



Stantec Consulting Services Inc.
12075 Corporate Parkway, Suite 200 Mequon WI 53092

July 6, 2016

Attention: Mr. John W. Peterson

Project Officer
Brownfields & NPL Reuse Section #1
USEPA Region 5
77 West Jackson Blvd
Chicago, Illinois 60604-3504

**Reference: Site Specific Sampling and Analysis Plan
Building Condition Assessment, Geophysical Survey, Tunnel Assessment, and
Pre-Demolition Lead-Based Paint, Asbestos, and Hazardous Material Survey,
1512 Washington Street
Manitowoc, Wisconsin
USEPA Cooperative Agreement No. BF-00E01529-0
Stantec Project No. 193703139**

Dear Mr. Peterson:

As recommended in the Stantec Consulting Services (Stantec) 2016 *Phase I ESA*, and on behalf of the City of Manitowoc (City), Stantec has prepared this site specific sampling and analysis plan and associated site-specific health and safety plan (provided in Attachment A) for: a building condition assessment; a geophysical survey; a subsurface tunnel assessment; and a pre-demolition lead-based paint, asbestos, and hazardous material survey at the vacant multi-story partially-demolished former industrial buildings located at 1512 Washington Street in the City of Manitowoc, Wisconsin (Site). The location of the Site is illustrated on Figure 1 and the orientation of Site buildings illustrated on Figure 2. Potential subsurface features of concern are illustrated on Figure 3. This work will be completed utilizing Brownfield site assessment grant funds provided to the City by the United States Environmental Protection Agency (USEPA) in 2015 under cooperative agreement no. BF-00E01529-0 pursuant to the eligibility determination granted for the Site on June 23, 2016.

BACKGROUND

The vacant multi-story partially-demolished former industrial buildings currently located at 1512 Washington Street were developed for industrial use in the manufacturing of aluminum goods by 1906 with additional redevelopment occurring between 1912 and 1927 and again between 1927 and 1956. EJ Spirtas Manitowoc, LLC purchased the property in 2006 and subsequently razed the 3-story facility previously located on the northeast corner of the property and several smaller buildings in March 2014; however the Wisconsin Department of Natural Resources (WDNR, 2016) noted the demolition was not completed as demolition waste was left onsite. EJ Spirtas Manitowoc, LLC continued partial demolition of the remaining multi-story former industrial buildings to remove recyclables (i.e. copper pipes, scrap metal, wooden floors, etc.). To prevent unsafe work practices, the City placed a "stop work" order on the property on January 22, 2015.

To facilitate investigation, remediation, demolition, and redevelopment of this massive blighted property, the City of Manitowoc Community Development Authority (CDA) acquired the property by condemnation and is beginning the planning process to abate the remaining asbestos, remove remaining hazardous materials, and raze the multi-story industrial buildings to



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complete phase two of the cleanup originally agreed to between EJ Spirtas Manitowoc, LLC and the USEPA.

PROBLEM STATEMENT

EJ Spirtas Manitowoc, LLC partially demolished portions of the remaining buildings primarily to facilitate removal of recyclable materials of value. Although the structural integrity of the buildings remains unconfirmed, it is known that large portions of the floors have been cut open, exterior and interior walls demolished, and columns potentially removed. Hastily conducted demolition likely rendered portions of the building structurally unsafe for occupancy which could pose a significant challenge and safety threat during completion of the proposed pre-demolition lead-based paint, asbestos, and hazardous material survey, abatement/removal of remaining hazardous materials from the building, and building demolition. As recommended in the Stantec (2016) Phase I ESA, a structural condition assessment must be completed prior to initiation of Site work to identify site conditions that could significantly limit the ability to properly and safely identify and abate remaining asbestos and remove additional remaining hazardous materials from the building. Although the primary purpose for the structural condition assessment is related to safely identifying and abating/removing hazardous materials, the information will be leveraged by contractors to identify critical structural aspects that will need to be precisely managed/controlled during demolition. Completion of the proposed structural condition assessment to evaluate the structural integrity of the buildings will be conducted by Phil Caswell, P.E. of Stantec (resume provided in Attachment B).

The Stantec (2016) Phase I ESA notes an apparent discrepancy in information provided in previous investigations (ES&T (2005) *Phase II ESA* and AECOM (2009) *Phase I ESA*) and the Wisconsin Underground Storage Tank (UST) database regarding the number/location of USTs remaining at the Site. The Stantec Phase I ESA also notes the likely presence of additional potential source areas reportedly abandoned in place (i.e. filled in vaults, pits, etc.). In addition to buried utilities, the presence of abandoned subsurface features poses a significant obstacle to assessment activities at the Site. Therefore, the Stantec (2016) Phase I ESA recommends conducting a geophysical survey at the Site as the first step in evaluating this Recognized Environmental Condition (REC 3.)

As illustrated on Figure 3, the Stantec (2016) Phase I ESA notes the presence of a subsurface tunnel network beneath the Site. Prior assessment of the tunnel network has been limited due to access restrictions and lack of electrical power in the tunnels. However, ES&T (2005) and STN (2009) note apparent releases into the tunnel network (REC 6) and the presence of asbestos in the tunnels. To address this REC, the Stantec Phase I ESA recommends mapping the tunnel network during the geophysical survey and evaluating the tunnel network as a potential release area, potential migration corridor, and potential structural obstacle to building demolition. Completion of a subsurface tunnel assessment is warranted to gather information on air quality, and significant obstructions inside the network to plan for tunnel entry during the pre-demolition



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lead-based paint, asbestos, and hazardous material survey and by staff in the future to evaluate apparent releases to the tunnel system.

A building inspection report was completed in December 2009 by STN Environmental JV (STN) under the Targeted Brownfields Assistance (TBA) program from USEPA. The report identified building materials and equipment requiring special handling and disposal as part of building demolition activities, which included a large quantity of asbestos, lead-based paint, light fixture ballast, dielectric fluids, mercury-containing light bulbs and switches, Freon-containing equipment, (possible) ash in floors used for insulation, and additional hazardous substance containers/drums. Documentation suggests some of these materials have been removed; however, recent unpublished work suggests a release of asbestos (and potentially lead-based paint) to soil and the adjacent rights-of-way (REC 4). The Stantec (2016) Phase I ESA recommends an updated pre-demolition lead-based paint, asbestos, and hazardous material survey to further evaluate this REC. The objectives of the survey will be to:

- Confirm the location, types, and quantities of remaining asbestos containing materials and hazardous materials identified in 2009 by STN,
- Determine the location, types, and quantities of suspect asbestos containing materials and hazardous materials not identified in the 2009 (STN) report, and
- Identify, catalog, delineate areas of stained concrete/wood floors (REC 5) for further evaluation/characterization prior to removal.

The proposed pre-demolition lead-based paint, asbestos, and hazardous material survey will comply with the Occupational Safety and Health Administration (OSHA) Asbestos Construction Standard found in Title 29 of the Code of Federal Regulations, Part 1926.1101, the OSHA Lead Exposure in Construction Standard, and WDNR and Wisconsin Department of Health Services requirements for inspection of building materials prior to renovation and/or demolition under the National Emissions Standards for Hazardous Air Pollutants. The survey, including the sampling of building materials for lead-based paint and asbestos, will be completed by Justin Gloede and/or Larry Pawlus of NorthStar Environmental Testing, LLC (NorthStar). Detailed information regarding the proposed work is provided below.

PROPOSED STRUCTURAL CONDITION ASSESSMENT

Hastily conducted demolition by EJ Spirtas Manitowoc, LLC likely rendered portions of the building structurally unsafe which could pose a significant challenge and safety threat during removal of remaining hazardous materials from the building. Therefore, a structural condition assessment to evaluate the integrity of the buildings is warranted to identify site conditions that could significantly limit the ability to properly and safely identify and abate remaining asbestos, and remove additional remaining hazardous materials from the Site. A site-specific health and safety plan for use during the building condition assessment is included in Attachment A. Although the primary purpose for the structural condition assessment is related to abatement,



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the information will be leveraged by contractors to identify critical structural aspects that will need to be precisely managed/controlled during building demolition.

The proposed scope of the structural condition assessment will include the tasks described in Attachment C. This scope will be completed by Phil Caswell, P.E. of Stantec and consist of a visual walk-through inspection of the building, noting and photographing observations. Areas or features showing visible signs of distress, cracking, sagging, material loss (e.g. rust or rot), etc. will be identified and noted. Special attention will be paid to missing/demolished structural components (i.e. walls/columns/beams) that could pose a significant limitation/challenge during abatement/demolition.

PROPOSED GEOPHYSICAL SURVEY

Subsurface anomalies (i.e. buried pits, vaults, USTs, utilities, tunnel network, etc.) may be present onsite that could pose a significant risk to conducting assessment and demolition activities at the property. Therefore, a geophysical survey using ground penetrating radar (GPR) survey techniques is warranted. Ground Penetrating Radar Systems, Inc (GPRS; Oconomowoc, Wisconsin) will be retained to complete the GPR survey at the Site using a Geophysical Survey Systems Inc SIR-3000 GPR Radar unit with a 400 MHz antenna and RD 4000 Radiofrequency Detection System. GPR survey data will be generated and interpreted in real-time using Radan Version 6.6 software. The GPR survey will be completed using a grid-pattern with adjacent scans no more than three feet apart. Where access is limited, scanning will be performed in as complete a manner as possible. The GPR survey will be extended approximately 10-20 feet into the adjacent rights-of-way to confirm USTs illustrated on Figure 3 have been removed from the Site. A geodetic survey will be completed per Stantec SOP-15 to document the locations, extents, and depths of identified anomalies relative to the ground surface.

PROPOSED SUBSURFACE TUNNEL ASSESSMENT

Entry into the tunnel system and completion of an assessment of the subsurface tunnel system will be completed by Veolia ES Industrial Services, Inc. (Veolia; Germantown, Wisconsin). Using permit-required confined space entry techniques under supplied air, teams will enter the tunnel network through identified entrances and traverse the tunnel lengths. Air quality inside the tunnel network will be continuously monitored with a four-gas meter (Oxygen, Carbon Monoxide, Hydrogen Sulfide, and Lower Explosive Limit), hydrogen cyanide meter, and a photo-ionization detector (PID). Entry staff will maintain constant communication with the aboveground support team through 2-way radios.

During future work, the structural condition assessment will be extended into the tunnel network to determine if significant structural liabilities are present that will pose a challenge to abatement of asbestos, demolition of the remaining buildings, and future remediation and demolition of the tunnels and other subgrade structures/appertenances.



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PROPOSED PRE-DEMOLITION LEAD-BASED PAINT, ASBESTOS, AND HAZARDOUS MATERIAL SURVEY

If the building condition assessment identifies conditions that could significantly limit the proposed pre-demolition lead-based paint, asbestos, and hazardous material survey, this site specific sampling and analysis plan may require revision. The proposed survey described in this sampling and analysis plan is designed to characterize the types, quantities, and location of asbestos containing materials, lead-based paint, and other hazardous materials currently present in the buildings. In combination with the structural condition assessment of the building, the proposed survey will assist in developing a plan to abate/remove these materials prior to building demolition.

A pre-demolition lead-based paint, asbestos, and hazardous material survey of each building will be performed by Justin Gloede and/or Larry Pawlus of NorthStar to establish baseline conditions at the building to plan for abatement and building demolition. NorthStar's survey will:

- Confirm the location, types, and quantities of remaining asbestos containing materials and hazardous materials identified in 2009 by STN,
- Determine the location, types, and quantities of suspect asbestos containing materials and hazardous materials not identified in the 2009 (STN) report, and
- Identify, catalog, delineate areas of stained concrete/wood floors for further evaluation/characterization prior to removal

Please note that the threshold for classifying "lead-based paint" has changed since the 2009 TBA survey. Therefore, the NorthStar survey will include a detailed/updated evaluation of remaining painted surfaces.

The proposed survey will utilize Stantec SOP-06 (*Asbestos Bulk Sample Collection*), SOP-12 (*Paint Chip Sample Collection*), and SOP-25 (*Measurement of Lead in Painted Surfaces with Portable Energy Dispersive X-Ray Fluorescence Spectrometry*) which were included in the Stantec (2015) Quality Assurance Project Plan. During the survey, the inspector will obtain information to evaluate the presence and suspected location/quantity of suspected asbestos, lead-based paint, and hazardous substances. The inspector will visually assess all areas within the building for suspect materials and inventory the results using a room by room format. Suspect materials will be categorized and quantified.

The survey will also include identifying/delineating/cataloging areas of staining using a room by room format for further evaluation at a later date.

ASBESTOS AND PAINT SAMPLE COLLECTION

Based on their professional judgement, Justin Gloede and/or Larry Pawlus of NorthStar will collect bulk samples of suspect asbestos containing materials to confirm/determine the location and quantities of remaining asbestos containing materials, following Stantec SOP-06, and submit



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samples to CEI Labs, Inc. (Cary, NC) under chain of custody procedures for laboratory analysis. In addition to evaluating a bulk sample for layers, regulatory procedures require that a confirmatory "Point Counting" test be performed on all samples resulting in an initial positive PLM result of <1% asbestos content. Therefore, sample results will be provided for each distinct layer of each sample submitted for analysis.

The total number of samples to be collected and submitted for laboratory analysis will depend on Site conditions, which remain largely unknown. The following guide will be used to determine the approximate quantity of samples submitted for laboratory analysis.

| | |
|--|--|
| Surface material (<1,000 square feet): | At least 3 samples |
| Surface material (1,000 to 5,000 square feet): | At least 5 samples |
| Surface material (>5,000 square feet): | At least 7 samples |
| Thermal system insulation: | At least 3 samples |
| Other materials: | A sufficient number to evaluate material |

Of particular note, the STN (2009) report identified 32,000 square feet of asbestos-containing mastic on the exterior of the 6-story building. This material appears to have become friable; therefore, during this survey, NorthStar will collect additional samples of the mastic material to further evaluate current Site conditions.

The concentration of lead in painted surfaces will be measured with a portable energy-dispersive x-ray florescent spectrometer per Stantec SOP-25 by Justin Gloede and/or Larry Pawlus of NorthStar. Confirmation paint chips will be collected by Justin Gloede and/or Larry Pawlus of NorthStar at a rate of no less than 1:50 per the requirements of Stantec SOP-25 using procedures outlined in Stantec SOP-12 and submitted to Legend Technical Services, LLC under chain of custody procedures for laboratory analysis. Representative testing locations will be chosen for each type of painted substrate within each area of the buildings.

DATA EVALUATION AND REPORT

A written summary report will be prepared and include the following:

- Structural concerns with the building and suggested approaches for safely/properly conducting the pre-demolition lead-based paint, asbestos, and hazardous material survey,
- Structural concerns with the building and suggested approaches for safely/properly conducting abatement at the Site.
- Structural concerns with the building and suggested approaches for safely/properly conducting demolition of Site buildings.



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- The locations, depths, and extents of subsurface anomalies consistent with potential release areas (i.e. USTs, Pits, Vaults, etc.) and the subsurface tunnel network.
- Summary of air-quality data and significant obstructions inside the tunnel network.
- A tabular list of all suspect materials identified in the buildings, including estimated quantities, condition, and friability of each type of material on a room by room basis,
- A site diagram with building sketches showing homogeneous sampling areas and sampling locations,
- A copy of the inspector's certifications,
- A copy of the laboratory's current certification,
- Copies of the sample chain-of-custody form(s) and laboratory reports, and
- Recommendations and cost estimates for abatement.

SCHEDULE

The proposed building condition assessment is tentatively scheduled to be conducted the week of July 18, 2016 and is expected to take two days to complete. A preliminary report will be prepared within 2 days of the Site visit and will be provided to Veolia, GPRS, and NorthStar to confirm the proposed work can be safely completed. The geophysical survey and subsurface tunnel assessment are tentatively scheduled to be conducted the week of July 25th and are expected to take one to two days to complete. A preliminary report on the tunnel assessment and GPR survey will be provided to Northstar to confirm the proposed survey can be safely completed. The pre-demolition lead-based paint, asbestos, and hazardous material survey is scheduled to be conducted the week of August 1, 2016 and is expected to require three days to complete. The final report documenting the results of these investigations will be available within 10 calendar days of the receipt of the laboratory data and documentation from Veolia, GPRS, and NorthStar.

Future work targeting Recognized Environmental Condition (REC) 5 of the Stantec (2016) Phase I ESA to characterize and delineate impacts to building materials (i.e. concrete, wood floors, etc.) will be described in a future sampling and analysis plan. Continued delineation of documented residual impacts to soil and groundwater (REC 2) will be conducted following building demolition and will be described in a future sampling and analysis plan.

LIMITATIONS

Stantec's observations, findings, and opinions should not be considered as scientific certainties, but only as opinion based on our professional judgment concerning the significance of the data reviewed in developing this site specific sampling and analysis plan. Specifically, Stantec cannot represent that the Site does not contain any hazardous or toxic materials or other latent conditions beyond that observed by Stantec during the course of the investigation. Additionally, due to limitations of this investigation process and the necessary



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use of data furnished by others, Stantec and its subcontractors cannot assume liability if actual conditions differ from the information presented in this report.

We trust this information meets your needs. Please feel free to contact me at 414-581-6476 if you have any questions or concerns.

STANTEC CONSULTING SERVICES INC.

A handwritten signature in blue ink that reads "Harris L. Byers".

Harris L. Byers
Brownfields Project Manager
Harris.Byers@stantec.com
(414) 581-6476

STANTEC CONSULTING SERVICES INC.

A handwritten signature in blue ink that reads "Hiedi Ann Waller".

Hiedi A. Waller, P.E.
Environmental Engineer
Hiedi.Waller@stantec.com

STANTEC CONSULTING SERVICES INC.

A handwritten signature in blue ink that reads "Richard J. Binder".

Richard J. Binder, P.G., CPG
QA/QC Manager
Rick.Binder@stantec.com

Enclosures:

Figures

Attachments: A - Health and Safety Plan
B - Resume of Phil Caswell, P.E. of Stantec
C - Structural Condition Assessment Scope of Services

FIGURES

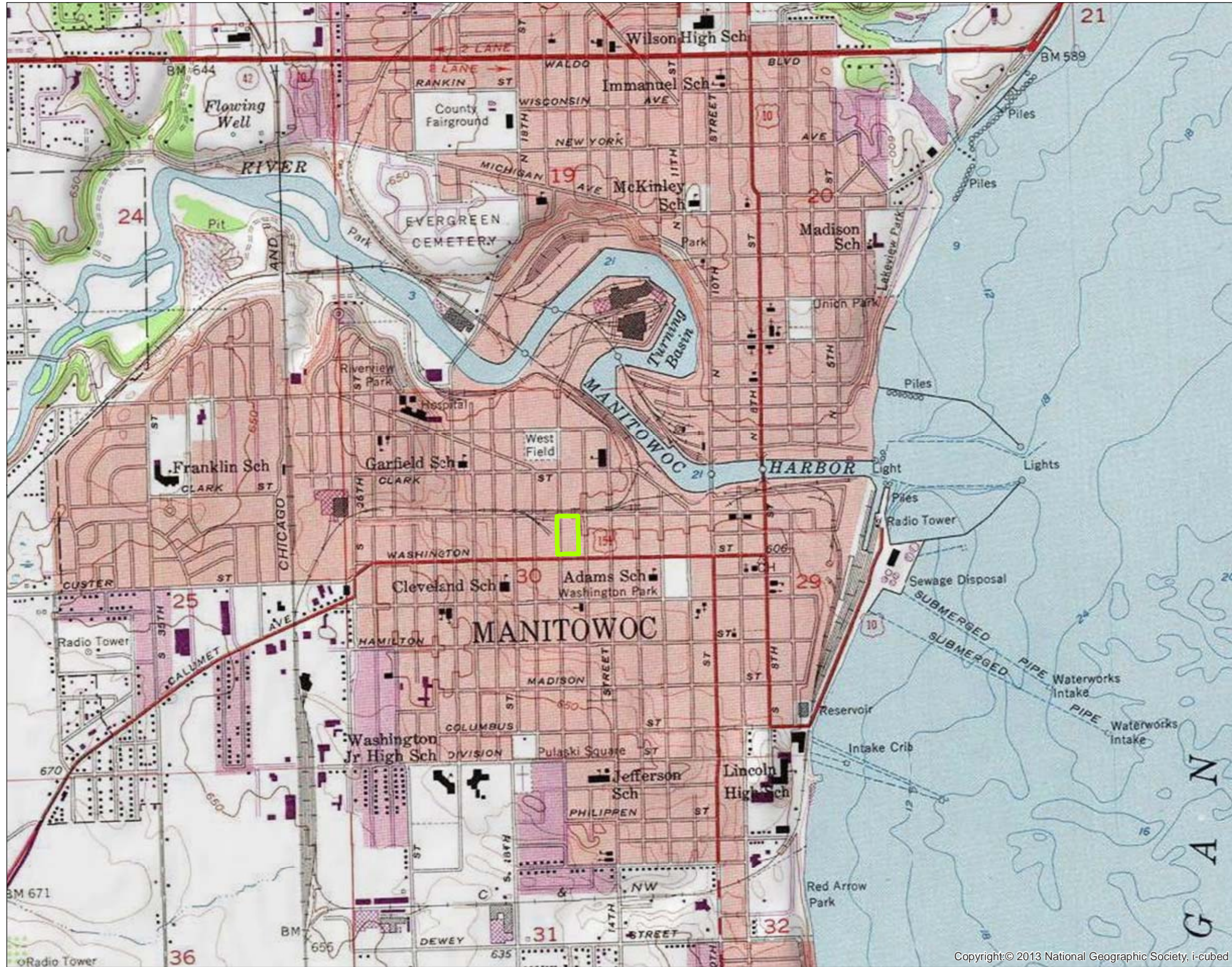
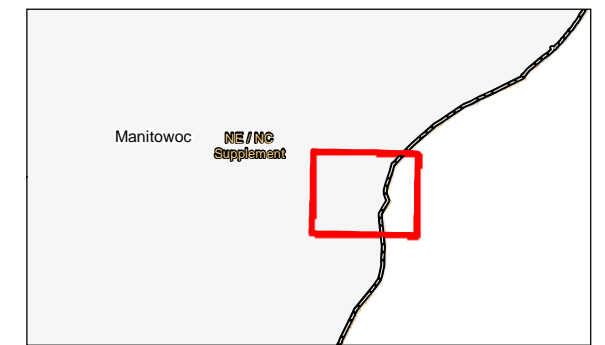


Figure No. 1
 Title **Figure 1 Site Location and USGS Topo Map**
 Client/Project
 City of Manitowoc
 USEPA Brownfield Assessment Grant
 Hazardous Substances
 0 1,050 2,100 Feet
 1937003931
 Prepared by HLB on 5-24-16

Legend
 Target Site



Notes
 1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803
 2. Feet
 3. Data Sources Include:



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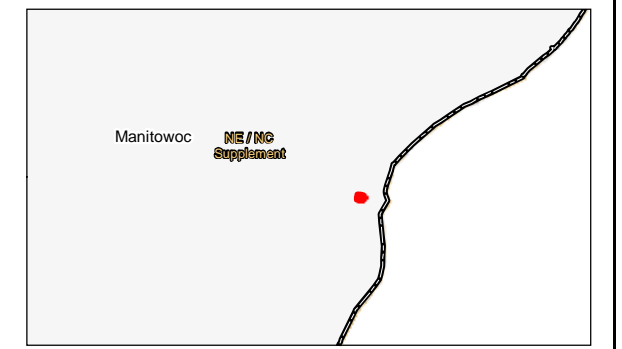
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Figure No. **2**
 Title **Figure 2
 Basemap and 2014 Ortho**
 Client/Project
 City of Manitowoc
 USEPA Brownfield Assessment Grant
 Hazardous Substances
 0 65 130 Feet
 1937003931
 Prepared by HLB on 5-24-16

Legend
 Target Site
 Parcels

- Notes
 1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803
 2. Feet
 3. Data Sources Include:
 Orthophotography: 2014 City of Manitowoc



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 Revised: 2016-05-24 By: bbyr

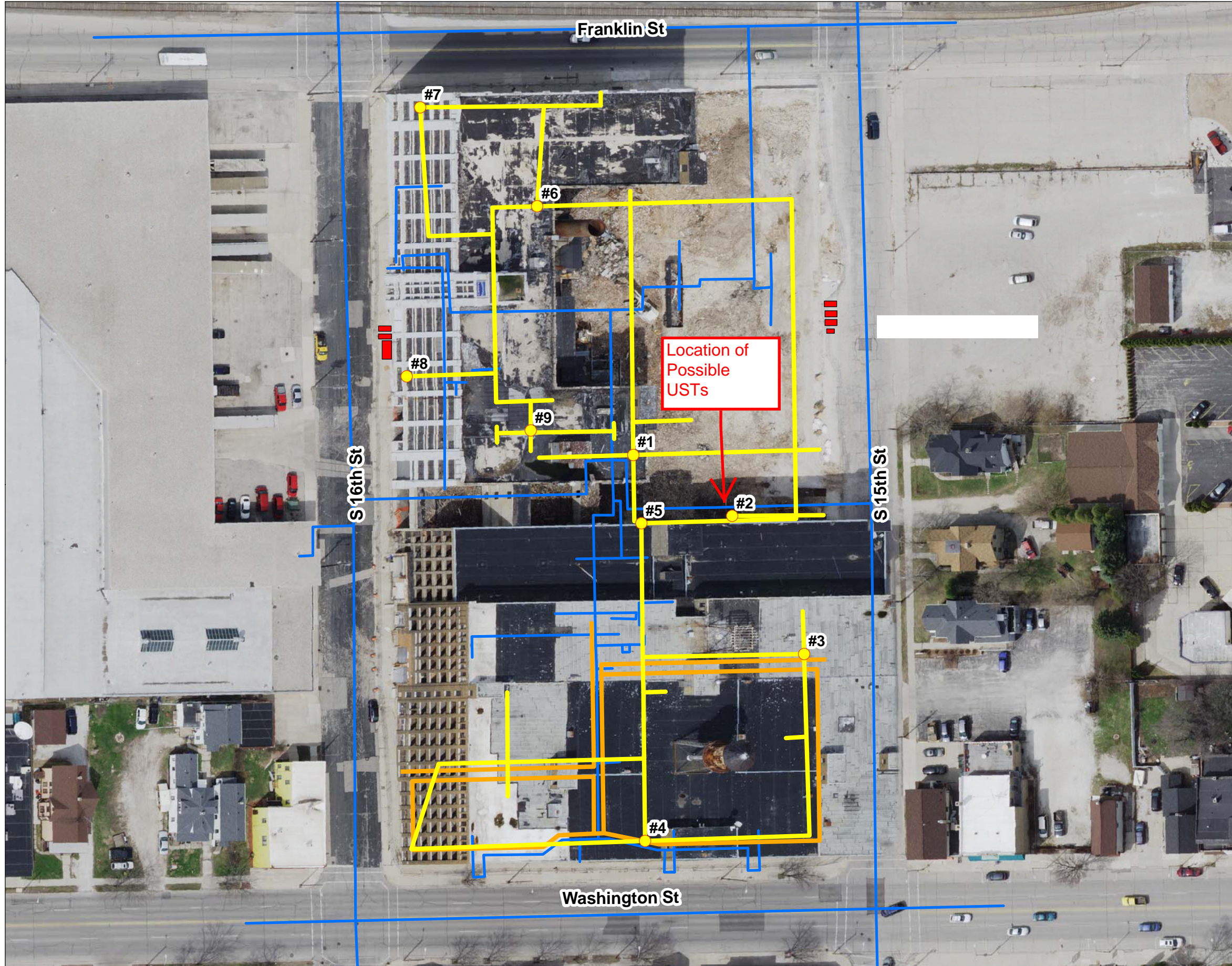
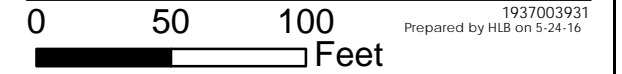


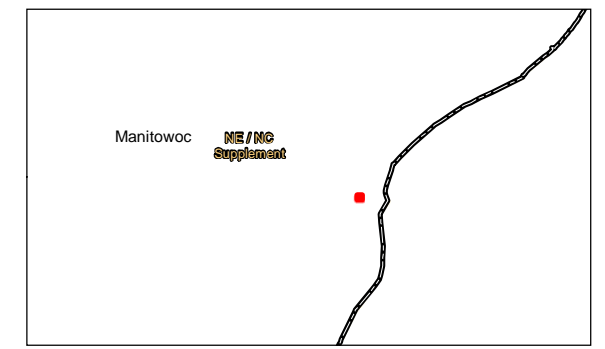
Figure No. **3**
 Title **Figure 3 Subsurface Tunnel Network and USTs (ca. 1959)**

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



Legend

- Tunnel Entrance (2015 Sketch)
- Tunnels (2015 Sketch)
- Concrete Tunnel (1959 Plan Set)
- Water (1959 Plan Set)
- USTs (1959 Plan Set)



Notes
 1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803
 2. Feet
 3. Data Sources Include:
 Orthophotography: 2014 City of Manitowoc



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ATTACHMENT A

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

July 6, 2016
Project Number 193703931



SITE- SPECIFIC HEALTH AND SAFETY PLAN

1512 West Washington Street
Manitowoc, Wisconsin

July 6, 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

A handwritten signature in blue ink that reads "Harris L. Byers". To the right of the signature is a horizontal line for a signature mark.

Brownfields Project Manager

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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 structural integrity of 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 the structural condition assessment as outlined in the Site-Specific Sampling and Analysis Plan (SSSAP). The Stantec Regional Safety and Environmental Coordinator (Fred Miller, CSP) has determined the structural condition assessment does not constitute work covered by 29 CFR 1910.

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 |
| Phil Caswell | Structural Engineer | Engineer and Site-Safety Officer |

7. Plan Prepared by: Harris Byers Date: 7/6/2016
8. Plan Reviewed by: Richard J. Binder, P.G. Date: 7/6/2016

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 complete a structural condition assessment to identify structural concerns with the building to further plan for inspection/abatement/removal of hazardous materials (including asbestos) prior to 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"/> Tyvex™ Suit** |
| | <input checked="" type="checkbox"/> Latex Gloves |
| | <input checked="" type="checkbox"/> Steel Toe Boots |
| | <input checked="" type="checkbox"/> Boot Covers** |
| <input checked="" type="checkbox"/> Other (describe) <u>Vacant multi-floor former industrial building with possible structural issues</u> | |

Estimated days on site: three days

* If particulates/dust is visible in the air, a half-faced respirator may be worn for comfort.

** If significant dust is present, a Tyvek suit and boot covers may be worn as an additional level of protection

4.0 Contaminant/Chemical Hazard Assessment

- The purpose of the investigation is to determine the magnitude and extend of asbestos, lead based-paint (LBP), and/or hazardous substances in building materials found within the properties. The purpose of this work is also to identify structural concerns with the building that may limit the ability to safely abate/remove remaining hazardous materials from the Site. The following assessment is related to on-site substances which may potentially be encountered.

| SUBSTANCE | MAXIMUM CONCENTRATION (UNITS) | MEDIUM ^{1,2} | PEL/TLV (PPM) ³ | CANCER STATUS ⁴ | ROUTE ⁵ |
|-----------|--|-----------------------|----------------------------|----------------------------|--------------------|
| 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 |

¹Environmental 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.

²List the maximum concentration for each medium separately

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

⁴Cancer 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.

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

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

None Expected

5.0 Physical Hazard Assessment

FLAMMABILITY/EXPLOSIVE

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 will be 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

The Stantec Regional Safety and Environmental Coordinator (Fred Miller, CSP) has determined the structural condition assessment does not constitute work covered by 29 CFR 1910. Therefore, 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.

| PROJECT TASK | LEVEL OF PROTECTION HAZ. WASTE & NON-HAZ. SITE (A, B, C, D, [OTHER SPECIFY BELOW])¹ |
|---------------------|---|
|---------------------|---|

| | |
|--|--------------------------|
| <u>Structural Condition Assessment</u> | <u>Modified Level D*</u> |
|--|--------------------------|

¹ See Attachment C for PPE description by level

* If particulates/dust is visible in the air, a half-faced respirator may be worn for comfort. If significant dust is present, a Tyvek suit and boot covers may be worn as an additional level of protection.

7.0 Medical Requirements

The Stantec Regional Safety and Environmental Coordinator (Fred Miller, CSP) has determined the structural condition assessment does not constitute work covered by 29 CFR 1910. Therefore, 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

The Stantec Regional Safety and Environmental Coordinator (Fred Miller, CSP) has determined the structural condition assessment does not constitute work covered by 29 CFR 1910.

Should Site conditions change, 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 |
|-------------------|------------|--------------------------|--------------------|
| None Anticipated | | | |
| | | | |

SURVEILLANCE METHODS

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

None anticipated

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 |
| Phil Caswell | 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 (2nd or 3rd 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 | 911 |
| * Hospital Emergency Center | (920) 433-0111 |
| * Hospital Life Line | NA |
| * Hospital Poison Center | NA |
| * Local Police | (920) 448-3200 or 911 |
| * County Sheriff | (920) 448-4200 |
| * State Police | (920) 448-4200 |
| * Fire Department | (920) 448-3280 or 911 |
| * Explosives Disposal Unit | NA |
| * Radio Channel | NA |

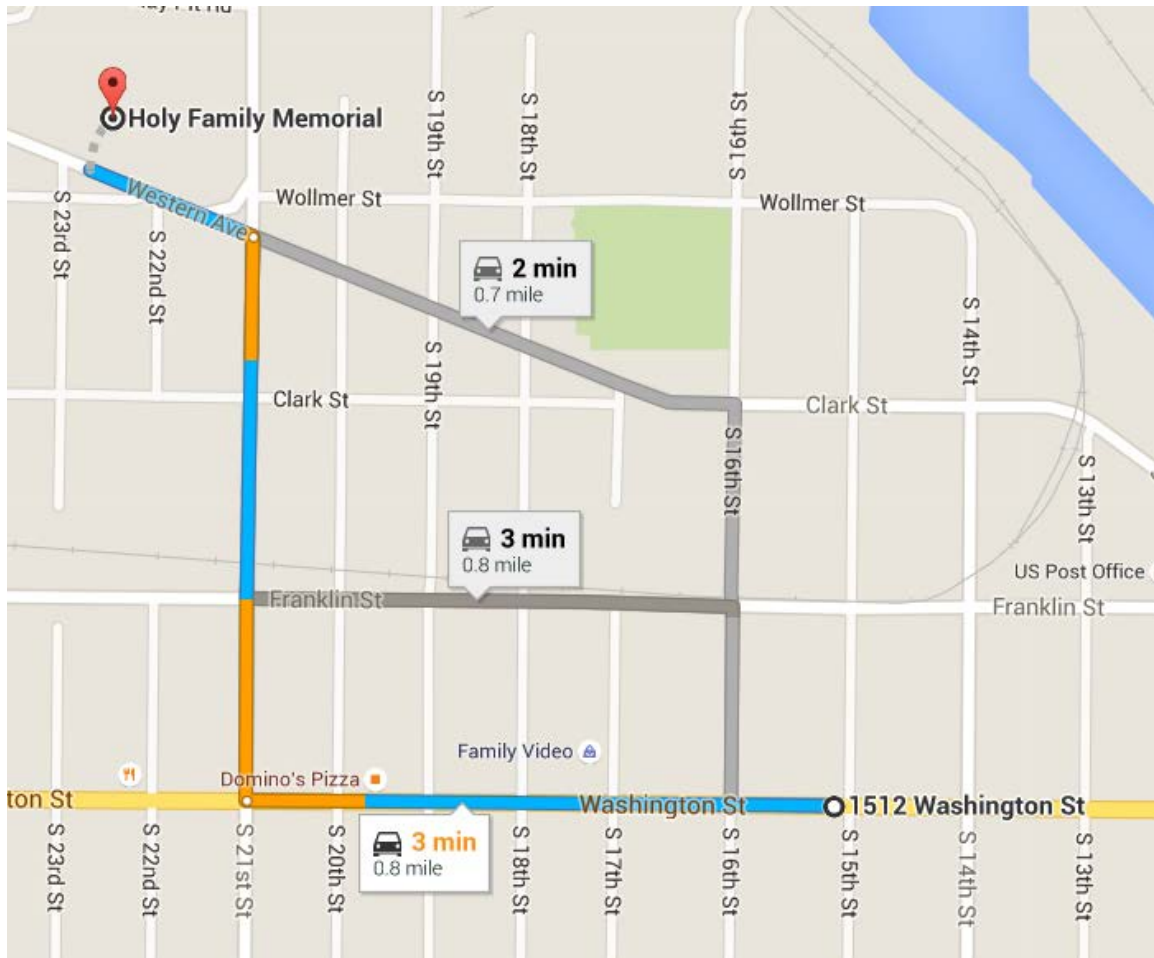
OTHER EMERGENCY CONTACTS

| | |
|----------------------------|----------------|
| * Stantec Office | (800) 880-4700 |
| * Client/Owner | (920) 448-3086 |
| * 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
Destination will be on the right

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:

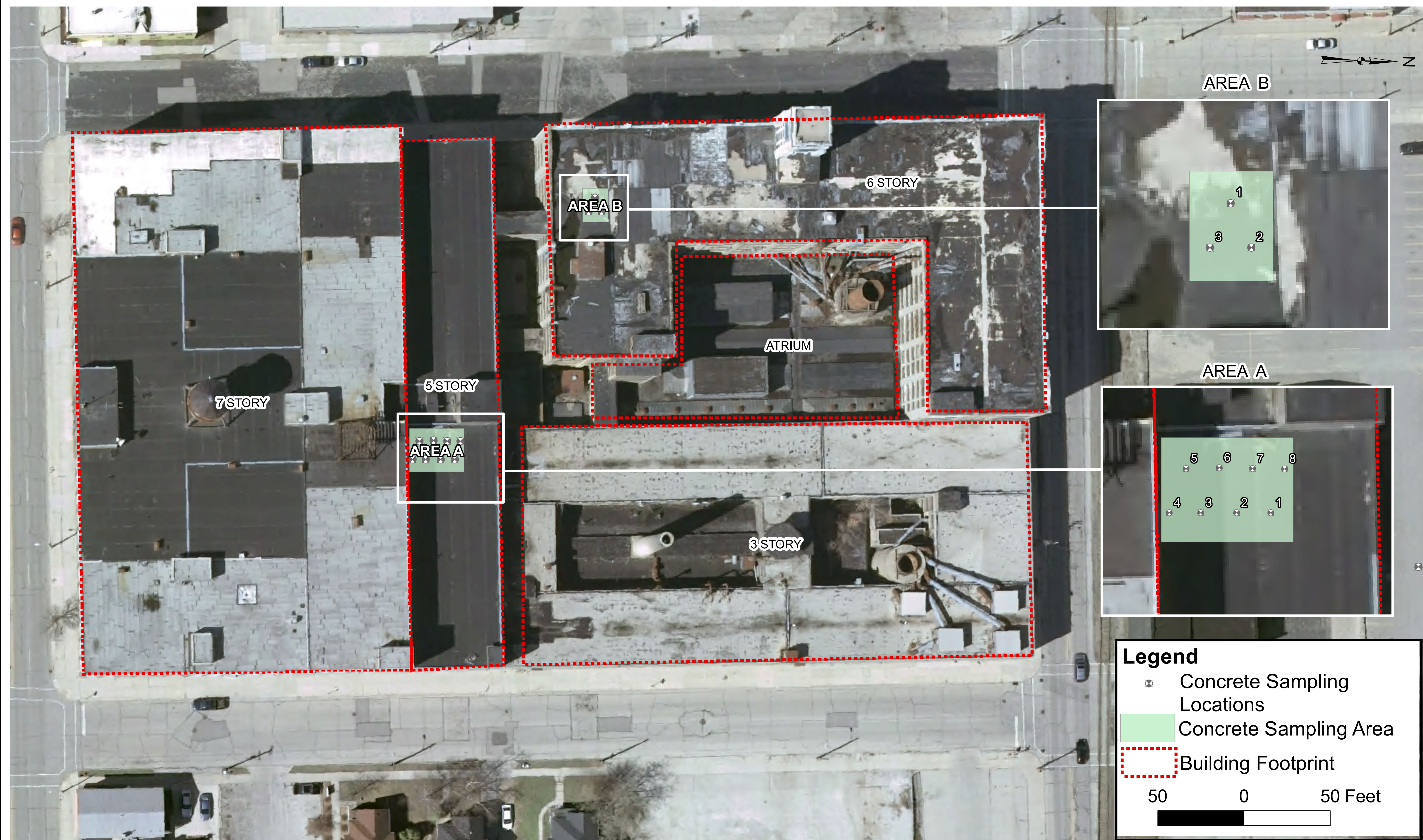
3. Reason for changes:

4. Report prepared by: _____ Date: _____

5. Report reviewed by: _____ Date: _____

FIGURES

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 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.

Attachment E – MSDS Sheets

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, CO₂, 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.

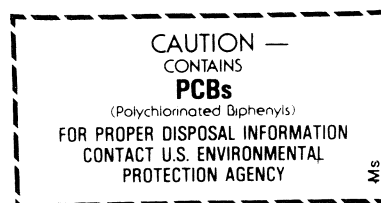
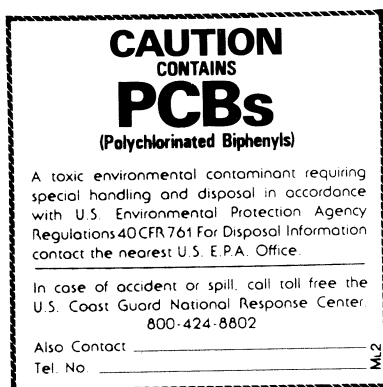
Personnel trained in emergency procedures and protected against attendant hazards should shut off sources of PCBs, clean up spills, control and repair leaks, and fight fires in PCB areas.

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/m³ 8-hour time-weighted average - Skin*

ACGIH TLV: 1 mg/m³ 8-hour time-weighted average - Skin*

Product: Chlorodiphenyl (54% chlorine)

OSHA PEL: 0.5 mg/m³ 8-hour time-weighted average - Skin*

ACGIH TLV: 0.5 mg/m³ 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

| PROPERTIES OF SELECTED AROCLORS[®] | | | | | | | |
|--|-----------------------|--------------------|--------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| PROPERTY | 1016 | 1221 | 1232 | 1242 | 1248 | 1254 | 1260 |
| 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, CO₂, 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

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

Lead White Oil Paint

MSDS Number 820-802

Section 1: Product and Company Information

| | |
|-------------------|---|
| Product Name(s) | Lead White Oil Paint |
| 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 ³ | | ACGIH TLV mg/m ³ | | NIOSH mg/m ³ | |
|--|-----------|---------------------|----------------------------|-------------------|-----------------------------|------|-------------------------|------|
| | | | TWA | STEL | TWA | STEL | TWA | STEL |
| Chemical Formula | | | | | | | | |
| Lead(II) carbonate basic C ₂ H ₂ O ₈ Pb ₃ | 1319-46-6 | 70–90% | 50 ¹ | N.E. ² | 0.05 | N.E. | 0.05 | N.E. |

1) Final PELs as listed under Lead, inorganic compounds. 50 mg/m³ TWA (as Pb); 30 mg/m³ 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. |
| Skin Contact | |
| 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"> • vacuum, equipped with a HEPA filter • broom, wet mop • dustpan, shovel, or scoop • bags, drums, or sacks for collection <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"> • gloves (rubber or leather) • cotton or Tyvek coveralls • chemical/safety impact goggles • respiratory equipment recommended in Section 8 |

Section 7: Handling and Storage

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

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 ³ (10 X PEL) | Half mask, air purifying respirator (APR) equipped with P100 filters. |
| Not in excess of 2.5 mg/m ³ (50 x PEL) | Full facepiece, APR with P100 filters |
| Not in excess of 50 mg/m ³ (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 ³ (2000 x PEL) | Supplied-air respirators with full facepiece, hood, helmet, or suit, operated in positive pressure mode. |
| Greater than 100 mg/m ³ , 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 6.6

(Water=1)

Viscosity Not applicable.

Evaporation Rate Not applicable.

(BuAc=1)

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 6.85×10^{-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 ₂ 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. |

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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^(a)

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

^(a) 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

| | |
|-----------------------------|---|
| Exposure Limits: | Chrysotile OSHA (PEL): 0.1 fibers/cc TWA ACGIH (TLV): 0.1 fibers/cc TWA NIOSH: 0.1 fibers/cc recommended TWA (10 h) |
| 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: | Chrysotile |
| Appearance: | Fibrous solid to dust-like powder. White to grey-brown. Odorless. |
| Relative Molecular Mass: | Not applicable. |
| Molecular Formula: | $Mg_3(Si_2O_5)(OH)_4$ |
| Water Solubility: | Insoluble. |
| Solvent Solubility: | Insoluble in organic solvents. |

10. STABILITY AND REACTIVITY

| | |
|------------------------------------|--|
| Stability: | <input checked="" type="checkbox"/> Stable <input type="checkbox"/> 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: | <input type="checkbox"/> Will Occur <input checked="" type="checkbox"/> Will Not Occur |

11. TOXICOLOGICAL INFORMATION

| | |
|---|---|
| Route of Entry: | <input checked="" type="checkbox"/> Inhalation <input checked="" type="checkbox"/> Skin <input checked="" type="checkbox"/> Ingestion |
| Toxicity Data: | Chrysotile Human, Inhalation TCL ₀ : 2.8 fibers/cc (5 years) Rat, Inhalation-Intermittent TCL ₀ : 8 210 µg/m ³ (6 h to 20 d) Rat, Oral-Continuous TDL ₀ : 10 867 mg/kg (78 weeks) |
| Tumorigenic, Reproductive, Mutagenic Data: | Chrysotile 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: 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^(a)

| | |
|---|--|
| Component: | Asbestiform Grunerite |
| Other Designations: | Asbestiform Grunerite (grunerite; amosite; brown asbestos; amosite asbestos) |
| CAS Number: | 12172-73-5 |
| 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 |
| Component: | Quartz |
| Other Designation: | Quartz (alpha quartz; silicon dioxide; silica; silicic anhydride; agate) |
| CAS Number: | 14808-60-7 |
| EC Number (EINECS): | 238-878-4 |
| 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 |

^(a) 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/m³ TWA (total dust) 30 mg/m³/% SiO₂ + 2, based on size/aerodynamic characteristics
OSHA (PEL): 0.1 mg/m³ TWA (respirable dust) 10 mg/m³/% SiO₂ + 2, based on size/aerodynamic characteristics
ACGIH (TLV): 0.025 mg m³ TWA (respirable dust)
NIOSH: 0.05 mg/m³ recommended TWA (10 h) (respirable dust)
UK WEL: 0.3 mg/m³ 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: Fe²⁺₇(Si₈O₂₂)(OH)₂
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_{LO}: 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^(a)

| | |
|---|--|
| Component: | Asbestiform Riebeckite |
| Other Designations: | Asbestiform Riebeckite (blue asbestos; crocidolite; asbestos; crocidolite asbestos) |
| CAS Number: | 12001-28-4 |
| 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 |

^(a) 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

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

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

| | |
|-----------------------------|---|
| Exposure Limits: | Asbestiform Riebeckite OSHA (PEL): 0.1 fibers/cc TWA ACGIH (TLV): 0.1 fibers/cc TWA NIOSH: 0.1 fibers/cc recommended TWA (10 h) |
| Ventilation: | Provide local exhaust ventilation system equipped with 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 Riebeckite |
| Appearance: | Fibrous solid to dust-like powder. Blue to purple color. Odorless. |
| Molecular Formula: | $\text{Na}_2(\text{Fe}^{2+}_3\text{Fe}^{3+}_2)(\text{Si}_8\text{O}_{22})(\text{OH})_2$ |
| Water Solubility: | Insoluble. |

10. STABILITY AND REACTIVITY

| | |
|------------------------------------|--|
| Stability: | <input checked="" type="checkbox"/> Stable <input type="checkbox"/> 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: | <input type="checkbox"/> Will Occur <input checked="" type="checkbox"/> Will Not Occur |

11. TOXICOLOGICAL INFORMATION

| | |
|---|--|
| Route of Entry: | <input checked="" type="checkbox"/> Inhalation <input checked="" type="checkbox"/> Skin <input checked="" type="checkbox"/> Ingestion |
| Toxicity Data: | Asbestiform Riebeckite Rat, Intraperitoneal LD ₅₀ : 300 mg/kg Rat, Inhalation-Intermittent TC ₁₀ : 7 200 µg/m ³ (6 h – 20 days) Rat, Inhalation-Intermittent TC ₁₀ : 13 600 µg/m ³ (6 h – 5 days) |
| Tumorigenic, Reproductive, Mutagenic Data: | Riebeckite asbestos 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.

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.

ATTACHMENT B
RESUME OF PHIL CASWELL, P.E. OF STANTEC



Mr. Caswell joined Stantec in 1984 and currently serves as Structural Discipline Leader. Phil's responsibilities include staff and project management, structural design, specification preparation, and quality assurance. His experience includes structural design and construction of a wide variety of project types, including water and wastewater treatment facilities, recreational facilities, and building life-cycle management, including structural condition assessments and forensic investigations, building renovation, reconstruction and/or demolition.

EDUCATION

Bachelor of Civil Engineering, University of Minnesota, St. Paul, Minnesota, 1983

REGISTRATIONS

Professional Engineer #19204, State of Minnesota

Professional Engineer #14996, State of Iowa

Professional Engineer #PE-29981, State of Wisconsin

Professional Engineer #8137, State of South Dakota

Professional Engineer #PE-4141, State of North Dakota

Professional Engineer #1999141353, State of Missouri

MEMBERSHIPS

Member, Minnesota Structural Engineers Assoc.

Member, American Concrete Institute

Member, American Society of Civil Engineers

PROJECT EXPERIENCE

Smith Foundry, Minneapolis, Minnesota

Fire damaged a storage area of this aged foundry, disrupting operations and requiring immediate assessment and action. Phil inspected the damaged areas and worked with the insurance company to come up with a repair/replacement strategy to be executed.

Roof Collapse Investigation, Heritage Lutheran Church, Apple Valley, Minnesota

The long-span prefabricated wood roof trusses over the community room in a newly-constructed education wing of this church collapsed under relatively light snow loads. Phil assisted the City of Apple Valley Building Department with overseeing the investigation and building reconstruction.

PROJECT EXPERIENCE

*James J. Hill Building Renovation, St. Paul, Minnesota

Phil was the project manager and structural engineer of record for the building renovation and foundation stabilization efforts for the seven-story historic James J. Hill Building as it was converted from an abandoned office building to luxury condominiums. On the national register of historic places, the building was renovated into modern residential luxury condominiums for a total project cost of approximately \$22 million. While several solutions were considered, none alone solved all the building's problems. Instead, a unique and complex combination of conventional and unconventional solutions provided immediate remediation and long-term stabilization without altering the building's historic facade. Structural modifications and repairs included major foundation stabilization efforts requiring underpinning, subsoil removal, and flood water pumping capability.

*** American Council of Engineering Companies of Minnesota Grand Award for Excellence Winner**

St. Barnabas Building Renovation, Minneapolis, Minnesota

Phil was the project manager and structural engineer of record for all modifications, reinforcing, and repairs. Working with Cermak Rhoades Architects, Stantec provided an extensive structural condition assessment of this five-story, brick and concrete former residential hospital wing that was originally constructed in 1910 to determine whether the structure was worth the cost of renovation. We developed an investigation, sampling, and testing program to comprehensively evaluate the condition and engineering properties of the structural and non-structural building materials. From our analysis, the new building program and remedial work was tailored to optimize the construction dollars spent. Modifications included adding a new elevator and shaft, major openings for new entries, entry canopies, and extensive concrete and masonry patching and restoration.

Philip J. Caswell PE

Structural Engineer

*North Pumping Station Renovation, South Bend, Indiana

Phil performed the condition assessment, conceptual and detailed structural design and construction phase services for the conversion of this Historic Register pumping station into a 15 mgd water treatment facility for the City of South Bend, IN.

Gust Akerlund Photo Studio, Cokato, Minnesota

Phil served as the structural project engineer to perform a structural condition assessment and manage the design of the restoration of this historic photographic studio-turned museum.

North States Industries, Siren, Wisconsin

Phil served as the structural project engineer, working closely with the contractor and insurance carrier, for the structural condition assessment, selective demolition, and extensive reconstruction of this light manufacturing facility following extensive tornado damage to multiple buildings on the facility's site.

2007 Capital Maintenance Plan - Municipal Public Buildings, Brooklyn Center, Minnesota

Phil provided structural engineering services, including structural condition assessments. Stantec developed a Capital Maintenance Plan (CMP) for 27 City-owned buildings and structures. This CMP included an in-depth field condition assessment, a report detailing the condition of each building or structure, and a detailed opinion of probable cost to implement the repair and maintenance items through 2025.

Cass County Ah Gwah Ching Site Demolition, Walker, Minnesota

Phil was project manager for this multiple-building demolition project involving preparation of plans and specifications for removing the Ah Gwah Ching facility. This obsolete State Regional Treatment Facility required full campus building and utility demolition and site restoration. Equipment and building materials were salvaged and/or recycled to the maximum extent possible, while also protecting existing trees.

RTC Incinerator Building Demolition, Fergus Falls, Minnesota

Phil was project manager for the demolition and removal of the existing below-grade concrete water reservoir and municipal waste incinerator building. The project is ongoing and will bring the abandoned site one step closer to attractive real estate ready for redevelopment. This project included demolition of existing RTC water reservoir and incinerator building.

430 Oak Grove Apartments

Stantec worked with ESG Architects and Kraus Anderson Contracting to transform this 4-story 1920's-era limestone Beaux Arts building – once home to the Northwestern National Life Insurance Co. – into 75 luxury apartments overlooking Loring park. Major modifications included creating a new adjacent parking deck and below-grade parking within the building basement; providing openings and structural framing modifications for improved vertical circulation, including new elevator and stairs; and creating second-level lofts in the high-ceilinged main floor spaces.

The building was listed on the National Register of Historic Places in 2012 so all new work had to avoid impacting the original exterior appearance.

Burnsville Bus Garage Second Floor Remodeling

Phil provided field investigation services and QA/QC of the roof, floor, and foundation structural modifications necessary for the interior remodeling of this existing office building. Stantec prepared HVAC, fire protection, voice/data network, power distribution, lighting and plumbing specifications and design for remodeling a portion of the second floor of the garage. We also coordinated existing with new equipment locations and provided design, bidding, and construction support for this project.

Endres Properties Manufacturing, Rosemount, Minnesota

Phil was the structural project engineer, working closely with the contractor and insurance carrier, for the structural condition assessment, selective demolition, and extensive reconstruction of this pet food processing facility following a massive dust explosion and fire. The project required working within the confines of a partially standing and partially burned manufacturing facility, while preparing the design for reconstruction on a short timeline.

West St. Paul Ice Arena Timber Arch Assessment and Repair

The exposed bearing ends of the main timber arches supporting the long-span building roof of this 1970's ice arena were showing signs of severe weathering and age. Stantec engineers performed a field investigation, including using ultrasonic testing equipment, to determine the amount of structurally sound material remaining to support the roof structure. Results indicated that a substantial amount of the structural strength was lost due to decay. Emergency repairs were immediately designed and implemented in order to keep the facility in safe operation until a long-term solution could be found.

* denotes projects completed with other firms

ATTACHMENT C
STRUCTURAL CONDITION ASSESSMENT
SCOPE OF SERVICES

**ATTACHMENT C
 SCOPE OF SERVICES LIST**

Structural Condition Assessment

| Part 1 – Data Collection Services | | | |
|--|------------|--------------|---|
| Inc. | N/I | Supp. | Service/Description |
| X | | | Initial site visit. |
| | X | | Follow-up site visits. No.: N/A |
| | X | | Meet separately with third party: Building Official/Design Professional/ Contractor/Attorney/ Realtor, etc. No.: _____ |
| X | | | Visually observe exposed building/structure components. |
| X | | | Note and document observations. |
| X | | | Photograph areas observed. |
| X | | | Temporarily move or remove finishes as necessary. Finishes will / will not be replaced by Stantec. |
| X | | | Destructively remove selected finishes as necessary to view structure. Finishes will / will not be replaced by Stantec. Example: |
| | X | | Non-destructively sample/test building/structure component materials. |
| | X | | Selectively (destructively) sample/test building/structure component materials. |
| | X | | Measure and document structure spaces and configuration. |
| | X | | Measure and document selected building/structure components, span & spacing. |
| | X | | Determine spot elevations at selected locations using local vertical datum. |
| | X | | Utilize survey crew for gathering as-built information – horizontal and vertical. |
| | X | | Other: |

| Part 2 – Design/Evaluation Services | | | |
|--|------------|--------------|--|
| Inc. | N/I | Supp. | Service/Description |
| X | | | Review existing drawings, material data or other available documentation. |
| X | | | Create sketch drawings of building/structure in areas investigated. |
| | X | | Create AutoCAD-format (.dwg) drawings of building/structure in areas investigated. |
| X | | | Prepare report describing preliminary findings. |
| | X | | Prepare detailed Investigation, Sampling and Testing Program. |
| | X | | Perform limited structural calculations to determine existing structural capacities of components. Does not include structure computer modeling. |
| | X | | Determine structure evaluation criteria based upon current codes. |
| | X | | Perform structural calculations to determine conformance with current codes. |

| | | | |
|----------|----------|----------|--|
| | X | | Investigate local regulatory flood information. |
| | X | | Solicit/coordinate environmental health consultant. |
| | X | | Solicit/coordinate geotechnical laboratory/consultant. |
| | X | | Solicit/coordinate materials testing laboratory. |
| | X | | Solicit/coordinate estimated construction costs from contractor(s). |
| | X | | Investigate conceptual remediation/repair options. |
| X | | | Prepare letter report (stapled) describing procedures, findings and recommendations. |
| | | X | Prepare formal report (bound) describing procedures, findings and recommendations. |
| | X | | Provide remediation/repair design and detailed documentation, including drawings and/or specifications, sufficient for construction. |
| | X | | Other: |

| Part 3 – Bidding and Construction Services | | | |
|---|------------|--------------|---|
| Inc. | N/I | Supp. | Service/Description |
| X | | | Contact contractors and solicit quotes for remediation/repair. |
| | X | | Provide contract administration throughout construction. |
| | X | | Provide periodic site inspection throughout construction. Estimated number of visits/visits per week:_____ |
| | X | | Document repaired/remediated conditions as-constructed. |
| | X | | Prepare Record Drawings _____ Signed _____ Unsigned |
| | X | | Other: |

Note: Proposed services do not include evaluation of mechanical or electrical equipment or systems, nor assessment of environmental health, including the presence or evaluation of mold, asbestos, or other hazardous or regulated materials. The potential for the existence of these substances would be noted, however, if identified.