# Supplemental Work Plan – Additional Field Sampling

## Former Bisonite Paint Company
## 2266 Military Road and 2268 Military Road
## Tonawanda, New York

## New York State Department of Environmental Conservation
## Brownfield Cleanup Program
## Site #C915010

Prepared For:
**ACM Northfield CR3, LLC**
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**February 2021**

**235.198A**

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**FIGURES**



**APPENDICES**

# 1.0 INTRODUCTION

This Supplemental Work Plan ("SWP") for additional sampling was prepared to address requests by the New York State Department of Environmental Conservation ("NYSDEC") and the New York State Department of Health ("NYSDOH") in a letter dated September 8, 2020. NYSDEC/NYSDOH requested additional soil sampling and a vapor intrusion assessment at the Former Bisonite Paint Company Site (#915010) located at 2266 and 2268 Military Road in Tonawanda, New York ("Site"). The SWP has been revised in response to NYSDEC's requests.

# 2.0 BACKGROUND

On June 5, 2020 Leader submitted a Remedial Investigation Report ("RIR") for the Site and on September 8, 2020 NYSDEC/NYSDOH requested additional sampling at the site. The sampling requested includes surface soil sampling to determine the extent of contamination and additional sub-slab and indoor air sampling to evaluate the potential exposures of the users of the adjacent office and warehouse space. This SWP provides the proposed scope of work to address the requests of the NYSDEC and NYSDOH.

# 3.0 SCOPE OF WORK

## 3.1 Surface Soil Sampling

During the RI four soil samples were collected and analyzed for the Target Compound List ("TCL") and Target Analyte List ("TAL") of contaminants. The samples with contaminant concentrations that exceeded the Restricted Use - Commercial Soil Cleanup Objectives ("SCO") were identified as follows:

Table 1 provides all sample analysis results from the surface soil samples where PCBs, pesticides, metals, mercury and semi-volatile organic compounds ("SVOCs") were found to exceed the 6 NYCRR Part 375 Unrestricted Use SCO. Only the polyaromatic hydrocarbon ("PAH") fractions were found to exceed the Unrestricted Use SCO; however, only PAHs were found to exceed the Restricted Use - Commercial SCO ("RUCSCO").

Six PAH compounds were found in the surface soil samples at concentrations exceeding the RUCSCO. The compounds identified above the RUCSCO included the following: Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Chrysene, Dibenz(a,h,)anthracene and Indeno(1,2,3-cd)pyrene.

Leader is proposing the sampling of 10 additional sample locations identified on Figure 1. On the north side of the Site there is limited space for sample collection because of a fence which is located adjacent off site. As Figure 1 shows several sampling locations were located to define the northernmost extent of contamination. At each sample location four depth intervals will be sampled: 0 to 2-inches; 2 to 6-inches; 6 to 12-inches and 12 to 24-inches. Each location will be sampled to 24-inches unless there is an obstruction. If an obstruction is found, the location will be offset by 2 to 4-feet and the interval sampled again. If an obstruction is found again at the same interval no additional sampling will be done for this location.

Each sample will be screened with an organic vapor analyzer with a photoionization detector ("PID") and the measurement of volatile organic vapors recorded. The samples will be analyzed for only PAHs unless volatile organic vapors are detected on the PID at a concentration above 25 parts per million or there is evidence of contamination, such as paint residuals or stained materials. The analysis of the PAH or volatile organic compounds ("VOCs") will follow the same methods and procedures used in the October 2019 Remedial Investigation Work Plan and Quality Assurance Project Plan ("RI Work Plan").

Sampling will be done using a direct push sampling tool collecting a sample every 2 feet in a dedicated acrylic sample sleeve. Between sampling locations, the tool will be decontaminated following the procedures identified in the RI Work Plan.

Sample results will be reported by the laboratory with full documentation so it may be reviewed and a Data Usability Summary Report prepared. In addition, the analytical report will be provided in a format consistent with NYSDEC's Electronic Data Deliverable ("EDD") format.

### 3.2 Vapor Intrusion Assessment Sampling

Both sub-slab and indoor air samples were collected within the on-Site building and one outside soil vapor sample during the RI. The results of the sample analysis are shown on Table 2 showing impact to the indoor air. Since a portion of the Site building is located on off-Site property, there are tenants in the off-Site portion that may be at risk. The goal of this assessment will be to collect samples to determine if there is a completed vapor intrusion pathway in the off-Site building area. The proposed sampling will be conducted following the NYSDOH "Guidance for Evaluating Soil Vapor Intrusion in the State of New York," dated October 2006 and Revised Matrix Tables dated May 2017. In accordance with the NYSDOH guidance the sampling will be conducted during the heating season of 2020/2021. Heating in the off-Site portions of the building uses gas fired units. The office uses a forced air system while the warehouse uses a ceiling mounted system with its heat exchanger on the roof.

To achieve this goal samples will be collected in those areas shown on Figure 2 including: a sub-slab vapor and indoor air sample in the area's office space; a sub-slab and indoor air sample in the book storage warehouse; and an outdoor-ambient air sample. 24-hours prior to conducting the sampling, unnecessary opening of exterior doors and windows or venting of the office and warehouse area will be discouraged, since prolonged opening of windows or doors, or venting will allow outdoor air to come into the building which may impact the indoor air sample results. The samples will be collected following the same procedures in the October 2019 RI Work Plan. Each sample will be analyzed for VOCs using method TO-15. Sample results will be reported with full documentation so it may be reviewed and a Data Usability Summary Report prepared. In addition, the analytical report will be provided in a format consistent with NYSDEC's EDD format.

## 4.0 HEALTH AND SAFETY

During the investigation, the RI Work Plan's Health and Safety Plan ("HASP") and Community Air Monitoring Plan ("CAMP") will be followed, (see Appendix 1). Continuous air monitoring will be done during the investigative work. Air monitoring will include an organic vapor analyzer with a photoionization detector ("PID") and a particulate (dust) monitor. The PID monitoring will use an action level 1 part per million of total volatile organic compounds in the breathing zone. The action levels for volatile organic compounds are presented on Table 2 of the HASP and in the CAMP. VOC monitoring will be required for all activities.

CAMP monitoring will be required for the activities specified in this work plan for outside of the building. As a part of the CAMP monitoring, Leader will monitor air quality at the perimeter of the exclusion zone (the unique work areas for sampling) and up and down wind of the sampling area. The goal of the CAMP is to protect air quality in areas where residents, tenants and passersby might be impacted. The CAMP action levels for particulates that are less than 10-microns in diameter ("PM-10"). The action level for PM-10 particulates is 100 micrograms per cubic meter of air greater than the upwind site perimeter concentration.

If dust exceeds the thresholds at the upwind monitoring location during the investigative activities, Leader will take appropriate corrective action. If dust from the sampling or drilling operations exceed project thresholds at the downwind monitoring location compared to the upwind monitoring location, the project field manager will determine what is causing the problem and seek a remedy, and if needed, they will stop work until it can be corrected.

## 5.0 REPORTING

When the data is received and a data usability summary report prepared, a sampling report will be prepared and submitted to the NYSDEC and NYSDOH. The report will include tables of the sample data. Tables will also be prepared so the data can be compared to the other surface soil sample data and sub-slab and indoor air sampling data. Figures will also be prepared to show the relative positions of the samples to other sample locations.

## 6.0 PROJECT MANAGEMENT

Frank Thomas will serve as Leader's Project Manager for this project. Mr. Thomas will be responsible for coordination between ACM Northfield and NYSDEC/NYSDOH. He will ensure the SWP and all reports are completed in keeping with the RI/FS and the SWP.

Peter von Schondorf, P.G. and Alec Minavio will assist Mr. Thomas with field work and the preparation of reports.

The NYSDEC Project Manager is Joshua Vaccaro. Mr. Vaccaro can be contacted at (716)-851-7226.

## 7.0 SCHEDULE

Upon NYSDEC approval of the SWP, Leader will schedule the sampling effort. Leader anticipates the sampling described herein will be completed within two weeks of SWP approval. The sampling is scheduled for 1 or 2 days, with results expected within three weeks after the samples are submitted for analysis.

# FIGURES


Title: Supplemental Surface Soil Sampling Locations
2266 and 2268 Military Road
Tonawanda, NY

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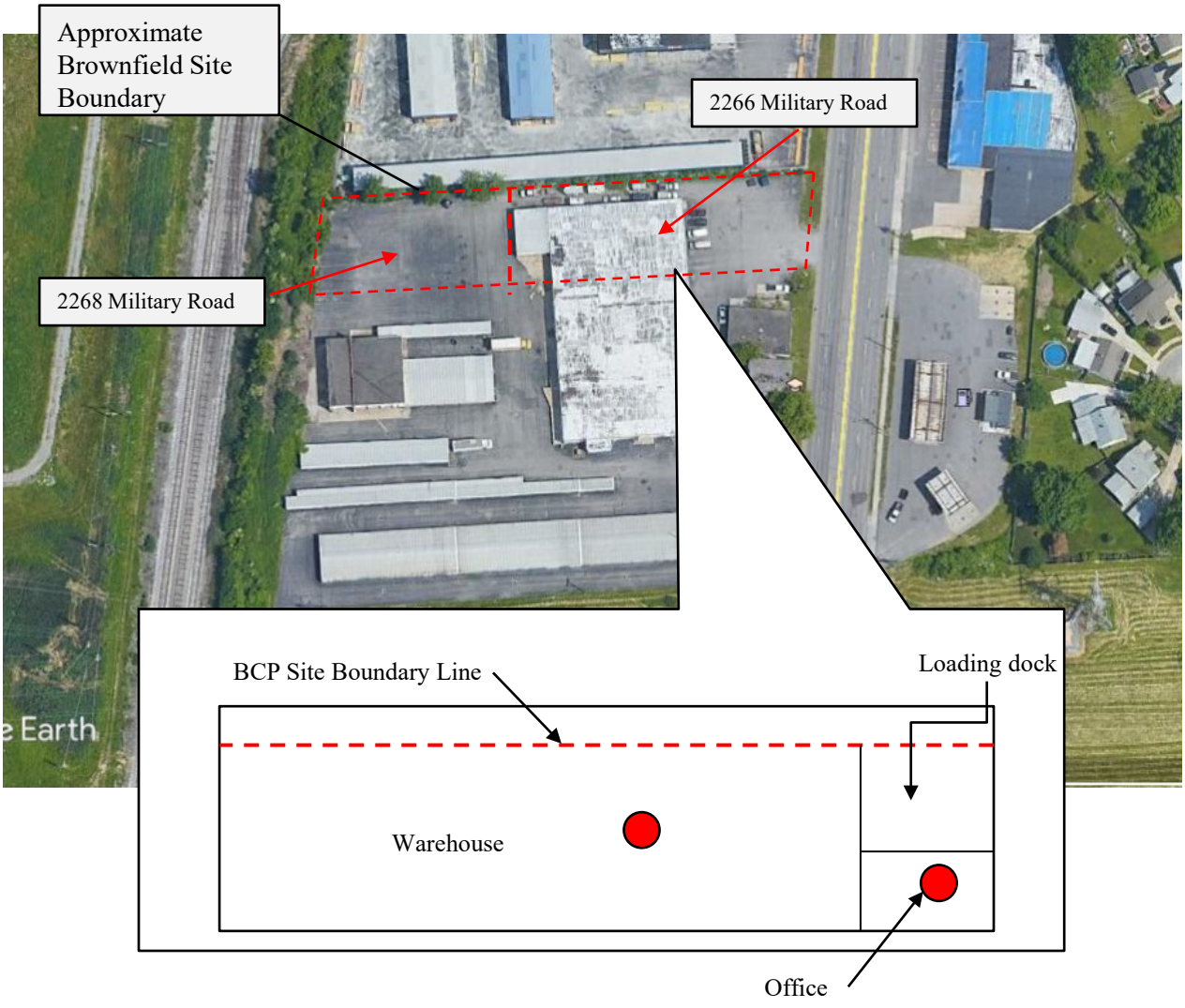
Project: 235.198A
Date: 10/1/2020
Scale: NTS

Drawn: PVS
Checked: MPR
File Name: Site Location

Figure 1

NORTH

Sub-slab and Indoor Air Couple




| | |
|---|---|
| Title | Supplemental Sampling Sub-slab & Indoor Air Loc.<br>2266 and 2268 Military Road<br>Tonawanda, NY |
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| Project | 235.198A |
| Date | 10/1/2020 |
| Scale | As shown |
| Drawn | PVS |
| Checked | MPR |
| File Name | Air Samples |
| Figure | 2 |

# APPENDIX 1

# Health and Safety Plan

# HEALTH AND SAFETY PLAN

## Former Bisonite Paint Company
## 2268 Military Road and 2266 Military Road
## Tonawanda, New York
## New York State Department of Environmental Conservation
## Brownfield Cleanup Program Site #C915010

Prepared for:

**ACM Northfield CR#3, LLC**
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**October 2019**

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## FIGURES



## TABLES

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## APPENDICES

# 1.0 Project Personnel Responsibilities

Project organization is presented below in Section 1.5.

## 1.1 Principle-In-Charge

The Principal-In-Charge for this project will be Michael Rumrill. Mr. Rumrill will act in a supervisory capacity for Leader Professional Services, Inc. (Leader) employees and their subcontractors and the planned site activities with respect to the project site. Mr. Rumrill will have the authority to direct site operations including the performance of this Health and Safety Plan. The project manager will have the required 29 CFR 1910.120 40-Hour Training and have an updated 8-Hour Refresher Training Certificate.

## 1.2 Project Manager

The Project Manager/QA/QC Manager will be Dixon Rollins, P.E. of Leader. If a substitute is required, the Project Supervisor will be an employee of Leader. The project supervisor will oversee all field and related activities specific to the project when the project manager is not on the site. The project manager will have the required 29 CFR 1910.120 40-Hour Training and have an updated 8-Hour Refresher Training Certificate.

## 1.3 Health and Safety Officer

Mr. Mark Perriello, CIH, CSP, will be the site's Health and Safety Officer ("HSO"). Mr. Perriello will have the authority to stop work if any operation threatens the health and safety of workers or the public. The HSO may designate a member of the work party for site health and safety responsibilities when the HSO cannot be on site. The HSO will have the required 29 CFR 1910.120 40-Hour Training and have an updated 8-Hour Refresher Training Certificate.

## 1.4 Project Team

Personnel and subcontractors on the project team will be responsible for the completion of the Work plan's required tasks. All personnel on the project team will comply with the site safety plan and ensure the site safety and health officer or supervisor is notified of any unsafe conditions. It is anticipated that the project team will consist of one to three individuals. This may vary due to any changes that occur during the actual site work. All personnel on the project team will have the required 29CFR 1910.120 40-Hour Training and participate in daily tailgate health and safety meetings.

## 1.5 Project Organization

Project Manager/Engineer – Dixon Rollins, P.E, Leader
Site Supervisor – Robert Murphy, Leader
Health and Safety Officer – Mark Perriello, CIH, CSP, Leader

## 2.0 Site Standard Operating Safety Procedures

Standard operating and safety procedures include safety precautions and operating practices that all personnel will follow. These include:

### 2.1 Personal Precautions

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in any area designated contaminated.

- Hands and face must be thoroughly washed upon leaving the work area.

- Whenever decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.

- No facial hair, which interferes with a satisfactory fit of the mask-to-face seal, is allowed on personnel required to wear respirators. Personnel will use the negative pressure fit test prior to each use of the equipment.

- Contact with contaminated or suspected contaminated surfaces should be avoided. Whenever possible, do not walk through puddles, leachate, discolored surfaces, kneel on ground, lean, sit or place equipment on drums, containers, or the ground.

- Medicine and alcohol can enhance or mask the effects from exposure to toxic chemicals. Prescribed drugs should not be taken by field personnel where the potential for absorption, inhalation, or ingestion of toxic substances exists unless specifically approved by a qualified physician. Alcoholic beverages should be avoided, in the off-duty hours, during the project.

### 2.2 Operations

- All personnel going on-site must be adequately trained and thoroughly briefed on anticipated hazards, equipment to be worn, safety practices to be followed, emergency procedures, and communications.

- Any required respiratory protection and chemical protective clothing must be worn by all personnel going into areas designated for wearing protective equipment.

- Personnel on-site must use the buddy system when wearing respiratory protection. As a minimum, one person, suitably equipped, is required as safety backup during initial entry.

- Visual contact must be maintained between pairs on-site and safety personnel. Entry team members should remain together to assist each other during emergencies.

- During continual operations, on-site workers act as safety backup to each other. Off-site personnel provide emergency assistance.

  Communications using radios, hand signals, signs, or other means must be maintained between team members at all times.

- Wind indicators visible to all site personnel should be strategically located throughout the site.

- Personnel and equipment in the contaminated area should be minimized to reduce the potential for cross contamination and the generation of decontamination waste.

- Work areas for various operational activities will be established by the project manager, or his designee, and the HSO.

- Procedures for leaving a contaminated area must be planned and implemented prior to going on-site. Work areas and decontamination procedures have been established based on expected site conditions and are described in the project Work Plan.

## 3.0 Health and Safety Hazards

The potential hazards that may be experienced during the performance of the Work Plan include: chemical exposures from contact with contaminated soil and groundwater; hazards inherent to working with drilling and sampling equipment and working within an active storage facility where vehicles come and go; slip, trip and fall hazards; and cold and heat stress from performing heavy work while working in cold temperatures and wearing protective clothing. The extent of contamination is well known but monitoring for the presence of organic vapors will be conducted. To prevent unnecessary exposures to vapors and to limit the potential for cross-contamination, all work areas will be limited from general access. The formation of distinctive work zones will assist in reducing the potential hazards that may exist at working at this facility. To further reduce the potential for accidents to involve moving vehicles, Leader will coordinate each field activity with the site manager(s) so tenants and delivery drivers know where investigative activities are occurring on the Site. To reduce accidents from occurring that involve slip, trip and fall hazards and hypothermia, work will be monitored by the Site HSO and workers will be encouraged to use the “buddy-system” while lifting heavy tools or items to reduce early fatigue while wearing protective clothing.

Table 1 list potential health and safety hazards that may be encountered based on general site tasks. This list has been compiled based on the scheduled activities and potential site conditions.

## 4.0 Personal Protective Equipment

## 4.1 Protective Equipment

All personnel will be provided with appropriate personal safety equipment and protective clothing. Each individual will be properly trained in the use of this safety equipment before the start of field activities. Safety equipment and protective clothing shall be used as directed by the Project Manager and/or Site HSO. All such equipment and clothing will be cleaned and maintained in proper condition by the personnel. The Site HSO will monitor the maintenance of personnel protective equipment to ensure proper procedures are followed.

Personal protective equipment will be worn at all times designated by this Health and Safety Plan. Levels of protective clothing and equipment are not expected to exceed Level C. Results from the previous groundwater samplings and on-site readings will be used to set action levels and levels of personal protection.

The personal protective equipment levels designated below are in conformance with EPA criteria for Level A, B, C, and D protection. All respiratory protective equipment used will be approved by National Institute for Occupational Safety and Health ("NIOSH") and Mine Safety and Health Administration ("MSHA"). Although the conditions within the proposed work areas are well known monitoring will be completed at all times, but it is doubtful that levels of respiratory protection will exceed Level D.

## 4.2 Level C Protection

A. Personal Protective Equipment

- Half-face, air-purifying, canister-equipped respirator (MSHA/NIOSH approved) for acid/gas/organic vapor with particulate filter
- Chemical-resistant clothing (overalls and long sleeved jacket; coveralls or hooded, one piece or two-piece chemical-splash suit; disposable chemical resistant one-piece suits)
- Work Clothes (Long Shelve Shirt and pants)
- Gloves (outer), chemical resistant
- Gloves (inner), chemical resistant
- Boots (inner), leather work shoe with steel toe and shank
- Boots (outer), chemical resistant (disposable*)
- Hard Hat (face shield*)
- Safety Glasses or goggles

- Taping between suit and gloves, and suit and boots

- High visibility vest

*Optional

B. Criteria for Selection

Meeting all of these criteria permits use of Level C Protection.

- Measured air concentration of identified substances will be reduced by the respirator to, at, or below the substance's Threshold Limit Value (TLV)/Permissible Exposure Limits (PEL) and the concentration is within the service limit of the canister.

- Atmospheric contaminant concentrations do not exceed IDLH levels.

- Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect the small area of skin left unprotected by chemical resistant clothing.

## 4.3 Level D Protection

A. Personal Protective Equipment

- Work Clothes (Long shelve shirt and pants)

- Leather, steel-toed boots

- High visibility vest

- As required:

    - Hard hat
    - Safety glasses/goggles
    - Hearing protection
    - Gloves

B. Criteria for Selection

Meeting all of these criteria permits the use of Level D Protection.

- Measured air concentrations of identified substances are below the substances Permissible Exposure Limit (PEL) or TLV.

- Oxygen content is > 19.5%.

- No unknown substances are present.

# 5.0 Decontamination

It is expected that the usual level of protection to be Level D. Level C will be used when potential exposures to contaminants justify increased protection. A decontamination zone will be set up at the entrance of each work zone. Based on the level of expected exposure to contaminants, the following decontamination protocol will be used.

## 5.1 Personnel Decontamination

It is expected that a minimum of Level D decontamination will be continually in effect at the site. On these occasions when higher levels of protection are required, appropriate decontamination procedures will be used. The extent of the decontamination procedures will be at the discretion of the site HSO.

In general, decontamination involves removing potentially contaminated soil from gloves and clothing, followed by scrubbing with a non-phosphate soap/water solution and clean water rinses. As a general rule, protective clothing will be removed in the reverse order as it was put on: gloves and boots off first, followed by protective suits and then breathing apparatus. As the different types of waste are generated, the team members will segregate the waste into different drums. Potentially contaminated soil and sediment will be placed into one drum and decontamination waste fluid into a second drum. All disposable items will be placed into a dry goods drum.

Certain parts of contaminated respirators, harness assemblies and leather or cloth components, are difficult to decontaminate. If grossly contaminated, they may have to be discarded. Rubber components can be soaked in soap and water and scrubbed with a brush. In addition to being decontaminated, all respirators, non-disposable protective clothing, and other personal articles must be sanitized before they can be used again unless they are assigned to individuals. The manufacturer's instruction should be followed in sanitizing the respirator masks. The Site HSO will be responsible for supervising the proper protective equipment.

All decontamination wastewaters will be collected and disposed of according to applicable regulations. This disposal will be done at the direction of the Project Manager.

## 5.2 Equipment Decontamination

Decontamination will be applicable to all activities on site and be completed in the contamination reduction zone ("CRZ") section of the exclusion zone. All equipment (i.e., tools, monitoring equipment, etc.) will receive initial decontamination. All equipment that has been in contact with contaminants shall be stored in an area within the limits of the existing exclusion zone or shall be thoroughly decontaminated prior to leaving the area. Decontamination will consist of cleaning of the entire piece of equipment to the satisfaction of the Site Supervisor or the HSO. Decontamination will be a multi-process task, first all loose dirt or other foreign materials will be removed from equipment surface. Scrubbing with a synthetic wire brush may be required to remove materials that adhere to the surfaces. After the loose dirt is removed, the equipment will be washed using a detergent and water solution and a wire brush followed by successive rinses with clean water. Washing with hot water from a power washer may be substituted for a synthetic wire brush.

All dirty equipment will be stored on plastic sheeting in such a manner that decontamination waters can be collected and disposed of in accordance with applicable regulations. Clean equipment not in use will be covered with plastic and stored at a designated storage area.

Air monitoring equipment will be protected with an outer coating (i.e. plastic), if there is a potential for the equipment to come into contact with potentially contaminated materials prior to the initial entry into the exclusion zone. Decontamination will then consist of removal of the protective coating in a manner that will not contaminate the air monitoring equipment.

# 6.0 Site Air Monitoring

Field activities associated with the work tasks at the Site may pose hazardous conditions, such as the release of hazardous substances into the worker's breathing zone. These substances may be in the form of vapors, dusts, or mists that can enter the body through ingestion, inhalation, or direct skin or eye contact. If the HSO, relying on instrument observations and odor, determines that a condition exists in which workers may be exposed to airborne hazardous materials, the HSO will upgrade the team's level of respiratory protection and complete chemical specific monitoring.

The following paragraphs describe the monitoring parameters to be evaluated during the start of the project. As the project continues, other site-specific monitoring will be required based on site conditions and experience at the site. Because this project will be completed in the winter/early spring and the proposed work area is covered with a combination of asphalt, concrete or dirt, there is a concern about contaminated dust being an issue. Potential combustible concentrations of volatile organic compounds have not been identified recently, but there remains a concern, thus the necessity for oxygen and combustible gas monitors is supported for the field investigation. All instruments to be

used during site activities will meet the established requirements set forth by OSHA, MSHA, NIOSH, and state agencies where applicable.

Field instrument measurements will be made during work progress with a direct reading organic vapor meter. Monitoring will take place in the work zone and workers breathing zone, up and down-wind from the work zone and at the site perimeter. Monitoring within the work zone will be taken at least every 15 to 30 minutes. Monitoring up and downwind of the work zone will be completed at least every 30 to 60 minutes and monitoring at the site perimeter will be completed at least every 60 minutes. If elevated readings are obtained (elevated compared to up-wind readings or compared to site specific action levels), then the frequency of taking measurements will be increased at the monitoring stations. NYSDEC and NYSDOH will be notified within 24-hours of any releases requiring work stoppage.

Dust monitoring will be conducted each day as conditions warrant from strategic locations up and down will of the site's work areas as a part of the Community Air Monitoring Program ("CAMP"). The CAMP monitoring will be done concurrently with the organic vapor monitoring done for the intrusive investigation. Dust monitoring will not be done when it is raining or snowing, or when minimal intrusive work is being conducted. For example, dust monitoring will not be required when sampling monitoring wells. These locations may vary based on where on the site work is being conducted and the wind direction. At least one upwind and one downwind locations will be monitored. The Project Manager and HSO may require additional monitoring stations based on the level of activity, wind conditions, and the proximity to air vents, open doors, and occupied spaces.

If dust exceeds thresholds at the upwind monitoring location during the investigative activities, the HSO will instruct the contractor to take an appropriate level of corrective action. If dust from the work areas exceed project thresholds at the downwind monitoring locations compared to the upwind monitoring location, the HSO will determine what is causing the problem and seek a remedy, and if needed, they will stop work until it can be corrected.

All soil and groundwater sampling data for the site is dated, but it is anticipated that organic vapors could range from 0 to 100 parts per million ("ppm") in the sample headspace. As a result, there is still a potential for VOCs to be identified in the breathing zone. Similarly, there is a potential for nuisance odors to be an issue. Organic vapor concentrations will be the primary measure for upgrading or downgrading worker respiratory protective equipment and implementing additional precautions or procedures (See Table 2, Action Levels).

All site monitoring will be conducted by or under the direction of the site HSO or if a concern was raised by a worker or NYSDEC. All readings obtained will be recorded in a dedicated site notebook maintained by the Project Manager/HSO or their designee. The site HSO will maintain all monitoring instruments throughout the remedial action to ensure their reliability and proper operation. Observations will be made during work

progress with a direct reading organic vapor meter. Monitoring will take place in the work zone and workers breathing zone, up and down-wind from the work zone and at the Site perimeter. Monitoring within the work zone will be taken at least every 15 to 30-minutes. Monitoring up and down-wind of the work zone will be completed at least every 30 to 60 minutes and monitoring at the Site perimeter will be completed at least every 60 minutes. If work is being conducted within 20-feet of building air ducts or open doors air monitoring will be conducted at least every 15 to 30-minutes. If elevated readings are obtained (elevated compared to up-wind readings or compared to Site specific action levels), then the frequency of taking measurements will be increased at the monitoring stations and as needed corrective action taken. NYSDEC and NYSDOH will be notified within 24-hours of exceedances of the air monitoring thresholds, which require work stoppage.

If dust exceeds thresholds at the upwind monitoring location during the investigative activities, the HSO will instruct the site manager to take an appropriate level of corrective action. If dust from the sampling or drilling operations exceed project thresholds at the downwind monitoring location compared to the upwind monitoring location, the HSO will determine what is causing the problem and seek a remedy, and if needed, they will stop work until it can be corrected. As a result, air monitors will be located up and down wind of the investigation work. As mentioned in the discussion for air monitoring of VOCs, if work is being conducted within 20-feet of a building air ducts and open doors, additional dust monitoring stations will be set up to monitor these features on the building. If elevated readings are observed, the HSO or their designee will also monitor the interior of the building(s). NYSDEC and NYSDOH will be notified within 24-hours of exceedances of the air monitoring thresholds, which require work stoppage.

All site monitoring will be conducted by or under the direction of the Site HSO. All readings obtained will be recorded in a dedicated site notebook maintained by the Project Supervisor or designate. NYSDEC and NYSDOH will be provided with CAMP data on a weekly basis. The Site HSO will maintain all monitoring instruments throughout the site investigation to ensure their reliability and proper operation.

## 7.0 Action Levels

Action levels have been established for the upgrade and downgrade in the levels of personal protective equipment. Table 2 lists the action levels, airborne concentrations and their respective personal protection for unknown sources of organic vapor concentrations. Section 8.0 discusses the minimal personal protection required for specific site activities based on current information. Changes to these specified levels are dependent on the result of air monitoring as outlined below.

## 8.0 Site Activities and Associated Personnel Protective Requirements

The levels of protection have been assigned anticipated Site activities (below) and represent a best estimate of exposure potential and protective equipment needed for that

exposure. The site HSO will revise those levels of protection, up or down, based on air monitoring results, and on-site assessments of actual exposures.

- *Level D* - General site work with limited physical contact with contaminated soil by personnel. If workers must pick up contaminated tools or a soil samples, protective chemical resistant gloves will be worn. Respiratory protection is not required because contaminant action levels cited on Table 2 are not exceeded.

- *Modified Level C* - General site work where personnel will be in direct contact with contaminated soil or groundwater, but respiratory protection is not required because contaminant action levels cited on Table 2 are not exceeded.

- *Level C* - General site work where personnel will be in direct contact with contaminated soil or groundwater, and organic vapor measurements or dust measurements are greater than those action levels cited on Table 2.

# 9.0 Contingency Plan

The Project Manager/Supervisor or HSO is responsible for implementing the Contingency Plan whenever there is either a threat to human health or an environmental hazard. Possible Contingency Plan situations include actual or imminent fires, explosions or spills.

The individual discovering the emergency situation is to notify the Project Supervisor or HSO who will then notify the facility manager for ACM and, or the appropriate organizations as described in Table 3.

## 9.1 Assessment

The Project Manager/Supervisor is responsible for ascertaining any possible health or environmental hazards and determining the need for evacuation and notification of the proper authorities.

## 9.2 Control Procedures

The team member or site employee discovering a fire, explosion, spill or other emergency situation is responsible for notifying the Project Supervisor or Site HSO and as much as possible, provide the information listed in Table 3.0. The Project Supervisor or HSO will assess the situation and notify the Tonawanda Self Storage representative to determine if it can be adequately handled by yard personnel or if additional assistance is needed.

Before any team member attempts to extinguish a fire, clean-up and contain a spill or take any action, he or she must be aware of the properties of the material involved and its associated hazards. All team members are familiarized with this information during the

initial tail grate safety meeting and are instructed on the proper protective clothing to be worn in such a situation.

Table 3 includes a list of the organizations that are available to provide emergency assistance.

## 9.3 Fire and/or Explosion

The most serious emergency situation that could be faced at the site would be a chemical release or major fire. In the event of a fire or explosion, the Project Supervisor or HSO should be notified as described in the preceding section. The Project Supervisor or HSO will notify the Fire Department immediately and work with the representative from the facility manager to notify tenants.

The Fire Department should be notified immediately once a fire is detected. Small fires can be extinguished using a fire extinguisher located at the site. Larger fires will require the assistance of the fire department. The fire department will be informed of the nature of the fire and wastes at the site, and if water can be used to extinguishing fire.

## 9.4 Spill and/or Material Releases

The procedure for notification of the Project Manager/Supervisor and, or HSO are described in Section 9.2. Immediately following the discovery of a spill the NYSDEC will be notified. In addition, the Comprehensive Environmental Response, Compensation, and Liability act of 1980 (CERCLA, or Superfund) requires that the National Response Center be notified of any release in excess of the reportable quantity of a listed material.

Spill clean-up poses no danger under normal conditions. The first step is to determine the source of the spill and correct it. This may involve patching a leaking drum, closing a valve or turning off a pump. In the event of a small spill, absorbent granules or sorbent pads will be utilized to soak up the spilled material. The granules would then be swept up and containerized in Department of Transportation approved drums.

In the event a large spill occurs, ACM's preferred remedial contractor will be called to bring in pumps and vacuum trucks and transfer spilled material from the collection area into storage tanks or drums. All absorbent materials will be placed in DOT approved drums.

Any contaminated structures and equipment must be properly cleaned before being returned to service. This procedure will include use of pressure washers and sorbent materials. All affected floors and equipment, pumps and hoses, will be cleaned with an appropriate detergent and rinsed with clear clean water.

## 10.0 Work Areas

The Project Manager/Supervisor, HSO, the representative from ACM, and if needed the Contractor, will clearly layout and identify work areas in the field and will limit equipment, operations, and personnel as defined in the following areas:

a) "Exclusion Zone" - This area will include all areas where environmental monitoring has shown, or it is suspected that a contamination may exist and be a potential exposure problem to workers. The level of personnel protective equipment required in these areas will be determined by the Site HSO. The area will be clearly delineated from the decontamination area. As work within the hazardous zone proceeds, the delineating boundary will be relocated as necessary to prevent the accidental contamination of nearby people and equipment. The Exclusion Zone will be delineated by plastic caution tape, barriers, or fencing (e.g. chain link, snow, or orange plastic fencing).

b) Contamination Reduction Zone (CRZ) - This zone will occur at the interface of "Contaminated" and "Clean" areas and will provide for the decontamination of equipment and materials and the transfer of equipment from the Clean Area to the Exclusion Zone. This area will contain all required emergency equipment, etc. This area will be clearly delineated by plastic tape, barriers or fencing (e.g. chain link, snow, or orange plastic fencing).

c) Support Zone ("Clean" Area) - This area is the remainder of the work site and project site. The "Clean" area will be clearly delineated, and procedures implemented to prevent active or passive contamination from the work site.

The function of the "Clean" area includes:

1) An entry area for personnel, material, and equipment to the "Contaminated Zone" area of site operations through the neutral zone.

2) An exit for decontaminated personnel, materials, and equipment from the "CRZ" area of site operations; and

3) A clean storage area for safety and work equipment.

## 11.0 Safety Equipment and Protective Clothing Specifications

All project team members and contractors will have the following safety equipment:

- Air purifying respirator with appropriate cartridges
- All protective clothing including, but not limited to:
    - Tyvek and washable PVC rain suits

  - Gloves
  - Boots

- Safety glasses
- Hearing protection
- Hard hats
- High visibility vest.

## 12.0 Air Emissions Control

The Project Team and subcontractor shall have on site all equipment and personnel necessary to monitor and control air emissions.

It is not expected that air emissions will pose a significant risk to health and safety or to the environment due to the nature of the contaminants on this project.

The Project Manager/Supervisor and/or the HSO will make the determination for requiring monitoring and control of air emissions with the assistance of the following monitoring equipment and the action levels cited on Table 2. It is anticipated that an organic vapor analyzer and chemical specific detection tubes will be used to measure the concentration of most organic contaminants in the air. These two measurement devices will handle the bulk of the real-time contaminant monitoring.

## 13.0 Additional Health and Safety Comments

1) The Site HSO will ensure that all safety equipment and protective clothing is kept clean and well maintained.

2) All prescription eyeglasses in use on this project will be safety glasses and will be compatible with respirators. No contact lenses shall be allowed on-site.

3) All disposable or reusable gloves worn on the site will be approved by the HSO.

4) During periods of prolonged respirator usage in contaminated areas, respirator filters will be changed upon breakthrough and at a minimum filters will be changed daily.

5) Footwear used on-site will be covered by rubber over-boots when entering or working in the "Exclusion Zone" area or "CRZ." Boots will be washed with water and detergents to remove dirt and contaminated sediment before leaving the "CRZ."

6) All personnel protective equipment used on-site will be decontaminated or disposed of at the end of the workday.

7) All air purifying respirators will be individually assigned and not interchanged between workers without cleaning and sanitizing.

8) Any team member or Contractor unable to pass a fit test as a result of facial hair or facial configuration shall not enter or work in an area that requires respiratory protection.

9) The Contractor will ensure that all project team members shall have vision or corrected vision to at least 20/40 in one eye.

10) Team members found to be disregarding any provision of this plan will, at the request of the HSO, be barred from the project.

11) Used disposable outerwear will be removed upon leaving CRZ and will be placed inside disposable containers labeled for that purpose. These containers will be stored at the site at the designated staging area. Leader will be responsible for proper disposal of these materials at the completion of the project.

12) Tyvek or PVC rain suits that become torn or badly soiled will be replace immediately.
13) Eating, drinking, chewing gum or tobacco, smoking, etc., will be prohibited in the exclusion zones and CRZ zones.

14) All personnel will thoroughly cleanse their hands, face, forearms, and other exposed areas prior to eating, smoking, or drinking.

15) All personnel will wash their hands, face, and forearms before using toilet facilities.

16) No alcohol, firearms, or drugs (without prescription) will be allowed on-site at any time.

# 14.0 Miscellaneous Health and Safety Items

## 14.1 Hypothermia

Pervious Clothing: When the ambient air temperature dips below 40$^{o}$ F. the Site HSO will begin to monitor employees for signs of hypothermia. Monitoring will take the form of measuring oral temperatures. The air temperature will be measured two times a day when the air temperature is expected to be below 40$^{o}$ F or as determined by the HSO.

Impervious Clothing: When the ambient air temperature has dip below 40$^{o}$ F. the HSO will begin to monitor employees for signs of hypothermia. Monitoring will take the form of measuring oral temperatures and checking an individual's verbal and physical responses. As the air temperature dips below 32$^{o}$ F., oral temperatures will be measured at the direction of the HSO and, or every hour during work periods.

In the event that the oral temperature at the beginning of the rest period drops below 96° F., the employee will be decontaminated and be advised to proceed to a heated room or vehicle and remove wet clothing and to drink warm fluids. At the end of the rest period, the oral temperature will be taken again to ensure that the employee's temperature is above 96° F. If the oral temperature has remained below 96° F., the employee will be advised to take a shower to increase his/her temperature. However, if the oral temperature still remains below 96° F. after the shower, the employee will be immediately sent to consult with a physician.

A fluid/electrolyte replacement will be used as necessary to minimize fluid loss. This liquid supplement will be stored in a cooler or thermos at the edge of the decontamination zone in plastic squeeze bottles. The plastic bottles will be marked with individual's names. Disposable cups with lids and straws may be used in place of the squeeze bottles.

Prior to drinking within the decontamination zone, the project personnel shall follow the following decontamination procedures:

1) Personnel shall wash and rinse their outer gloves and remove them.

2) Personnel shall remove their hard hats and respirators and place on a table.

3) Personnel shall remove their inner gloves and place them on a table.

4) Personnel shall wash and rinse their face and hands.

5) Personnel shall carefully remove their personal bottle or cup from the cooler to ensure that their outer clothes do not touch any bottles, cups, etc.

6) The used bottle or cups will not be returned to the cooler but will be placed in a receptacle or container to be cleaned or disposed of.

7) Personnel shall replace their respirators, hard hats, gloves, and tape gloves prior to re-entering the hazardous zone.

## 14.2 Retention On-Site

During the course of the project, it is expected that waste materials will be retained on-site until removed by ACM. All waste containers will be labeled according to DOT and other regulations where appropriate. Waste materials, both drummed and bulk, will be stored in designated areas. All waste drums will be sealed before they are moved from the exclusion zone.

## 14.3 Equipment and Material Decontamination

All equipment and material used in this project shall be thoroughly decontaminated using procedures described in the project Work Plan before it is removed from the project site. Debris and contaminated clothing and tools which cannot be decontaminated, shall be disposed of.

## 14.4 Communications

Telephone communications will be available at all times on the site. A telephone will be maintained with the Project Manager or Site Supervisor.

Communication procedures are outlined in the Contingency Plan in Section 9.0 of the Health and Safety Plan.

Table 3 contains an emergency call list and will be posted in one of the team member's vehicles and in the Tonawanda Self Storage office.

## 14.5 On-Site Hygiene Facilities

The office lavatories will be available for decontaminated team members and subcontractors. Water will be available in the CRZ for decontamination.

A first aid kit will be kept in the support zone at the Site at all times.

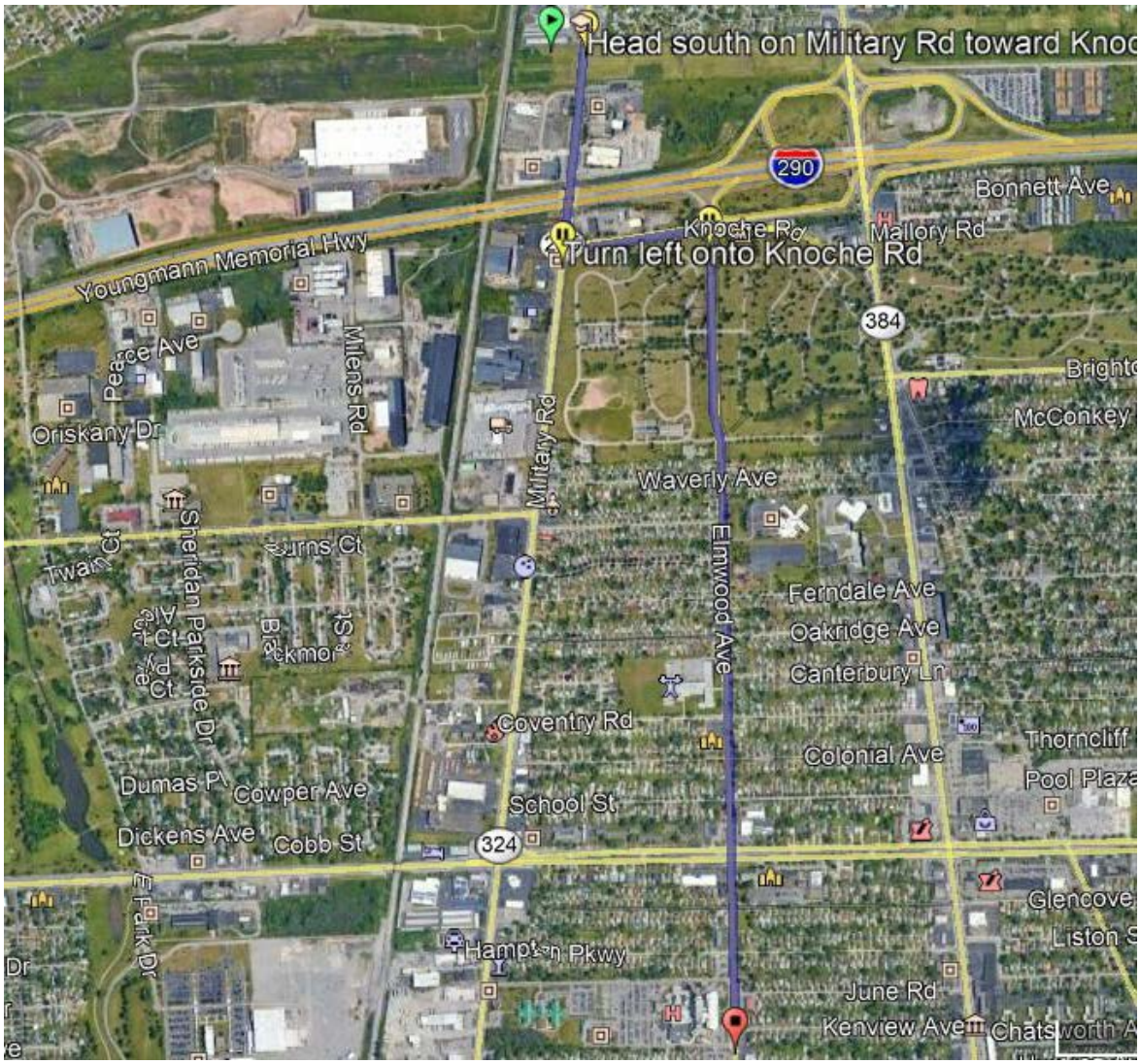
# 15.0 Tailgate Safety Meetings

The HSO or the designated representative will conduct daily tailgate safety meetings each workday and will be mandatory for all project personnel. The meetings will provide information on the anticipated site conditions and the work to be completed that day. Appendix A contains a form for documenting Safety Meetings. Completed forms will be retained in Leader's project file.

Additional safety meetings will be held on an as required basis.

# 16.0 Medical Surveillance

All team members and subcontractors that may potentially have contact with hazardous substances at concentrations above the permissible exposure level (PEL) will be part of a Medical Monitoring Program as outlined in 29CFR 1910.134 and 29CFR 1910.120.




Route to Hospital
Leaving the Site, make a right turn on Military Road.
Travel south approximately 0.3 miles and make a left (first traffic light south of Rt. 190) onto Knoche Road.
From Knoche Road travel east 0.2 miles and make left onto Elmwood Avenue (first traffic light).
From Elmwood Avenue travel south 1.15-miles to the hospital which on the right
(west) side of the road. The second entrance into the hospital leads to the Emergency Department
(716) 447-6121.

| | |
|---|---|
| Title | Route to Hospital<br>2950 Elmwood Avenue<br>Buffalo, New York |
| Prepared For | ACM Northfield CR#3, LLC<br>3144 South Winton Road<br>Rochester, New York |

Leader Professional Services
271 Marsh Road, Suite 2
Pittsford, NY 14534
(585) 248-2413
FAX (585) 248-2834

| | |
|---|---|
| Project | 235.198 |
| Date | 11/26/18 |
| Scale | Not to Scale |
| Drawn | PVS |
| Checked | MPR |
| File Name | Hospital Map |
| Figure | 1 |

**TABLE 1**

**KNOWN AND POTENTIAL HEALTH AND SAFETY HAZARDS**
**BISONITE PAINT COMPANY**
**TONAWANDA, NEW YORK**

Known and Potential Site Hazards: *Chemical* (See Appendix B for information sheets and/or MSDSs)

1) Contaminants

- Xylene
- Toluene
- Antimony
- Barium
- Chromium
- Lead
- Mercury

2) Review of Symptoms

Symptoms of exposure to hazardous wastes and in particular to the contaminants above will be reviewed with all site personnel. Symptoms of both acute and chronic exposures will be covered. In addition, the on-site coordinators will be advised to watch for outward evidence of changes in workers' health. These outward symptoms may include fatigue, tremor, insomnia, skin irritations or discoloration, eye, nose and throat irritation, cough, or abdominal soreness.

Note the number and nature of potential contaminants mandate that contact of waste materials with the exposed skin must not be allowed to occur under any circumstances.

Known and Potential Site Hazards: *Non-Chemical*

- General Physical Hazards. Since the project will take place at an active truck terminal, the physical hazards include:

  Vehicular traffic
  Underground and aboveground utilities
  Slip, trip, and fall

# TABLE 2

## ACTION LEVELS
## BISONITE PAINT COMPANY
## TONAWANDA, NEW YORK

| Unknown Organic Vapor Concentrations (ppm)[1] | Level of Protection |
|---|---|
| < 1 | Level D |
| ≥ 1 < 10 | Level C |
| >10 | Level B |
| **Anticipated Chemical Contaminants[2]** | **Time Weight Average (ppm)** |
| Xylene | 100 |
| Toluene | 100 |
| Metals (as Mercury dust) | <0.025 mg/cubic meter |

Note:

1 Unknown organic vapor action levels are based on the lowest known exposure limits for chlorine (PEL = 1 ppm, IDLH = 30 ppm). The air purifying cartridge limitation for chlorine is 10 ppm.

**TABLE 3**

**EMERGENCY CALL LIST**
**BISONITE PAINT COMPANY**
**TONAWANDA, NEW YORK**

Fires - Spills

| | |
|---|---|
| Tonawanda Fire Department | 911 |

Public Services

| | |
|---|---|
| Tonawanda Police Emergency | 911 |

Emergency Medical Services

| | |
|---|---|
| Kenmore Mercy Hospital (Emergency Department) | (716) 447-6121 |

**SPILL NOTIFICATION**

Agencies

| | |
|---|---|
| National Response Center | (800) 424-8802 |
| Local DEC Office Region 9 | (716) 851-7220 |
| Spill Hotline | (800) 457-7362 |

Provide the following information to the agencies:

- Name of person making the call
- Company and location
- Nature of fire (fire calls only)
- Name and estimated amount of chemical released to the environment (spills only)
- Time of release
- Remedial action taken to correct the problem

**Site Contacts**

| | |
|---|---|
| Joshua M. Vaccaro (NYSDEC Project Manager) | (716) 851-7220 |
| Shaun Surani (Public Health Specialist, NYSDOH) | (518) 402-7860 |
| Dixon Rollins, P.E. (Leader Professional Services-Rochester) | (585) 248-2413 |
| Michael Rumrill (Leader Professional Services – Rochester) | (585) 248-2413 |

# APPENDIX A

# SAFETY MEETING SIGN-OFF SHEETS

# SAFETY MEETING ATTENDENCE SIGN-OFF SHEET

| Person/Company | Date |
|---|---|
| | |
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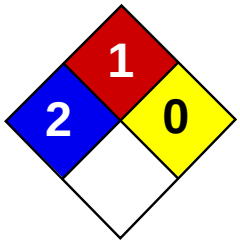
# APPENDIX B

# MSDS



# Material Safety Data Sheet
## Antimony MSDS

## Section 1: Chemical Product and Company Identification

**Product Name:** Antimony

**Catalog Codes:** SLA1453, SLA4462

**CAS#:** 7440-36-0

**RTECS:** CC4025000

**TSCA:** TSCA 8(b) inventory: Antimony

**CI#:** Not available.

**Synonym:** Stibium

**Chemical Name:** Not available.

**Chemical Formula:** Sb

**Contact Information:**

**Sciencelab.com, Inc.**
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

**CHEMTREC (24HR Emergency Telephone), call:**
1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

## Section 2: Composition and Information on Ingredients

**Composition:**

| Name | CAS # | % by Weight |
|---|---|---|
| Antimony | 7440-36-0 | 100 |

**Toxicological Data on Ingredients:** Antimony: ORAL (LD50): Acute: 7000 mg/kg [Rat].

## Section 3: Hazards Identification

**Potential Acute Health Effects:**
Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator).

**Potential Chronic Health Effects:**
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to blood, kidneys, lungs, the nervous system, liver, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

## Section 4: First Aid Measures

**Eye Contact:**
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

**Skin Contact:**
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

**Serious Skin Contact:**
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

**Inhalation:**
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:**
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

**Ingestion:**
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** Not available.

**Flammable Limits:** Not available.

**Products of Combustion:** Some metallic oxides.

**Fire Hazards in Presence of Various Substances:** Not available.

**Explosion Hazards in Presence of Various Substances:**
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:** Not available.

## Section 6: Accidental Release Measures

**Small Spill:** Use appropriate tools to put the spilled solid in a convenient waste disposal container.

**Large Spill:**
Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

**Precautions:**
Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In

case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area.

## Section 8: Exposure Controls/Personal Protection

**Engineering Controls:**
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:**
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**
TWA: 0.5 Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid.

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 121.75 g/mole

**Color:** Not available.

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 1635°C (2975°F)

**Melting Point:** 630°C (1166°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 6.691 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Not available.

**Solubility:** Insoluble in cold water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Not available.

**Incompatibility with various substances:** Not available.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Eye contact. Inhalation. Ingestion.

**Toxicity to Animals:** Acute oral toxicity (LD50): 7000 mg/kg [Rat].

**Chronic Effects on Humans:** Causes damage to the following organs: blood, kidneys, lungs, the nervous system, liver, mucous membranes.

**Other Toxic Effects on Humans:**
Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator).

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Human: passes through the placenta, excreted in maternal milk.

**Special Remarks on other Toxic Effects on Humans:** Not available.

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are more toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**

## Section 14: Transport Information

**DOT Classification:** CLASS 6.1: Poisonous material.

**Identification:** : Antimony powder UNNA: UN2871 PG: III

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

**Federal and State Regulations:**
Pennsylvania RTK: Antimony Massachusetts RTK: Antimony TSCA 8(b) inventory: Antimony

**Other Regulations:** OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

**Other Classifications:**

**WHMIS (Canada):**
CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):** R36/38- Irritating to eyes and skin.

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 1

**Reactivity:** 0

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 2

**Flammability:** 1

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

## Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/11/2005 11:19 AM

**Last Updated:** 05/21/2013 12:00 PM

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Laguna Clay Company
14400 Lomitas Ave
City of Industry, CA 91746
1-800-4Laguna
info@lagunaclay.com
www.lagunaclay.com

**SAFETY DATA SHEET**
North American Version

# BARIUM CARBONATE

## 1. PRODUCT AND COMPANY IDENTIFICATION

### 1.1. Identification of the substance or mixture

| | | |
|---|---|---|
| Product name | : | BARIUM CARBONATE |
| Product grade(s) | : | A , B , C , D<br>Barium Carbonate Granular<br>Barium Carbonate Powder |
| Chemical Name | : | Barium carbonate |
| Synonyms | : | Barium salt |
| Molecular formula | : | $BaCO_3$ |
| Molecular Weight | : | 197.3 g/mol |

### 1.2. Use of the Substance/Mixture

Recommended use :

- Use in the manufacturing of other barium substances
- Use as reactive processing aid (sulfate removal)
- Glass industry
- Manufacture of ceramic materials
- Manufacture of electro-ceramic materials
- Manufacture of glazes, frits and enamels
- Use in welding electrode coating
- Use in the preparation of slurry
- Manufacture of pyrotechnical products
- Welding in industrial and professional settings
- For further information, please contact: Supplier

### 1.3. Company/Undertaking Identification

Address : SOLVAY CHEMICALS, INC.
3333 RICHMOND AVENUE
HOUSTON TX 77098-3099
United States

### 1.4. Emergency and contact telephone numbers

| | | |
|---|---|---|
| **Emergency telephone number** | : | **1 (800) 424-9300 CHEMTREC ® (USA & Canada)**<br>**01-800-00-214-00 (MEX. REPUBLIC)** |
| **Contact telephone number (product information):** | : | **US: +1-800-765-8292 (Product information)**<br>**US: +1-713-525-6500 (Product information)** |

## 2. HAZARDS IDENTIFICATION

### 2.1. Emergency Overview:

| | | |
|---|---|---|
| NFPA | : | H= 2 F= 0 I= 1 S= None |
| HMIS | : | H= 2 F= 0 R= 1 PPE = Supplied by User; dependent on local conditions |



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SOLVAY Chemicals

SOLVAY

Distributed by:
Laguna Clay Company
14400 Lomitas Ave
City of Industry, CA 91746
1-800-4Laguna
info@lagunaclay.com
www.lagunaclay.com

***General Information***

| | | |
|---|---|---|
| Appearance | : | powder, pellets |
| Colour | : | white |
| Odour | : | odourless |

**2.2. Potential Health Effects:**

***Inhalation***
- May cause irritation of the mucous membranes.

***Eye contact***
- Contact with eyes may cause irritation.

***Skin contact***
- Prolonged skin contact may cause skin irritation.

***Ingestion***
- Acute intoxication by inhalation or ingestion of water soluble barium salts causes vomiting, diarrhoea, convulsive tremors and muscular paralysis.
- Risk of convulsions, pulmonary arrest.
- Risk of cardiac rhythm alteration, sudden cardiac failure.
- Risk of shock.

***Other toxicity effects***
- See section 11: Toxicological Information

**2.3. Environmental Effects:**
- See section 12: Ecological Information

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

**Barium carbonate**

| | | |
|---|---|---|
| CAS-No. | : | 513-77-9 |
| **Concentration** | : | **>= 97.0 %** |

## 4. FIRST AID MEASURES

**4.1. Inhalation**
- Move to fresh air.
- If symptoms persist, call a physician.

**4.2. Eye contact**
- Rinse thoroughly with plenty of water, also under the eyelids.
- If eye irritation persists, consult a specialist.

**4.3. Skin contact**
- Remove and wash contaminated clothing before re-use.
- Wash off with plenty of water.
- If symptoms persist, call a physician.

**4.4. Ingestion**
- Call a physician immediately.
- Take victim immediately to hospital.
- If swallowed, rinse mouth with water (only if the person is conscious).
- Artificial respiration and/or oxygen may be necessary.

**4.5. Notes to physician**

***Exposure to decomposition products :***



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info@lagunaclay.com
www.lagunaclay.com

- Give to drink 30 grams of sodium sulphate in 250 ml of fresh water.
- Immediate medical attention is required.
- Medical examination necessary even only on suspicion of intoxication.

## 5. FIREFIGHTING MEASURES

**5.1. Suitable extinguishing media**
- Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

**5.2. Extinguishing media which shall not be used for safety reasons**
- None.

**5.3. Special exposure hazards in a fire**
- Not combustible.

**5.4. Hazardous decomposition products**
- Barium oxide
- Other hazardous decomposition products may be formed.

**5.5. Special protective equipment for firefighters**
- In the event of fire, wear self-contained breathing apparatus.
- Use personal protective equipment.

## 6. ACCIDENTAL RELEASE MEASURES

**6.1. Personal precautions, protective equipment and emergency procedures**

6.1.1. Advice for non-emergency personnel
- Evacuate personnel to safe areas.

6.1.2. Advice for emergency responders
- Use personal protective equipment.
- Prevent further leakage or spillage.

**6.2. Environmental precautions**
- Should not be released into the environment.
- Local authorities should be advised if significant spillages cannot be contained.

**6.3. Methods and materials for containment and cleaning up**
- Pick up and transfer to properly labelled containers.
- Keep in suitable, closed containers for disposal.

**6.4. Reference to other sections**
- Refer to protective measures listed in sections 7 and 8.

## 7. HANDLING AND STORAGE

**7.1. Handling**
- Ensure adequate ventilation.
- Avoid contact with skin and eyes.

**7.2. Storage**
- Store in original container.
- Keep in a well-ventilated place.
- Keep in a dry place.
- Keep in properly labelled containers.
- Keep container closed.



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- Keep away from Incompatible products.

### 7.3. Packaging material

- Paper + PE.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1. Exposure Limit Values

**Barium carbonate**

- US. ACGIH Threshold Limit Values 2009
  time weighted average = 0.5 mg/m3
  Remarks: as Ba
- US. OSHA Table Z-1-A (29 CFR 1910.1000) 1989
  time weighted average = 0.5 mg/m3
  Remarks: as Ba
- US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) 02 2006
  Permissible exposure limit = 0.5 mg/m3
  Remarks: as Ba
- US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A 06 2008
  time weighted average = 0.5 mg/m3
  Remarks: as Ba

**Strontium carbonate**

- US. ACGIH Threshold Limit Values
  Remarks: none established

**Barium sulfate**

- US. ACGIH Threshold Limit Values 12 2010
  time weighted average = 10 mg/m3
- US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) 02 2006
  Permissible exposure limit = 5 mg/m3
- US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) 02 2006
  Permissible exposure limit = 15 mg/m3
- US. OSHA Table Z-1-A (29 CFR 1910.1000) 1989
  time weighted average = 5 mg/m3
- US. OSHA Table Z-1-A (29 CFR 1910.1000) 1989
  time weighted average = 10 mg/m3
- US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A 06 2008
  time weighted average = 5 mg/m3
  Remarks: respirable dust fraction
- US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A 06 2008
  time weighted average = 10 mg/m3
  Remarks: Total dust

ACGIH® and TLV® are registered trademarks of the American Conference of Governmental Industrial Hygienists.
SAEL = Solvay Acceptable Exposure Limit, Time Weighted Average for 8 hour workdays. No Specific TLV STEL (Short Term Exposure Level) has been set. Excursions in exposure level may exceed 3 times the TLV TWA for no more than a total of 30 minutes during a workday and under no circumstances should they exceed 5 times the TLV TWA.

### 8.2. Engineering controls

- Apply technical measures to comply with the occupational exposure limits.

### 8.3. Personal protective equipment

#### *8.3.1. Respiratory protection*

- In case of insufficient ventilation, wear suitable respiratory equipment.
- Self-contained breathing apparatus (EN 133)



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- Respirator with a dust filter
- Use only respiratory protection that conforms to international/ national standards.
- Use NIOSH approved respiratory protection.

***8.3.2. Hand protection***

- Impervious gloves
- Suitable material: PVC, Neoprene, Natural Rubber

***8.3.3. Eye protection***

- Dust proof goggles, if dusty.

***8.3.4. Skin and body protection***

- Long sleeved clothing

***8.3.5. Hygiene measures***

- Eye wash bottles or eye wash stations in compliance with applicable standards.
- When using do not eat, drink or smoke.
- Wash hands before breaks and at the end of workday.
- Handle in accordance with good industrial hygiene and safety practice.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### 9.1. General Information

| | | |
|---|---|---|
| **Appearance** | : | powder, pellets |
| **Colour** | : | white |
| **Odour** | : | odourless |

### 9.2. Important health safety and environmental information

| | | |
|---|---|---|
| **pH** | : | 5 - 7 |
| **Boiling point/boiling range** | : | *Remarks*: not applicable, Thermal decomposition |
| **Flash point** | : | *Remarks*: not applicable |
| **Flammability** | : | *Remarks*: The product is not flammable. |
| **Explosive properties** | : | *Explosion danger*:<br>*Remarks*: Not explosive |
| **Oxidizing properties** | : | *Remarks*: Non oxidizer |
| **Vapour pressure** | : | *Remarks*: not applicable |
| **Relative density / Density** | : | 4.31 |
| **Bulk density** | : | from 400 - 2,000 kg/m3 |
| **Solubility(ies)** | : | 14 mg/l (Water)<br>*Temperature*: 20 °C ( 68 °F ) |
| **Partition coefficient: n-octanol/water** | : | *Remarks*: not applicable |
| **Vapour density** | : | *Remarks*: not applicable |
| **Evaporation rate** | : | *Remarks*: not applicable |

### 9.3. Other data



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| | | |
|---|---|---|
| **Melting point/range** | : | >= 900 °C ( 1,652 °F )<br>*Remarks*: Thermal decomposition |
| **Auto-flammability** | : | *Remarks*: not applicable |
| **Granulometry** | : | 2.32 - 14.6 µm (powder)<br>*Remarks*: d 50 |
| **Decomposition temperature** | : | 1,380 °C ( 2,516 °F ) |

## 10. STABILITY AND REACTIVITY

### 10.1. Stability
- Stable under recommended storage conditions.

### 10.2. Conditions to avoid
- none
- Keep at temperature not exceeding: 1,380 °C ( 2,516 °F )

### 10.3. Materials to avoid
- Acids

### 10.4. Hazardous decomposition products
- Barium oxide, Other hazardous decomposition products may be formed.

## 11. TOXICOLOGICAL INFORMATION

### Toxicological data

***Acute oral toxicity***
- LD50, rat, < 300 mg/kg (Barium chloride anhydrous)
- LD50, rat, > 300 mg/kg, Remarks. practically insoluble

***Acute inhalation toxicity***
- LC50, , Remarks study scientifically unjustified

***Acute dermal irritation/corrosion***
- LD50, rat, > 2,000 mg/kg (Barium chloride anhydrous)

***Skin irritation***
- rabbit, No skin irritation

***Eye irritation***
- rabbit, No eye irritation

***Sensitisation***
- Did not cause sensitization. (Barium chloride anhydrous)

***Chronic toxicity***
- Inhalable dust, Repeated exposure, rat, Target Organs: cardio-vascular system, hematology system, Respiratory system, NOEL: 5.2 mg/m3, observed effect
- Inhalable dust, NOEL: 1 mg/m3, NOAEL
- Oral, Repeated exposure, rat/mouse, Target Organs: cardio-vascular system, hematology system, renal system, adrenal glands, NOEL: 87.8 mg/kg, NOAEL

***Carcinogenicity***
- Oral, Prolonged exposure, rat/mouse, Animal testing did not show any carcinogenic effects., (Barium chloride anhydrous)

***Genetic toxicity in vitro***
- in vitro, Animal testing did not show any mutagenic effects. (Barium chloride anhydrous)



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***Reproductive toxicity***

- Effect on fertility, Repeated exposure, Target Organs: Oral, 258 - 290 mg/kg, NOAEL, Barium chloride anhydrous)

***Remarks***

- Harmful if swallowed.
- The toxicity is mainly linked to the barium ion (nervous, cardiovascular, respiratory and gastro-intestinal troubles).
- Risk of effect on the liver, the cardiovascular system, the hematological system and the adrenals
- Irritating to eyes and skin.

## 12. ECOLOGICAL INFORMATION

### 12.1. Ecotoxicity effects

***Acute toxicity***

- Remarks: Aquatic toxicity is unlikely due to low solubility.
- Fishes, Brachydanio rerio, LC50, 96 h, > 152 mg/l (Barium chloride anhydrous)
- Crustaceans, Daphnia magna, LC50, 48 h, 14.5 mg/l (Barium chloride anhydrous)

***Chronic toxicity***

- Crustaceans, Daphnia magna, EC50, 21 Days, 2.9 mg/l
- Pseudokirchneriella subcapitata (green algae), growth rate, 72 h, >= 61 mg/l
  Remarks: NOEC
- Pseudokirchneriella subcapitata (green algae), EC50, growth rate, 72 h, > 100 mg/l

### 12.2. Mobility

- Air
  Remarks: mobility as solid aerosols
- Water/soil
  Remarks: low solubility and mobility

### 12.3. Persistence and degradability

***Abiotic degradation***

- Water/soil
  Result: slow ionization and cation precipitation in presence of sulfates or carbonates

***Biodegradation***

- Remarks: The methods for determining biodegradability are not applicable to inorganic substances.

### 12.4. Bioaccumulative potential

- Bioconcentration
  Result: potential accumulation of the cation

### 12.5. Other adverse effects

- no data available

### 12.6. Remarks

- Ecological injuries are not known or expected under normal use.
- Persistent product mainly in its inert form.

## 13. DISPOSAL CONSIDERATIONS

### 13.1. Waste from residues / unused products

- In accordance with local and national regulations.
- Use a solution of sodium or magnesium sulphate or possibly a dilute solution of sulphuric acid to form a sulphate precipitate.



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- Dispose of wastes in an approved waste disposal facility.

**13.2. Packaging treatment**

- Containers that cannot be cleaned must be treated as waste.
- Must be incinerated in a suitable incineration plant holding a permit delivered by the competent authorities.

**13.3. RCRA Hazardous Waste**

- Listed RCRA Hazardous Waste (40 CFR 302) - No
- Unlisted RCRA Hazardous Waste (40 CFR 302) - Yes
- D005 (barium containing waste)

## 14. TRANSPORT INFORMATION

- not regulated

## 15. REGULATORY INFORMATION

**15.1. Inventory Information**

| | | |
|---|---|---|
| **Toxic Substance Control Act list (TSCA)** | : - | In compliance with inventory. |
| **Australian Inventory of Chemical Substances (AICS)** | : - | In compliance with inventory. |
| **Canadian Domestic Substances List (DSL)** | : - | In compliance with inventory. |
| **Korean Existing Chemicals Inventory (KECI (KR))** | : - | In compliance with inventory. |
| **EU list of existing chemical substances (EINECS)** | : - | In compliance with inventory. |
| **Japanese Existing and New Chemical Substances (MITI List) (ENCS)** | : - | In compliance with inventory. |
| **Inventory of Existing Chemical Substances (China) (IECS)** | : - | In compliance with inventory. |
| **Philippine Inventory of Chemicals and Chemical Substances (PICCS)** | : - | In compliance with inventory. |
| **New Zealand Inventory of Chemicals (NZIOC)** | : - | In compliance with inventory. |

**15.2. Other regulations**

***US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A)***

- not regulated.

***SARA Hazard Designation (SARA 311/312)***

- Acute Health Hazard: Yes.

***US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required***

- not regulated.

***US. EPA CERCLA Hazardous Substances (40 CFR 302)***

- not regulated.



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***US. New Jersey Worker and Community Right-to-Know Act (New Jersey Statute Annotated Section 34:5A-5)***
- yes.

***US. Pennsylvania Worker and Community Right-to-Know Law (34 Pa. Code Chap. 301-323)***
- yes.

***US. California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)***
- not regulated.

## 16. OTHER INFORMATION

**Ratings :**

**NFPA (National Fire Protection Association)**
Health = 2 Flammability = 0 Instability = 1 Special =None

**HMIS (Hazardous Material Information System)**
Health = 2 Fire = 0 Reactivity = 1 PPE : Supplied by User; dependent on local conditions

**Further information**
- Update
  This data sheet contains changes from the previous version in section(s): 8 , 11 , 12 , 15
- Distribute new edition to clients

Material Safety Data Sheets contain country specific regulatory information; therefore, the MSDS's provided are for use only by customers of the company mentioned in section 1 in North America. If you are located in a country other than Canada, Mexico or the United States, please contact the Solvay Group company in your country for MSDS information applicable to your location.

The previous information is based upon our current knowledge and experience of our product and is not exhaustive. It applies to the product as defined by the specifications. In case of combinations or mixtures, one must confirm that no new hazards are likely to exist. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and integrity of the work environment. (Unless noted to the contrary, the technical information applies only to pure product).

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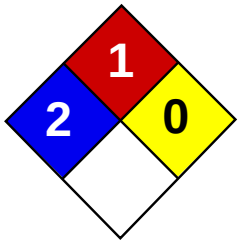


| | |
|---|---|
| Health | 2 |
| Fire | 1 |
| Reactivity | 0 |
| Personal Protection | E |

# Material Safety Data Sheet
## Chromium MSDS

## Section 1: Chemical Product and Company Identification

**Product Name:** Chromium

**Catalog Codes:** SLC4711, SLC3709

**CAS#:** 7440-47-3

**RTECS:** GB4200000

**TSCA:** TSCA 8(b) inventory: Chromium

**CI#:** Not applicable.

**Synonym:** Chromium metal; Chrome; Chromium Metal Chips 2" and finer

**Chemical Name:** Chromium

**Chemical Formula:** Cr

**Contact Information:**

**Sciencelab.com, Inc.**
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

**CHEMTREC (24HR Emergency Telephone), call:** 1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

## Section 2: Composition and Information on Ingredients

**Composition:**

| Name | CAS # | % by Weight |
|---|---|---|
| Chromium | 7440-47-3 | 100 |

**Toxicological Data on Ingredients:** Chromium LD50: Not available. LC50: Not available.

## Section 3: Hazards Identification

**Potential Acute Health Effects:**
Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Slightly hazardous in case of ingestion.

**Potential Chronic Health Effects:**
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, lungs, liver, upper respiratory tract. Repeated or prolonged exposure to the substance can produce target organs damage.

## Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

**Skin Contact:**
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

**Serious Skin Contact:**
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

**Inhalation:**
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:** Not available.

**Ingestion:**
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** 580°C (1076°F)

**Flash Points:** Not available.

**Flammable Limits:** Not available.

**Products of Combustion:** Some metallic oxides.

**Fire Hazards in Presence of Various Substances:**
Slightly flammable to flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

**Explosion Hazards in Presence of Various Substances:**
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:**
Moderate fire hazard when it is in the form of a dust (powder) and burns rapidly when heated in flame. Chromium is attacked vigorously by fused potassium chlorate producing vivid incandescence. Pyrophoric chromium unites with nitric oxide with incandescence. Incandescent reaction with nitrogen oxide or sulfur dioxide.

**Special Remarks on Explosion Hazards:**
Powdered Chromium metal +fused ammonium nitrate may react violently or explosively. Powdered Chromium will explode spontaneously in air.

## Section 6: Accidental Release Measures

**Small Spill:**
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

**Large Spill:**
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

**Precautions:**
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids, alkalis.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area.

## Section 8: Exposure Controls/Personal Protection

**Engineering Controls:**
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:**
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**
TWA: 0.5 (mg/m3) from ACGIH (TLV) [United States] TWA: 1 (mg/m3) from OSHA (PEL) [United States] TWA: 0.5 (mg/m3) from NIOSH [United States] TWA: 0.5 (mg/m3) [United Kingdom (UK)] TWA: 0.5 (mg/m3) [Canada]Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid. (Metal solid.)

**Odor:** Odorless.

**Taste:** Not available.

**Molecular Weight:** 52 g/mole

**Color:** Silver-white to Grey.

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 2642°C (4787.6°F)

**Melting Point:** 1900°C (3452°F) +/- !0 deg. C

**Critical Temperature:** Not available.

**Specific Gravity:** 7.14 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Not available.

**Solubility:**
Insoluble in cold water, hot water. Soluble in acids (except Nitric), and strong alkalies.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Excess heat, incompatible materials

**Incompatibility with various substances:** Reactive with oxidizing agents, acids, alkalis.

**Corrosivity:** Not available.

**Special Remarks on Reactivity:**
Incompatible with molten Lithium at 180 deg. C, hydrogen peroxide, hydrochloric acid, sulfuric acid, most caustic alkalies and alkali carbonates, potassium chlorate, sulfur dioxide, nitrogen oxide, bromine pentafluoride. It may react violently or ignite with bromine pentafluoride. Chromium is rapidly attacked by fused sodium hydroxide + potassium nitrate. Potentially hazardous incompatibility with strong oxidizers.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Inhalation. Ingestion.

**Toxicity to Animals:**
LD50: Not available. LC50: Not available.

**Chronic Effects on Humans:**
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: kidneys, lungs, liver, upper respiratory tract.

**Other Toxic Effects on Humans:**
Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of ingestion.

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:**
May cause cancer based on animal data. There is no evidence that exposure to trivalent chromium causes cancer in man.

**Special Remarks on other Toxic Effects on Humans:**
Acute Potential Health Effects: May cause skin irritation. Eyes: May cause mechanical eye irritation. Inhalation: May cause irritation of the respiratory tract and mucous membranes of the respiratory tract. Ingestion: May cause gastrointestinal tract irritation with nausea, vomiting, diarrhea. Chronic Potential Health Effects: Inhalation: The effects of chronic exposure include irritation , sneezing, reddness of the throat, bronchospasm, asthma, cough, polyps, chronic inflammation, emphysema, chronic bronchitis, pharyngitis, bronchopneumonia, pneumoconoisis. Effects on the nose from chronic chromium exposure include irritation, ulceration, and perforation of the nasal septum. Inflammation and ulceration of the larynx may also occur. Ingestion or Inhalation: Chronic exposure may cause liver and kidney damage.

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The product itself and its products of degradation are not toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

## Section 14: Transport Information

**DOT Classification:** Not a DOT controlled material (United States).

**Identification:** Not applicable.

**Special Provisions for Transport:** Not applicable.

## Section 15: Other Regulatory Information

**Federal and State Regulations:**
Connecticut hazardous material survey.: Chromium Illinois toxic substances disclosure to employee act: Chromium Illinois chemical safety act: Chromium New York release reporting list: Chromium Rhode Island RTK hazardous substances: Chromium Pennsylvania RTK: Chromium Minnesota: Chromium Michigan critical material: Chromium Massachusetts RTK: Chromium Massachusetts spill list: Chromium New Jersey: Chromium New Jersey spill list: Chromium Louisiana spill reporting: Chromium California Director's List of Hazardous Substances: Chromium TSCA 8(b) inventory: Chromium SARA 313 toxic chemical notification and release reporting: Chromium CERCLA: Hazardous substances.: Chromium: 5000 lbs. (2268 kg)

**Other Regulations:**
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):** Not controlled under WHMIS (Canada).

**DSCL (EEC):**
R40- Limited evidence of carcinogenic effect S36/37/39- Wear suitable protective clothing, gloves and eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 1

**Reactivity:** 0

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 2

**Flammability:** 1

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles.

## Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 08:16 PM

**Last Updated:** 05/21/2013 12:00 PM

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# Lead

**SAFETY DATA SHEET**

## 1 PRODUCT AND SUPPLIER IDENTIFICATION

**Product Name**: Lead - pellets, shot, sheet, foil, rod, wire, target

**Formula**: Pb

**Supplier**: ESPI Metals

1050 Benson Way

Ashland, OR 97520

**Telephone**: 800-638-2581

**Fax**: 541-488-8313

**Email**: sales@espimetals.com

**Emergency**: Infotrac 800-535-5053 (US) or 352-323-3500 (24 hour)

**Recommended Uses**: Scientific Research

## 2 HAZARDS IDENTIFICATION

**GHS Classification (29 CFR 1910.1200)**: Acute toxicity, category 4, Carcinogenicity, category 2, Reproductive toxicity, category 2.

**GHS Label Elements**:

**Signal Word**: Warning

**Hazard Statements**: H302 Harmful if swallowed, H332 Harmful if inhaled, H351 Suspected of causing cancer, H361 Suspected of damaging fertility or the unborn child.

**Precautionary Statements**: P260 Do not breath dust/fume/gas/mist/vapors/spray, P264 Wash hands thoroughly after handling, P281 Use personal protective equipment as required, P301+P304+P312 IF SWALLOWED OR INHALED: Call a POISON CENTER or doctor/physician if you feel unwell.

## 3 COMPOSITION/INFORMATION ON INGREDIENTS

**Ingredient**: Lead

**CAS#**: 7439-92-1

**%**: 100

**EC#**: 231-100-4

## 4 FIRST AID MEASURES

**General Measures**: Under normal handling and use, exposure to solid forms of this material present few health hazards. Subsequent operations such as grinding, melting or welding may produce hazardous dust or fumes which can be inhaled or come in contact with the skin or eyes. Emergency responders should take care to avoid secondary exposure to lead particulate. Wear appropriate protective equipment.

**INHALATION**: Remove to fresh air, keep warm and quiet, give oxygen if breathing is difficult. Seek immediate medical attention.

**INGESTION**: Rinse mouth with water. Do not induce vomiting. Seek immediate medical attention. Never induce vomiting or give anything by mouth to an unconscious person.

**SKIN**: Remove contaminated clothing, wash affected area with soap and water. Seek medical attention. Wash contaminated clothing before reusing.

**EYES**: Flush eyes with lukewarm water, including under upper and lower eyelids, for at least 15 minutes. Seek medical attention.

**Most Important Symptoms/Effects, Acute and Delayed**: May cause irritation. See section 11 for more information.

**Indication of Immediate Medical Attention and Special Treatment**: No other information available.

## 5 FIREFIGHTING MEASURES

**Extinguishing Media**: Use suitable extinguishing agent for surrounding materials and type of fire.

**Unsuitable Extinguishing Media**: No information available.

**Specific Hazards Arising from the Material**: This product does not present fire or explosion hazards as shipped. Fine dust from processing is a weak to moderate fire hazard if allowed to accumulate and subjected to an ignition source. Under fire conditions toxic fumes of lead oxide may be released.

**Special Protective Equipment and Precautions for Firefighters**: Full face, self-contained breathing apparatus and full protective clothing when necessary.

## 6 ACCIDENTAL RELEASE MEASURES

**Personal Precautions, Protective Equipment, and Emergency Procedures**: Wear appropriate respiratory

and protective equipment specified in section 8. Avoid creating dusts. Avoid breathing dust or fume. Isolate spill area and provide ventilation.

**Methods and Materials for Containment and Cleaning Up**: For larger pieces - pick up mechanically. For chips or dust - vacuum using a HEPA filter. Place in properly labeled closed containers. Avoid creating dusts. Do not use compressed air.

**Environmental Precautions**: Do not allow to enter drains or to be released to the environment.

## 7 HANDLING AND STORAGE

**Precautions for Safe Handling**: Handle in a well-ventilated area. Avoid creating dust. Avoid exposure to high temperature. Avoid breathing dust or fumes. Avoid contact with skin and eyes. Wash thoroughly before eating or smoking. See section 8 for information on personal protection equipment.

**Conditions for Safe Storage, Including Any Incompatibilities**: Store in a sealed container. Store in a cool, dry area. Protect from moisture. Do not store together with strong oxidizers or acids. See section 10 for more information on incompatible materials.

## 8 EXPOSURE CONTROLS AND PERSONAL PROTECTION

**Exposure Limits**: Lead

**OSHA/PEL**: 50 µg/$m^3$

**ACGIH/TLV**: 0.05 mg/$m^3$

**Appropriate Engineering Controls**: Whenever possible the use of local exhaust ventilation or other engineering controls is the preferred method of controlling exposure to airborne dust and fume to meet established occupational exposure limits. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air. Clothing worn in areas of exposure to lead dust or fume should be restricted to the workplace and laundered regularly.

**Individual Protection Measures, Such as Personal Protective Equipment**:

**Respiratory Protection**: When potential exposures are above the occupational limits, approved respirators must be used.

**Eye Protection**: Safety glasses

**Skin Protection**: Wear impermeable gloves, protective work clothing as necessary.

## 9 PHYSICAL AND CHEMICAL PROPERTIES

**Appearance**:

**Form**: Solid in various forms

**Color**: Silvery metallic

**Odor**: Odorless

**Odor Threshold**: Not determined

**pH**: N/A

**Melting Point**: 327.5 $^{O}$C

**Boiling Point**: 1740 $^{O}$C

**Flash Point**: N/A

**Evaporation Rate**: N/A

**Flammability**: No data

**Upper Flammable Limit**: No data

**Lower Flammable Limit**: No data

**Vapor Pressure**: 1 mm Hg @ 973 $^{O}$C

**Vapor Density**: N/A

**Relative Density (Specific Gravity)**: 11.34 g/cc

**Solubility in $H_2O$**: Insoluble

**Partition Coefficient (n-octanol/water)**: Not determined

**Autoignition Temperature**: No data

**Decomposition Temperature**: No data

**Viscosity**: N/A

## 10 STABILITY AND REACTIVITY

**Reactivity**: No data

**Chemical Stability**: Stable under recommended storage conditions.

**Possibility of Hazardous Reactions**: High temperatures will generate toxic lead oxide fumes.

**Conditions to Avoid**: Avoid creating or accumulating fines or dusts. Avoid high temperatures.

**Incompatible Materials**: Strong acids, strong oxidizers, halogens and interhalogen compounds.

**Hazardous Decomposition Products**: Lead oxide fume.

**Other**: Freshly cut or cast lead surfaces tarnish rapidly due to the formation of an insoluble protective layer of basic lead carbonate.

## 11 TOXICOLOGICAL INFORMATION

**Likely Routes of Exposure**: Inhalation, skin, eyes. Product as shipped does not present an inhalation hazard; however subsequent operations may create dusts or fumes which could be inhaled.

**Symptoms of Exposure**: Skin or eye contact with dust or fume may cause local irritation. Inhalation of dust or fumes may cause headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss,

anemia, and pain in legs, arms, and joints. An acute short-term dose of lead could cause acute encephalopathy with seizures, coma, and death. However, short-term exposure of this magnitude is rare. Kidney damage, as well as anemia, can occur from acute exposure. Symptoms due to ingestion of lead dust or fume would be similar to those from inhalation. Other health effects such as metallic taste in the mouth and constipation or bloody diarrhea might also be expected to occur.

**Acute and Chronic Effects**: Lead accumulates in bone and body organs once it enters the body. Elimination from the body is slow. Initial and periodic medical examinations are advised for persons repeatedly exposed to levels above the exposure limits of lead dust or fumes. Once lead enters the body, it can affect a variety of organ systems, including the nervous system, kidneys, reproductive system, blood formation, and gastrointestinal system.

**Acute Toxicity**: No data

**Carcinogenicit**y: **NTP**: R - Reasonably anticipated to be a carcinogen **IARC**: 2B - Possibly carcinogenic to humans

To the best of our knowledge the chemical, physical and toxicological characteristics of the substance are not fully known.

## 12 ECOLOGICAL INFORMATION

**Ecotoxicity**: No data

**Persistence and Degradability**: No data

**Bioaccumulative Potential**: No data

**Mobility in Soil**: No data

**Other Adverse Effects**: Do not allow material to be released to the environment. No further relevant information available.

## 13 DISPOSAL CONSIDERATIONS

**Waste Disposal Method**:

**Product**: Dispose of in accordance with Federal, State and Local regulations.

**Packaging**: Dispose of in accordance with Federal, State and Local regulations.

## 14 TRANSPORT INFORMATION

**DOT/ADR/IATA/IMDG Regulations**: Not regulated

**UN Number**: N/A

**UN Proper Shipping Name**: N/A

**Transport Hazard Class**: N/A

**Packing Group**: N/A

**Marine Pollutant**: No

**Special Precautions**: N/A

## 15 REGULATORY INFORMATION

**TSCA Listed**: All components are listed.

**Regulation (EC) No 1272/2008 (CLP)**: Acute toxicity, category 4, Carcinogenicity, category 2, Reproductive toxicity, category 2.

**Canada WHMIS Classification (CPR, SOR/88-66)**: Class D, Division 2, Subdivision A - Very toxic material causing other toxic effects.

**HMIS Ratings**: **Health**: 1 **Flammability**: 0 **Physical**: 0

**NFPA Ratings**: **Health**: 1 **Flammability**: 0 **Reactivity**: 0

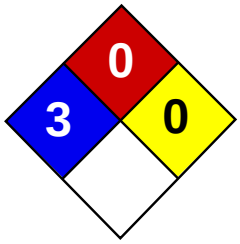
**Chemical Safety Assessment**: A chemical safety assessment has not been carried out.

## 16 OTHER INFORMATION

The above information is believed to be correct, but does not purport to be all inclusive and shall be used only as a guide. ESPI Metals shall not be held liable for any damages resulting from handling or from contact with the above product.

**Prepared by**: ESPI Metals

**Revised/Reviewed**: September 2014



# Material Safety Data Sheet
## Mercury MSDS

## Section 1: Chemical Product and Company Identification

**Product Name:** Mercury

**Catalog Codes:** SLM3505, SLM1363

**CAS#:** 7439-97-6

**RTECS:** OV4550000

**TSCA:** TSCA 8(b) inventory: Mercury

**CI#:** Not applicable.

**Synonym:** Quick Silver; Colloidal Mercury; Metallic Mercury; Liquid Silver; Hydragyrum

**Chemical Name:** Mercury

**Chemical Formula:** Hg

**Contact Information:**

**Sciencelab.com, Inc.**
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

**CHEMTREC (24HR Emergency Telephone), call:** 1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

## Section 2: Composition and Information on Ingredients

**Composition:**

| Name | CAS # | % by Weight |
|---|---|---|
| Mercury | 7439-97-6 | 100 |

**Toxicological Data on Ingredients:** Mercury LD50: Not available. LC50: Not available.

## Section 3: Hazards Identification

**Potential Acute Health Effects:**
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

**Potential Chronic Health Effects:**
Hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation.

Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

## Section 4: First Aid Measures

**Eye Contact:**
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

**Skin Contact:**
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

**Serious Skin Contact:**
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

**Inhalation:**
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

**Serious Inhalation:**
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

**Ingestion:**
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** Non-flammable.

**Auto-Ignition Temperature:** Not applicable.

**Flash Points:** Not applicable.

**Flammable Limits:** Not applicable.

**Products of Combustion:** Not available.

**Fire Hazards in Presence of Various Substances:** Not applicable.

**Explosion Hazards in Presence of Various Substances:**
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:** Not applicable.

**Special Remarks on Fire Hazards:**
When thrown into mercury vapor, boron phosphodiiodide ignites at once. Flame forms with chlorine jet over mercury surface at 200 deg to 300 deg C. Mercury undergoes hazardous reactions in the presence of heat and sparks or ignition.

**Special Remarks on Explosion Hazards:**
A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. CHLORINE DIOXIDE & LIQUID HG, WHEN MIXED, EXPLODE VIOLENTLY. Mercury and Ammonia can produce an

explosive compound. A mixture of the dry carbonyl and oxygen will explode on vigorous shaking with mercury. Methyl azide in the presence of mercury was shown to be potentially explosive.

## Section 6: Accidental Release Measures

**Small Spill:** Absorb with an inert material and put the spilled material in an appropriate waste disposal.

**Large Spill:**
Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

**Precautions:**
Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

## Section 8: Exposure Controls/Personal Protection

**Engineering Controls:**
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

**Personal Protection:**
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

**Personal Protection in Case of a Large Spill:**
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**
TWA: 0.025 from ACGIH (TLV) [United States] SKIN TWA: 0.05 CEIL: 0.1 (mg/m3) from OSHA (PEL) [United States] Inhalation TWA: 0.025 (mg/m3) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Liquid. (Heavy liquid)

**Odor:** Odorless.

**Taste:** Not available.

**Molecular Weight:** 200.59 g/mole

**Color:** Silver-white

**pH (1% soln/water):** Not available.

**Boiling Point:** 356.73°C (674.1°F)

**Melting Point:** -38.87°C (-38°F)

**Critical Temperature:** 1462°C (2663.6°F)

**Specific Gravity:** 13.55 (Water = 1)

**Vapor Pressure:** Not available.

**Vapor Density:** 6.93 (Air = 1)

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Not available.

**Solubility:** Very slightly soluble in cold water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Incompatible materials

**Incompatibility with various substances:** Reactive with oxidizing agents, metals.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:**
Ground mixtures of sodium carbide and mercury, aluminum, lead, or iron can react vigorously. A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. Incompatible with boron diiodophosphide; ethylene oxide; metal oxides, metals(aluminum, potassium, lithium, sodium, rubidium); methyl azide; methylsilane, oxygen; oxidants(bromine, peroxyformic acid, chlorine dioxide, nitric acid, tetracarbonynickel, nitromethane, silver perchlorate, chlorates, sulfuric acid, nitrates,); tetracarbonylnickel, oxygen, acetylinic compounds, ammonia, ethylene oxide, methylsiliane, calcium,

**Special Remarks on Corrosivity:**
The high mobility and tendency to dispersion exhibited by mercury, and the ease with which it forms alloys (amalga) with many laboratory and electrical contact metals, can cause severe corrosion problems in laboratories. Special precautions: Mercury can attack copper and copper alloy materials.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

**Toxicity to Animals:**
LD50: Not available. LC50: Not available.

**Chronic Effects on Humans:**
CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS).

**Other Toxic Effects on Humans:**
Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator).

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:**

May affect genetic material. May cause cancer based on animal data. Passes through the placental barrier in animal. May cause adverse reproductive effects(paternal effects- spermatogenesis; effects on fertility - fetotoxicity, post-implantation mortality), and birth defects.

**Special Remarks on other Toxic Effects on Humans:**

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are less toxic than the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

## Section 14: Transport Information

**DOT Classification:** Class 8: Corrosive material

**Identification:** : Mercury UNNA: 2809 PG: III

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

**Federal and State Regulations:**
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Mercury California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Mercury Connecticut hazardous material survey.: Mercury Illinois toxic substances disclosure to employee act: Mercury Illinois chemical safety act: Mercury New York acutely hazardous substances: Mercury Rhode Island RTK hazardous substances: Mercury Pennsylvania RTK: Mercury Minnesota: Mercury Massachusetts RTK: Mercury New Jersey: Mercury New Jersey spill list: Mercury Louisiana spill reporting: Mercury California Director's List of Hazardous Substances.: Mercury TSCA 8(b) inventory: Mercury SARA 313 toxic chemical notification and release reporting: Mercury CERCLA: Hazardous substances.: Mercury: 1 lbs. (0.4536 kg)

**Other Regulations:**
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):**
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

**DSCL (EEC):**
R23- Toxic by inhalation. R33- Danger of cumulative effects. R38- Irritating to skin. R41- Risk of serious damage to eyes. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S2- Keep out of the

reach of children. S7- Keep container tightly closed. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S46- If swallowed, seek medical advice immediately and show this container or label. S60- This material and its container must be disposed of as hazardous waste. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

**HMIS (U.S.A.):**

**Health Hazard:** 3

**Fire Hazard:** 0

**Reactivity:** 0

**Personal Protection:**

**National Fire Protection Association (U.S.A.):**

**Health:** 3

**Flammability:** 0

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

## Section 16: Other Information

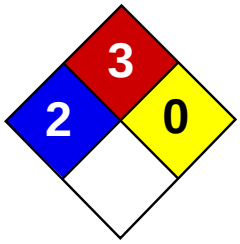
**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 08:22 PM

**Last Updated:** 05/21/2013 12:00 PM

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.*



# Material Safety Data Sheet
## Toluene MSDS

## Section 1: Chemical Product and Company Identification

**Product Name:** Toluene

**Catalog Codes:** SLT2857, SLT3277

**CAS#:** 108-88-3

**RTECS:** XS5250000

**TSCA:** TSCA 8(b) inventory: Toluene

**CI#:** Not available.

**Synonym:** Toluol, Tolu-Sol; Methylbenzene; Methacide; Phenylmethane; Methylbenzol

**Chemical Name:** Toluene

**Chemical Formula:** C6-H5-CH3 or C7-H8

**Contact Information:**

**Sciencelab.com, Inc.**
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

**CHEMTREC (24HR Emergency Telephone), call:** 1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

## Section 2: Composition and Information on Ingredients

**Composition:**

| Name | CAS # | % by Weight |
|---|---|---|
| Toluene | 108-88-3 | 100 |

**Toxicological Data on Ingredients:** Toluene: ORAL (LD50): Acute: 636 mg/kg [Rat]. DERMAL (LD50): Acute: 14100 mg/kg [Rabbit]. VAPOR (LC50): Acute: 49000 mg/m 4 hours [Rat]. 440 ppm 24 hours [Mouse].

## Section 3: Hazards Identification

**Potential Acute Health Effects:**
Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

**Potential Chronic Health Effects:**
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, the nervous system, liver, brain, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

## Section 4: First Aid Measures

**Eye Contact:**
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

**Skin Contact:**
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

**Serious Skin Contact:**
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

**Inhalation:**
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:**
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

**Ingestion:**
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** Flammable.

**Auto-Ignition Temperature:** 480°C (896°F)

**Flash Points:** CLOSED CUP: 4.4444°C (40°F). (Setaflash) OPEN CUP: 16°C (60.8°F).

**Flammable Limits:** LOWER: 1.1% UPPER: 7.1%

**Products of Combustion:** These products are carbon oxides (CO, CO2).

**Fire Hazards in Presence of Various Substances:**
Flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

**Explosion Hazards in Presence of Various Substances:**
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**
Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:**
Toluene forms explosive reaction with 1,3-dichloro-5,5-dimethyl-2,4-imidazolididione; dinitrogen tetraoxide; concentrated nitric acid, sulfuric acid + nitric acid; N2O4; AgClO4; BrF3; Uranium hexafluoride; sulfur dichloride. Also forms an explosive mixture with tetranitromethane.

## Section 6: Accidental Release Measures

**Small Spill:** Absorb with an inert material and put the spilled material in an appropriate waste disposal.

**Large Spill:**
Toxic flammable liquid, insoluble or very slightly soluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

**Precautions:**
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

**Storage:**
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

## Section 8: Exposure Controls/Personal Protection

**Engineering Controls:**
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

**Personal Protection:**
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**
TWA: 200 STEL: 500 CEIL: 300 (ppm) from OSHA (PEL) [United States] TWA: 50 (ppm) from ACGIH (TLV) [United States] SKIN TWA: 100 STEL: 150 from NIOSH [United States] TWA: 375 STEL: 560 (mg/m3) from NIOSH [United States] Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Liquid.

**Odor:** Sweet, pungent, Benzene-like.

**Taste:** Not available.

**Molecular Weight:** 92.14 g/mole

**Color:** Colorless.

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 110.6°C (231.1°F)

**Melting Point:** -95°C (-139°F)

**Critical Temperature:** 318.6°C (605.5°F)

**Specific Gravity:** 0.8636 (Water = 1)

**Vapor Pressure:** 3.8 kPa (@ 25°C)

**Vapor Density:** 3.1 (Air = 1)

**Volatility:** Not available.

**Odor Threshold:** 1.6 ppm

**Water/Oil Dist. Coeff.:** The product is more soluble in oil; log(oil/water) = 2.7

**Ionicity (in Water):** Not available.

**Dispersion Properties:** See solubility in water, diethyl ether, acetone.

**Solubility:**
Soluble in diethyl ether, acetone. Practically insoluble in cold water. Soluble in ethanol, benzene, chloroform, glacial acetic acid, carbon disulfide. Solubility in water: 0.561 g/l @ 25 deg. C.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Heat, ignition sources (flames, sparks, static), incompatible materials

**Incompatibility with various substances:** Reactive with oxidizing agents.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:**
Incompatible with strong oxidizers, silver perchlorate, sodium difluoride, Tetranitromethane, Uranium Hexafluoride. Frozen Bromine Trifluoride reacts violently with Toluene at -80 deg. C. Reacts chemically with nitrogen oxides, or halogens to form nitrotoluene, nitrobenzene, and nitrophenol and halogenated products, respectively.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

**Toxicity to Animals:**
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 636 mg/kg [Rat]. Acute dermal toxicity (LD50): 14100 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 440 24 hours [Mouse].

**Chronic Effects on Humans:**
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, the nervous system, liver, brain, central nervous system (CNS).

**Other Toxic Effects on Humans:**
Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

**Special Remarks on Toxicity to Animals:**
Lowest Published Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Rabbit] - Route: Inhalation; Dose: 55000 ppm/40min

**Special Remarks on Chronic Effects on Humans:**
Detected in maternal milk in human. Passes through the placental barrier in human. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects and birth defects (teratogenic). May affect genetic material (mutagenic)

**Special Remarks on other Toxic Effects on Humans:**

Acute Potential Health Effects: Skin: Causes mild to moderate skin irritation. It can be absorbed to some extent through the skin. Eyes: Cauess mild to moderate eye irritation with a burning sensation. Splash contact with eyes also causes conjunctivitis, blepharospasm, corneal edema, corneal abraisons. This usually resolves in 2 days. Inhalation: Inhalation of vapor may cause respiratory tract irritation causing coughing and wheezing, and nasal discharge. Inhalation of high concentrations may affect behavior and cause central nervous system effects characterized by nausea, headache, dizziness, tremors, restlessness, lightheadedness, exhilaration, memory loss, insomnia, impaired reaction time, drowsiness, ataxia, hallucinations, somnolence, muscle contraction or spasticity, unconsciousness and coma. Inhalation of high concentration of vapor may also affect the cardiovascular system (rapid heart beat, heart palpitations, increased or decreased blood pressure, dysrhythmia, ), respiration (acute pulmonary edema, respiratory depression, apnea, asphyxia), cause vision disturbances and dilated pupils, and cause loss of appetite. Ingestion: Aspiration hazard. Aspiration of Toluene into the lungs may cause chemical pneumonitis. May cause irritation of the digestive tract with nausea, vomiting, pain. May have effects similar to that of acute inhalation. Chronic Potential Health Effects: Inhalation and Ingestion: Prolonged or repeated exposure via inhalation may cause central nervous system and cardiovascular symptoms similar to that of acute inhalation and ingestion as well liver damage/failure, kidney damage/failure (with hematuria, proteinuria, oliguria, renal tubular acidosis), brain damage, weight loss, blood (pigmented or nucleated red blood cells, changes in white blood cell count), bone marrow changes, electrolyte imbalances (Hypokalemia, Hypophostatemia), severe, muscle weakness and Rhabdomyolysis. Skin: Repeated or prolonged skin contact may cause defatting dermatitis.

## Section 12: Ecological Information

**Ecotoxicity:**
Ecotoxicity in water (LC50): 313 mg/l 48 hours [Daphnia (daphnia)]. 17 mg/l 24 hours [Fish (Blue Gill)]. 13 mg/l 96 hours [Fish (Blue Gill)]. 56 mg/l 24 hours [Fish (Fathead minnow)]. 34 mg/l 96 hours [Fish (Fathead minnow)]. 56.8 ppm any hours [Fish (Goldfish)].

**BOD5 and COD:** Not available.

**Products of Biodegradation:**
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are less toxic than the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

## Section 14: Transport Information

**DOT Classification:** CLASS 3: Flammable liquid.

**Identification:** : Toluene UNNA: 1294 PG: II

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

**Federal and State Regulations:**
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Toluene California prop. 65 (no significant risk level): Toluene: 7 mg/day (value) California prop. 65 (acceptable daily intake level): Toluene: 7 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Toluene Connecticut hazardous material survey.: Toluene Illinois

toxic substances disclosure to employee act: Toluene Illinois chemical safety act: Toluene New York release reporting list: Toluene Rhode Island RTK hazardous substances: Toluene Pennsylvania RTK: Toluene Florida: Toluene Minnesota: Toluene Michigan critical material: Toluene Massachusetts RTK: Toluene Massachusetts spill list: Toluene New Jersey: Toluene New Jersey spill list: Toluene Louisiana spill reporting: Toluene California Director's List of Hazardous Substances.: Toluene TSCA 8(b) inventory: Toluene TSCA 8(d) H and S data reporting: Toluene: Effective date: 10/04/82; Sunset Date: 10/0/92 SARA 313 toxic chemical notification and release reporting: Toluene CERCLA: Hazardous substances.: Toluene: 1000 lbs. (453.6 kg)

**Other Regulations:**
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):**
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):**
R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S25- Avoid contact with eyes. S29- Do not empty into drains. S33- Take precautionary measures against static discharges.

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 3

**Reactivity:** 0

**Personal Protection:** h

**National Fire Protection Association (U.S.A.):**

**Health:** 2

**Flammability:** 3

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

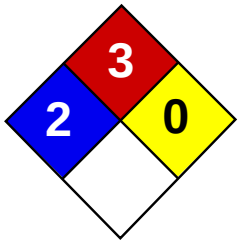
## Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 08:30 PM

**Last Updated:** 05/21/2013 12:00 PM



# Material Safety Data Sheet
## Xylenes MSDS

## Section 1: Chemical Product and Company Identification

**Product Name:** Xylenes

**Catalog Codes:** SLX1075, SLX1129, SLX1042, SLX1096

**CAS#:** 1330-20-7

**RTECS:** ZE2100000

**TSCA:** TSCA 8(b) inventory: Xylenes

**CI#:** Not available.

**Synonym:** Xylenes; Dimethylbenzene; xylol; methyltoluene

**Chemical Name:** Xylenes (o-, m-, p- isomers)

**Chemical Formula:** C6H4(CH3)2

**Contact Information:**

**Sciencelab.com, Inc.**
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

**CHEMTREC (24HR Emergency Telephone), call:** 1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

## Section 2: Composition and Information on Ingredients

**Composition:**

| Name | CAS # | % by Weight |
|---|---|---|
| Xylenes | 1330-20-7 | 100 |

**Toxicological Data on Ingredients:** Xylenes: ORAL (LD50): Acute: 4300 mg/kg [Rat]. 2119 mg/kg [Mouse]. DERMAL (LD50): Acute: >1700 mg/kg [Rabbit].

## Section 3: Hazards Identification

**Potential Acute Health Effects:** Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation.

**Potential Chronic Health Effects:**
CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, liver, mucous membranes, bone marrow, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

## Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

**Skin Contact:**
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

**Serious Skin Contact:**
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

**Inhalation:**
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

**Serious Inhalation:**
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

**Ingestion:**
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** Flammable.

**Auto-Ignition Temperature:** 464°C (867.2°F)

**Flash Points:** CLOSED CUP: 24°C (75.2°F). (Tagliabue.) OPEN CUP: 37.8°C (100°F).

**Flammable Limits:** LOWER: 1% UPPER: 7%

**Products of Combustion:** These products are carbon oxides (CO, CO2).

**Fire Hazards in Presence of Various Substances:**
Highly flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

**Explosion Hazards in Presence of Various Substances:**
Risks of explosion of the product in presence of mechanical impact: Not available. Slightly explosive in presence of open flames and sparks, of heat.

**Fire Fighting Media and Instructions:**
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

**Special Remarks on Fire Hazards:** Vapors may travel to source of ignition and flash back.

**Special Remarks on Explosion Hazards:**
Vapors may form explosive mixtures with air. Containers may explode when heated. May polymerize explosively when heated. An attempt to chlorinate xylene with 1,3-Dichloro-5,5-dimethyl-2,4-imidazolidindione (dichlorohydrantoin) caused a violent explosion

## Section 6: Accidental Release Measures

**Small Spill:** Absorb with an inert material and put the spilled material in an appropriate waste disposal.

**Large Spill:**
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined

areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

**Precautions:**
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

**Storage:**
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

## Section 8: Exposure Controls/Personal Protection

**Engineering Controls:**
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

**Personal Protection:**
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**
TWA: 100 (ppm) [Canada] TWA: 435 (mg/m3) [Canada] TWA: 434 STEL: 651 (mg/m3) from ACGIH (TLV) [United States] TWA: 100 STEL: 150 (ppm) from ACGIH (TLV) [United States] Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Liquid.

**Odor:** Sweetish.

**Taste:** Not available.

**Molecular Weight:** 106.17 g/mole

**Color:** Colorless. Clear

**pH (1% soln/water):** Not available.

**Boiling Point:** 138.5°C (281.3°F)

**Melting Point:** -47.4°C (-53.3°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 0.864 (Water = 1)

**Vapor Pressure:** 0.9 kPa (@ 20°C)

**Vapor Density:** 3.7 (Air = 1)

**Volatility:** Not available.

**Odor Threshold:** 1 ppm

**Water/Oil Dist. Coeff.:** The product is more soluble in oil; log(oil/water) = 3.1

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Not available.

**Solubility:**
Insoluble in cold water, hot water. Miscible with absolute alcohol, ether, and many other organic liquids.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Heat, ignition sources, incompatibles

**Incompatibility with various substances:** Reactive with oxidizing agents, acids.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:** Store away from acetic acid, nitric acid, chlorine, bromine, and fluorine.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Dermal contact. Eye contact. Inhalation.

**Toxicity to Animals:**
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2119 mg/kg [Mouse]. Acute dermal toxicity (LD50): >1700 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5000 4 hours [Rat].

**Chronic Effects on Humans:**
CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, mucous membranes, bone marrow, central nervous system (CNS).

**Other Toxic Effects on Humans:** Hazardous in case of skin contact (irritant, permeator), of ingestion, of inhalation.

**Special Remarks on Toxicity to Animals:**
Lowest Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Man] - Route: Oral; Dose: 10000 ppm/6H

**Special Remarks on Chronic Effects on Humans:**
Detected in maternal milk in human. Passes through the placental barrier in animal. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects (male and femael fertility (spontaneous abortion and fetotoxicity)) and birth defects based animal data.

**Special Remarks on other Toxic Effects on Humans:**
Acute Potential Health Effects: Skin: Causes skin irritation. Can be absorbed through skin. Eyes: Causes eye irritation. Inhalation: Vapor causes respiratory tract and mucous membrane irritation. May affect central nervous system and behavior (General anesthetic/CNS depressant with effects including headache, weakness, memory loss, irritability, dizziness, giddiness, loss of coordination and judgement, respiratory depression/arrest or difficulty breathing, loss of appetite, nausea, vomiting, shivering, and possible coma and death). May also affects blood, sense organs, liver, and peripheral nerves. Ingestion: May cause gastrointestinal irritation including abdominal pain, vomiting, and nausea. May also affect liver and urinary system/ kidneys. May cause effects similar to those of acute inhalation. Chronic Potential Health Effects: Chronic inhalation may affect the urinary system (kidneys) blood (anemia), bone marrow (hyperplasia of bone marrow) brain/behavior/Central Nervous system. Chronic inhalation may alsocause mucosal bleeding. Chronic ingestion may affect the liver and metabolism (loss of appetite) and may affect urinary system (kidney damage)

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are less toxic than the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

## Section 14: Transport Information

**DOT Classification:** CLASS 3: Flammable liquid.

**Identification:** : Xylenes UNNA: 1307 PG: III

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

**Federal and State Regulations:**
Connecticut hazardous material survey.: Xylenes Illinois chemical safety act: Xylenes New York acutely hazardous substances: Xylenes Rhode Island RTK hazardous substances: Xylenes Pennsylvania RTK: Xylenes Minnesota: Xylenes Michigan critical material: Xylenes Massachusetts RTK: Xylenes Massachusetts spill list: Xylenes New Jersey: Xylenes New Jersey spill list: Xylenes Louisiana spill reporting: Xylenes California Director's List of Hazardous Substances: Xylenes TSCA 8(b) inventory: Xylenes SARA 302/304/311/312 hazardous chemicals: Xylenes SARA 313 toxic chemical notification and release reporting: Xylenes CERCLA: Hazardous substances.: Xylenes: 100 lbs. (45.36 kg)

**Other Regulations:**
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):**
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):**
R10- Flammable. R21- Harmful in contact with skin. R36/38- Irritating to eyes and skin. S2- Keep out of the reach of children. S36/37- Wear suitable protective clothing and gloves. S46- If swallowed, seek medical advice immediately and show this container or label.

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 3

**Reactivity:** 0

**Personal Protection:** h

**National Fire Protection Association (U.S.A.):**

**Health:** 2

**Flammability:** 3

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

## Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/11/2005 12:54 PM

**Last Updated:** 05/21/2013 12:00 PM

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# APPENDIX C

# CAMP

**Generic Community Air Monitoring Plan**
**Bisonite Paint Company Site**
**2268 and 2266 Military Road**
**Tonawanda, New York**

## 1.0 Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain site investigation or remediation activities are in progress. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, it is intended to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The site specific CAMP presented below will be sufficient to cover many, if not most, site activities. Specific requirements should be reviewed for each situation in consultation with the Site Safety Officer, NYSDEC and NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical-specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures. These requirements will be determined in consultation with Site Safety Officer, NYSDEC, and NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

## 2.0 Community Air Monitoring Plan

The limited site information suggests VOCs, semivolatile organic compounds ("SVOCs"), PCBs, and metals are present in the soil and possibly only VOCs being present in the groundwater. Based on the known and potential contaminants at the site, real-time air monitoring for VOCs and particulate levels at the perimeter of the exclusion zone and work area will be necessary.

### *2.1 Continuous Monitoring*

Continuous air monitoring will be required for all intrusive in-ground activities conducted during the site investigation, interim remedial measures or remediation. Continuous monitoring will include monitoring for VOCs and particulates.

### *2.2 Periodic Monitoring*

Periodic monitoring for VOCs will be required during non-intrusive site activities such as monitoring well development, purging a monitoring well before sampling, and the collection of groundwater samples from monitoring wells. Periodic monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, when opening a well cap, monitoring during well baling/purging, and taking a reading prior to leaving a sample location.

### 2.2.1 VOC Monitoring, Response Levels, and Actions

VOCs will be monitored at up and downwind locations of the work area preferably at the perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis using dedicated equipment. Point of sampling VOC monitoring will be also be done to ensure the health and safety of all; for example, when a freshly retrieved sample is opened or sampling the immediate work area using a hand-held instrument.

Upwind VOC concentrations will be measured at the start of each workday and periodically (every 15 to 30-minutes) thereafter using a handheld instrument to establish background conditions, particularly if wind direction changes. The VOC monitoring work (continuous and periodic monitoring) will be performed using an organic vapor analyzer with a photoionization or flame ionization detector. The equipment will be field checked for calibration at least daily using a gas standard. As the field calibration drifts beyond an acceptable limit a complete calibration will be conducted or the equipment will be replaced. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or the exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or the exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

    a. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. NYSDEC and NYSDOH will be notified within 24-hours of exceedances of the perimeter air monitoring requiring work stoppage.

    b. All 15-minute readings must be recorded and be available for NYSDEC and NYSDOH personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

### 2.2.2 Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone using dedicated equipment. Activities requiring continuous monitoring include all activities where the ground surface is disturbed. VOC monitoring threshold/action levels are discussed in Section 2.2.1.

The particulate monitoring equipment will be able to measure in real time particulate sizes of less than 10 micrometers (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will also provide an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter ("mcg/$m^3$") greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/$m^3$ above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/$m^3$ above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/$m^3$ of the upwind level and in preventing visible dust migration.

3. If dust exceeds 150 mcg/$m^3$ at the upwind monitoring location during the investigative activities, Leader will instruct the site manager to take appropriate corrective action. If dust from the sampling or drilling operations exceed project thresholds at the downwind monitoring location compared to the upwind monitoring location, the field manager will determine what is causing the problem and seek a remedy, and if needed, they will stop work until it can be corrected. As a result, air monitors will be located up and down wind of the investigation work.

4. All readings must be recorded and be available for NYSDEC, NYSDOH and County Health personnel to review. If there are exceedances to the CAMP, NYSDEC and NYSDOH will be notified within 24-hours. CAMP results will be provided to NYSDOH on a weekly basis.