designed to prevent physical contact with pressurized streams of ARMEX® Blast Media and surface coatings being removed. See operating instructions for blasting equipment.

To minimize static electricity hazards, properly ground the equipment and work piece, use a conductive nozzle, and wet blast whenever possible. Conduct the blasting operation in non-hazardous areas if possible. See *Static Electricity Hazard Information Bulletin*.

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### 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: White crystalline powder

ODOR: None

PHYSICAL STATE: Solid

pH AS IS: Not Applicable

pH (1% SOLN. w/v): 8.2

VAPOR PRESSURE: Not applicable

VAPOR DENSITY: Not applicable

BOILING POINT: Not applicable

FREEZING/MELTING POINT: Not applicable

SOLUBILITY IN WATER: 8.6 g/100 ml @ 68°F

DENSITY (g/cc): Approximately 1.0

% VOLATILE: Not applicable

VOLATILE ORGANIC COMPOUNDS: None

### 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable

CONDITIONS TO AVOID: Contact with acids. Temperatures above 228°F.

INCOMPATIBILITY WITH OTHER MATERIALS: Reacts with acids to release carbon dioxide. May also yield free caustic in presence of lime dust (CaO) and moisture.

HAZARDOUS DECOMPOSITION PRODUCTS: Exposure to temperatures in excess of 228°F or incompatible materials (acids) may cause high levels of carbon dioxide gas to be generated. This presents a danger in confined spaces. Thermal decomposition brought on by exposure to temperatures in excess of 1000°F will yield sodium oxide, a severe skin, eye and inhalation irritant.

HAZARDOUS POLYMERIZATION: Will not occur.

### 11. TOXICOLOGICAL INFORMATION

EYE EFFECTS: Sodium bicarbonate, the principal constituent in ARMEX® Blast Media, was classified as practically non-irritating and minimally irritating to the washed and unwashed eye, respectively, when tested in accordance with 40 CFR Part 792. The Maximum Mean Total Score (MMTS) for washed eyes was 2.0. The MMTS for unwashed eyes was 8.3.

SKIN EFFECTS: ARMEX® Blast Media was not a primary skin irritant when tested in accordance with 40 CFR 798.4470. The primary dermal irritation index (PDII) was 0.3 which indicates a minimal skin irritation potential.

ACUTE ORAL EFFECTS: ARMEX® Blast Media was non-toxic when tested in accordance with 40 CFR 798.1175. The LD<sub>50</sub> (oral-rat) was 8.0 g/Kg.

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INHALATION EFFECTS: ARMEX® Blast Media was non-toxic and exhibited no observed adverse effects when tested in accordance with 40 CFR 798.1150. The LC<sub>50</sub> was determined to be greater than 4.94 mg/L in rats over a 4-1/2 hour exposure period.

### 12. ECOLOGICAL INFORMATION

AQUATIC TOXICITY: Sodium bicarbonate, the principal constituent in ARMEX® Blast Media, is classified as practically non-toxic to the following environmental organisms:

Daphnids: 48 hour EC<sub>50</sub> = 4100 mg/l; NOEC = 3100 mg/l

Bluegill: 96 hour LC<sub>50</sub> = 7100 mg/l; NOEC = 5200 mg/l

Rainbow Trout: 96 hour LC<sub>50</sub> = 7700 mg/l; NOEC = 2300 mg/l

PERSISTENCE: This material is not expected to persist in the environment.

BIOACCUMULATION: This material is not expected to bioaccumulate in the environment.

### 13. DISPOSAL CONSIDERATIONS

Bury in a secured landfill in accordance with all local, state and federal environmental regulations. State and local regulations may differ from federal. Be sure to consult with appropriate agencies for specific rules. Empty containers may be incinerated or discarded as general trash.

Because of its non-hazardous nature, you may be able to sewer diluted waste ARMEX® Blast Media from blasting operations. Coatings removed during blasting may need to be contained, collected and disposed of separately. You will still be required to provide proof to the POTW or your local authorities that the waste material is non-hazardous, and obtain the appropriate NPDES discharge permits (if discharging directly into a storm sewer or waterway).

### 14. TRANSPORTATION INFORMATION

D.O.T. SHIPPING NAME: Not regulated

TECHNICAL SHIPPING NAME: Not regulated. Shipped as ARMEX® Blast Media.

D.O.T. HAZARD CLASS: None

U.N./N.A. NUMBER: None

HAZARDOUS SUBSTANCE/RQ: None

D.O.T. LABEL: None

D.O.T. PLACARD: None

### 15. REGULATORY INFORMATION

OSHA: Not hazardous under 29 CFR 1910.1200

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CERCLA REPORTABLE QUANTITY: None

RCRA: Not a hazardous waste by listing or characteristic

SARA TITLE III:

Section 302, Extremely Hazardous Substances: None

Section 311/312, Hazardous Categories: Non-hazardous

Section 313, Toxic Chemicals: None

ARMEX ingredients are reported in the EPA TSCA Inventory.

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### 16. OTHER INFORMATION

SUPERSEDES DATE: 01/11/05

REASON FOR REVISION: Regulatory review of content.

For more non-emergency health, safety and environmental information telephone 609.279.7705 or write to:

Church & Dwight Co., Inc.  
469 North Harrison Street  
Princeton, New Jersey 08543

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