

**SITE-SPECIFIC SAMPLING AND ANALYSIS PLAN**  
**Phase II Environmental Site Assessment -**  
**Characterization and Assessment of Floor Stains and**  
**Delineation of Polychlorinated Biphenyls Impacts to Concrete**

**1512 Washington Street**  
**Manitowoc, Wisconsin**

**U.S. EPA Brownfield Cooperative Agreement No.: BF-00E01529-0**

**September 2016**  
**Project Number 193703931**



## TABLE OF CONTENTS

1.0 INTRODUCTION.....1

    1.1 General.....1

    1.2 Site Description/Background.....1

    1.3 Environmental Concerns.....2

2.0 DATA QUALITY OBJECTIVES.....4

    2.1 Problem Statement .....4

    2.2 Conceptual Site Model .....4

3.0 CHARACTERIZATION AND ASSESSMENT OF FLOOR STAINS .....6

    3.1 General.....6

    3.2 Objectives.....6

    3.3 Assessment of Floor Stains.....6

        3.3.1 Special Handling Considerations and QA/QC Samples .....8

        3.3.2 Chain-Of-Custody .....8

        3.3.3 Field Log Book .....8

4.0 DELINEATION OF PCB-IMPACTS TO CONCRETE.....9

    4.1 General.....9

    4.2 Objectives.....9

    4.3 Building Material Assessment.....9

        4.3.1 Special Handling Considerations and QA/QC Samples .....9

        4.3.2 Chain-Of-Custody .....10

        4.3.3 Field Log Book .....11

5.0 REPORT.....12

6.0 REFERENCES.....13

### TABLE

- Table 1a: Proposed Laboratory Analysis of Stained Flooring
- Table 1b: Proposed Laboratory Analysis of Concrete in Known PCB Areas

### FIGURES

- Figure 1: Site Location and 2014 Orthophotograph
- Figure 2a: Proposed Sample Locations – Ground Floor
- Figure 2b: Proposed Sample Locations in PCB Release Areas “A” and “B”
- Figure 3: Proposed Sample Locations – 2<sup>nd</sup> Floor
- Figure 4: Proposed Sample Locations – 3<sup>rd</sup> Floor
- Figure 5: Proposed Sample Locations – 4<sup>th</sup> Floor
- Figure 6: Proposed Sample Locations – 5<sup>th</sup> Floor
- Figure 7a: Subsurface Tunnel Network and Locations of Previous Borings
- Figure 7b: Subsurface Tunnel Network and Proposed Sample Location

### APPENDICES

- Appendix A: Site-Specific Health and Safety Plan

## 1.0 INTRODUCTION

### 1.1 General

This Site-Specific Sampling and Analysis Plan (SSSAP) has been prepared on behalf of the City of Manitowoc (hereinafter referred to as the "City") by Stantec Consulting Services Inc. (Stantec) for field sampling and associated laboratory analyses of stained porous building materials to be performed as part of a Phase II Environmental Site Assessment (ESA) of the property located at 1512 Washington Street in the City of Manitowoc, Wisconsin (herein referred to as the Site or Property). The location of the Site is illustrated on Figure 1.

The project is being performed using funds from a community-wide brownfields assessment grant for hazardous substances awarded to the City by the United States Environmental Protection Agency (USEPA) in 2015.

### 1.2 Site Description/Background

**Industrial Development and Operation.** As described in the Stantec (2016a) Phase I ESA, the property appears undeveloped in 1835. By 1878, the property was platted as 18 contiguous parcels within lot 246; however, development had not yet occurred. A plat map published in 1878 indicates Sherman Creek bisected the far northwestern portion of the property and flows north to the Manitowoc River. Initial development of the property appears to have occurred between 1878 and 1893, at which time, the property was developed and was occupied by a tannery and 6 apparent residential structures. By 1906, the property consisted of 13 individual residential dwellings and associated automobile garages, a tannery, and a small aluminum manufacturing plant. By 1921, Sherman Creek had been contained within a culvert, residential structures removed, and the majority of the property occupied by a large industrial facility utilized for the manufacturing of aluminum goods. Significant development of the property for industrial use as a multi-story aluminum goods manufacturing facility occurred between 1906 and 1912 and again between 1912 and 1927. The last multi-story building was constructed at the property adjacent to Washington Street between 1927 and 1956. A Phase I ESA prepared by AECOM in 2009 clarifies that industrial operations ceased at the Site in 1986; however, the Mirro Aluminum Company (Mirro) corporate and engineering offices remained on the 6th and 7th floors of the building until 2001. The AECOM (2009) Phase I ESA notes that Mirro was a division of the Newell Company, which subsequently became Newell-Rubbermaid.

**Property Ownership.** The property was purchased from Newell Holdings Delaware, Inc. by Union Street Partners, LLC on March 26, 2004 who sold the property to Kenneth J. Lemberger, Sr. on November 18, 2005. The property was transferred to Mirro Building, LLC on March 23, 2006 and EJ Spirtas Manitowoc, LLC purchased the property from Mirro Building, LLC on June 2, 2006. The Community Development Authority of the City of Manitowoc took ownership of the property on June 29, 2016.

### 1.3 Environmental Concerns

Multiple phases of due diligence have occurred at the Site. A Phase I ESA was completed on behalf of the current owner (the Community Development Authority of the City of Manitowoc) on June 28, 2016 by Stantec utilizing USEPA Brownfield Assessment grant funding provided to the City of Manitowoc. The Stantec (2016a) Phase I ESA provides a summary of the following reports, which document residual hazardous substance and petroleum impacts to Site soil/groundwater/building materials:

- AECOM, 2009a, Phase I Environmental Site Assessment, January 19, 2009.
- AECOM, 2009b, Phase II Subsurface Assessment, June 4, 2009.
- AES, Inc., 2011, Targeted Brownfields Assessment, March 2011.

- ES&T, 2005, Phase II Environmental Site Assessment, March 10, 2005.
- Legend Technical Services, 2008, Limited Asbestos Visual Inspection Survey Report, July 29, 2009.
- OTIE, 2011, Site Assessment Report, March 15, 2011.
- Stantec, 2016, Property Specific Determination of Eligibility Request, June 14, 2016.
- STN Environmental JV, 2009, Presentation of Building Inspection Results, December 23, 2009.
- STS, 2003, Phase I Environmental Site Assessment, June 20, 2003.
- Symbiont, 2015, PCB Contaminated Concrete Sampling and Unlabeled Drum Characterization Results, May 13, 2015. (See Figure 2b of this SAP for the locations of the two identified PCB areas)
- USEPA, 2011, Pollution/Situation Report #2, September 29, 2011.
- WDNR, 2016, Clarification of the Local Government Unit Liability Exemption Related to the Potential Acquisition of the Former Mirro Plant #9, March 8, 2016.

The Stantec (2016a) Phase I ESA identified the following Recognized Environmental Conditions (RECs) related to porous building materials:

- REC 2: **Documented Residual Impacts to Soil, Groundwater, and/or Building Materials.** Documented residual impacts to soil, groundwater, and/or building materials from hazardous substances and/or petroleum associated with Site development and/or prior Site operations described represents a REC reflective of ongoing evaluation of known release areas. Of particular concern are the multiple Polychlorinated Biphenyl (PCB) release areas inside the buildings and the areas of documented light non-aqueous phase liquid impacts to soil. Further investigation to delineate the vertical and horizontal extents of impacts in known release areas is warranted.
- REC 5: **Potential Petroleum and Hazardous Substance Releases to Building Materials.** Stains observed within the buildings by others suggest industrial operations may have resulted in releases of petroleum and hazardous substances to building materials. Potential impacts to the buildings represent an additional REC relative to the existing structures. Characterization of building materials for disposal/handling purposes is warranted and a materials management plan developed prior to building demolition.
- REC 6: **Releases to Tunnel System.** An extensive subsurface utility tunnel network is known to exist beneath the Site. Although much remains unknown about the status/condition of the tunnel system, others have reported suspect releases to the tunnel system from hazardous materials and petroleum. Subsurface tunnel systems can serve as conduits for migration of residual impacts. The presence and suspect releases to the tunnel network represents a REC. The tunnel system should be mapped using geophysical surveying techniques and evaluated as a potential source area, potential migration corridor, and potential structural obstacle to building demolition.

Symbiont completed a supplemental investigation in October/December 2015 and documented the results in a *Site Investigation Results and Summary of Previous Site Assessments* report dated August 1, 2016. With respect to PCBs, the following is noted:

- A small quantity of light non-aqueous phase liquid (LNAPL) accumulated in temporary monitoring well TW-108. A sample of the LNAPL was collected, and although the "fingerprint" analysis suggested the liquid resembled transformer fluid, the concentrations of PCBs in the LNAPL were less than 3.8 micrograms per liter (the laboratory limit of detection) for each of the seven PCB Aroclors.



- The concentrations of PCBs in two soil samples collected from 0-1 feet and 4-6 feet below ground surface from a soil boring completed in the loading dock area on the west side of the building (loading docks 6 and 7) were less than laboratory detection limits. This loading dock was identified previously by Symbiont (2015) as a storage area for drums containing PCB oil.
- The concentrations of PCBs in water collected from a storm sewer located closest to loading docks 6 and 7 were less than laboratory detection limits.
- The concentration of Aroclor 1260 in a groundwater sample from temporary monitoring well TW-103 was 0.55 micrograms per liter, which is only slightly greater than the laboratory reporting limit of 0.46 micrograms per liter. This detection is somewhat unexplainable in that PCBs are generally considered hydrophobic and unlikely to be present in dissolved phase in groundwater. Although Symbiont did not report the presence of LNAPL in TW-103, as illustrated on Figure 7A, TW-103 is located near an LNAPL plume identified/delineated previously by AECOM (2010) and near the portion of the tunnel system with apparent residual petroleum impacts noted by Stantec during the tunnel assessment (Stantec, 2016i). Continued evaluation of this LNAPL plume is will occur as Site access increases following building demolition to determine if PCBs are present/associated with the LNAPL plume.
- PCBs were detected in soil by Symbiont near two areas previously identified by AECOM (2009 and 2010). PCB concentrations measured by Symbiont in soil were all less than 6 milligrams per kilogram.

To evaluate the RECs identified in the Stantec (2016a) Phase I ESA, after the Community Development Authority of the City of Manitowoc took ownership of the property on June 29, 2016, Site assessment activities have continued at the Site, including:

- Stantec, 2016b, Site Specific Sampling and Analysis Plan, July 6, 2016.
- Stantec, 2016c, Mirro Buildings Structural Condition Assessment, July 25, 2016.
- Stantec, 2016d, Photographic Documentation of Former Mirro Building Current Ground Floor Features, July 28, 2016.
- Stantec, 2016e, Addendum 1 to the July 6, 2016 Site-Specific Sampling and Analysis Plan, July 28, 2016.
- Stantec, 2016f, Geophysical Survey Results and Site Survey, August 15, 2016.
- Stantec, 2016g, Inventory of Floor Stains and Photographic Documentation of the Former Mirro Building, August 17, 2016.
- Stantec, 2016h, Asbestos and Lead Based Paint Pre-Demolition Survey, *ongoing*.
- Stantec, 2016i, Inspection of Subsurface Service Tunnel Network, August 31, 2016.

As illustrated on Figures 2-7, the Stantec (2016a) Phase I ESA and the investigations described in Stantec (2016g and 2016i) identified, cataloged, and delineated 29 areas of visibly stained concrete/wood floors in the buildings and tunnel system, including four areas (Area 4, Area, 8, Area 14, and Area 24) of known/suspect PCB-releases requiring further evaluation/delineation.

To determine if the residual impacts to building materials at the Site will warrant special handling/disposal during demolition, Stantec recommends characterization of stained porous building materials for disposal/handling purposes and preparation of a materials management plan prior to building demolition.

## 2.0 DATA QUALITY OBJECTIVES

### 2.1 Problem Statement

Various environmental concerns associated with stained building materials the Property have been identified, but not yet fully investigated or assessed. The main objective for performing this Phase II ESA is to evaluate releases of hazardous materials and/or petroleum to porous building materials. Specifically, the purpose of the assessment is to characterize stained building materials. If present and applicable, the extent and magnitude of release will be evaluated to assess appropriate abatement actions. Additional phases of investigation may be required based on the results of this investigation.

### 2.2 Conceptual Site Model

The "Triad approach" for characterization and remediation of contaminated sites was developed by USEPA and others with a goal of increasing confidence that project decisions about contaminant presence or absence, location, fate, exposure, and risk reduction choices, are made correctly and cost effectively. The foundation for site-related decisions that are both correct and optimized (from a cost-benefit standpoint) is the "Conceptual Site Model" (CSM) (Crumbling, 2004). CSM uses all available historical and current information to estimate:

- where contamination is (or might be) located,
- how much is (or might be) there,
- how variable concentrations may be and how much spatial patterning may be present,
- what is happening to contaminants as far as fate and migration,
- who might be exposed to contaminants or harmful degradation products, and
- what might be done to manage risk by mitigating exposure.

The locations of stained flooring and proposed sample locations are illustrated on Figures 2-7. The current CSM builds on the environmental concerns outlined in Section 1.3 and acknowledges the following attributes of the Site that are relevant to defining the nature and extent of residual impacts to porous building materials:

1. Prior investigations have documented residual PCBs impacts to concrete at concentrations significantly greater than 50 milligrams per kilogram in Area 8, Area 14, and Area 24; however, residual PCB impacts to concrete in these areas have not been delineated. Paint markings left previously by others indicate PCBs were previously detected in Area 4; however, sample results remain unknown. The primary congener detected at the Site is Aroclor 1260.
2. Industrial activities reportedly occurred throughout multiple floors of the buildings and often involved use of portable hydraulic presses/machinery. Demolition activities conducted by the prior owner appear to have resulted in additional releases to porous building materials. Stains to the flooring in twenty-four discrete areas within the building were identified by Stantec (2016c). Stantec (2016c) noted the following with respect to certain areas of the Site:
  - a. Area 7 – remaining wall-mounted fixtures/conduit suggest this area formerly contained a large quantity of electrical components thought to power hydraulic equipment.
  - b. Area 28 – flooring in area 28 appears to be constructed with creosote-treated wood blocks and discoloration suggests a possible release.
  - c. Areas 20, 21, 23, 26, and 27 – stains in these areas appear more pronounced compared to the stains inside the building suggesting these stains could be associated with recent demolition activities. Debris on the ground suggests this area (except for Area 23) was used for sorting/cutting/processing scrap metal during recent demolition activities by the prior owner.

3. Stantec has confirmed observations made previously by others regarding residual petroleum impacts to the tunnel system (Area 29; Figure 7). The residual impacts to the tunnel system appear to correspond to residual light non-aqueous phase liquid (LNAPL) identified previously by others beneath the building slab (Figure 8). Unfortunately, characterization of the LNAPL has not occurred.
4. Potential constituents of concern (COC) are based on the most likely constituents to restrict the handling and disposal of waste building materials and include: polychlorinated biphenyls (PCBs), Resource Conservation and Recovery Act (RCRA) metals, and semi-volatile organic compounds (SVOCs).

The locations of potential source areas summarized above relative to proposed sample locations and Site features are illustrated on Figures 2-7.

## 3.0 CHARACTERIZATION AND ASSESSMENT OF FLOOR STAINS

### 3.1 General

The purpose of this portion of the assessment is to determine if stained building materials in areas not previously sampled should be managed as a hazardous waste or a solid waste based on the presence/concentration of select constituents of concern. Proposed building material sampling locations and analyses are based on the environmental concerns and the CSM detailed in Sections 1.3 and 2.2, respectively. A site-specific Health and Safety Plan to be utilized by Stantec personnel during the assessment activities is presented in Appendix A.

### 3.2 Objectives

As described in USEPA (2011), samples will be collected at a frequency of 1 sample per 100 square feet based on the apparent surface area of the stain. Stantec will sample stained building materials in 25 discrete areas to characterize building materials for waste handling/disposal purposes per NR 500, NR 600, and NR 700 rule series of the Wisconsin Administrative Code (WAC), 40 CFR 261, and the Toxic Substance Control Act (TSCA). Delineation of documented residual PCB-impacts to concrete is discussed further in Section 4. Standard Operating Procedures (SOPs) for tasks associated with this work plan are presented in the Quality Assurance Project plan (QAPP; Stantec, 2015) and in the QAPP Addenda/Updates (Stantec, 2016j and 2016k).

Laboratory data will be compared to:

1. SVOCs - USEPA thresholds for toxicity presented in 40 CFR 261.24 using the "20-times" rule.
2. Total RCRA Metals – USEPA thresholds for toxicity thresholds presented in 40 CFR 261.24 using the "20-times" rule
3. PCBs - cleanup action levels as outlined in Attachment 2 of the RR-786 WDNR (2014) document *PCB Remediation in Wisconsin under the One Cleanup Program Memorandum of Agreement*

If PCBs are identified in a stained area, the horizontal and vertical extents of impacts will be delineated during subsequent phases of investigation utilizing protocols described in Section 4 of this SAP.

### 3.3 Assessment of Floor Stains

The purpose of this portion of the assessment is to determine if stained building materials in areas not previously sampled should be managed as a hazardous waste or a solid waste based on the presence/concentration of select constituents of concern. During the inventory of floor stains discussed in Stantec (2016g), personnel noted the presence of water damage and apparent mold made distinguishing stains attributable to hazardous material releases inside the building difficult. To screen each identified stain and potentially identify additional release areas, each floor will be screened using a portable low-voltage ultraviolet light per Stantec (2015) SOP-16. Stantec staff has found this technique useful in identifying/distinguishing releases attributable to petroleum-based materials.

As illustrated on Figures 2-7, porous building materials will be sampled at 25 locations by Stantec. The purpose of analyzing porous media for RCRA metals is to determine if heavy metals (not associated with lead paint) are associated with an apparent release. Therefore, prior to sampling, the sample surface will be wiped clean of dust/debris using dry paper towels.

Per SOP-20 (Stantec, 2016k), samples will be homogenized and powdered in-place using a hammer drill (concrete) or chipped with spade-bit (wood) and collected into laboratory-supplied sample

containers using a vacuum pump. Sample locations will be targeted toward the center of each stain; however, actual locations may be adjusted based on accessibility.

Sample collection and field classification will be conducted per SOP No. 02 (Stantec, 2015). Sample collection and laboratory analytical methods for building material samples and the rationale for selecting sample locations are presented in Table 1a. Samples will be visually and physically examined by Stantec field geologists, and observations made of the general material (color, consistency, powder texture), visible layering, odors, and other distinctive features as described in SOP No. 02 (Stantec, 2015). Pertinent observations noted during sampling will be documented in the field book and summarized on modified boring logs.

The proposed sampling methodologies are appropriate for the primary constituents of concern for this investigation (PCBs and heavy metals). Although prior work has not documented the presence of a solvent degreaser at the property, volatile organic compounds could have been used in small quantities at the Site. Therefore, the surface of identified stains and the bottom of the final borehole will be field screened for the presence of volatile organic compounds (VOCs) using a photoionization detector (PID) as described in SOP No. 01 (Stantec, 2015). The PID will be calibrated daily in the field in accordance with the manufacturer's specifications per SOP No. 09.

All building material samples will be collected and preserved in accordance with SOP No. 02, SOP No. 20, and Table 3 of the QAPP (Stantec, 2015). The laboratory will supply the appropriate containers. Samples will be submitted to the laboratory as soon as possible after collection (i.e. daily).

Unless otherwise specified in Table 1a, concrete samples will be collected from 0-0.25 inches below surface using a two-inch diameter carbide bit. If deeper samples are specified in Table 1a or field conditions indicate the stain has penetrated beyond 0.25 inches, an additional powdered concrete sample will be collected from the same borehole from 0.25-0.5 inches below surface using a 1.5-inch diameter carbide bit. If impacts extend deeper, additional samples may be collected per SOP 20 and submitted to the laboratory. Analysis by the laboratory of the deeper samples will be contingent upon constituent concentrations in more shallow material; however, laboratory hold times cannot be exceeded.

Composite wood samples will be collected from 0-0.5 inches below surface of stained flooring using a two-inch diameter spade bit up to the depth of the flooring. If impacts extend deeper, additional samples may be collected per SOP 20 and submitted to the laboratory. Analysis by the laboratory of the deeper samples will be contingent upon constituent concentrations in more shallow material; however, laboratory hold times cannot be exceeded.

Each sample will be assigned a sample identification number (SIN) based on the following format:

Sample Type	Label for Type of Sample	Location Number	Material	Sample Interval (inches)	Sample Identification No. (SIN)
Building Material	BM	A1	C=Concrete W=Wood	(0-0.25)	BM-A1-C-(0-0.25)
Trip blank	TB	---	---	---	TB1
Field Dup	FB	---	---	---	FD-1
MS/MSD	BM	A1	C=Concrete W=Wood	(0-0.25)	BM-A1-C-(0-0.5)-MS

The exact quantity of building material samples collected will be determined in the field and will target areas and depths indicative of a suspected release. All samples will be placed in laboratory-supplied containers (per SOP No. 02), preserved as appropriate, stored on ice, and submitted under

chain-of-custody procedures to Test America (Chicago, Illinois), a State of Wisconsin-certified laboratory for analysis as described in the QAPP using protocols outlined in SOP No. 07.

Sampling equipment such as coring/drilling tools will be decontaminated prior to arrival on-site and between each sampling location as described in SOP No. 08 and SOP No. 20.

Generation of investigative waste is considered to be minimal using the proposed sampling protocols. As needed, investigative wastes will be managed per SOP No. 10. In general, waste will be collected in Department of Transportation (DOT)-approved 55 gallon drums or other appropriate containers, sealed, labeled, and stored on site pending the completion of laboratory analysis and determination of disposal restrictions, if any. As appropriate, waste will be handled, transported, and disposed of by a licensed waste hauler per federal and state requirements. The generator of the waste will be the property owner at the time of the investigation.

### *3.3.1 Special Handling Considerations and QA/QC Samples*

As summarized on Table 1a, quality assurance/quality control (QA/QC) samples to be collected and analyzed will include matrix spike/matrix spike duplicates and field duplicate samples.

De-identified duplicate samples will be collected and analyzed to evaluate sample variability and overall data precision. Duplicate samples will be collected adjacent to actual sample locations and from depth intervals representing the range of site conditions. Duplicate samples will be collected and analyzed for constituents at a rate of one sample for every 20 or fewer investigative samples.

Matrix spike/matrix spike duplicate samples will be collected and analyzed for constituents at a rate of one sample for every 20 or fewer investigative samples.

### *3.3.2 Chain-Of-Custody*

Chain-of-custody procedures will be utilized to track possession and handling of individual samples from the time of collection in the field through the time of delivery to the analytical laboratory. The chain-of-custody program will include use of sample labels, custody seals, field logbooks, chain-of-custody forms and laboratory logbooks. All chain-of-custody procedures will be performed in accordance with SOP No. 07 (Stantec, 2015).

### *3.3.3 Field Log Book*

Each sampling team will maintain an up-to-date field log book to document daily activities (if more than one group of individuals is sampling). The log book will include a general list of tasks performed, additional data, or observations not listed on field data sheets and document communications with on-site personnel or visitors as these apply to the project. A table identifying sample duplicate samples will be recorded in the field book.

## 4.0 DELINEATION OF PCB-IMPACTS TO CONCRETE

### 4.1 General

Four areas of the buildings have been documented previously by others as PCB-release areas. Proposed sample areas are targeted to delineate the horizontal and vertical extents of residual PCB impacts to building materials based on the environmental concerns and CSM detailed in Sections 1.3 and 2.2, respectively. A site-specific HASP, to be utilized by Stantec personnel during the assessment activities, is presented in Appendix A.

### 4.2 Objectives

As described in USEPA (2011), samples will be collected at a frequency of 1 sample per 100 square feet based on the apparent surface area of the stain. Stantec will sample stained flooring in 4 discrete areas to delineate residual PCB impacts for waste handling/management/disposal during demolition per NR 500, NR 600, and NR 700 WAC rule series, 40 CFR 261, and the Toxic Substance Control Act (TSCA). Standard Operating Procedures (SOPs) for tasks associated with this work plan are presented in the Quality Assurance Project plan (QAPP; Stantec, 2015) and in the QAPP Addenda/Updates (Stantec, 2016j and 2016k).

Laboratory data will be compared to cleanup action levels as outlined in Attachment 2 of the RR-786 WDNR (2014) document *PCB Remediation in Wisconsin under the One Cleanup Program Memorandum of Agreement*.

### 4.3 Building Material Assessment

The purpose of this portion of the assessment is to delineate PCB impacts to concrete in four previously identified release areas. Surface stains in the four areas will be delineated in the field using a portable low-voltage ultraviolet light per Stantec (2015) SOP-16. Stantec staff have found this technique useful in identifying/distinguishing releases attributable to petroleum-based materials. Sampling for horizontal delineation of PCB impacts will be taken from outside the area of apparent release as delineated with the low-voltage ultraviolet light.

As illustrated on Figures 2b and Figure 3, porous building materials will be sampled at 4 locations using Stantec SOP-20 (Stantec, 2016k). Prior to sampling, the sample surface will be wiped clean of dust/debris using dry paper towels. Concrete building materials will be powdered in-place using a hammer drill and powder collected into laboratory-supplied sample containers using a vacuum pump assembly per SOP-20.

Sample collection and laboratory analytical methods for building material samples and the rationale for selecting sample locations are presented in Table 1b. Samples will be visually and physically examined by Stantec field geologists, and observations made of the general material (color, consistency, powder texture), visible layering, odors, and other distinctive features as described in SOP No. 02 (Stantec, 2015). Pertinent observations noted during sampling will be documented in the field book and summarized on modified boring logs.

Shallow concrete samples will be collected from 0-0.25 inches below surface using a two-inch diameter carbide bit. As summarized on Table 1b, for horizontal delineation purposes, sample locations will be targeted outside the visible stained areas; however, actual locations may be adjusted based on accessibility.

At select locations, an additional powdered concrete sample will be collected from the same borehole from 0.25-0.5 inches below surface using a 1.5-inch diameter carbide bit advanced in the center of the 2-inch diameter borehole. For vertical delineation purposes, sample locations will be targeted to the center of the stained areas. If visual indication suggests impacts extend deeper, additional samples may be collected per SOP 20 and submitted to the laboratory. Analysis by the



laboratory of the deeper samples will be contingent upon constituent concentrations in more shallow material; however, laboratory hold times cannot be exceeded.

All building material samples will be collected and preserved in accordance with SOP No. 02, SOP No. 20, and Table 3 of the QAPP (Stantec, 2015). The laboratory will supply the appropriate containers. Samples will be submitted to the laboratory as soon as possible after collection (i.e. daily).

Each sample will be assigned a sample identification number (SIN) based on the following format:

Sample Type	Label for Type of Sample	Location Number	Material	Sample Interval (inches)	Sample Identification No. (SIN)
Building Material	BM	A1	C=Concrete	(0-0.25)	BM-A23-C-(0-0.25)
Trip blank	TB	---	---	---	TB1
Field Dup	FB	---	---	---	FD-1
MS/MSD	BM	A1	C=Concrete	(0-0.25)	BM-A23-C-(0-0.5)-MS

The exact quantity of building material samples collected will be determined in the field and will target areas and depths indicative of a suspected release. All samples will be placed in laboratory-supplied containers (per SOP No. 02), preserved as appropriate, stored on ice, and submitted under chain-of-custody procedures to Test America (Chicago, Illinois), a State of Wisconsin-certified laboratory for analysis as described in the QAPP using protocols outlined in SOP No. 07.

Sampling equipment such as drilling tools will be decontaminated prior to arrival on-site and between each sampling location as described in SOP No. 08 and SOP No. 20.

Generation of investigative waste is considered to be minimal using the proposed sampling protocols. The PCB associated waste will be managed separately from waste generated during work described in Section 3. As needed, investigative wastes will be managed per SOP No. 10. In general, waste will be collected in Department of Transportation (DOT)-approved 55 gallon drums or other appropriate containers, sealed, labeled, and stored on site pending the completion of laboratory analysis and determination of disposal restrictions, if any. As appropriate, waste will be handled, transported, and disposed of by a licensed waste hauler per federal and state requirements. The generator of the waste will be the property owner at the time of the investigation.

#### 4.3.1 Special Handling Considerations and QA/QC Samples

As summarized on Table 1b, quality assurance/quality control (QA/QC) samples to be collected and analyzed will include matrix spike/matrix spike duplicates and field duplicate samples.

De-identified duplicate samples will be collected and analyzed to evaluate sample variability and overall data precision. Duplicate samples will be collected adjacent to actual sample locations and from depth intervals representing the range of site conditions. Duplicate samples will be collected and analyzed for constituents at a rate of one sample for every 20 or fewer investigative samples.

Matrix spike/matrix spike duplicate samples will be collected and analyzed for constituents at a rate of one sample for every 20 or fewer investigative samples.

#### 4.3.2 Chain-Of-Custody

Chain-of-custody procedures will be utilized to track possession and handling of individual samples from the time of collection in the field through the time of delivery to the analytical laboratory. The chain-of-custody program will include use of sample labels, custody seals, field logbooks, chain-of-



---

custody forms and laboratory logbooks. All chain-of-custody procedures will be performed in accordance with SOP No. 07 (Stantec, 2015).

#### *4.3.3 Field Log Book*

Each sampling team will maintain an up-to-date field log book to document daily activities (if more than one group of individuals is sampling). The log book will include a general list of tasks performed, additional data or observations not listed on field data sheets, and document communications with on-site personnel or visitors as these apply to the project. A table identifying sample duplicate samples will be recorded in the field book.

---

## 5.0 REPORT

The proposed sampling of building materials during a Phase II ESA will enable refinement of the conceptual model of conditions and contaminant sources at the Site. The Phase II ESA report will include:

- Laboratory analytical reports
- Photographic documentation
- Tables summarizing analytical results
- Material management/handling/disposal recommendations for each stained area

Recommendations for future actions to facilitate planned demolition at the Site will be provided in the Phase II ESA Report.

---

## 6.0 REFERENCES

- Stantec. 2015. Quality Assurance Project Plan (Revision 0), Implementation of U.S. EPA Assessment Grants for Petroleum and Hazardous Substance Brownfields, City of Manitowoc, WI, U.S. EPA Cooperative Agreement Nos. BF- BF-00E01529-0. August 19, 2015
- Crumbling, D. 2004. Summary of the Triad Approach. White Paper, U.S. EPA, Office of Superfund Remediation and Technology Innovation. March 25, 2004.
- Stantec. 2016j. Quality Assurance Project Plan Addendum 1, June 3, 2016.
- Stantec. 2016k. Quality Assurance Project Plan Update and Addendum 2. August 15, 2016.
- USEPA. 2011. Standard Operating Procedure for Sampling Porous Surfaces for Polychlorinated Biphenyls (PCBs). May 2011.

*\*\* Additional references listed in Section 1.3*

# TABLES

Table 1a  
Proposed Laboratory Analysis of Stained Flooring  
1512 Washington Street  
Manitowoc, Wisconsin

Area	Building	Floor	Stained Material	PCBs (8082A)	Metals (6010)
1	South	4th	2"x6" Wood Flooring; Stained; Former Location of Equipment	(1) Composite Wood	(1) Composite Wood
2	South	4th	2"x6" Wood Flooring; Stained; Former Location of Equipment	(1) Composite Wood	(1) Composite Wood
3	South	3rd	2"x6" Wood Flooring; Stained; Former Location of Equipment	(1) Composite Wood	(1) Composite Wood
5	South	Ground	Tongue/Groove Wood Floor; Former Location of Equipment	(1) Composite Wood	(1) Composite Wood
6	South	Ground	Wood and Concrete; Former Location of Equipment	(3) Composite Wood (1) Concrete	(3) Composite Wood (1) Concrete
7	South	Ground	2" x6" Wood Flooring; Former Location of Possible Transformer/Electrical	(3) Composite Wood	(3) Composite Wood
9	North	5th	Concrete; Former Equipment Location	(1) Concrete 0-0.25" (1) Concrete 0.25"-0.5"	(1) Concrete 0-0.25" (1) Concrete 0.25"-0.5"
10	North	4th	Tongue/Groove Wood Floor; Former Location of Equipment	(1) Composite Wood	(1) Composite Wood
11	North	4th	Tongue/Groove Wood Floor; Former Location of Equipment	(1) Composite Wood	(1) Composite Wood
12	North	4th	Tongue/Groove Wood Floor; Former Location of Equipment	(1) Composite Wood	(1) Composite Wood
13	North	3rd	Tongue/Groove Wood Floor; Former Location of Equipment	(1) Composite Wood	(1) Composite Wood
15	North	2nd	Tongue/Groove Wood Floor; Former Location of Equipment	(1) Composite Wood	(1) Composite Wood
16	North	Ground	Wood and Concrete; Former Location of Equipment	(1) Composite Wood (1) Concrete 0-0.25"	(1) Composite Wood (1) Concrete 0-0.25"
17	North	Ground	Concrete and Tongue/Groove Wood Floor; Former Location of Equipment	(1) Composite Wood (1) Concrete 0-0.25"	(1) Composite Wood (1) Concrete 0-0.25"
18	North	Ground	Concrete and Tongue/Groove Wood Floor; Former Location of Equipment	(1) Composite Wood (1) Concrete 0-0.25"	(1) Composite Wood (1) Concrete 0-0.25"

Table 1a  
Proposed Laboratory Analysis of Stained Flooring  
1512 Washington Street  
Manitowoc, Wisconsin

Area	Building	Floor	Stained Material	PCBs (8082A)	Metals (6010)
19	North	Ground	Tongue/Groove Wood Floor; Former Location of Equipment	(1) Composite Wood	(1) Composite Wood
20	North	Ground (Outside)	Stained Concrete	(1) Concrete 0-0.25" (1) Concrete 0.25"-0.5"	(1) Concrete 0-0.25" (1) Concrete 0.25"-0.5"
21	North	Ground (Outside)	Stained Concrete	(1) Concrete 0-0.25" (1) Concrete 0.25"-0.5"	(1) Concrete 0-0.25" (1) Concrete 0.25"-0.5"
22	North	Ground (Outside)	Concrete; Former Equipment Location	(1) Concrete 0-0.25" (1) Concrete 0.25"-0.5"	(1) Concrete 0-0.25" (1) Concrete 0.25"-0.5"
23	North	Ground (Outside)	Concrete; Former Equipment Location	(1) Concrete 0-0.25" (1) Concrete 0.25"-0.5"	(1) Concrete 0-0.25" (1) Concrete 0.25"-0.5"
25	North	Ground	Concrete; Former Equipment Location	(1) Concrete 0-0.25" (1) Concrete 0.25"-0.5"	(1) Concrete 0-0.25" (1) Concrete 0.25"-0.5"
26	North	Ground	Stained Concrete	(1) Concrete 0-0.25" (1) Concrete 0.25"-0.5"	(1) Concrete 0-0.25" (1) Concrete 0.25"-0.5"
27	North	Ground	Tongue/Groove Wood Floor; Former Location of Equipment	(1) Composite Wood	(1) Composite Wood
28*	South	Ground	Wood Block Floor	(1) Composite Wood	(1) Composite Wood
29	North	Tunnel	Concrete	(1) Composite Wood	(1) Composite Wood
Estimated number of investigative samples to be analyzed				40	40
(2) BM-A23-C-(0-0.5)-MS (2) BM-A19-W-(0-0.5)-MS				Matrix Spike/Matrix Spike Duplicate	4
(1) FD-1 (1) FD-2				Field duplicates to assess the quality of the data and collection techniques.	2
Estimated number of QAQC samples to be analyzed				6	6
Estimated number of samples to be analyzed				46	46

Notes:

\* One additional composite wood sample from Area 28 will be analyzed for semivolatile organic compounds.

FD = Field Duplicate

QAQC = Quality Assurance Quality Control

PCB = Polychlorinated Biphenyl

RCRA = Resource Conservation and Recovery Act

(8082) = Laboratory analytical method (SW-846)

Table 1b  
Proposed Laboratory Analysis of Concrete in Known PCB Areas  
1512 Washington Street  
Manitowoc, Wisconsin

Area	Building	Floor	Rationale	PCBs (8082A)
4	South	2nd	Delineate stained concrete in area marked "PCB Area"	(4) Concrete 0-0.25"
8	South	Ground	Delineate stained concrete in former transformer area; PCB Area "A "	(6) Concrete 0-0.25" (3) Concrete 0.25 - 0.5"
14	North	2nd	Delineate stained concrete in existing PCB transformer area	(4) Concrete 0-0.25"
24	North	Ground	Delineate stained concrete in PCB Area "B"	(3) Concrete 0-0.25"
Estimated number of investigative samples to be analyzed				20
A4-1			Matrix Spike/Matrix Spike Duplicate	2
FD-1			Field duplicate to assess quality of data	1
Estimated number of QAQC samples to be analyzed				3
Estimated number of samples to be analyzed				23

Notes:

FD = Field Duplicate

QAQC = Quality Assurance Quality Control

PCB = Polychlorinated Biphenyl

(8082) = Laboratory analytical method (SW-846)

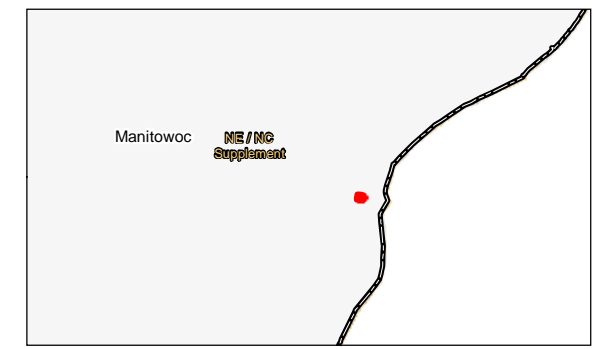
# FIGURES





Figure No.  
**1**  
 Title  
**Figure 1**  
**Site Location and 2014 Ortho**  
 Client/Project  
 City of Manitowoc  
 USEPA Brownfield Assessment Grant  
 Hazardous Substances  
 0 65 130  
 Feet  
 1937003931  
 Prepared by HLB on 5-24-16

Legend  
 Target Site  
 Parcels



Notes  
 1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803  
 2. Feet  
 3. Data Sources Include:  
 Orthophotography: 2015 City of Manitowoc



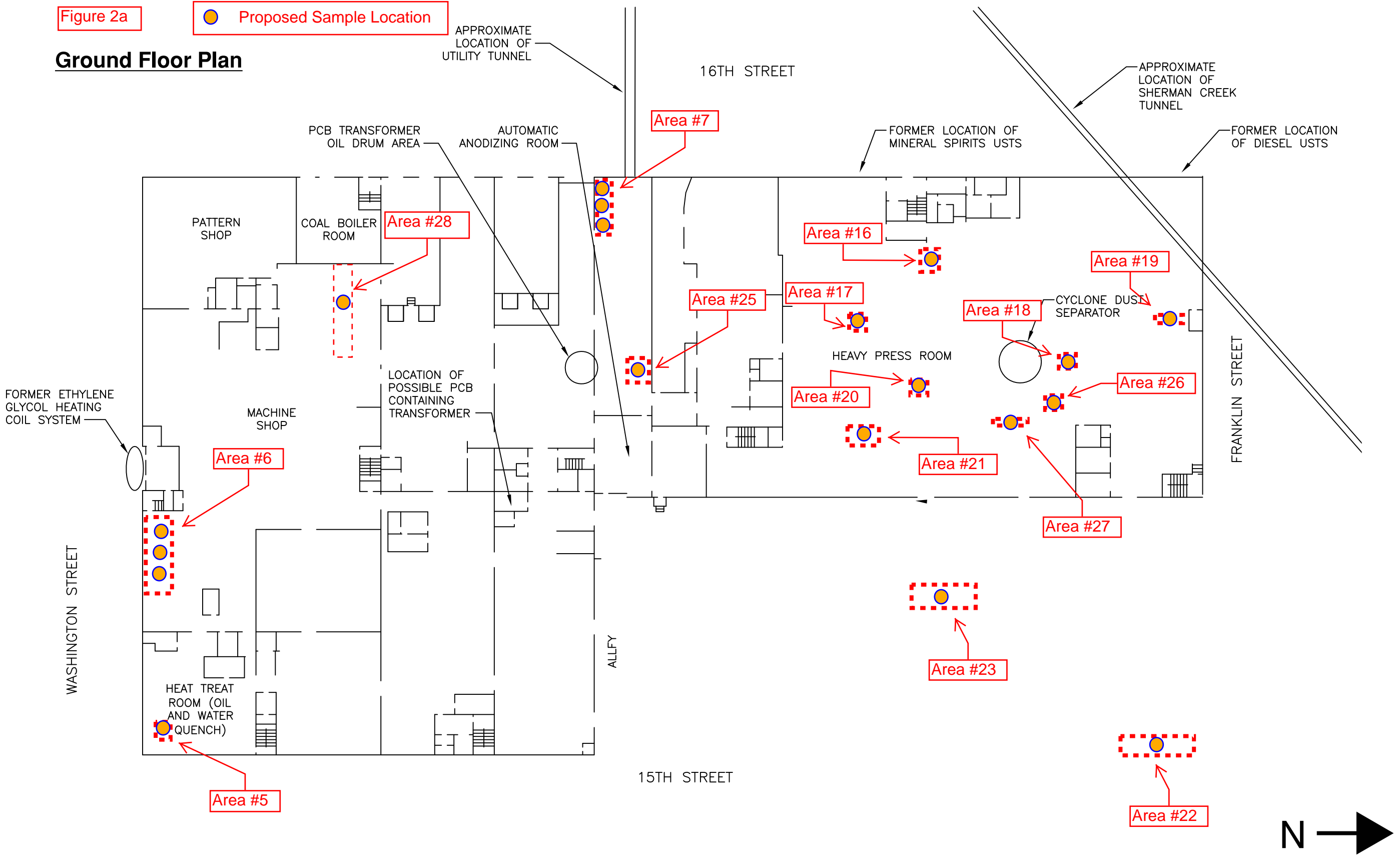
R:\Data\Manitowoc\Map\1512\Washington\01.mxd Revised: 2016-05-24 By: bbyers



Figure 2a

Proposed Sample Location

# Ground Floor Plan







**Legend**

- Proposed Stantec Sample Locations
- ⊗ Concrete Sampling Locations
- Concrete Sampling Area
- ⋯ Building Footprint

50      0      50 Feet

Figure 2B  
 Proposed Sample Locations in PCB  
 Release Areas "A" and "B"

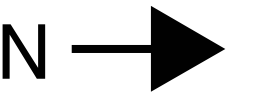
SCALE
DWG
DATE
PROJ NO.

Basemap Source: Symbiont, 2015



Figure 3

● Proposed Sample Location



### 2nd Floor Plan

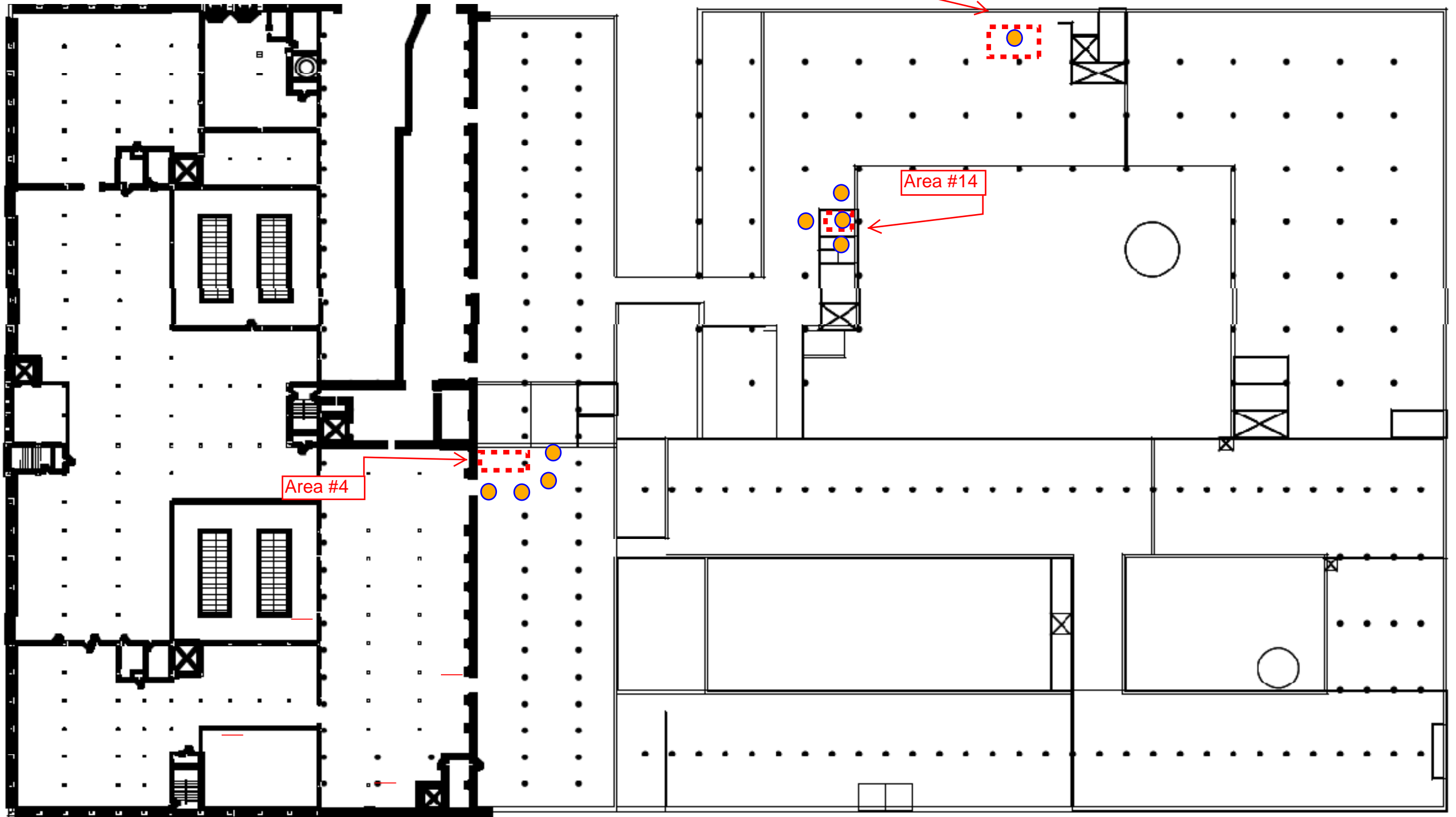


Figure 4

3rd Floor Plan

Proposed Sample Location

Area #13

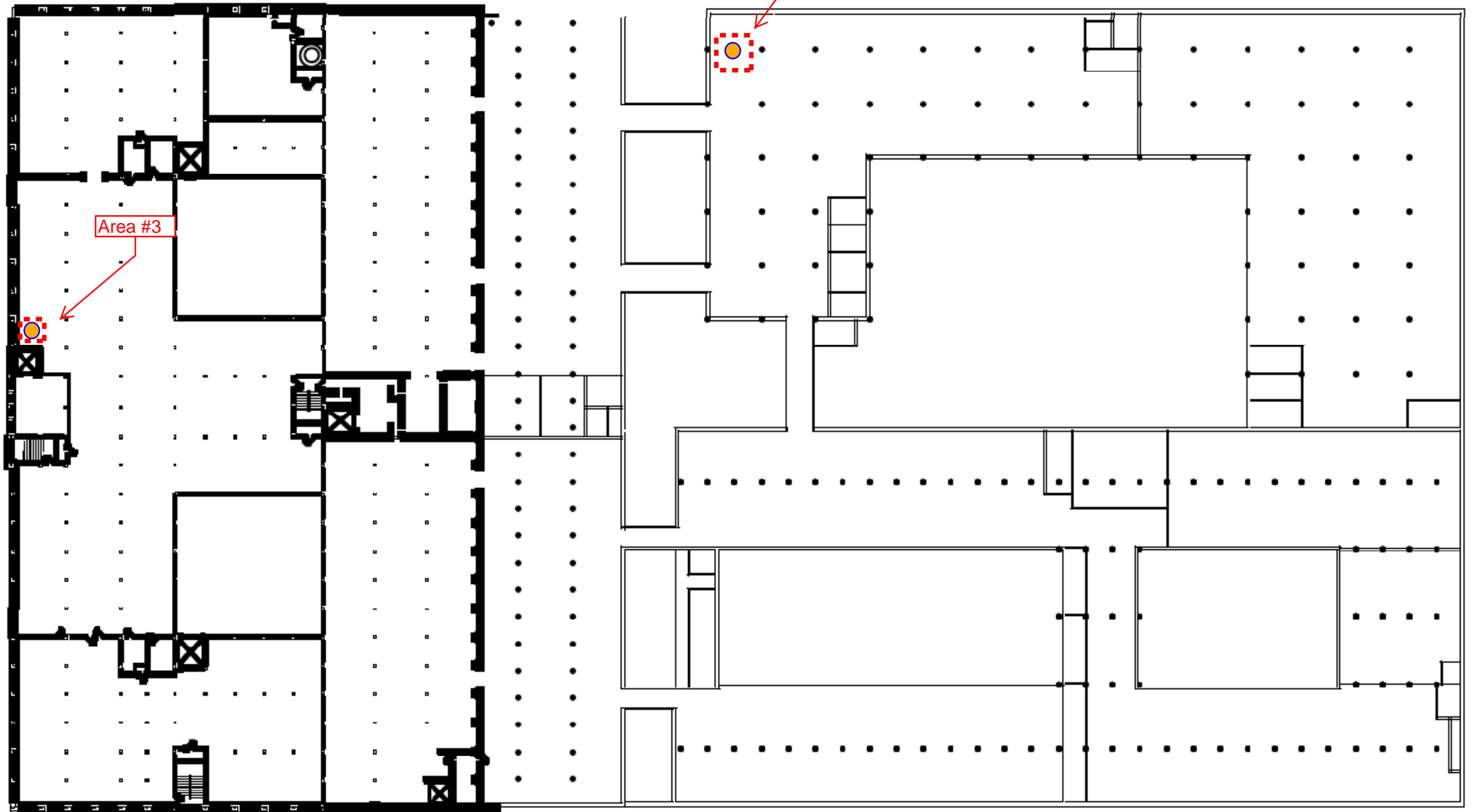
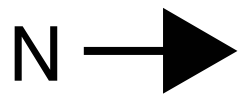
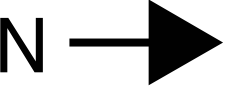


Figure 5



### 4th Floor Plan

● Proposed Sample Location

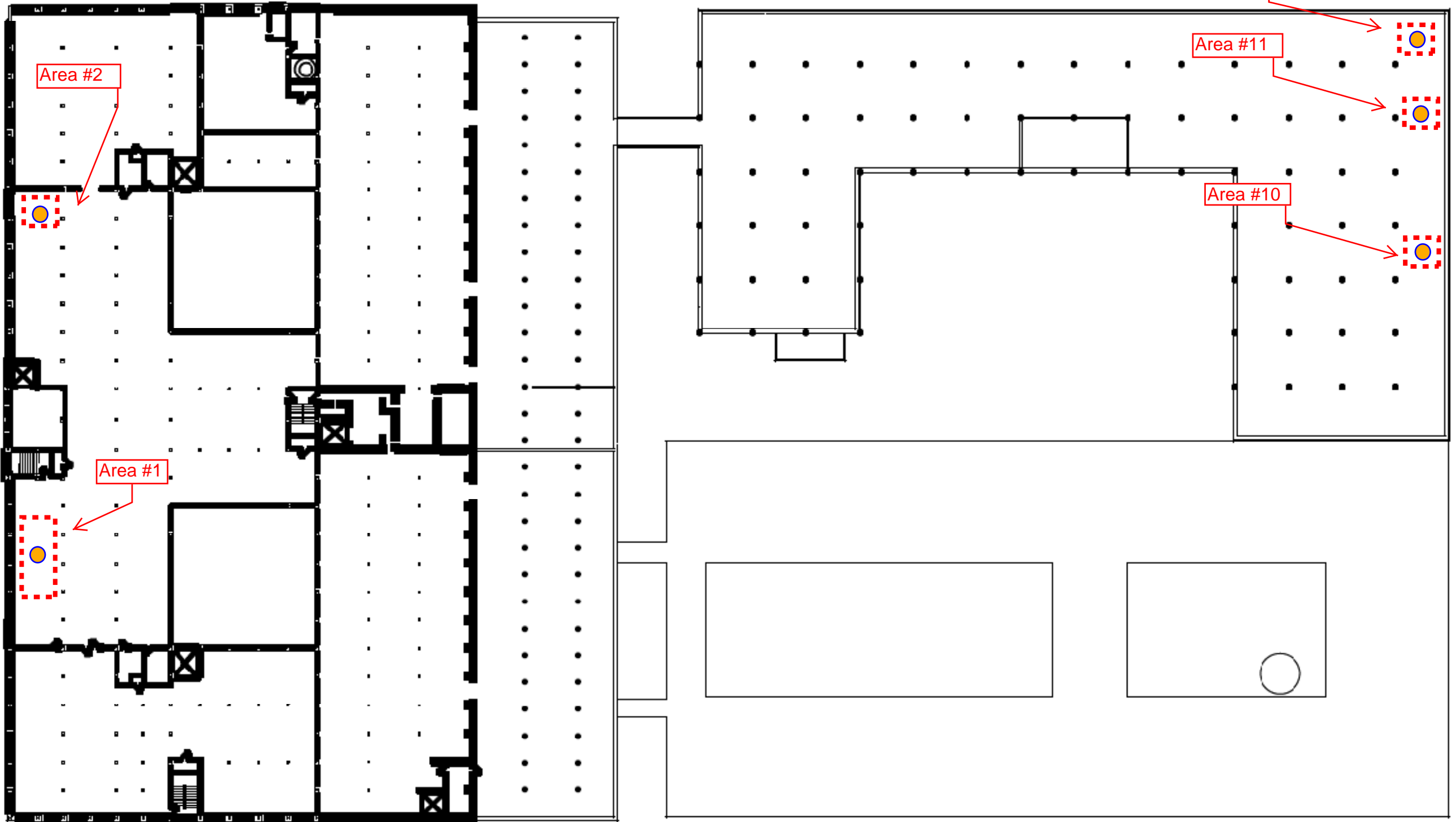
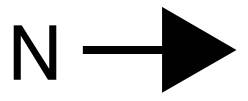
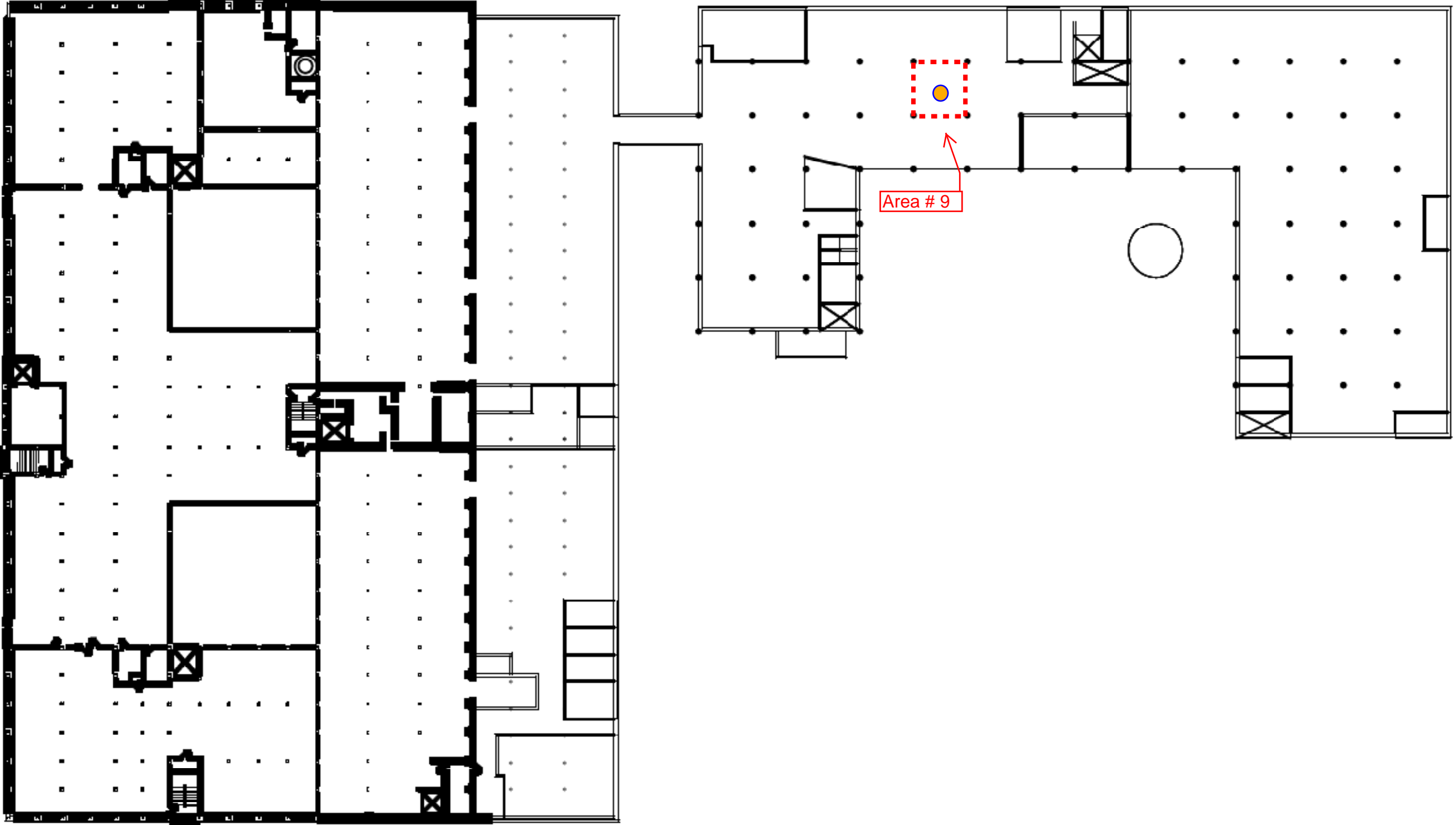


Figure 6



5th Floor Plan

● Proposed Sample Location



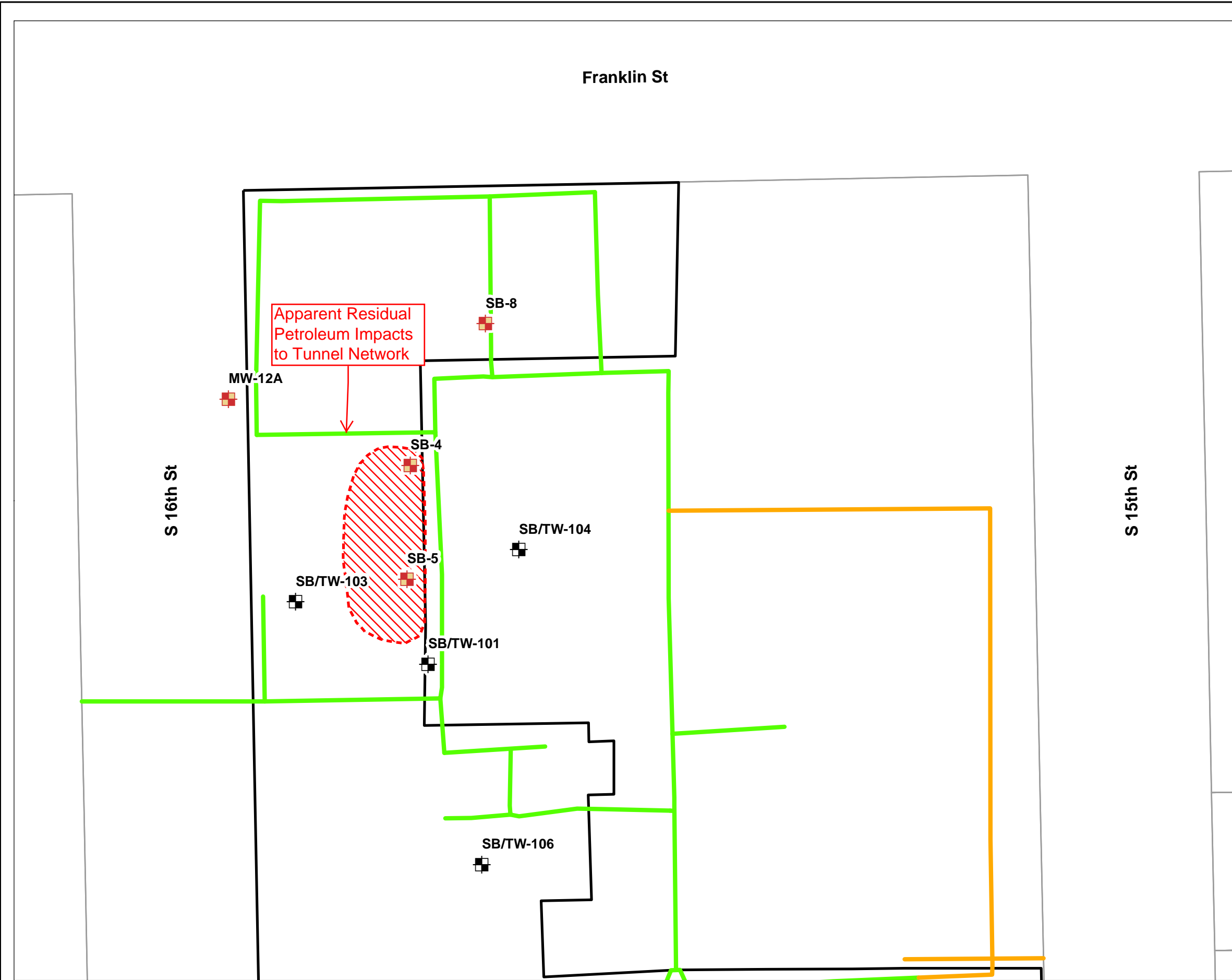


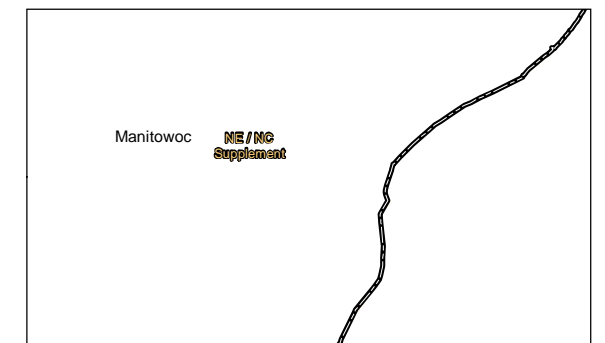
Figure No. **7A**  
 Title  
**Figure 7A. Subsurface Tunnel Network and Locations of Previous Borings**

Client/Project  
 City of Manitowoc  
 USEPA Brownfield Assessment Grant  
 Hazardous Substances

0 15 30 60 Feet  
 193703931  
 Prepared by HLB on 8-31-16

### Legend

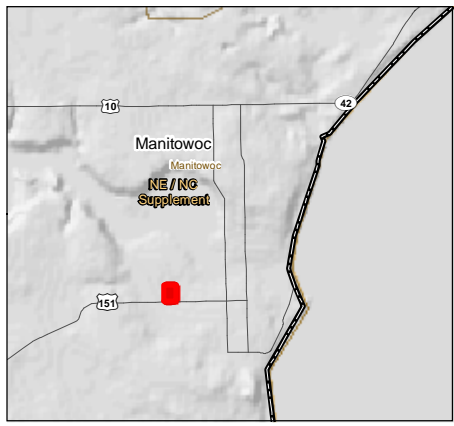
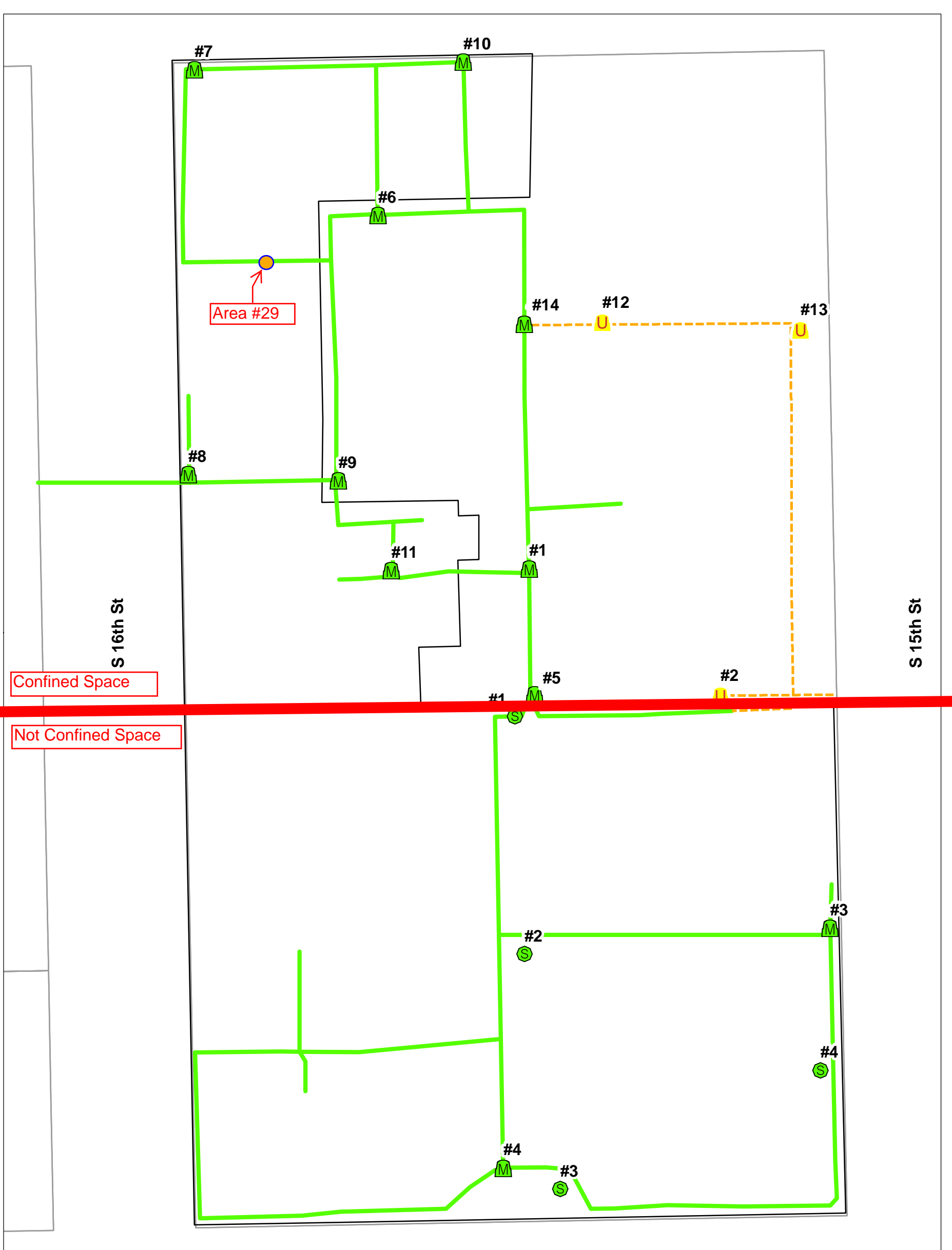
- Corner of Building
- ▭ Parcels
- Select Previous Sample Locations**
  - AECOM (2010)
  - Symbiont (2016)
  - ▨ LNAPL Extent (AECOM, 2010)
- Tunnel Network**
  - GPR Confirmed
  - Unconfirmed



**Notes**  
 Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet  
 Data Sources Include:  
 Orthophotography: 2015 City of Manitowoc  
 Symbiont(2016)  
 AECOM (2010) as presented in AES (2010)







**Notes**  
 Coordinate System: NAD 1983 StatePlane Wisconsin  
 South FIPS 4803 Feet  
 Orthophotography Source: 2014, City of Manitowoc

**Legend**

- Corner of Building
- Tunnel Entrances**
- Confirmed-Floor Access-Way
- Confirmed-Stairwell
- Unconfirmed-Manway
- Confirmed
- Unconfirmed
- Proposed Sample Location

Figure No. **7B**

Title **Figure 7B Subsurface Tunnel Network and Sample Location**

Client/Project  
 City of Manitowoc  
 USEPA Brownfield Assessment Grant  
 Hazardous Substances

0 15 30 60 Feet

1:550 (At Original document size of 11x17)

193703931  
 Prepared by HLB on 8-31-16

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

# APPENDIX A – SITE-SPECIFIC HEALTH AND SAFETY PLAN

# Site-Specific Health and Safety Plan

City of Manitowoc, Wisconsin

1512 WEST WASHINGTON STREET  
MANITOWOC, WISCONSIN

U.S. EPA Brownfield Cooperative Agreement No.: BF-00E01529-0

September 11, 2016  
Project Number 193703931



**SITE- SPECIFIC HEALTH AND SAFETY PLAN**

1512 West Washington Street  
Manitowoc, Wisconsin

September 11, 2016

Prepared For:  
Nicolas Sparacio, AICP  
Community Development Director  
City of Manitowoc  
900 Quay Street  
Manitowoc, WI 54220-4543

Prepared By:  
Stantec Consulting Services Inc.  
12075 Corporate Parkway Suite 200  
Mequon WI 53092-2649

The information presented in this Site-Specific Health and Safety Plan is intended solely to denote the health and safety measures/guidelines applicable to Stantec personnel engaged in field activities at the above-referenced site. Stantec makes no warranties regarding the accuracy of the Site-Specific Health and Safety Plan, and nothing contained herein shall be construed as providing recommendations or direction, either expressed or implied, regarding health and safety measures to be taken by anyone other than Stantec personnel. Non-Stantec personnel shall be responsible for complying with site safety plans and local, state, and/or federal regulations applicable to non-Stantec personnel.

Stantec Project Number: 193703931

  
\_\_\_\_\_  
Harris L. Byers  
Brownfields Project Manager

# Table of Contents

1.0 Introduction .....	1
2.0 Background Information .....	2
3.0 Site Information .....	3
4.0 Contaminant/Chemical Hazard Assessment .....	4
5.0 Physical Hazard Assessment .....	5
6.0 Personal Protective Equipment .....	7
7.0 Medical Requirements .....	8
8.0 Training Requirements .....	9
9.0 Environmental Monitoring .....	10
10.0 Site Safety Procedures .....	11
11.0 Decontamination .....	13
12.0 Emergency Plan .....	14
13.0 Emergency References .....	18
14.0 Evacuation/Hospital Routes .....	19
15.0 Site Health and Safety Plan Review .....	21
16.0 Site Health and Safety Plan Follow-Up Report .....	22
17.0 Addendum to Site Health and Safety Plan .....	23
Figures	
Medical Data Summary Forms .....	Attachment A
Incident Report Sheets .....	Attachment B
Personal Protective Equipment .....	Attachment C
First Aid .....	Attachment D
MSDS Sheets .....	Attachment E

## 1.0 Introduction

The purpose of this Site-Specific Health and Safety Plan (SHSP) is to identify, evaluate and control the safety and health hazards associated with the planned tasks to assess the surface stains at the vacant former-industrial partially demolished buildings at 1512 West Washington Street in Manitowoc, Wisconsin and ensure the health and safety of all Stantec employees involved. Specifically, this SHSP is to be used by Stantec staff during implementation of the Site-Specific Sampling and Analysis Plan (SSSAP).

All field activities must be conducted in compliance with this SHSP. Personnel covered by this SHSP who cannot or will not comply with the SHSP will be excluded from on-site activities. Anyone who will be on site will be required to sign the SHSP review found in this SHSP.

Contractors and sub-contractors will be given a copy of this SHSP and will sign the review acknowledging that they have read and understood this SHSP. Their signature indicates that Stantec has informed them of the site emergency response procedures and any potential fire, explosion, health, safety or other hazards of the hazardous waste operation that have been identified. However, Stantec does not assume responsibility for the actions of the contractors or sub-contractor. Contractors will be required to develop and follow their own SHSP related to specific on-site activities.

This SHSP was prepared from the best available information concerning site conditions at the time of development. The health and safety specifications in this SHSP are based on reasonably available sampling information and reports. The project manager or site safety officer have the authority to amend any part of this program at any time due to changes to site conditions that may affect the health and safety of on-site personnel.

## 2.0 Background Information

1. Site Name: 1512 West Washington Street, Manitowoc, Wisconsin
2. Site Location: 1512 West Washington Street, Manitowoc, Wisconsin
3. Client Name: City of Manitowoc
4. Client Contact: Nicolas Sparacio Phone: (920)686-6931
5. Stantec Project Manager: Harris Byers Phone: (414) 581-6476
6. Anticipated On-Site Personnel:

NAME	AFFILIATION	FUNCTION
Harris Byers	Project Manager	Supervisor
Nick Heim	Geologist	Site-Safety Officer

7. Plan Prepared by: Harris Byers Date: 9/11/2016
8. Plan Reviewed by: Richard J. Binder, P.G. Date: 9/11/2016

The Project Manager and Site-Safety Officer (SSO) or an alternate designee will be responsible for the implementation of this SHSP. Provided below are the key titles and associated responsibilities for personnel that are involved in the site activities.

### PROJECT MANAGER

The Stantec Project Manager provides overall direction for the implementation of field activities in accordance with this SHSP. The Project Manager will also serve as the program liaison to federal, state, and local authorities. Specific program questions will be directed to this individual.

### SITE-SAFETY OFFICER

The SSO will be the Stantec field supervisor. She/he will direct the implementation and field evaluation of the SHSP. The SSO will be in charge during any emergency until she/he is relieved by Fire or other senior Emergency Responders. The SSO will be responsible for:

- Conduct health and safety briefings for Stantec employees based upon potential hazards specific to the designated work tasks scheduled
- Modify SHSP as required to address specific situations
- Investigate and report on-site accidents/incidents

### 3.0 Site Information

1. Purpose of Investigation/Field Work: The purpose of this work is to assess the surface stains on porous building media for the purpose of waste characterization and material handling during building demolition.

2a. Potential Hazard to Personnel	2b. Protective Equipment Required
<input type="checkbox"/> Fire/explosive condition	<input checked="" type="checkbox"/> First aid kit
<input checked="" type="checkbox"/> Worker exposure/injury	<input checked="" type="checkbox"/> Eye wash
<input type="checkbox"/> Confined spaces	<input checked="" type="checkbox"/> Ladder
<input type="checkbox"/> Steep/uneven terrain	<input checked="" type="checkbox"/> Fire Extinguisher
<input checked="" type="checkbox"/> Chemical/contaminant exposure	<input checked="" type="checkbox"/> Safety Glasses
<input type="checkbox"/> Traffic/heavy machinery	<input checked="" type="checkbox"/> Communication
<input type="checkbox"/> Noise exposure	<input checked="" type="checkbox"/> Hard Hat
<input type="checkbox"/> Thermal exposure	<input checked="" type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> * Respirator/SCBA	<input checked="" type="checkbox"/> Kleenguard White Coveralls*
<input checked="" type="checkbox"/> Gasoline powered generator	<input checked="" type="checkbox"/> Latex Gloves
<input checked="" type="checkbox"/> Hand tools (hammer drill)	<input checked="" type="checkbox"/> Steel Toe Boots
	<input checked="" type="checkbox"/> Boot Covers (PVC Non-Skid Boot Covers)
<input checked="" type="checkbox"/> Other (describe) <u>Vacant multi-floor former industrial building with known structural issues</u>	

Estimated days on site: three days

\* Moldex Airwave 4700N100 single use half-face dust mask and Kleenguard White Coveralls may be worn on a voluntary basis per the recommendation of Dan Feldt, MPH, CIH; Sr. Industrial Hygienist at Stantec.



## 4.0 Contaminant/Chemical Hazard Assessment

1. The purpose of this work is to assess the surface stains on porous building media for the purpose of waste characterization and material handling during building demolition.

SUBSTANCE	MAXIMUM CONCENTRATION (UNITS)	MEDIUM <sup>1,2</sup>	PEL/TLV (PPM) <sup>3</sup>	CANCER STATUS <sup>4</sup>	ROUTE <sup>5</sup>
LBP	68.9% (see STN, 2009)	BM	0.05/0.05	B2	I, IN
Asbestos	65% (see STN, 2009)	BM	0.5/0.01	A	I, IN
PCBs	6.9% (see Symbiont, 2015 adapted as Figure 1)	BM CONCRETE	0.5/0.5	B2	I, IN

<sup>1</sup>Environmental Medium: Building Material (BM) as identified in:

*STN Environmental JV. 2009. Presentation of Building Inspection Results. December 23, 2009.*  
*Symbiont, 2015, PCB Contaminated Concrete sampling and Unlabeled Drum Characterization Results, May 13, 2015.*

<sup>2</sup>List the maximum concentration for each medium separately

<sup>3</sup>Use the lower of the two exposure limits (PEL/TLV)

<sup>4</sup>Cancer status; EPA Classification

Group A: Human carcinogen – Sufficient evidence to support a casual association between exposure and cancer.

Group B1: Probable Human Carcinogen – Limited evidence of carcinogenicity in humans

Group B2: Probable Human Carcinogen – Sufficient evidence of carcinogenicity in animals, inadequate evidence of carcinogenicity in humans.

Group C: Possible Human Carcinogen – Limited evidence of carcinogenicity in animals.

Group D: Not Classified – Inadequate evidence of carcinogenicity in animals.

Group E: No Evidence of Carcinogenicity in Humans – No evidence for carcinogenic in at least two adequate animal tests or in both epidemiologist and animal studies.

<sup>5</sup>Route: (I) – Inhalation, (A) – Skin absorption, (IN) – Ingestion, (C) – Eye/skin contact.

2. The following chemical(s) may be/could be brought to the work site:

Gasoline for generator

Detergent for decontamination of drill bits and sampling equipment

Hexane for rinsing drill bits and sampling equipment

## 5.0 Physical Hazard Assessment

### FLAMMABILITY/EXPLOSIVE

Although gasoline and hexane will be used during this project, it is unlikely that explosive atmospheres will be encountered while performing tasks. However, it is possible that unknown chemicals may be encountered. Therefore, the following standard safety procedures will be implemented.

- All field vehicles and heavy equipment will be equipped with a type-ABC fire extinguisher. Fire extinguishers will be mounted on the vehicles where field personnel can easily access them. A fire extinguisher check, including inspection of gauges, hoses, and tanks, will be conducted before use of the field vehicle to ensure proper operation of the equipment.
- When necessary other appropriate firefighting equipment will be made available.
- Open fires and burning are prohibited. Smoking will be prohibited in all areas where flammable, combustible, or oxidizing materials are stored or are in use and any area containing unknown contaminants.

### HEAVY EQUIPMENT

It is unlikely that heavy equipment will be utilized while performing this work. However, the hazards associated with the operation of heavy equipment can be effectively managed through adequate training and constant awareness. Any subcontractor equipment operators must have had the required training and must demonstrate the necessary skills for the piece of equipment they are operating. Constant visual and verbal contact should be maintained with the operator to facilitate awareness. Equipment will not obstruct roadways, walkways, electrical lines, etc. Proper distance from power lines should be observed. The operator and field personnel should be aware of loose soil or uneven terrain that cannot be driven over or parked on for sake of a roll-over hazard. All personnel working around heavy equipment will wear hard hats and safety-toed boots (at a minimum). Personnel should avoid turning their back to operating machinery.

### EXCAVATIONS

It is unlikely that excavations will be utilized while performing this work. However, under no circumstances should an employee enter an unshored excavation greater than 4 feet in depth. Shored excavations may also be considered confined spaces. A soil sample from excavations should be obtained from the backhoe bucket or other means if at all possible. Before entering an excavation the situations should be discussed with the project manager to assess confined space requirements (See Section 8).

### SLIPS, TRIPS, AND FALLS

Although it can be difficult to prevent slips, trips, and fall hazards, these hazards can be minimized through good housekeeping, proper site-control measures, and keeping the work area free of obstructions. In the event that only one Stantec field person is on site, that person will inform the on-site subcontractors of where he/she will be working and ask them to accompany him/her for the work. Since it is virtually impossible to eliminate all slip, trip, and fall hazards in the Assessment Area, personnel should always be aware of the terrain they are walking across and have sure footing, taking very deliberate steps and the easiest path of travel. Cones and or caution tape have been used to mark identifiable hazards.

---

## **LIFTING**

Field operations often require that physical labor tasks be performed. All employees should employ proper lifting procedures. Additionally, employees should not attempt to lift bulky or heavy objects (greater than 40 pounds) without assistance.

## **TOOLS AND EQUIPMENT**

Hazards present during the use of tools and equipment are generally associated with improper tool handling and inadequate maintenance. Management of these hazards requires a rigorous maintenance of tools and equipment and effective training of employees in the proper use of these tools. Electrical cords must have unbroken insulation and should not be exposed to water or other liquids. A ground fault circuit interrupter outlet or cord must be used in any area where water may be present.

## 6.0 Personal Protective Equipment

Modified Level D will be the required level for this portion of work at the Site.

However, if site conditions change (e.g., unknown contaminants encountered, employee complaints, etc.) and a higher degree of protection is required, the SSO will consult the Project Manager and the required changes in personal protective equipment (PPE) will be made. A change in the level of PPE will result in this SHSP being amended and reviewed by the Project Manager.

<b>PROJECT TASK</b>	<b>LEVEL OF PROTECTION HAZ. WASTE &amp; NON-HAZ. SITE (A, B, C, D, [OTHER SPECIFY BELOW])<sup>1</sup></b>
---------------------	---

<u>Evaluation of Surface Stains</u>	<u>Modified Level D*</u>
-------------------------------------	--------------------------

<sup>1</sup> See Attachment C for PPE description by level

\* Moldex Airwave 4700N100 single use half-face dust mask and Kleenguard White Coveralls may be worn on a voluntary basis per the recommendation of Dan Feldt, MPH, CIH; Sr. Industrial Hygienist at Stantec.

## 7.0 Medical Requirements

Medical examinations are not warranted for the proposed scope of work. Should Site conditions warrant revision, Stantec personnel, whose presence may be required on a site where exposure to toxic and/or hazardous substances exists, shall be required to participate in any medical monitoring as deemed necessary by Stantec. All medical examinations performed for Stantec personnel shall be conducted in accordance with the requirements of 29 CFR 1910.120, 29 CFR 1910.134. In addition, it may be necessary to require specific clinical tests for certain sites. Any site-specific testing shall be identified below.

### SITE-SPECIFIC CLINICAL TESTS

PARAMETER	REQUIRED TESTING	ACTION LEVEL
N/A	N/A	N/A

All Stantec employees will be medically qualified and fit tested for respiratory protection as appropriate.

### MEDICAL DATA SUMMARY

Medical examinations are not warranted for the proposed scope of work. Should Site conditions warrant revision, this form shall be completed by Stantec personnel prior to commencement of activities at the site. This form shall be kept at the project site for the duration of applicable project activities. This form must be delivered to the attending physician when medical assistance is required.

Medical Data Summary Forms are provided in Attachment A

## 8.0 Training Requirements

All Stantec personnel participating in site investigations where exposure to toxic and/or hazardous substances is possible must complete at least 40 hours of health and safety training required by 29 CFR 1910.120. The dates of certification are documented in the following Stantec office:

Stantec  
12075 Corporate Parkway Suite 200  
Mequon WI 53092-2649  
Contact: Mr. Jon Currie

### **CONFINED SPACE ENTRY**

As a general rule, Stantec employees are prohibited from entering confined spaces. However, if it becomes absolutely necessary to enter a confined space to accomplish a required task, specific procedures will be established by the Stantec project manager and safety personnel on a task-by-task basis.

## 9.0 Environmental Monitoring

Service, maintenance, and calibration of monitoring equipment shall be performed in accordance with manufacturers' recommendations.

### MONITORING EQUIPMENT CHECKLIST

TYPE OF EQUIPMENT	SERIAL NO.	WRITTEN SOP AVAILABLE	DATE CALIBRATED
PID	To Be Determined	Yes	Daily
4-Gas Meter	To Be Determined	Yes	Daily

### SURVEILLANCE METHODS

The monitoring methods to be used at the project site are described below:

The breathing zone and work area will be periodically screened for volatile organic compounds (VOCs) using the PID and four-gas meter. If elevated VOCs are detected in the breathing zone or four-gas meter indicates a risk exists, Stantec staff will remove their persons from the work site, notify the project manager and evaluate appropriate actions (e.g. upgrade to Level C, etc.).

## 10.0 Site Safety Procedures

A site-specific/pre-entry meeting will be held before the start of any site activities in the Assessment Area. Additional meetings will be held as necessary. The purpose of these safety meetings is to:

- Describe the assigned tasks and their potential hazards.
- Coordinate activities.
- Identify methods and precautions to prevent injuries.
- Plan for emergencies.
- Describe any changes in the Site Safety Plan.
- Solicit worker feedback on conditions affecting safety and health.
- Solicit worker feedback on how well the Site Safety Plan is working.

Safety meetings will also be held at all other times necessary to ensure that all field personnel and visitors are aware of the health and safety hazards at the site. All field personnel and visitors will be required to attend these meetings. The on-site SSO or alternate designee will conduct the meetings.

The SSO will also conduct frequent inspections of site conditions, equipment, and activities to determine whether the SHSP is adequate and being followed. In order to make safety inspections effective, the following guidelines should be observed:

- Review the results of these inspections with supervisors and workers.
- Re-inspect any identified problems to ensure that they have been corrected.
- Document all inspections and subsequent follow-up actions in field notebook kept for this project. Retain these records until site activities are completed and at least 5 years after project has been completed.

The frequency of inspections shall be both at the beginning and the end of each work shift or when site conditions change due to factors such as weather, tasks are performed or new hazards being introduced on-site or discovered during site activities.

### **PERIMETER ESTABLISHMENT**

The property lines will be used as the perimeter.

### **SITE ENTRY PROCEDURES**

Before entering the site all personnel shall don the required personal protective equipment (PPE) and follow the decontamination procedures when exiting site.

### **SITE CONTROL AND DESIGNATION OF WORK ZONES**

The following procedures shall be observed to minimize the potential for contaminant transfer, personnel exposure to hazardous materials, and work place injury.

### **EXCLUSION ZONE**

We do not plan to formally delineate the exclusion zone because of numerous and small work locations involved across the site over a relatively short period of time, and the limited likelihood



of exposure to personnel other than those doing the actual work. The exclusion zone will be determined at each work location.

#### **CONTAMINATION REDUCTION ZONE**

We do not plan to formally delineate the contamination reduction zone because of numerous and small work locations involved across the site over a relatively short period of time, and the limited likelihood of exposure to personnel other than those doing the actual work. The contamination reduction zone will be determined at each work location.

#### **SUPPORT ZONE**

The support zone will consist of an area outside of the exclusion and contamination reduction zone where field vehicles and equipment will be staged. Eating, drinking, and smoking will only be allowed in this area.

## 11.0 Decontamination

All non-disposable field equipment will be decontaminated before each use and between samples to avoid cross-contamination between samples and to ensure the health and safety of the field crews. Field personnel must follow the procedures outlined below whenever leaving the exclusion areas. All decontamination procedures will be performed in accordance with the field standard operating procedure (SOP) for *Equipment Decontamination* and *Management of Investigative Wastes Procedures* included in the QAPP.

### **PERSONNEL DECONTAMINATION PROCEDURES**

Gloves will be placed in a plastic bag and disposed of properly. Re-usable PPE will be decontaminated with an appropriate detergent wash and rinsed with water. Decontamination water will be containerized and disposed of properly.

### **SAMPLING/MONITORING EQUIPMENT DECONTAMINATION PROCEDURES**

Disposable equipment will be placed in a garbage bag and disposed of properly. Re-usable equipment will be washed and scrubbed with an appropriate detergent wash and rinsed with water. Equipment will be decontaminated after each sampling event to prevent cross contamination. Decontamination water will be containerized and disposed of properly.

## 12.0 Emergency Plan

This emergency action plan can be fully or partially activated depending on the extent of the encountered incident. The plan will be activated whenever an emergency is discovered. Where possible, the emergency will be brought under control by the on-site personnel. The on-site SSO has full responsibility in the event of an emergency and will be required to determine if outside response needs to be contacted.

The personnel who have responsibilities in the event of an emergency are listed below with their area(s) of responsibility. In addition, procedures to be followed in the event of a site evacuation are also outlined.

### EMERGENCY PERSONNEL RESPONSIBILITIES

NAME	RESPONSIBILITY
Harris Byers	Supervisor
Nicolas Heim	SSO

The SSO is the on-site emergency coordinator who has the responsibility for controlling emergency response operations at the site. In the event of an emergency, the SSO must identify, as best as possible, all hazardous substances or conditions present. She/he must implement appropriate emergency operations in accordance with this plan. In addition, she/he must limit the number of personnel exposed to the emergency, by communicating with all personnel on-site and assuring they get to a safe area.

### COMMUNICATION

Before starting field activities, the appropriate representatives of the City of Manitowoc will be notified of the planned activities. Stantec will review the SHSP and Emergency Plan with the City of Manitowoc representatives to inform them of potential emergencies related to the field activities at the site.

If an emergency occurs, fast and effective communication is essential. Without proper communication, the ability to initiate and carry out an appropriate response could be severely hindered. There are three important elements to effective communications. First, the appropriate message to be communicated must be determined. Second, the message then must be transmitted correctly. Finally, the person receiving the message must understand the message onsite. Communication will be accomplished through direct-voice contact, two-way radio dispatch, and cell phones. The SSO will have a cell phone either on person or in the field vehicle at all times while performing tasks at the Site.

In the event of an emergency, the SSO will contact off-site first responders or transport the victim to the hospital following the evacuation/hospital route found in this SHSP. If victim is in distress, 911 can be called immediately by the individual who discovers the emergency. Outside medical assistance should be requested if any of the following conditions occur.

- Cardiac Arrest
- Chest Pain

- Breathing Difficulty
- Burns (2<sup>nd</sup> or 3<sup>rd</sup> degree over 10 percent of the body or about the face or neck)
- Diabetic Emergency
- Drug Overdose
- Hypertension
- Multiple Trauma
- Seizure
- Smoke, Heat or Toxic Gas Inhalation
- Uncontrollable Bleeding

Emergency eye wash bottles will be kept in field vehicles in case of any eye emergencies requiring immediate flushing of the eyes to prevent permanent damage to the person's sight. If outside assistance is required, immediately dial 911. Call from a safe area. The following information should be given.

- Inform the dispatcher of the emergency
- Identify yourself
- Indicate if someone is injured
- Describe how to get to the area of emergency

After making the call, evacuate victims to safe area if they can be moved and wait to meet the responders.

## EMERGENCY PROCEDURES

### INJURY

- All site personnel shall assemble at the decontamination line.
- The SSO shall evaluate the nature of injury and contact outside emergency services if needed.
- Move victim to Contamination Reduction Zone if can be moved.
- Perform emergency decontamination procedures (section below) on victim.
- Transport victim to hospital if needed or inform outside emergency personnel of situation and designated medical facility.
- No persons shall re-enter the Exclusion Zone until the cause of the injury (or symptoms) is determined.
- Perform an accident investigation using Attachment B (Incident Report Sheet).

### DECONTAMINATION DURING MEDICAL EMERGENCIES

If emergency life-saving first aid and/or medical treatment are required, decontamination procedures may be limited or omitted. If the contamination does not present a hazard to the rescue personnel, life-saving care may be instituted immediately. If contamination will present a risk to rescue personnel, minimal decontamination should be performed to allow initiation of aid.

If contamination presents a significant risk to rescue personnel, then decontamination will need to be performed until the contamination is no longer a risk.

Medical assistance personnel will be notified before transporting the victim if the victim may be contaminated. Assurance must be made that the medical personnel at the receiving area are able and willing to handle a victim who is contaminated. Site personnel will accompany contaminated victim to the medical facility to advise on matters involving decontamination. A copy of this SHSP, including materials safety data sheets (MSDS) (if known), will be brought along with the victim.

Heat-related illnesses range from heat fatigue to heat stroke. Heat stroke requires prompt treatment to prevent irreversible damage or death. Protective clothing must be promptly removed. Less serious forms of heat stress also require prompt attention. Unless the victim is obviously contaminated, decontamination may be omitted or minimized and treatment should begin immediately.

## **FIRE/EXPLOSION**

If fire or explosions occur in the Assessment Area, the following actions will be performed.

- Any personnel who discover a fire should immediately notify 911 to request assistance.
- On-site personnel, under the direction of the SSO, will attempt to control or extinguish fire with fire extinguisher, if possible.
- A 10-second air horn blast shall be sounded.
- All site personnel not involved with fighting the fire shall assemble at the decontamination line.
- Evacuation of the affected area may be necessary in case of major fire or explosion. All personnel will be familiar with excavation procedures and means of exit from their work areas.
- Emergency Response officials will determine the appropriate actions for off-site response actions.

## **UNKNOWN INTACT DRUMS**

It is not anticipated that unknown intact drums will be encountered during the assessment activities, however, if encountered, the following steps will be performed.

- The drum will first be inspected from the surface by the SSO. The SSO will be looking for the following items:
  - Symbols, words or other marks on the drum indicating that its contents are hazardous (e.g., radioactive, explosive, corrosive, toxic or flammable)
  - Symbols, words or other marks on the drum indicating that it contains discarded laboratory chemicals, reagents, or potentially dangerous materials in small volume individual containers
  - Evidence of deterioration such as corrosion, rust, and leaks
  - Evidence that the drum is under pressure such as swelling and bulging
  - Drum type and drum lid
- After surface inspection of the drum, investigative activities will cease, and the drum will remain intact.

## SPILL/RELEASE

If a spill or release occurs, the following steps will be performed.

- Report it immediately to the SSO.
- All personnel shall then re-locate upwind and upgradient of the spill to a safe distance (e.g., 1000 feet).
- SSO will assess the spill and inform the drilling contractor to put absorbent material down to try to contain the spill if possible.
- If spill or release cannot be contained and/or cannot be safely characterized, a 10-second blast shall be sounded and all personnel shall be evacuated immediately to the decontamination line.
- Then a safe distance away, upwind and upgradient of spill.
- SSO will contact the site hazardous material spill response contractor and inform them about the spill/release and to coordinate spill cleanup.
- The SSO will contact the Manitowoc County emergency response personnel, and the Wisconsin Department of Natural Resources.

The SSO will coordinate with the spill release contractor and determine through the SSO's/spill contractor's professional opinion if there is a threat to the neighboring community. Should the neighboring community require evacuation, the SSO will contact the local authorities, inform them of the situation, and ask that they contact the affected receptors.

## ADVERSE WEATHER CONDITIONS

If the SSO is notified of adverse weather conditions, the following steps shall be performed.

- The SSO will determine if work can continue without endangering the health and safety of the field workers. The SSO will monitor the weather during the a.m. and p.m. hours and will document it in the field logbook. Some of the items to be considered before determining the continuance of work are:
  - Potential for heat stress and heat related injuries
  - Potential for cold stress and frostbite related injuries
  - Dangerous weather related working conditions (high winds)
  - Limited Visibility
  - Potential for electrical storms/lightning. No activities will be permitted during electrical storms
  - Tornado watches and warnings. No activities will be permitted during a tornado warning
  - Winter weather watches and warnings. No activities will be permitted during a snow storm.

In the event of a weather emergency:

- Take appropriate cover in either nearby buildings or vehicles depending on the emergency.
- Work will cease until the conditions clear up and all watches/warnings are lifted.

## GENERAL SITE EVACUATION PROCEDURES

Exit exclusion zone, contaminant reduction zone, and support zone. Contact emergency services (911) if necessary.

First Aid procedures for a variety of situations are included in Attachment D.

## 13.0 Emergency References

### EMERGENCY RESOURCES

* Ambulance	<b>911</b>
* Hospital Emergency Center	<b>(920) 433-0111</b>
* Hospital Life Line	NA
* Hospital Poison Center	NA
* Local Police	<b>(920) 448-3200 or 911</b>
* County Sheriff	<b>(920) 448-4200</b>
* State Police	<b>(920) 448-4200</b>
* Fire Department	<b>(920) 448-3280 or 911</b>
* Explosives Disposal Unit	NA
* Radio Channel	NA

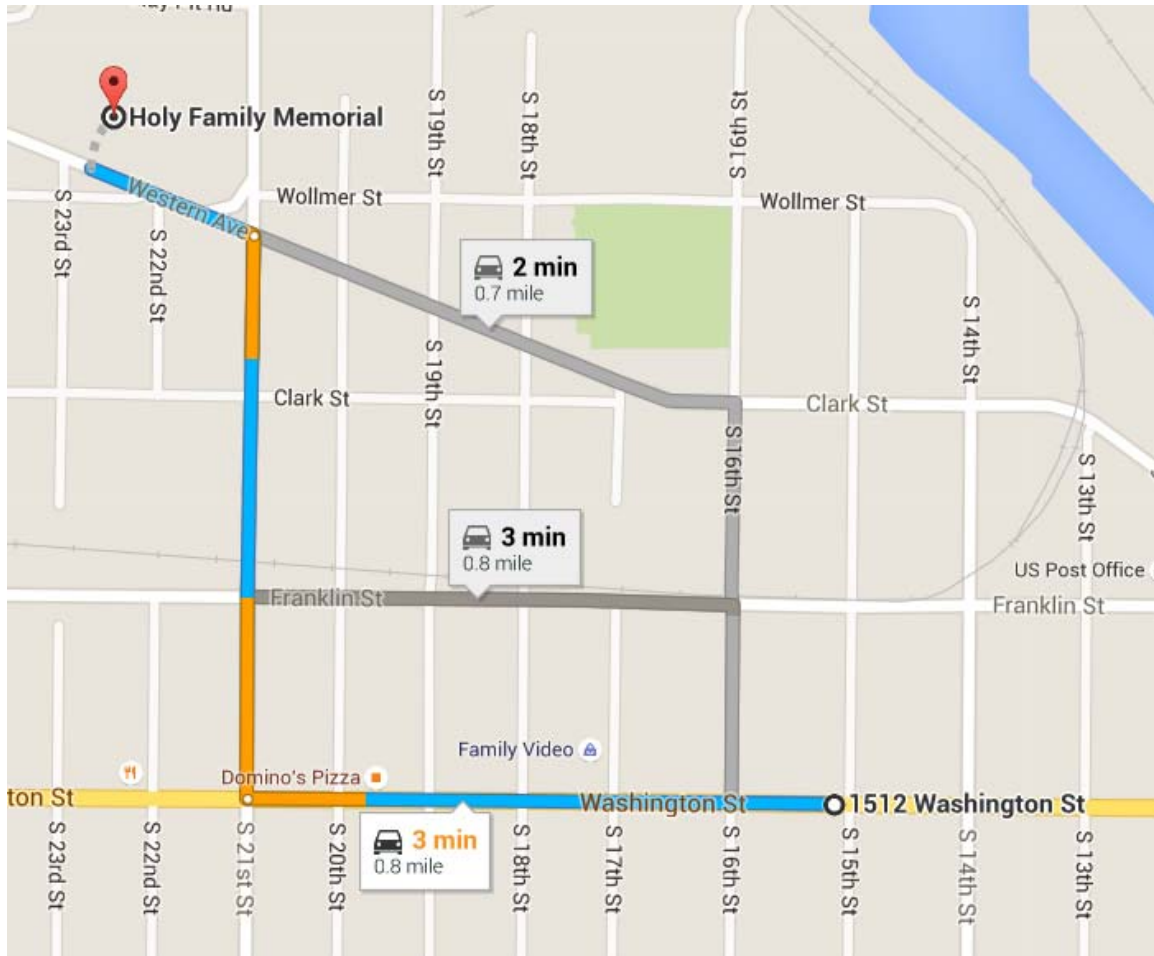
### OTHER EMERGENCY CONTACTS

* Stantec Office	(800) 880-4700
* Client/Owner	(920) 686-6931
* National Response Center	(800) 424-8802
* WI Emergency Government	(800) 943-0003

Note: Incident reports are provided in Attachment B.

## 14.0 Evacuation/Hospital Routes

From 1512 West Washington Street to Holy Family Memorial



Driving directions from:  
1512 Washington Street to

**Holy Family Memorial Hospital**  
2300 Western Avenue  
Manitowoc, Wisconsin 54221

1512 Washington St  
Manitowoc, WI 54220

- ↑ Head west on Washington St toward S 16th St  
0.3 mi
- ↪ Turn right onto S 21st St  
0.3 mi
- ↵ Turn left at the 3rd cross street onto Western Ave  
0.1 mi  
**i** Destination will be on the right



## 15.0 Site-Specific Health and Safety Plan Review

This document shall be signed by site personnel prior to their first site visit.

"I have read and understand the contents of this Site Safety Plan and will comply with its provisions, requirements, and restrictions."

NAME (PRINT)	SIGNATURE	DATE
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

# 16.0 Site-Specific Health and Safety Plan Follow-Up Report

Project Site: \_\_\_\_\_

1. Was the Site Health and Safety Plan followed?

\_\_\_\_\_ Yes \_\_\_\_\_ No

2. If no, explain all changes to the Site Health and Safety Plan:

---

---

---

---

---

---

---

---

3. Reason for changes:

---

---

---

---

---

---

---

---

4. Report prepared by: \_\_\_\_\_ Date: \_\_\_\_\_

5. Report reviewed by: \_\_\_\_\_ Date: \_\_\_\_\_

## 17.0 Addendum to Site-Specific Health and Safety Plan

Use this page to add additional site data or describe any special circumstances that have become apparent after the original preparation of this Site Health and Safety Plan. Include any changes in site conditions, PPE and monitoring modifications and other items as appropriate.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

# FIGURES

# Attachment A – Medical Data Summary Forms

**MEDICAL DATA SUMMARY FORM:**

This form shall be completed by Stantec personnel prior to commencement of activities of the site. This form shall be kept at the project site for the duration of project activities. This form must be delivered to the attending physician when medical assistance is required.

Site: \_\_\_\_\_

Location: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Home Phone: \_\_\_\_\_

Height: \_\_\_\_\_ Weight: \_\_\_\_\_ Age: \_\_\_\_\_ Sex: \_\_\_\_\_

In case of emergency contact: \_\_\_\_\_

Address: \_\_\_\_\_

Phone (\_\_\_\_\_) \_\_\_\_\_

Allergies: \_\_\_\_\_

Recent Illnesses: \_\_\_\_\_

Previous exposure to hazardous substances?

\_\_\_\_\_ Yes \_\_\_\_\_ No

Current medication: \_\_\_\_\_

Medical restrictions: \_\_\_\_\_

Name of personal physician: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: (\_\_\_\_\_) \_\_\_\_\_

Date Completed: \_\_\_\_\_

## Attachment B – Incident Report Sheets

## INCIDENT REPORT

Project #: \_\_\_\_\_

Site: \_\_\_\_\_

Location: \_\_\_\_\_

Name of Affected Individual: \_\_\_\_\_

Address: \_\_\_\_\_

Age: \_\_\_\_\_ Sex: \_\_\_\_\_

Description of Incident: \_\_\_\_\_

Date of Incident: \_\_\_\_\_ Time of Incident: \_\_\_\_\_

Was Medical Care Required?  YES  NO

Immediate Family Notified  YES  NO

If Yes, Describe Care Received (attach medical record): \_\_\_\_\_

Date Care Received: \_\_\_\_\_ Location: \_\_\_\_\_

Future Preventative Measures/Corrective Action Taken: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Report Prepared By: \_\_\_\_\_ Date: \_\_\_\_\_

Report Reviewed By: \_\_\_\_\_ Date: \_\_\_\_\_



# Attachment C – Personal Protective Equipment

## PERSONAL PROTECTIVE EQUIPMENT (PPE)

1. Level A protection should be selected when the highest level of respiratory, skin, eye, and mucous membrane protection is needed.
  - Positive-pressure, self-contained, breathing apparatus (MSHA/NIOSH approved) **(REQUIRED)**
  - Fully encapsulated, chemical resistant suit **(REQUIRED)**
  - Chemical-resistant inner and outer gloves **(REQUIRED)**
  - Chemical-resistant boots with steel toe and shank **(REQUIRED)**
  - Chemical-resistant coveralls
  - Two-way radio communication **(REQUIRED)**
  
2. Level B protection should be selected when the highest level of respiratory protection is needed, but with a lesser degree of skin and eye protection.
  - Positive-pressure, self-contained, breathing apparatus (MSHA/NIOSH approved) **(REQUIRED)**
  - Chemical-resistant clothing (coveralls, hooded two-piece, chemical resistant splash suit, or disposable chemical-resistant coveralls) **(REQUIRED)**
  - Coveralls (under splash suit)
  - Chemical-resistant inner and outer gloves **(REQUIRED)**
  - Chemical-resistant boots with steel toe and shank **(REQUIRED)**
  - Two-way radio communication
  - Hard hat **(REQUIRED)**
  
3. Level C protection should be selected when the type and concentration of hazardous airborne substance is known, the criteria for using air-purifying respirators is met, and skin and eye exposure is unlikely. Monitoring of the air must be performed to comply with OSHA regulations and to ensure respirator effectiveness.
  - Full face, air purifying respirator (MSHA/NIOSH approved) with appropriate cartridges **(REQUIRED)**
  - Chemical-resistant clothing (coveralls, hooded two-piece, chemical resistant splash suit, or disposable chemical-resistant coveralls) **(REQUIRED)**
  - Chemical-resistant inner and outer gloves **(REQUIRED)**
  - Chemical-resistant boots with steel toe and shank **(REQUIRED)**
  - Two-way radio communication
  - Hard hat **(REQUIRED)**
  - Escape respirator
  
4. Level D is primarily a work uniform. It shall not be worn on-site where respiratory or skin hazards exist.
  - Protective coveralls and protective gloves **(REQUIRED)**
  - Boots with steel toe and shank **(REQUIRED)**
  - Hard hat **(REQUIRED)**
  - Safety glasses **(REQUIRED)**
  - Safety vest **(REQUIRED)**

## Attachment D – First Aid

## **FIRST AID**

### **BITES**

#### **ANIMAL BITES**

Thoroughly wash the wound with soap and water, flush the area with running water, and apply a sterile dressing. Immobilize affected part until the victim has been attended by a physician. See that the animal is kept alive and in quarantine. Obtain the name and address of the owner of the animal.

#### **INSECT BITES:**

Remove “stinger” without squeezing if present; keep affected part below the level of the heart; and apply ice bag. For minor bites and stings, apply soothing lotions such as calamine.

### **BURNS AND SCALDS**

#### **MINOR BURNS:**

DO NOT APPLY VASELINE OR GREASE OF ANY KIND. If there are no areas of open skin, apply cold water until pain subsides; cover with a dry, sterile dressing. Do not break blisters or remove tissue. Seek medical attention.

#### **SEVERE BURNS:**

Do not remove adhered particles of clothing. Do not apply ice or immerse in water. Do not apply any ointments or grease. Cover burns with thick, sterile dressings. Keep burned feet or legs elevated if possible. May need to treat for shock.

#### **CHEMICAL BURNS:**

Wash away the chemical soaked clothing with large amounts of water. Remove victim's chemical-soaked clothing. If dry lime, brush away before flushing. Apply sterile dressing and seek medical attention.

### **CRAMPS**

#### **SYMPTOMS:**

Muscle cramps in abdomen and extremities. Heat exhaustion may also be present.

#### **TREATMENT:**

Same as for heat exhaustion.

### **CUTS**

Apply pressure with sterile gauze dressing and elevate the area until bleeding stops. Apply bandage and seek medical attention.

### **EYES**

#### **FOREIGN OBJECTS:**

Keep the victim from rubbing eyes and flush the eye with water. If flushing fails to remove the object, apply a dry protective dressing to both eyes and seek medical attention.

#### **CHEMICALS:**

Flood the eye thoroughly with water for 15 minutes. Cover the eye with a dry sterile pad and seek medical attention.

## **FAINTING**

Keep the victim lying down. Loosen tight clothing. If victim vomits, roll person onto side or turn head to the side. Maintain an open airway. Bathe the person's face gently with cool water. Unless recovery is prompt, seek medical attention.

## **FRACTURES**

Deformity of an injured part usually means a fracture. If a fracture is suspected, splint the part. **DO NOT ATTEMPT TO MOVE THE VICTIM.** Seek medical attention immediately.

## **FROSTBITE**

### **SYMPTOMS:**

Just before frostbite occurs, skin may be flushed then changes to white or grayish-yellow. Pain may be felt early; then may subside. Blisters may appear; affected part feels very cold and/or may be numb.

### **TREATMENT:**

Bring victim indoors, cover the frozen area; provide extra clothing and blankets. Re-warm frozen area quickly by immersion in warm water—**NOT HOT WATER.** **DO NOT RUB THE PART.** Seek medical attention.

## **HEAT EXHAUSTION**

Caused by exposure to heat, either sun or indoor.

### **SYMPTOMS:**

Near-normal body temperature; pale and clammy skin; profuse sweating, tiredness, weakness, headache, perhaps cramps, nausea, dizziness, and possible fainting.

### **TREATMENT:**

Keep victim in lying position and raise feet. Loosen clothing, apply cool wet cloths. If conscious, give sips of water. Seek medical attention immediately.

## **SUNSTROKE**

### **SYMPTOMS:**

High body temperature; hot, red, and dry skin; rapid pulse. Victim may be unconscious.

### **TREATMENT:**

Keep victim in lying position with head elevated. Remove clothing and repeatedly sponge the bare skin with cool water. Seek medical attention immediately.

## **POISONING**

Call the Poison Control Center for instruction on immediate care. If victim becomes unconscious, keep the airway open. If breathing stops, begin rescue breathing. Call Emergency Medical Services (EMS) immediately.

## **POISON IVY**

Remove contaminated clothing. Wash all exposed areas thoroughly with soap and water. If rash is mild, apply calamine lotion or other soothing skin lotion. If a severe reaction occurs, seek medical attention.

### **PUNCTURE WOUNDS**

If puncture wounds is deeper than skin surface, seek medical attention. Serious infection can occur unless proper treatment is received.

### **SPRAINS**

Elevate injured part and apply ice bag or cold packs. Do not soak in hot water. Immobilize affected part and seek medical attention.

### **UNCONSCIOUSNESS**

Never attempt to give anything by mouth. Keep victim lying flat, maintain open airway. If victim is not breathing, perform rescuer breathing and call EMS immediately.



Figure 1



Path: G:\Projects\City of Manitowoc\Sites\Mirro\WXD\Figure2-Concretesamples.mxd

**SYMBIONT**  
 6737 West Washington Street  
 Suite 3440  
 West Allis, Wisconsin 53214  
 414.291.8840  
 FAX 414.291.8841

- WASTEWATER TREATMENT/CONVEYANCE
- FACILITIES ENGINEERING
- ENVIRONMENTAL MANAGEMENT
- AIR QUALITY
- DESIGN/BUILD CONSTRUCTION MANAGEMENT
- INVESTIGATION, REMEDIATION, AND SITE CLOSURE
- HEALTH CARE FACILITIES DESIGN
- WATER SUPPLY AND DISTRIBUTION
- SOLID AND HAZARDOUS WASTE MANAGEMENT
- PROCESS ENGINEERING
- WATER RESOURCES PLANNING/DESIGN
- STORM WATER MANAGEMENT
- GIS SERVICES
- BROWNFIELDS

DSGN: SGH	CHK: SGH
DR: RED	APVD: SGH

**CITY OF MANITOWOC  
 U.S. EPA BROWNFIELDS  
 GRANT IMPLEMENTATION  
 MIRRO PLANT #9  
 1512 WASHINGTON STREET**

SCALE	1 in = 25 ft
DWG	2
DATE	MARCH 2015
PROJ NO.	W111086

FIGURE 2  
 SITE BASEMAP



## Attachment E – MSDS Sheets



# MATERIAL SAFETY DATA SHEET PACKET

**National Institute of Standards and Technology  
Standard Reference Materials Program  
100 Bureau Drive, Stop 2300  
Gaithersburg, Maryland 20899-2300**

**SRM Number: 1866b  
SRM Name: Common Commercial  
Asbestos**

**Date of Issue: 09 January 2007**

**MSDS Coordinator: Mario Cellarosi  
Telephone: 301-975-6776  
FAX: 301-926-4751  
E-mail: SRMMSDS@nist.gov**

**Emergency Telephone Chem Trec:  
1-800-424-9300 (North America)  
+1-703-527-3887 (International)**

**Description:** Standard Reference Material (SRM) 1866b is comprised of three commercial-grade asbestos materials that were, or are, commonly used in commerce. These asbestos materials are typical of the asbestos found in bulk samples during routine asbestos inspections of building materials. The optical properties serve as a primary calibration standard in the identification of asbestos with polarized light microscopy (PLM). A unit of SRM 1866b consists of a set of three bottles: one bottle containing chrysotile, one bottle containing asbestiform grunerite (amosite), and one bottle containing asbestiform riebeckite (crocidolite). Each bottle contains between 1 gram and 3 grams of material.

## **Chrysotile**

**Asbestiform Grunerite (Amosite)**

**Asbestiform Riebeckite (Crocidolite)**

An MSDS is provided for each of the three asbestos materials listed above, which contain hazardous components 1 % or greater and/or carcinogens 0.1 % or greater, in compliance with OSHA 29 CFR 1910.1200.

# MATERIAL SAFETY DATA SHEET

## 1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology  
Standard Reference Materials Program  
100 Bureau Drive, Stop 2300  
Gaithersburg, Maryland 20899-2300

SRM Number: 1866b  
MSDS Number: 1866b  
SRM Name: Common Commercial Asbestos

Date of Issue: 09 January 2007

MSDS Coordinator: Mario Cellarosi  
Telephone: 301-975-6776  
FAX: 301-926-4751  
E-mail: SRMMSDS@nist.gov

Emergency Telephone ChemTrec:  
1-800-424-9300 (North America)  
+1-703-527-3887 (International)

**Description:** Standard Reference Material (SRM) 1866b is a set of three individual commercial-grade asbestos materials: **chrysotile**, asbestiform grunerite (amosite), and asbestiform riebeckite (crocidolite). A unit of SRM 1866b consists of three bottles, each containing between 1 gram and 3 grams of individual material.

**Substance:** Chrysotile

## 2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS<sup>(a)</sup>

**Component:** Chrysotile  
**Other Designations:** Chrysotile (metaxite; serpentine chrysotile; asbestos; chrysotile asbestos)  
**CAS Number:** 12001-29-5  
**EC Number (EINECS):** Not assigned.  
**SRM Nominal Concentration (% by weight or volume):** > 90

**Component:** Magnetite (as an impurity)  
**Other Designation:** Magnetite (magnetic iron oxide; black iron oxide; magnetic iron ore; lodestone; black ferric oxide)  
**CAS Number:** 1309-38-2  
**EC Number (EINECS):** 215-169-8  
**SRM Nominal Concentration (% by weight):** < 5  
**EC Classification:** T  
Carcinogen Category 1  
**EC Risk (R No.):** 23, 45, 48  
**EC Safety (S No.):** 45, 53

<sup>(a)</sup> Hazardous components 1 % or greater; carcinogens 0.1 % or greater are listed in compliance with OSHA 29 CFR 1910.1200.

## 3. HAZARDS IDENTIFICATION

**NFPA Ratings (Scale 0–4):** Health = 1      Fire = 0      Reactivity = 0

**Major Health Hazards:** Cancer hazard (in humans)

### Potential Health Effects

#### Inhalation:

Inhalation of chrysolite asbestos dust may be irritating. Symptoms include a cough and chest pain. Chronic exposure may cause asbestosis, interstitial fibrosis of the lung tissue, which may develop within 4 years to 9 years, but onset may be typically delayed 20 years to 40 years after first exposure. Death from asbestosis may be due to respiratory or cardiac failure. Secondary lung infections may also occur. Chronic exposure of asbestos to workers may also cause pleural effusion as early as 3 years to 4 years after initial exposure. Chronic exposure of asbestos to workers also increases the chance of pleural and peritoneal mesotheliomas, bronchogenic carcinoma, lung cancer, and cancers of the gastrointestinal tract and larynx. The latent period for mesothelioma is 3 years to 40 years; for lung cancer, 15 years to 30 years.

**Skin Contact:** Direct contact may cause irritation. Asbestos fibers may penetrate the skin and result in "asbestos corns", due to thickening of the skin around the implanted fiber. These corns usually occur on the hands and forearms, and they disappear on removal of the fibers.

**Eye Contact:** Direct contact may cause irritation with redness due to mechanical action.

**Ingestion:** Acute exposure by cause gastrointestinal irritation. Chronic exposure of asbestos fibers may be involved in cancers of the buccal cavity and pharynx, esophagus, stomach, colon, and rectum.

**Listed as a Carcinogen/  
Potential Carcinogen:**

Yes	No	
<u>X</u>	_____	In the National Toxicology Program (NTP) Report on Carcinogens.
<u>X</u>	_____	In the International Agency for Research on Cancer (IARC) Monographs.
<u>X</u>	_____	By the Occupational Safety and Health Administration (OSHA).

---

#### 4. FIRST AID MEASURES

---

**Inhalation:** If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration by qualified personnel. Get immediate medical attention.

**Skin Contact:** Rinse affected area with copious amounts of water followed by washing with soap and water for at least 15 minutes while removing contaminated clothing. Get immediate medical attention.

**Eye Contact:** Flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Get immediate medical attention.

**Ingestion:** If a large amount is swallowed, get immediate medical attention.

---

#### 5. FIRE FIGHTING MEASURES

---

**Fire and Explosion Hazards:** Chrysotile is a negligible fire hazard.

**Extinguishing Media:** Regular dry chemical. Carbon dioxide. Water. Regular foam.

**Fire Fighting:** If material is involved in a fire, extinguish fire with a medium appropriate for the surrounding fire. Material itself does NOT burn or burns with difficulty. Keep run-off water out of sewers and water sources. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

**Component:** Chrysotile

**Flash Point:** Not applicable.

**Method Used:** Not applicable.

**Autoignition Temp.:** Not applicable.

**Flammability Limits in Air**

**UPPER (Volume %):** Not applicable.

**LOWER (Volume %):** Not applicable.

---

#### 6. ACCIDENTAL RELEASE MEASURES

---

**Occupational Release:** Do NOT touch or walk through spilled material. Avoid inhalation of asbestos dust (see Section 8, "Exposure Controls and Personal Protection"). Collect small dry spills with a shovel and place material into an appropriate container for disposal. Prevent entry into waterways and sewers. Clean up residue with a HEPA filter vacuum.

**Disposal:** Refer to Section 13, "Disposal Considerations".

---

#### 7. HANDLING AND STORAGE

---

**Storage:** Store and handle in accordance with all current regulations and standards.

**Safe Handling Precautions:** See Section 8, "Exposure Controls and Personal Protection".

---

## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

---

<b>Exposure Limits:</b>	<b>Chrysotile</b> OSHA (PEL): 0.1 fibers/cc TWA ACGIH (TLV): 0.1 fibers/cc TWA NIOSH: 0.1 fibers/cc recommended TWA (10 h)
<b>Ventilation:</b>	Provide local exhaust ventilation system equipped with a HEPA-filter dust collection system.
<b>Respirator:</b>	If workplace conditions warrant a respirator's use, a NIOSH/MSHA approved respirator should be used under an implemented respiratory protection program in accordance with OSHA Standard 29 CFR 1910.134 (General Industry, Use of Respirators) and 29 CFR 1910.1001 for occupational exposure to asbestos.
<b>Eye Protection:</b>	Wear safety goggles. An eye wash station should be readily available near areas of use.
<b>Personal Protection:</b>	Wear appropriate protective clothing and gloves to prevent skin exposure. Refer to OSHA Regulated Substances: OSHA 29 CFR 1910.1001.

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

---

<b>Component:</b>	<b>Chrysotile</b>
<b>Appearance:</b>	Fibrous solid to dust-like powder. White to grey-brown. Odorless.
<b>Relative Molecular Mass:</b>	Not applicable.
<b>Molecular Formula:</b>	$Mg_3(Si_2O_5)(OH)_4$
<b>Water Solubility:</b>	Insoluble.
<b>Solvent Solubility:</b>	Insoluble in organic solvents.

---

## 10. STABILITY AND REACTIVITY

---

<b>Stability:</b>	<input checked="" type="checkbox"/> Stable <input type="checkbox"/> Unstable
	Stable at normal temperatures and pressure.
<b>Conditions to Avoid:</b>	Avoid generating dust. Keep out of water supplies and sewers.
<b>Incompatible Materials:</b>	May be attacked by strong acids.
<b>Fire/Explosion Information:</b>	See Section 5, "Fire Fighting Measures".
<b>Hazardous Decomposition:</b>	Completely decomposes at temperatures of 1 000 °C.
<b>Hazardous Polymerization:</b>	<input type="checkbox"/> Will Occur <input checked="" type="checkbox"/> Will Not Occur

---

## 11. TOXICOLOGICAL INFORMATION

---

<b>Route of Entry:</b>	<input checked="" type="checkbox"/> Inhalation <input checked="" type="checkbox"/> Skin <input checked="" type="checkbox"/> Ingestion
<b>Toxicity Data:</b>	<b>Chrysotile</b> Human, Inhalation TCL <sub>0</sub> : 2.8 fibers/cc (5 years) Rat, Inhalation-Intermittent TCL <sub>0</sub> : 8 210 µg/m <sup>3</sup> (6 h to 20 d) Rat, Oral-Continuous TDL <sub>0</sub> : 10 867 mg/kg (78 weeks)
<b>Tumorigenic, Reproductive, Mutagenic Data:</b>	Chrysotile has been investigated as a tumorigenic and mutagenic effector.
<b>Health Effects (Acute and Chronic):</b>	See Section 3: "Hazards Identification" for potential health effects.

---

## 12. ECOLOGICAL INFORMATION

---

<b>Ecotoxicity Data:</b>	Not available.
--------------------------	----------------

---

### 13. DISPOSAL CONSIDERATIONS

---

**Waste Disposal:** Dispose in accordance with all applicable federal, state, and local regulations.

---

### 14. TRANSPORTATION INFORMATION

---

**U.S. DOT and IATA:** Asbestos; UN2212; Hazard Class 9  
NOTE: This material, as packaged for SRM 1866b, is not subject to the regulations per DOT Special Provision 156 and IATA special Provision A61.

---

### 15. REGULATORY INFORMATION

---

**U.S. Regulations:** CERCLA Sections 102a/103 (40 CFR 302.4): Asbestos: 1 lbs RQ  
SARA Title III Section 302 (40 CFR 355.30): Not regulated.  
SARA Title III Section 304 (40 CFR 355.40): Not regulated.  
SARA Title III Section 313 (40 CFR 372.65): Asbestos.  
OSHA Process Safety (29 CFR 1910.119): Not regulated.  
SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE: No.  
CHRONIC: Yes.  
FIRE: No.  
REACTIVE: No.  
SUDDEN RELEASE: No.

**State Regulations:** California Proposition 65: Asbestos is known to the state of California to cause cancer (Feb. 17, 1987).

#### CANADIAN Regulations

**WHMIS Classification:** Not determined for this material.

#### EUROPEAN Regulations

**EC Classification (assigned):** T Toxic.  
Carcinogen Category 1.

**EC Risk Phrases:** R45 May cause cancer.  
R23/48 Toxic: danger of serious damage to health by prolonged exposure through inhalation.

**EC Safety Phrases:** S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).  
S53 Avoid exposure.

#### National Inventory Status

**U.S. Inventory (TSCA):** Asbestos: Not listed on inventory.

**TSCA 12(b)  
Export Notification:** Asbestos: CAS No.: 1332-21-4  
Section 6

---

### 16. OTHER INFORMATION

---

**Sources:** MDL Information Systems, Inc., MSDS *Chrysotile*, 15 June 2006.

**Disclaimer:** Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.

# MATERIAL SAFETY DATA SHEET

## 1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology  
Standard Reference Materials Program  
100 Bureau Drive, Stop 2300  
Gaithersburg, Maryland 20899-2300

SRM Number: 1866b  
MSDS Number: 1866b  
SRM Name: Common Commercial Asbestos

Date of Issue: 09 January 2007

MSDS Coordinator: Mario Cellarosi  
Telephone: 301-975-6776  
FAX: 301-926-4751  
E-mail: SRMMSDS@nist.gov

Emergency Telephone ChemTrec:  
1-800-424-9300 (North America)  
+1-703-527-3887 (International)

**Description:** Standard Reference Material (SRM) 1866b is a set of three individual commercial-grade asbestos materials: chrysotile, **asbestiform grunerite (amosite)**, and asbestiform riebeckite (crocidolite). A unit of SRM 1866b consists of three bottles, each containing between 1 gram and 3 grams of individual material.

**Substance:** Asbestiform Grunerite

## 2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS<sup>(a)</sup>

<b>Component:</b>	<b>Asbestiform Grunerite</b>
<b>Other Designations:</b>	<b>Asbestiform Grunerite</b> (grunerite; amosite; brown asbestos; amosite asbestos)
<b>CAS Number:</b>	12172-73-5
<b>EC Number (EINECS):</b>	Not assigned.
<b>SRM Nominal Concentration (% by weight or volume):</b>	> 90
<b>Component:</b>	<b>Magnetite (as an impurity)</b>
<b>Other Designation:</b>	<b>Magnetite</b> (magnetic iron oxide; black iron oxide; magnetic iron ore; lodestone; black ferric oxide)
<b>CAS Number:</b>	1309-38-2
<b>EC Number (EINECS):</b>	215-169-8
<b>SRM Nominal Concentration (% by weight):</b>	< 5
<b>Component:</b>	<b>Quartz</b>
<b>Other Designation:</b>	<b>Quartz</b> (alpha quartz; silicon dioxide; silica; silicic anhydride; agate)
<b>CAS Number:</b>	14808-60-7
<b>EC Number (EINECS):</b>	238-878-4
<b>SRM Nominal Concentration (% by weight):</b>	< 5
<b>EC Classification:</b>	T Carcinogen Category 1
<b>EC Risk (R No.):</b>	23, 45, 48
<b>EC Safety (S No.):</b>	45, 53

<sup>(a)</sup> Hazardous components 1 % or greater; carcinogens 0.1 % or greater are listed in compliance with OSHA 29 CFR 1910.1200.

## 3. HAZARDS IDENTIFICATION

**NFPA Ratings (Scale 0-4):** Health = 1      Fire = 0      Reactivity = 0  
**Major Health Hazards:** Cancer hazard (in humans)

## Potential Health Effects

### Inhalation:

Inhalation of grunerite asbestos dust may be irritating. Symptoms include a cough and chest pain. Chronic exposure may cause asbestosis, interstitial fibrosis of the lung tissue, which may develop within 4 years to 9 years, but onset may be typically delayed 20 years to 40 years after first exposure. Death from asbestosis may be due to respiratory or cardiac failure. Secondary lung infections may also occur. Chronic exposure of asbestos to workers may also cause pleural effusion as early as 3 years to 4 years after initial exposure. Chronic exposure of asbestos to workers also increases the chance of pleural and peritoneal mesotheliomas, bronchogenic carcinoma, lung cancer, and cancers of the gastrointestinal tract and larynx. The latent period for mesothelioma is 3 years to 40 years; for lung cancer, 15 years to 30 years.

### Skin Contact:

Direct contact may cause irritation. Asbestos fibers may penetrate the skin and result in "asbestos corns", due to thickening of the skin around the implanted fiber. These corns usually occur on the hands and forearms, and they disappear on removal of the fibers.

### Eye Contact:

Direct contact may cause irritation with redness due to mechanical action.

### Ingestion:

Acute exposure by cause gastrointestinal irritation. Chronic exposure of asbestos fibers may be involved in cancers of the buccal cavity and pharynx, esophagus, stomach, colon, and rectum.

### Listed as a Carcinogen/ Potential Carcinogen:

Yes	No	
<u>X</u>	_____	In the National Toxicology Program (NTP) Report on Carcinogens.
<u>X</u>	_____	In the International Agency for Research on Cancer (IARC) Monographs.
<u>X</u>	_____	By the Occupational Safety and Health Administration (OSHA).

---

## 4. FIRST AID MEASURES

---

### Inhalation:

If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration by qualified personnel. Get immediate medical attention.

### Skin Contact:

Rinse affected area with copious amounts of water followed by washing with soap and water for at least 15 minutes while removing contaminated clothing. Get medical attention, if needed.

### Eye Contact:

Flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Get immediate medical attention.

### Ingestion:

If a large amount is swallowed, get immediate medical attention.

---

## 5. FIRE FIGHTING MEASURES

---

### Fire and Explosion Hazards:

Asbestiform grunerite is a negligible fire hazard.

### Extinguishing Media:

Regular dry chemical. Carbon dioxide. Water. Regular foam.

### Fire Fighting:

If material is involved in a fire, extinguish fire with a medium appropriate for the surrounding fire. Material itself does NOT burn or burns with difficulty. Keep run-off water out of sewers and water sources. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

### Component:

**Asbestiform Grunerite**

### Flash Point:

Not applicable.

### Method Used:

Not applicable.

### Autoignition Temp.:

Not applicable.

### Flammability Limits in Air

#### UPPER (Volume %):

Not applicable.

#### LOWER (Volume %):

Not applicable.

---

## 6. ACCIDENTAL RELEASE MEASURES

---

**Occupational Release:** Do NOT touch or walk through spilled material. Avoid inhalation of asbestos dust (see Section 8, "Exposure Controls and Personal Protection"). Collect small dry spills with a shovel and place material into an appropriate container for disposal. Prevent entry into waterways and sewers. Clean up residue with a HEPA filter vacuum.

**Disposal:** Refer to Section 13, "Disposal Considerations".

---

## 7. HANDLING AND STORAGE

---

**Storage:** Store and handle in accordance with all current regulations and standards.

**Safe Handling Precautions:** See Section 8, "Exposure Controls and Personal Protection".

---

## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

---

**Exposure Limits:** **Asbestiform Grunerite**  
OSHA (PEL): 0.1 fibers/cc TWA  
ACGIH (TLV): 0.1 fibers/cc TWA  
NIOSH: 0.1 fibers/cc recommended TWA (10 h)

**Quartz**

OSHA (PEL): 0.3 mg/m<sup>3</sup> TWA (total dust) 30 mg/m<sup>3</sup>/% SiO<sub>2</sub> + 2, based on size/aerodynamic characteristics)

OSHA (PEL): 0.1 mg/m<sup>3</sup> TWA (respirable dust) 10 mg/m<sup>3</sup>/% SiO<sub>2</sub> + 2, based on size/aerodynamic characteristics)

ACGIH (TLV): 0.025 mg m<sup>3</sup> TWA (respirable dust)

NIOSH: 0.05 mg/m<sup>3</sup> recommended TWA (10 h) (respirable dust)

UK WEL: 0.3 mg/m<sup>3</sup> TWA (respirable particulate) (Chemical Hazard Alert Notice issued).

**Ventilation:** Provide local exhaust ventilation system equipped with a HEPA-filter dust collection system.

**Respirator:** If workplace conditions warrant a respirator's use, a NIOSH/MSHA approved respirator should be used under an implemented respiratory protection program in accordance with OSHA Standard 29 CFR 1910.134 (General Industry, Use of Respirators) and 29 CFR 1910.1001 for occupational exposure to asbestos.

**Eye Protection:** Wear safety goggles. An eye wash station should be readily available near areas of use.

**Personal Protection:** Wear appropriate protective clothing and gloves to prevent skin exposure. Refer to OSHA Regulated Substances: OSHA 29 CFR 1910.1001.

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

---

**Component:** **Asbestiform Grunerite**  
**Appearance:** Fibrous solid to dust-like powder. Grey-brown to light brown. Odorless.  
**Relative Molecular Mass:** Not applicable.  
**Molecular Formula:** Fe<sup>2+</sup><sub>7</sub>(Si<sub>8</sub>O<sub>22</sub>)(OH)<sub>2</sub>  
**Water Solubility:** Insoluble

---

## 10. STABILITY AND REACTIVITY

---

**Stability:**   X   Stable        Unstable

Stable at normal temperatures and pressure.

**Conditions to Avoid:** Avoid generating dust. Keep out of water supplies and sewers.

**Incompatible Materials:** May be attacked by strong acids.

**Fire/Explosion Information:** See Section 5, "Fire Fighting Measures".

---



**Hazardous Decomposition:** Completely decomposes at temperatures of 1 000 °C.

**Hazardous Polymerization:** \_\_\_\_\_ Will Occur                       X  Will Not Occur

---

## 11. TOXICOLOGICAL INFORMATION

---

**Route of Entry:**     X  Inhalation                       X  Skin                       X  Ingestion

**Toxicity Data:**    **Asbestiform Grunerite**  
Rat, Intrapleural TD<sub>LO</sub>: 150 mg/kg

**Tumorigenic, Reproductive, Mutagenic Data:** Asbestiform grunerite has been investigated as a tumorigenic and mutagenic effector.

**Health Effects (Acute and Chronic):** See Section 3: "Hazards Identification" for potential health effects.

---

## 12. ECOLOGICAL INFORMATION

---

**Ecotoxicity Data:** Not available.

---

## 13. DISPOSAL CONSIDERATIONS

---

**Waste Disposal:** Dispose in accordance with all applicable federal, state, and local regulations.

---

## 14. TRANSPORTATION INFORMATION

---

**U.S. DOT and IATA:**    **U.S. DOT and IATA:**    Asbestos; UN2212; Hazard Class 9  
NOTE: This material, as packaged for SRM 1866b, is not subject to the regulations per DOT Special Provision 156 and IATA special Provision A61.

---

## 15. REGULATORY INFORMATION

---

**U.S. Regulations:** CERCLA Sections 102a/103 (40 CFR 302.4): Asbestos: 1 lbs RQ.  
SARA Title III Section 302 (40 CFR 355.30): Not regulated.  
SARA Title III Section 304 (40 CFR 355.40): Not regulated.  
SARA Title III Section 313 (40 CFR 372.65): Asbestos.  
OSHA Process Safety (29 CFR 1910.119): Not regulated.  
SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):  
   ACUTE:    No.  
   CHRONIC:    Yes.  
   FIRE:    No.  
   REACTIVE:    No.  
   SUDDEN RELEASE:    No.

**State Regulations:** California Proposition 65: Asbestos is known to the state of California to cause cancer (Feb. 27, 1987).

**CANADIAN Regulations  
WHMIS Classification:** Not determined for this material.

**EUROPEAN Regulations  
EC Classification (assigned):** T                      Toxic.  
   Carcinogen Category 1

**EC Risk Phrases:** R45                      May cause cancer.  
R23/48                      Toxic: danger of serious damage to health by prolonged exposure through inhalation.

**EC Safety Phrases:** S45                      In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).  
S53                      Avoid exposure.

**National Inventory Status**

**U.S. Inventory (TSCA):** Asbestos: Not listed on inventory.

**TSCA 12(b)**

**Export Notification:** Asbestos: CAS No.: 1332-21-4  
Section 6

---

**16. OTHER INFORMATION**

---

**Sources:** MDL Information Systems, Inc., MSDS *Amosite*, 16 June 2005.

**Disclaimer:** Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.

# MATERIAL SAFETY DATA SHEET

## 1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology  
Standard Reference Materials Program  
100 Bureau Drive, Stop 2300  
Gaithersburg, Maryland 20899-2300

SRM Number: 1866b  
MSDS Number: 1866b  
SRM Name: Common Commercial Asbestos

Date of Issue: 09 January 2007

MSDS Coordinator: Mario Cellarosi  
Telephone: 301-975-6776  
FAX: 301-926-4751  
E-mail: SRMMSDS@nist.gov

Emergency Telephone ChemTrec:  
1-800-424-9300 (North America)  
+1-703-527-3887 (International)

**Description:** Standard Reference Material (SRM) 1866b is a set of three individual commercial-grade asbestos materials: chrysotile, asbestiform grunerite (amosite), and **asbestiform riebeckite (crocidolite)**. A unit of SRM 1866b consists of three bottles, each containing between 1 gram and 3 grams of individual material.

**Substance:** Asbestiform Riebeckite

## 2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS<sup>(a)</sup>

<b>Component:</b>	<b>Asbestiform Riebeckite</b>
<b>Other Designations:</b>	Asbestiform Riebeckite (blue asbestos; crocidolite; asbestos; crocidolite asbestos)
<b>CAS Number:</b>	12001-28-4
<b>EC Number (EINECS):</b>	Not assigned.
<b>SRM Nominal Concentration (% by weight or volume):</b>	> 90
<b>Component:</b>	<b>Magnetite (as an impurity)</b>
<b>Other Designation:</b>	<b>Magnetite</b> (magnetic iron oxide; black iron oxide; magnetic iron ore; lodestone; black ferric oxide)
<b>CAS Number:</b>	1309-38-2
<b>EC Number (EINECS):</b>	215-169-8
<b>SRM Nominal Concentration (% by weight):</b>	< 5
<b>EC Classification:</b>	T Carcinogen Category 1
<b>EC Risk (R No.):</b>	23, 45, 48
<b>EC Safety (S No.):</b>	45, 53

<sup>(a)</sup> Hazardous components 1 % or greater; carcinogens 0.1 % or greater are listed in compliance with OSHA 29 CFR 1910.1200.

## 3. HAZARDS IDENTIFICATION

**NFPA Ratings (Scale 0–4):** Health = 1      Fire = 0      Reactivity = 0

**Major Health Hazards:** Cancer hazard (in humans)

**Potential Health Effects**

**Inhalation:**

Inhalation of riebeckite asbestos dust may be irritating. Symptoms include a cough and chest pain. Chronic exposure may cause asbestosis, interstitial fibrosis of the lung tissue, which may develop within 4 years to 9 years, but onset may be typically delayed 20 years to 40 years after first exposure. Death from asbestosis may be due to respiratory or cardiac failure. Secondary lung infections may also occur. Chronic exposure of asbestos to workers may also cause pleural effusion as early as 3 years to 4 years after initial exposure. Chronic exposure of asbestos to workers also increases the chance of pleural and peritoneal mesotheliomas, bronchogenic carcinoma, lung cancer, and cancers of the gastrointestinal tract and larynx. The latent period for mesothelioma is 3 years to 40 years; for lung cancer, 15 years to 30 years.

**Skin Contact:** Direct contact may cause irritation. Asbestos fibers may penetrate the skin and result in "asbestos corns", due to thickening of the skin around the implanted fiber. These corns usually occur on the hands and forearms, and they disappear on removal of the fibers.

**Eye Contact:** Direct contact may cause irritation with redness due to mechanical action.

**Ingestion:** Acute exposure by cause gastrointestinal irritation. Chronic exposure of asbestos fibers may be involved in cancers of the buccal cavity and pharynx, esophagus, stomach, colon, and rectum.

**Listed as a Carcinogen/  
Potential Carcinogen:**

Yes	No	
<u>X</u>	_____	In the National Toxicology Program (NTP) Report on Carcinogens.
<u>X</u>	_____	In the International Agency for Research on Cancer (IARC) Monographs.
<u>X</u>	_____	By the Occupational Safety and Health Administration (OSHA).

---

#### 4. FIRST AID MEASURES

---

**Inhalation:** If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration by qualified personnel. Get immediate medical attention.

**Skin Contact:** Rinse affected area with copious amounts of water followed by washing with soap and water for at least 15 minutes while removing contaminated clothing. Get medical attention, if needed.

**Eye Contact:** Flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Get immediate medical attention.

**Ingestion:** Get immediate medical attention. If vomiting occurs, keep head lower than hips to prevent aspiration. Give artificial respiration, if not breathing, by qualified personnel.

---

#### 5. FIRE FIGHTING MEASURES

---

**Fire and Explosion Hazards:** Asbestiform Riebeckite

**Extinguishing Media:** Regular dry chemical. Carbon dioxide. Water. Regular foam.

**Fire Fighting:** If material is involved in a fire, extinguish fire with a medium appropriate for the surrounding fire. Material itself does NOT burn or burns with difficulty. Keep run-off water out of sewers and water sources. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

**Component:** Asbestiform Riebeckite

**Flash Point:** Not applicable.

**Method Used:** Not applicable.

**Autoignition Temp.:** Not applicable.

**Flammability Limits in Air**

**UPPER (Volume %):** Not applicable.

**LOWER (Volume %):** Not applicable.

---

#### 6. ACCIDENTAL RELEASE MEASURES

---

**Occupational Release:** Do NOT touch or walk through spilled material. Avoid inhalation of asbestos dust (see Section 8, "Exposure Controls and Personal Protection"). Collect small dry spills with a shovel and place material into an appropriate container for disposal. Prevent entry into waterways and sewers. Clean up residue with a HEPA filter vacuum.

**Disposal:** Refer to Section 13, "Disposal Considerations".

---

## 7. HANDLING AND STORAGE

---

<b>Storage:</b>	Store and handle in accordance with all current regulations and standards. Store in a cool, dry place.
<b>Safe Handling Precautions:</b>	See Section 8, "Exposure Controls and Personal Protection".

---

## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

---

<b>Exposure Limits:</b>	<b>Asbestiform Riebeckite</b> OSHA (PEL): 0.1 fibers/cc TWA ACGIH (TLV): 0.1 fibers/cc TWA NIOSH: 0.1 fibers/cc recommended TWA (10 h)
<b>Ventilation:</b>	Provide local exhaust ventilation system equipped with HEPA-filter dust collection system.
<b>Respirator:</b>	If workplace conditions warrant a respirator's use, a NIOSH/MSHA approved respirator should be used under an implemented respiratory protection program in accordance with OSHA Standard 29 CFR 1910.134 (General Industry, Use of Respirators) and 29 CFR 1910.1001 for occupational exposure to asbestos.
<b>Eye Protection:</b>	Wear safety goggles. An eye wash station should be readily available near areas of use.
<b>Personal Protection:</b>	Wear appropriate protective clothing and gloves to prevent skin exposure. Refer to OSHA Regulated Substances: OSHA 29 CFR 1910.1001.

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

---

<b>Component:</b>	<b>Asbestiform Riebeckite</b>
<b>Appearance:</b>	Fibrous solid to dust-like powder. Blue to purple color. Odorless.
<b>Molecular Formula:</b>	$\text{Na}_2(\text{Fe}^{2+}_3\text{Fe}^{3+}_2)(\text{Si}_8\text{O}_{22})(\text{OH})_2$
<b>Water Solubility:</b>	Insoluble.

---

## 10. STABILITY AND REACTIVITY

---

<b>Stability:</b>	<input checked="" type="checkbox"/> Stable <input type="checkbox"/> Unstable
	Stable at normal temperatures and pressure.
<b>Conditions to Avoid:</b>	Avoid generating dust. Keep out of water supplies and sewers.
<b>Incompatible Materials:</b>	May be attacked by strong acids.
<b>Fire/Explosion Information:</b>	See Section 5, "Fire Fighting Measures".
<b>Hazardous Decomposition:</b>	Completely decomposes at temperatures of 1 000 °C.
<b>Hazardous Polymerization:</b>	<input type="checkbox"/> Will Occur <input checked="" type="checkbox"/> Will Not Occur

---

## 11. TOXICOLOGICAL INFORMATION

---

<b>Route of Entry:</b>	<input checked="" type="checkbox"/> Inhalation <input checked="" type="checkbox"/> Skin <input checked="" type="checkbox"/> Ingestion
<b>Toxicity Data:</b>	<b>Asbestiform Riebeckite</b> Rat, Intraperitoneal LD <sub>50</sub> : 300 mg/kg Rat, Inhalation-Intermittent TC <sub>10</sub> : 7 200 µg/m <sup>3</sup> (6 h – 20 days) Rat, Inhalation-Intermittent TC <sub>10</sub> : 13 600 µg/m <sup>3</sup> (6 h – 5 days)
<b>Tumorigenic, Reproductive, Mutagenic Data:</b>	Riebeckite asbestos has been investigated as a tumorigenic and mutagenic effector.
<b>Health Effects (Acute and Chronic):</b>	See Section 3: "Hazards Identification" for potential health effects.

---

## 12. ECOLOGICAL INFORMATION

---

**Ecotoxicity Data:** Not available.

---

## 13. DISPOSAL CONSIDERATIONS

---

**Waste Disposal:** Dispose in accordance with all applicable federal, state, and local regulations.

---

## 14. TRANSPORTATION INFORMATION

---

**U.S. DOT and IATA:** **U.S. DOT and IATA:** Asbestos; UN2212; Hazard Class 9  
**NOTE:** This material, as packaged for SRM 1866b, is not subject to the regulations per DOT Special Provision 156 and IATA special Provision A61.

---

## 15. REGULATORY INFORMATION

---

**U.S. Regulations:** CERCLA Sections 102a/103 (40 CFR 302.4): Asbestos: 1 lbs RQ.  
SARA Title III Section 302 (40 CFR 355.30): Not regulated.  
SARA Title III Section 304 (40 CFR 355.40): Not regulated.  
SARA Title III Section 313 (40 CFR 372.65): Asbestos.  
OSHA Process Safety (29 CFR 1910.119): Not regulated.  
SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE: No.  
CHRONIC: Yes.  
FIRE: No.  
REACTIVE: No.  
SUDDEN RELEASE: No.

**State Regulations:** California Proposition 65: Asbestos is known to the state of California to cause cancer (Feb. 27, 1987)

### CANADIAN Regulations

**WHMIS Classification:** Not determined.

### EUROPEAN Regulations

**EC Classification (assigned):** T Toxicity.  
Carcinogen Category 1.

**EC Risk Phrases:** R45 May cause cancer.  
R23/48 Toxic: danger of serious damage to health by prolonged exposure through inhalation.

**EC Safety Phrases:** S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).  
S53 Avoid exposure.

### National Inventory Status

**U.S. Inventory (TSCA):** Asbestos: Not listed on inventory.

### TSCA 12(b)

**Export Notification:** Asbestos: CAS No. 1332-21-4  
Section 6

---

## 16. OTHER INFORMATION

---

**Sources:** MDL Information Systems, Inc., MSDS *Crocidolite*, 14 September 2006.

**Disclaimer:** Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.

[HOME](#) > [MSDS LEAD WHITE OIL PAINT](#)

## Lead White Oil Paint

### MSDS Number 820-802

#### Section 1: Product and Company Information

Product Name(s)	<b>Lead White Oil Paint</b>
Product Number(s)	820-802, 820-803
Company	Natural Pigments LLC PO Box 112 Willits, CA 95490 United States of America
Technical Phone	707-459-9998
Fax	408-516-9442

#### Section 2: Composition / Information on Ingredients

Component Name	CAS No.	% Composition Range	OSHA PEL mg/m <sup>3</sup>		ACGIH TLV mg/m <sup>3</sup>		NIOSH mg/m <sup>3</sup>	
			TWA	STEL	TWA	STEL	TWA	STEL
<b>Chemical Formula</b>								
Lead(II) carbonate basic C <sub>2</sub> H <sub>2</sub> O <sub>8</sub> Pb <sub>3</sub>	1319-46-6	70–90%	50 <sup>1</sup>	N.E. <sup>2</sup>	0.05	N.E.	0.05	N.E.

1) Final PELs as listed under Lead, inorganic compounds. 50 mg/m<sup>3</sup> TWA (as Pb); 30 mg/m<sup>3</sup> Action Level (as Pb. Poison - see 29 CFR 1910.10 25) (listed under Lead, inorganic compounds). 2) N.E. = None Established

#### Section 3: Hazards Identification

##### Inhalation

**Acute Health Effects** Inhalation is the main route of lead intoxication. Symptoms which may be experienced from the inhalation of lead dust or fume may not develop quickly, therefore there may be no immediate effects from exposure. Increasing amounts can build up in the body and may reach a point where symptoms and disability occur. The effects of exposure to fumes and dusts of inorganic lead may include decreased physical stamina, fatigue, sleep disturbance, headaches, aching bones and muscles, constipation, abdominal pains and decreased appetite. Inhalation of large amounts may lead to seizures, coma or possibly death.

This product is listed by the EPA (EPA-B2 Sufficient evidence from animal studies; inadequate evidence or no data from epidemiological studies) and IARC (IARC-2B possibly carcinogenic to humans: limited evidence in humans in the absence of sufficient evidence in experimental animals) as a suspected carcinogen.

**Chronic Health Effects** Lead is a cumulative poison. Increasing amounts can build up in the body and may reach a point where symptoms and disability can occur. These may include anemia, pale skin, a blue line at the gum margin, decreased hand-grip strength, abdominal pain, severe constipation, nausea, vomiting, and paralysis of the wrist joint. Prolonged exposure may result in kidney damage. If the nervous system is affected, usually due to very high exposures, the resulting effects include severe headaches, convulsions, delirium, coma, and possibly death. Continuous exposure may result in decreased fertility. Lead is a teratogen. Elevated lead exposure of either parent before pregnancy may increase the chances of miscarriage or birth defects. Exposure of the mother during pregnancy may cause birth defects.

**Aggravation of Pre-existing Conditions** Medical conditions that may be aggravated by exposure: Any previously existing lung or pulmonary condition.

##### Ingestion

**Acute Health Effects** Symptoms which may be experienced from the ingestion of lead dust or fume may not develop quickly, therefore there may be no immediate effects from exposure. Increasing amounts can build up in the body and may reach a point where symptoms and disability may occur. The effects of exposure to fumes and dusts of inorganic lead may include decreased physical stamina, fatigue, sleep disturbance, headaches, aching bones and muscles, constipation, abdominal pains and decreased appetite.

This product is listed by the EPA (EPA-B2 Sufficient evidence from animal studies; inadequate evidence or no data from epidemiological studies) and IARC (IARC-2B possibly carcinogenic to humans: limited evidence in humans in the absence of sufficient evidence in experimental animals) as a suspected carcinogen.

**Chronic Health Effects** Lead is a cumulative poison. Increasing amounts can build up in the body and may reach a point where symptoms and disability can occur. These may include anemia, pale skin, a blue line at the gum margin, decreased hand-grip strength, abdominal pain, severe constipation, nausea, vomiting, and paralysis of the wrist joint. Prolonged exposure may result in kidney damage. If the nervous system is affected, usually due to very high exposures, the resulting effects include severe headaches, convulsions, delirium, coma, and possibly death. Continuous exposure may result in decreased fertility. Lead is a teratogen. Elevated lead exposure of either parent before pregnancy may increase the chances of miscarriage or birth defects. Exposure of the mother during pregnancy may cause birth defects.

**Aggravation of Pre-existing Conditions** Medical conditions that may be aggravated by exposure: None anticipated.

##### Eye Contact

**Acute Health Effects** Exposure to dust may cause irritation.

**Chronic Health Effects** The temporary effects of eye contact or obscured vision due to excessive airborne concentrations may directly impair an individual's ability to locate emergency exits and/or eyewash stations to receive first aid.

Aggravation of Pre-existing Conditions	Medical conditions that may be aggravated by exposure: None anticipated.
<b>Skin Contact</b>	
Acute Health Effects	Skin contact with material may cause irritation.
Chronic Health Effects	No chronic effects are anticipated.
Aggravation of Pre-existing Conditions	Medical conditions that may be aggravated by exposure: None anticipated.
	Health effects described above are based on published scientific information available for review, and evaluated on behalf of this product. Actual signs and symptoms experienced may vary due to conditions at the time of exposure.

#### Section 4: First Aid Measures

After Inhalation	Remove to fresh air. If conscious, have victim clear nasal passages. Restore breathing (e.g., artificial respiration, CPR). Seek medical attention, as necessary, if symptoms develop or persist.
After Skin Contact	Wash area skin with soap and water. Wash clothing before reuse. Call a physician, if irritation occurs.
After Eye Contact	Holding eyelids open, do not allow victim to rub their eyes. Gently flush eyes for 15 minutes with large quantities of water. Seek medical attention if irritation develops or persists.
After Ingestion	Never give anything by mouth to an unconscious person. Get medical aid immediately. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2 to 4 cupfuls of milk or water.

#### Section 5: Fire Fighting Measures

Fire	Not considered to be a fire hazard. Not flammable.
Explosion	Not considered to be an explosion hazard.
Flash Points	Not applicable
Auto-Ignition	Not applicable
Flammable Limits	Not applicable
Extinguishing Media	This material is not combustible and is not anticipated to react with commercially employed extinguishing media. Use appropriate extinguishing media for surrounding fire.
Special Fire Fighting Procedure	As part of responding to any fire, firefighters should wear full turnout gear with a positive pressure demand mode Self-Contained Breathing Apparatus (SCBA). Contain all fire suppression run-off.
Hazardous Thermal Decomposition Byproducts	This product, when heated to decomposition temperature, may emit toxic fumes of lead.
Fire/Explosion Hazards	Incompatible with strong oxidizers, hydrogen peroxide, and active metals, such as sodium and potassium.

#### Section 6: Accidental Release Measures

Spill Procedures	Protect against identified hazards through use of prescribed personal protection equipment, proper work and hygiene practices. Limit foot and vehicular traffic to minimize mechanical agitation and dispersion. Employ a vacuum, equipped with HEPA (High Efficiency Particulate Air) filter, for clean-up of the spill material. If no vacuum is available, use a broom and shovel to collect excess powder in the area. Residual material should then be cleared, utilizing the process of wet sweeping, to avoid dust generation.
Containment Techniques	This is a solid material and will not travel far from the spill location unless mechanically agitated. Therefore, no specific containment techniques are recommended outside of restricting access to the spill location. Lead is considered a hazardous material. During spill cleanup, residual wash waters should be contained and collected for proper disposal. Precautionary measures should be exercised to prevent this substance or associated wash waters from entering the waterways.
Spill Response Equipment	The following equipment is recommended for spill response: <ul style="list-style-type: none"> <li>• vacuum, equipped with a HEPA filter</li> <li>• broom, wet mop</li> <li>• dustpan, shovel, or scoop</li> <li>• bags, drums, or sacks for collection</li> </ul> <p>Note: Non-sparking equipment may be selected, based on location specific requirements and individual work site evaluations.</p>
Personal Protective Equipment	Employees should utilize the following protective equipment when performing spill response activities: <ul style="list-style-type: none"> <li>• gloves (rubber or leather)</li> <li>• cotton or Tyvek coveralls</li> <li>• chemical/safety impact goggles</li> <li>• respiratory equipment recommended in Section 8</li> </ul>

#### Section 7: Handling and Storage

Handling	When handling this product, all personnel are directed to: <ul style="list-style-type: none"> <li>• Wear all specified elements of PPE, as directed by this document, or under location specific requirements, whichever is more conservative.</li> <li>• Avoid creating dust, where possible.</li> <li>• Be familiar with the requirements set forth in the OSHA Lead Standard 29 CFR 1910.1025.</li> </ul>
Storage	The following information provides the appropriate and recommended methods for safe storage and maintenance of product integrity: <ul style="list-style-type: none"> <li>• Store in a cool, dry, well-ventilated area.</li> <li>• Product containers (paper bags, nylon bags, drums, etc.) are prone to physical damage. Care should be taken in storage and handling in order to prevent damage.</li> <li>• Avoid contact with oxidizers and chemically active metals, since violent reactions may occur.</li> </ul>

#### Section 8: Exposure Controls / Personal Protection

Engineering Controls	If user operations generate dusts or fumes, use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. Where any employee is exposed to lead above the permissible limits for more than 30 days per year, the employer shall implement engineering and work practice controls including administrative controls to reduce and maintain employee exposure to lead in accordance with the implementation schedule specified in 29 CFR 1910.1025(e)(1), except to the extent that the employer can demonstrate that such controls are not feasible. Wherever the engineering and work practice controls which can be instituted are not sufficient to reduce employee exposure to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposure
----------------------	---



to the lowest feasible level and shall supplement them by the use of respiratory protection which complies with the requirements of 29 CFR 1910.1025(f).

Respiratory Protection The following NIOSH/MSHA approved respiratory protection is recommended for use in airborne concentrations exceeding the exposure limits identified in this section.

Not in excess of 0.5 mg/m <sup>3</sup> (10 X PEL)	Half mask, air purifying respirator (APR) equipped with P100 filters.
Not in excess of 2.5 mg/m <sup>3</sup> (50 x PEL)	Full facepiece, APR with P100 filters
Not in excess of 50 mg/m <sup>3</sup> (1000 x PEL)	Any powered air purifying respirator with P100 filters or half mask supplied-air respirator operated in positive pressure mode.
Not in excess of 100 mg/m <sup>3</sup> (2000 x PEL)	Supplied-air respirators with full facepiece, hood, helmet, or suit, operated in positive pressure mode.
Greater than 100 mg/m <sup>3</sup> , unknown	Full facepiece, self-contained breathing apparatus operated in concentration or fire fighting, positive pressure mode. Utilization of respiratory equipment should be in accordance with 29 CFR 1910.1025 and 29 CFR 1910.134.

Hand Protection Leather or rubber gloves and full body cotton coveralls are recommended to prevent direct skin contact.

Note: Protective clothing is required if the lead exposure exceeds the PEL or TLV. Full body, cotton or disposable coveralls should be worn during use and handling, be left at the work site and be properly disposed of or laundered after use, with the wash water disposed of in accordance with local, state and federal regulations. Personal clothing should be protected from contamination.

Other: An emergency eye wash is recommended in the work area to offer first aid assistance for incidental contact with eyes. All emergency eye wash stations should, at a minimum, meet requirements as established under ANSI Z.358.1 (latest version) for location, design, and operation.

Eye/Face Protection Chemical/safety impact goggles are recommended to be used where excessive dust concentrations may exist. In situations where respiratory protection is required to be used for excessive dust concentrations, a full-face APR may be used in place of a half-face APR with chemical/safety impact goggles.

Work Hygiene Practices To control potential exposures, avoid creating dust. Always wear appropriate protective equipment when handling lead chemicals. To avoid skin contact, gloves (leather or rubber) should be worn when handling containers of lead chemicals. Do not eat, drink, smoke or apply cosmetics while using/handling lead chemicals. Always wash hands and face after handling lead chemicals. Before using this product, be familiar with the OSHA Standard for Occupational Exposure to Lead, 29 CFR 1910.1025.

- Avoid direct skin contact when possible.
- Do not eat, drink, smoke, or perform other hand-to-mouth activities in product use or handling area.
- Wash thoroughly after handling this product.

## Section 9: Physical and Chemical Properties

Appearance Physical State: Solid  
Color: White  
Form: Powder

Odor Odorless

Molecular Weight 267.2

Ph Value Not applicable.

Boiling Point (at 760 mm Hg) Not applicable.

Melting Point

315° C. (600° F.) ([decomposes](#))

Flash Point Not applicable.

Flammability Not applicable.

Autoignition Temperature Not applicable.

Explosive Properties Not applicable.

Explosion Limits Not applicable.

Vapor Pressure (mm Hg) 10 at 1085° C. (1985° F.)

Vapor Density (Air=1) Not applicable.

Solubility 0.00011g/100ml at 20° C.

Specific Gravity (Water=1) 6.6

Viscosity Not applicable.

Evaporation Rate (BuAc=1) Not applicable.

## Section 10: Stability and Reactivity

Stability Stable under ordinary conditions of use and storage. Stable to 314° C. (599° F.).

Hazardous Oxides of lead.

Decomposition Products

Hazardous Will not occur.

Polymerization

Incompatibilities Reacts violently with hydrogen peroxide and other strong oxidizers to liberate hydrogen gas. Do not heat in the presence of aluminum, sodium metal, or potassium metal.

Conditions to Avoid Incompatible materials and excessive temperatures.

## Section 11: Toxicological Information

Occupationally Relevant Routes of Exposure

Inhalation No quantitative information found.

Ingestion No quantitative information found.

Skin No quantitative information found.

Eye No quantitative information found.

## Section 12: Ecological Information

	Lead and its compounds have been known as metals since ancient times. It occurs widely in the earth's crust and can be dissolved from rocks and minerals into surface waters. Lead and its compounds have a variety of commercial and industrial uses, such as lead pipes, lead-lined containers for corrosive gases and liquids, tetraethyl lead, paint pigments, alloys in metallurgy, storage batteries, ceramics, electronic devices, and plastics.
Acute (short-term) Ecological Effects	Acute toxic effects to excessive concentrations may include death of some animals, birds, or fish, and possible death or low growth rate in some plants. Acute effects are seen two to four days after animals or plants come in contact with a toxic chemical substance. Toxicity to aquatic life is affected by water hardness - the softer the water the greater the toxicity. Lead and its compounds have high acute toxicity to aquatic life. Insufficient data are available to evaluate or predict the short-term effects of lead and its compounds to plants, birds, or land animals.
Chronic (long-term) Ecological Effects	Chronic toxic effects may include shortened lifespan, reproductive problems, lower fertility, and changes in appearance or behavior. Chronic effects can be seen long after first exposure(s) to a toxic chemical. Lead and its compounds have high chronic toxicity to aquatic life. Lead causes nerve and behavioral effects in humans and could cause similar long-term effects in birds and land animals exposed to lead and its compounds.
Water Solubility	Lead and its compounds range in their respective water solubilities from highly soluble to practically insoluble. The solubility of this material in cold water is $6.85 \times 10^{-7}$ g/100cc.
Distribution and Persistence in the Environment	Lead and its compounds are highly persistent in water, with a half-life greater than 200 days. The half-life of a pollutant is the amount of time it takes for one-half of the chemical to be degraded.
Bioaccumulation in Aquatic Organisms	Some substances increase in concentration, or bioaccumulate, in living organisms as they breathe contaminated air, drink contaminated water, or eat contaminated food. These chemicals can become concentrated in the tissues and internal organs of animals and humans. The concentration of lead and its compounds found in fish tissues is expected to be much higher than the average concentration of lead in the water from which the fish was taken.
Permissible Concentration in Water	To protect freshwater aquatic life $e[2.35$ in (hardness) - 9.48] never to exceed $e[1.22$ in (hardness) - 0.47]. To protect saltwater aquatic life 668 $\mu\text{g/l}$ on a acute toxicity basis and 25 $\mu\text{g/l}$ on a chronic basis. To protect humans, maintain water concentrations to less than 50 $\mu\text{g/l}$ .

## Section 13: Disposal Considerations

Physical/Chemical Properties	This material is a stable solid.
Recommended Disposal Method	Where possible, re-blend spilled, unused, or off-specification materials with other suitable materials in support of waste minimization. Where this is not possible, dispose of material according to Federal (country-specific), state, and local requirements.
Empty Containers	This product may be shipped in paper or nylon bags, steel drums, plastic or steel pails, or intermediate bulk containers. All residual material must be emptied and the containers recycled where possible. Where recycling is not possible, containers must be disposed of in accordance with Federal (country-specific), state, and local regulations. If questions exist about disposal, please contact the manufacturer for additional information.

## Section 14: Transportation Information

DOT Shipping Name	Not regulated for domestic transport by land, rail or air.  EXCEPTION: 49 CFR 172.101, Table 1 to Appendix A: If individual packages offered for transport contain in excess of 10 pounds of elemental lead metal smaller than 100 micrometers (0.004 inches) particle size, this material must be reclassified as "Environmentally Hazardous Substances, Solid, N.O.S., 9, UN3077, PG III, RQ (lead metal)."
International Air Transportation (ICAO)	Environmentally Hazardous Substances, Solid, N.O.S., 9, UN3077, PG III, Marine Pollutant (Lead Compounds), ERG 171
Ocean Transportation (IMDG)	Environmentally Hazardous Substances, Solid, N.O.S., 9, UN3077, PG III, Marine Pollutant (Lead Compounds), ERG 171
Emergency Response Guidebook Information	Produced by the US DOT the ERG is designed to aid first responders in quickly identifying specific or generic hazards of materials involved in an incident and protecting themselves and the general public during the initial response phase of an incident.

UN No.	Guide	Name of Materials	ISO	H <sub>2</sub> O React	TIH Gas(es)
34240	152	Lead carbonates, basic or neutral, artificial	No	No	

## Section 15: Regulatory Information

SARA 313 Title III The product or component(s) of the product we sell to you is subject to the reporting requirements of Section 313, Title III of the Superfund Amendments and Re-authorization Act of 1986 (SARA), 40 CFR Part 372.

Product	Chemical	CAS Number	% By Weight
Lead Carbonate	Lead Compounds	598-63-0	0-100

OSHA Status	None of the chemicals in this product are considered highly hazardous by OSHA.
TSCA Chemical Inventory	CAS No. 598-63-0 is on the EPA Toxic Substance Control Act (TSCA) inventory List.
Section 12b	None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule	None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs	None of the chemicals in this material have an RQ.
SARA Codes	CAS No. 598-63-0: immediate, delayed.
SARA Section 302 Extremely Hazardous Substances	None of the chemicals in this product have a TPQ.
Section 313	This material contains Lead carbonate (listed as Lead, inorganic compounds), 100%, (CAS# 598-63-0) which is subject to the reporting

requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act	CAS No. 598-63-0 (listed as "Lead, inorganic compounds") is listed as a Hazardous Air Pollutant (HAP). This material does not contain any Class 1 Ozone depleters. This material does not contain any Class 2 Ozone depleters.
Clean Water Act	CAS No. 598-63-0 (listed as "Lead, inorganic compounds") is listed as a Hazardous Substance under the Clean Water Act. None of the chemicals in this product are listed as Priority Pollutants under the Clean Water Act. CAS No. 598-63-0 is listed as a Toxic Pollutant under the Clean Water Act.
State	CAS No. 598-63-0 can be found on the following state right to know lists: California, (listed as Lead compounds), New Jersey, (listed as Lead compounds), New Jersey, (listed as Lead, inorganic compounds), Pennsylvania, (listed as Lead compounds), Minnesota, (listed as Lead, inorganic compounds), Massachusetts.

**California Proposition 65** **WARNING:** This product contains lead carbonate, listed as "Lead compounds", a chemical known to the state of California to cause cancer.  
**WARNING:** This product contains Lead carbonate, listed as "Lead, inorganic compounds", a chemical known to the state of California to cause developmental reproductive toxicity.  
**California No Significant Risk Level:** None of the chemicals in this product are listed.

#### International Regulations **European Labeling in Accordance with EC Directives**

##### Hazard Symbols:

X N

##### Risk Phrases:

R 22 Harmful if swallowed.

R 33 Danger of cumulative effects.

R 45 May cause cancer.

R 46 May cause heritable genetic damage.

R 60 May impair fertility.

##### Safety Phrases:

S 13 Keep away from food, drink and animal feeding stuffs.

S 20/21 When using do not eat, drink or smoke.

S 24/25 Avoid contact with skin and eyes.

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 28B After contact with skin, wash immediately with plenty of water and soap.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

##### WGK (Water Danger/Protection)

CAS No. 598-63-0: No information available.

##### Canada - DSL/NDSL

CAS No. 598-63-0 is listed on Canada's DSL List.

##### Canadian Ingredient Disclosure List

CAS No. 598-63-0 is listed on the Canadian Ingredient Disclosure List.

WHMIS	This product has a WHMIS classification of D2A. This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.
-------	--

## Section 16: Labeling Information

Product Name	Cerussite
Ingredients	Lead Carbonate
Signal Word	Warning!
Hazard Description	This product contains inorganic lead compounds. When handling contents, do not inhale or swallow. Overexposure through inhalation and/or ingestion could cause damage to the blood or the nervous, digestive, and/or renal systems.
Precautionary Measures	Avoid contact with the skin, eyes, and mucous membranes. Use with adequate ventilation. Wear appropriate personal protective equipment. When handling contents, use NIOSH/MSHA approved respirators, clean protective clothing and gloves. Keep out of reach of children. Keep away from feed and food products. Continued exposure without these precautions could lead to lead poisoning. Wash thoroughly after use.
First aid Procedures	Inhalation: Remove victim to fresh air. Restore breathing if necessary. If conscious, have victim clear nasal passages. Ingestion: If victim is conscious and alert, give large amounts of water and induce vomiting. Eyes: Holding eyelids open, gently flush eyes for 15 minutes with large quantities of water. Do not allow the victim to rub their eyes. Skin: Wash area with soap and water. In all cases of administered first aid, seek medical attention if symptoms develop or persist.
Fire Instructions	This material is not flammable; however, it may contribute toxic fumes of lead if involved in a fire. Select fire extinguishment media for surrounding materials.
Spill or Leak Procedures	Wear appropriate protective equipment. Limit foot and vehicular traffic to minimize agitation and dispersion. Employ a vacuum (equipped with a HEPA filter), broom and shovel, and wet sweeping for spill clean-up. Avoid creating dust. Do not allow this product or run-off to reach waterways.
Handling and Storage Instructions	Wear specified elements of personal protective equipment, as defined in the Material Safety Data Sheet (MSDS), or follow location specific instructions for handling this product. Store in a cool, dry, well-ventilated area. Specific instructions concerning directions for use and handling may be found in the MSDS or may be supplied by the manufacturer.

## Section 17: Other Information

HMIS Ratings	Health: 2 Flammability: 0 Reactivity: 1 Personal Protection: E
Date	15 December 2013
Disclaimer	The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Natural Pigments, LLC shall not be held liable for any damage resulting from handling or from contact with the above product.

Copyright 2005-2007 Natural Pigments, LLC. License granted to make unlimited paper copies for internal use only.

**FOLLOW US ON**



Facebook



RSS Feed



Twitter



Flickr

**NEWSLETTER**

Enter your email address

**ABOUT US**

[About Natural Pigments](#)

[Forum](#)

[Art Materials Resources](#)

[Natural Pigments Events](#)

[Contact Us](#)

**SERVICE & SUPPORT**

[Shipping Policy](#)

[Privacy Policy](#)

[Return Policy](#)

[Health & Safety](#)

[Sitemap](#)

[Mobile site](#)

Copyright © Natural Pigments 2015



# Monsanto

## Material Safety Data

### POLYCHLORINATED BIPHENYLS (PCBs)

Emergency Phone No.  
(Call Collect)  
314-694-1000

---

---

#### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

---

---

PRODUCT NAME: **POLYCHLORINATED BIPHENYLS (PCBs)**  
Aroclor® Series 1016, 1221, 1232, 1242, 1248, 1254, 1260, 1262, 1268  
Therminol® FR Series

MSDS Number: M00018515

Date: 12/95

Chemical Family: Chlorinated Hydrocarbons  
Chemical Name: Polychlorinated biphenyls  
Synonyms: PCBs, Chlorodiphenyls, Chlorinated biphenyls

#### Trade Names/Common Names:

PYRANOL® and INERTEEN® are trade names for commonly used dielectric fluids that may have contained varying amounts of PCBs as well as other components including chlorinated benzenes.

ASKAREL is the generic name for a broad class of fire resistant synthetic chlorinated hydrocarbons and mixtures used as dielectric fluids that commonly contained about 30 - 70% PCBs. Some ASKAREL fluids contained 99% or greater PCBs and some contained no PCBs.

PYDRAUL® is the trade name for hydraulic fluids that, prior to 1972, may have contained varying amounts of PCBs and other components including phosphate esters.

The product names/trade names are representative of several commonly used Monsanto products (or products formulated with Monsanto products). Other trademarked PCB products were marketed by Monsanto and other manufacturers. PCBs were also manufactured and sold by several European and Japanese companies. Contact the manufacturer of the trademarked product, if not in this listing, to determine if the formulation contained PCBs.

In 1972, Monsanto restricted sales of PCBs to applications involving only closed electrical systems, (transformers and capacitors). In 1977, all manufacturing and sales were voluntarily terminated. In 1979, EPA restricted the manufacture, processing, use, and distribution of PCBs to specifically exempted and authorized activities.

**MONSANTO COMPANY, 800 N. LINDBERGH BLVD., ST. LOUIS, MO 63167**

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT  
Call CHEMTREC - Day or Night - 1-800-424-9300 Toll free in the continental U.S., Hawaii, Puerto Rico, Canada, Alaska, or Virgin Islands. For calls originating elsewhere: 202-483-7616 (collect calls accepted)

For additional nonemergency information, call: 314-694-3344.

---

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

---

Chemically, commercial PCBs are defined as a series of technical mixtures, consisting of many isomers and compounds that vary from mobile, oily liquids to white crystalline solids and hard noncrystalline resins. Technical products vary in composition, in the degree of chlorination, and possibly according to batch.

The mixtures generally used contain an average of 3 atoms of chlorine per molecule (42% chlorine) to 5 atoms of chlorine per molecule (54% chlorine). They were used as components of dielectric fluids in transformers and capacitors. Prior to 1972, PCB applications included heat transfer media, hydraulic, and other industrial fluids, plasticizers, carbonless copy paper, paints, inks, and adhesives.

<u>Component</u>	<u>CAS No.</u>
chlorinated biphenyl	1336-36-3
Aroclor 1016	12674-11-2
Aroclor 1221	11104-28-2
Aroclor 1232	11141-16-5
Aroclor 1242	53469-21-9
Aroclor 1248	12672-29-6
Aroclor 1254	11097-69-1
Aroclor 1260	11096-82-5
Aroclor 1262	37324-23-5
Aroclor 1268	11100-14-4

There are also CAS Numbers for individual PCB congeners and for mixtures of Aroclor® products.

PCBs are identified as hazardous chemicals under criteria of the OSHA Hazard Communication Standard (29 CFR Part 1910.1200). PCBs have been listed in the International Agency for Research on Cancer (IARC) Monographs (1987)-Group 2A and in the National Toxicology Program (NTP) Annual Report on Carcinogens (Seventh).

---

## 3. HAZARDS IDENTIFICATION

---

### EMERGENCY OVERVIEW

Appearance and Odor: PCB mixtures range in form and color from clear to amber liquids to white crystalline solids. They have a mild, distinctive odor and are not volatile at room temperature. Refer to Section 9 for details.

**WARNING!**  
**CAUSES EYE IRRITATION**  
**MAY CAUSE SKIN IRRITATION**

**PROCESSING AT ELEVATED TEMPERATURES MAY RELEASE VAPORS OR FUMES WHICH MAY CAUSE RESPIRATORY TRACT IRRITATION**

### POTENTIAL HEALTH EFFECTS

#### Likely Routes

of Exposure: Skin contact and inhalation of heated vapors

Eye Contact: Causes moderate irritation based on worker experience.

Skin Contact: Prolonged or repeated contact may result in redness, dry skin and defatting based on human experience. A potential exists for developing chloracne. PCBs can be absorbed through intact skin.

Inhalation: Due to the low volatility of PCBs, exposure to this material in ambient conditions is not expected to produce adverse health effects. However, at elevated processing temperatures, PCBs may produce a vapor that may cause respiratory tract irritation if inhaled based on human experience.

Ingestion: No more than slightly toxic based on acute animal toxicity studies. Coughing, choking and shortness of breath may occur if liquid material is accidentally drawn into the lungs during swallowing or vomiting.

Other: Numerous epidemiological studies of humans, both occupationally exposed and nonworker environmentally exposed populations, have not demonstrated any causal relationship between PCB exposure and chronic human illnesses such as cancer or neurological or cardiovascular effects. PCBs at high dosage can cause skin symptoms; however, these subside upon removal of the exposure source.

Refer to Section 11 for toxicological information.

---

---

#### 4. FIRST AID MEASURES

---

---

IF IN EYES, immediately flush with plenty of water for at least 15 minutes. If easy to do, remove any contact lenses. Get medical attention. Remove material from skin and clothing.

IF ON SKIN, immediately flush the area with plenty of water. Wash skin gently with soap as soon as it is available. Get medical attention if irritation persists.

IF INHALED, remove person to fresh air. If breathing is difficult, get medical attention.

IF SWALLOWED, do NOT induce vomiting. Rinse mouth with water. Get medical attention. Contact a Poison Control Center. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

NOTE TO PHYSICIANS: Hot PCBs may cause thermal burn. If electrical equipment arcs between conductors, PCBs or other chlorinated hydrocarbon dielectric fluids may decompose to produce hydrochloric acid (HCl), a respiratory irritant. If large amounts are swallowed, gastric lavage may be considered.

---

---

#### 5. FIRE FIGHTING MEASURES

---

---

Flash Point: 284 degrees F (140 degrees C) or higher depending on the chlorination level of the Aroclor product

Fire Point: 349 degrees F (176 degrees C) or higher depending on the chlorination level of the Aroclor product

NOTE: Refer to Section 9 for individual flash points and fire points.

##### Extinguishing

Media: Extinguish fire using agent suitable for surrounding fire. Use dry chemical, foam, carbon dioxide or water spray. Water may be ineffective. Use water spray to keep fire-exposed containers or transformer cool.

PCBs are fire-resistant compounds. They may decompose to form CO, CO<sub>2</sub>, HCl, phenolics, aldehydes, and other toxic combustion products under severe conditions such as exposure to flame or hot surfaces.

Dielectric fluids having PCBs and chlorinated benzenes as components have been reported to produce polychlorinated dibenzo-p-dioxins (PCDDs) and furans (PCDFs) during fire situations involving electrical equipment. At temperatures in the range of 600-650 degrees C in the presence of excess oxygen, PCBs may form polychlorinated dibenzofurans (PCDFs). Laboratory studies under similar conditions have demonstrated that PCBs do not produce polychlorinated dibenzo-p-dioxins (PCDDs).

Federal regulations require all PCB transformers to be registered with fire response personnel.

If a PCB transformer is involved in a fire-related incident, the owner of the transformer may be required to report the incident. Consult and follow appropriate federal, state and local regulations.

Fire Fighting Equipment: Fire fighters and others exposed to products of combustion should wear self-contained breathing apparatus. Equipment should be thoroughly decontaminated after use.

---

## 6. ACCIDENTAL RELEASE MEASURES

---

Cleanup and disposal of liquid PCBs and other PCB items are strictly regulated by the federal government. The regulations are found at 40 CFR Part 761. Consult these regulations as well as applicable state and local regulations prior to any cleanup or disposal of PCBs, PCB items, or PCB contaminated items.

If PCBs leak or are spilled, the following steps should be taken immediately:

All nonessential personnel should leave the leak or spill area.

The area should be adequately ventilated to prevent the accumulation of vapors.

The spill/leak should be contained. Loss to sewer systems, navigable waterways, and streams should be prevented. Spills/leaks should be removed promptly by means of absorptive material, such as sawdust, vermiculite, dry sand, clay, dirt or other similar materials, or trapped and removed by pumping or other suitable means (traps, drip-pans, trays, etc.).

Personnel entering the spill or leak area should be furnished with appropriate personal protective equipment and clothing as needed. Refer to Section 8 for personal protection equipment and clothing.

Personnel trained in emergency procedures and protected against attendant hazards should shut off sources of PCBs, clean up spills, control and repair leaks, and fight fires in PCB areas.

Refer to Section 13 for disposal information and Sections 14 and 15 for information regarding reportable quantity, and Section 7 for marking information.

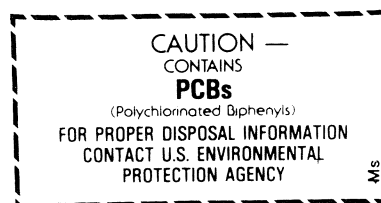
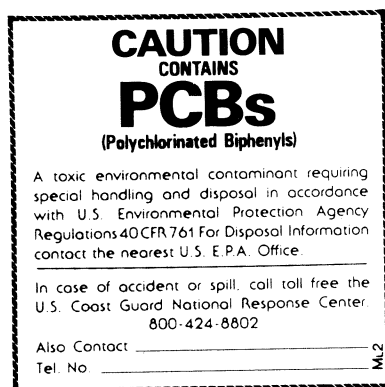
---

## 7. HANDLING AND STORAGE

---

Care should be taken to prevent entry into the environment through spills, leakage, use vaporization, or disposal of liquid or containers. Avoid prolonged breathing of vapors or mists. Avoid contact with eyes or prolonged contact with skin. If skin contact occurs, remove by washing with soap and water. Following eye contact, flush with water. In case of spillage onto clothing, the clothing should be removed as soon as practical, skin washed, and clothing laundered. Comply with all federal, state, and local regulations.

Federal regulations under the Toxic Substances Control Act require PCBs, PCB items, storage areas, transformer vaults, and transport vehicles to be marked (check regulations, 40 CFR 761, for details).



**Storage:** The storage of PCB items or equipment (those containing 50 ppm or greater PCBs) and PCB waste is strictly regulated by 40 CFR Part 761. The storage time is limited, the storage area must meet physical requirements, and the area must be labeled.

**Avoid contact with eyes.**

**Wash thoroughly after handling.**

**Avoid breathing processing fumes or vapors.**

**Process using adequate ventilation.**



---



---

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

---



---

**Eye Protection:** Wear chemical splash goggles and have eye baths available where there is significant potential for eye contact.

**Skin Protection:** Wear appropriate protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine the appropriate type glove for a given application. Wear chemical goggles, face shield, and chemical resistant clothing such as a rubber apron when splashing is likely. Wash immediately if skin is contacted. Remove contaminated clothing promptly and launder before reuse. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling.

ATTENTION! Repeated or prolonged skin contact may cause chloracne in some people.

**Respiratory Protection:** Avoid breathing vapor, mist, or dust. Use NIOSH/MSHA approved equipment when airborne exposure limits are exceeded. Full facepiece equipment is recommended when airborne exposure limits are exceeded and, if used, replaces the need for face shield and/or chemical splash goggles. Consult respirator manufacturer to determine the type of equipment for a given application. The respirator use limitations specified by NIOSH/MSHA or the manufacturer must be observed. High airborne concentrations may require use of self-contained breathing apparatus or supplied air respirator. Respiratory protection programs must be in compliance with 29 CFR Part 1910.134.

ATTENTION! Repeated or prolonged inhalation may cause chloracne in some people.

**Ventilation:** Provide natural or mechanical ventilation to control exposure levels below airborne exposure limits (see below). If practical, use local mechanical exhaust ventilation at sources of vapor or mist, such as open process equipment.

### Airborne Exposure Limits:

**Product:** Chlorodiphenyl (42% chlorine)

OSHA PEL: 1 mg/m<sup>3</sup> 8-hour time-weighted average - Skin\*

ACGIH TLV: 1 mg/m<sup>3</sup> 8-hour time-weighted average - Skin\*

**Product:** Chlorodiphenyl (54% chlorine)

OSHA PEL: 0.5 mg/m<sup>3</sup> 8-hour time-weighted average - Skin\*

ACGIH TLV: 0.5 mg/m<sup>3</sup> 8-hour time-weighted average - Skin\*

\*For Skin notation see Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Government Industrial Hygienists, 1995-1996.

---



---

**9. PHYSICAL AND CHEMICAL PROPERTIES**


---



---

<b>PROPERTIES OF SELECTED AROCLORS<sup>®</sup></b>							
<b>PROPERTY</b>	<b>1016</b>	<b>1221</b>	<b>1232</b>	<b>1242</b>	<b>1248</b>	<b>1254</b>	<b>1260</b>
Color (APHA)	40	100	100	100	100	100	150
Physical state	mobile oil	mobile oil	mobile oil	mobile oil	mobile oil	viscous liquid	sticky resin
Stability	inert	inert	inert	inert	inert	inert	inert
Density (lb/gal 25°C)	11.40	9.85	10.55	11.50	12.04	12.82	13.50
Specific gravity x/15.5°C	1.36-1.37 x-25°	1.18-1.19 x-25°	1.27-1.28 x-25°	1.30-1.39 x-25°	1.40-1.41 x-65°	1.49-1.50 x-65°	1.55-1.56 x-90°
Distillation range (°C)	323-356	275-320	290-325	325-366	340-375	365-390	385-420
Acidity mg KOH/g, maximum	.010	.014	.014	.015	.010	.010	.014
Fire point (°C)	none to boiling point	176	238	none to boiling point	none to boiling point	none to boiling point	none to boiling point
Flash point (°C)	170	141-150	152-154	176-180	193-196	none	none
Vapor pressure (mm Hg @ 100°F)	NA	NA	0.005	0.001	0.00037	0.00006	NA
Viscosity (Saybolt Univ. Sec. @ 100°F) (centistokes)	71-81 13-16	38-41 3.6-4.6	44-51 5.5-7.7	82-92 16-19	185-240 42-52	1800-2500 390-540	— —

NA—Not Available

NOTE: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

---



---

**10. STABILITY AND REACTIVITY**


---



---

Stability: PCBs are very stable, fire-resistant compounds.

Materials to Avoid: None

Hazardous Decomposition

Products: PCBs may decompose to form CO, CO<sub>2</sub>, HCl, phenolics, aldehydes, and other toxic combustion products under severe conditions such as exposure to flame or hot surface.

Hazardous Polymerization: Does not occur.

---



---

**11. TOXICOLOGICAL INFORMATION**


---



---

Data from laboratory studies conducted by Monsanto and from the available scientific literature are summarized below.

Single exposure (acute) studies indicate:

Oral - Slightly Toxic (Rat LD50 - 8.65 g/kg for 42% chlorinated; 11.9 g/kg for 54% chlorinated)

The liquid products and their vapors are moderately irritating to eye tissues. Animal experiments of varying duration and at different air concentrations show that for similar exposure conditions, the 54% chlorinated material produces more liver injury than the 42% chlorinated material.

There are literature reports that PCBs can impair reproductive functions in monkeys. The National Cancer Institute (NCI) performed a study in 1977 using Aroclor 1254 with both sexes of rats. NCI stated that the PCB, Aroclor 1254, was not carcinogenic under the conditions of their bioassay. There is sufficient evidence in the scientific literature to conclude that Aroclor 1260 can cause liver cancer when fed to rodents at high doses. Similar experiments with less chlorinated PCB products have produced negative or equivocal results.

The consistent finding in animal studies is that PCBs produce liver injury following prolonged and repeated exposure by any route, if the exposure is of sufficient degree and duration. Liver injury is produced first, and by exposures that are less than those reported to cause cancer in rodents. Therefore, exposure by all routes should be kept sufficiently low to prevent liver injury.

Numerous epidemiological studies of humans, both occupationally exposed and nonworker environmentally exposed population, have not demonstrated any causal relationship between PCB exposure and chronic human illnesses such as cancer or neurological or cardiovascular effects. PCBs at high dosage can cause skin symptoms; however, these subside upon removal of the exposure source.

PCBs have been listed in the International Agency for Research on Cancer (IARC) Monographs (1987)-Group 2A and in the National Toxicology Program (NTP) Seventh Annual Report on Carcinogens.

## 12. ECOLOGICAL INFORMATION

Care should be taken to prevent entry of PCBs into the environment through spills, leakage, use, vaporization or disposal of liquid or solids. PCBs can accumulate in the environment and can adversely affect some animals and aquatic life. In general, PCBs have low solubility in water, are strongly bound to soils and sediments, and are slowly degraded by natural processes in the environment.

## 13. DISPOSAL CONSIDERATIONS

The disposal of PCB items or equipment (those containing 50 ppm or greater PCBs) and PCB wastes is strictly regulated by 40 CFR Part 761. For example, all wastes and residues containing PCBs (wiping cloths, absorbent material, used disposable protective gloves and clothing, etc.) should be collected, placed in proper containers, marked and disposed of in the manner prescribed by EPA regulations (40 CFR Part 761) and applicable state and local regulations.

## 14. TRANSPORT INFORMATION

The data provided in this section are for information only. Please apply the appropriate regulations to properly classify a shipment for transportation.

DOT Classification:	IF WEIGHT OF PCBs TO BE SHIPPED IS OVER ONE POUND, THE FOLLOWING CLASSIFICATION AND LABEL APPLY.
DOT Label:	LIQUID: Environmentally Hazardous Substance, liquid, n.o.s. (Contains PCB), 9, UN 3082, III
	SOLID: Environmentally Hazardous Substance, solid, n.o.s. (Contains PCB), 9, UN 3077, III
DOT Label:	Class: 9
DOT Reportable Quantity:	One Pound
IMO Classification:	Polychlorinated Biphenyls, IMO Class 9, UN 2315, II IMO Page 9034, EMS 6.1-02
IATA/ICAO Classification:	Polychlorinated Biphenyls, 9, UN2315, II

---

---

## 15. REGULATORY INFORMATION

---

---

For regulatory purposes, under the Toxic Substances Control Act, the term "PCBs" refers to a chemical substance limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances which contain such a substance (40 CFR Part 761).

TSCA Inventory: not listed.

Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370): Immediate, Delayed.  
SARA Section 313 Toxic Chemical(s): Listed-1993 (De Minimis concentration 0.1%.)

Reportable Quantity (RQ) under DOT (49 CFR) and CERCLA Regulations: 1 lb. (polychlorinated biphenyls) PCBs.

Release of more than 1 (one) pound of PCBs to the environment requires notification to the National Response Center (800-424-8802 or 202-426-2675).

Various state and local regulations may require immediate reporting of PCB spills and may also define spill cleanup levels. Consult your attorney or appropriate regulatory officials for information relating to spill reporting and spill cleanup.

---

---

## 16. OTHER INFORMATION

---

---

Reason for revision: Conversion to the 16 section format. Supersedes MSDS dated 10/88.

Therminol®, Aroclor® and Pydraul® are registered trademarks of Monsanto Company  
Pyranol® is a registered trademark of General Electric Company  
Inerteen® is a registered trademark of Westinghouse Electric Corporation

FOR ADDITIONAL NONEMERGENCY INFORMATION, CONTACT:

Gary W. Mappes  
Manager, Product & Environmental Safety

Robert G. Kaley, II  
Director, Environmental Affairs

Monsanto Company  
800 North Lindbergh Boulevard  
St. Louis, MO 63167  
(314) 694-3344

---

---

Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be correct as of the date hereof, Monsanto Company makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will Monsanto Company be responsible for damages of any nature whatsoever resulting from the use of or reliance upon Information. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

---

---