FORMER BARNET MILLS

RENSSELAER COUNTY

RENSSELAER, NEW YORK

# INTERIM SITE MANAGEMENT PLAN

NYSDEC Site Number: C442065

**Prepared for:**

BBL Barnett, LLC

302 Washington Avenue Extension

Albany, NY 12203

**Prepared by:**

LaBella Associates, DPC

5 McCrea Hill Road

Ballston Spa, NY 12020

**Revisions to Final Approved Interim Site Management Plan:**

| Revision No. | Date Submitted | Summary of Revision | NYSDEC Approval Date |
|---|---|---|---|
| | | | |
| | | | |
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| | | | |

JULY 18, 2024

## CERTIFICATION STATEMENT

I ___Dan Noll, PE _____certify that I am currently a Qualified Environmental Professional as in defined in 6 NYCRR Part 375 and that this Interim Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and Green Remediation (DER-31).




Dan Noll, PE
LaBella Associates, D.P.C
NYS Professional Geologist #087996

7/30/2024
Date

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## RENSSELAER COUNTY

## RENSSELAER, NEW YORK

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## List of Acronyms

| | |
|---|---|
| BCA | Brownfield Cleanup Agreement |
| BCP | Brownfield Cleanup Program |
| CAMP | Community Air Monitoring Plan |
| CFR | Code of Federal Regulation |
| COC | Certificate of Completion |
| DER | Division of Environmental Remediation |
| EC | Engineering Control |
| EWP | Excavation Work Plan |
| HASP | Health and Safety Plan |
| IC | Institutional Control |
| ISMP | Interim Site Management Plan |
| NYSDEC | New York State Department of Environmental Conservation |
| NYSDOH | New York State Department of Health |
| NYCRR | New York Codes, Rules and Regulations |
| O&M | Operation and Maintenance |
| OSHA | Occupational Safety and Health Administration |
| P.E. or PE | Professional Engineer |
| PFAS | Per- and Polyfluoroalkyl Substances |
| PID | Photoionization Detector |
| QAPP | Quality Assurance Project Plan |
| QEP | Qualified Environmental Professional |
| RAO | Remedial Action Objective |
| RCRA | Resource Conservation and Recovery Act |
| SCG | Standards, Criteria and Guidelines |
| SCO | Soil Cleanup Objective |
| SMP | Site Management Plan |
| SOP | Standard Operating Procedures |
| SVI | Soil Vapor Intrusion |
| TAL | Target Analyte List |
| TCL | Target Compound List |
| USEPA | United States Environmental Protection Agency |
| UST | Underground Storage Tank |

# ES EXECUTIVE SUMMARY

The following provides a brief summary of the controls implemented for the Site, as well as the inspections, monitoring, maintenance and reporting activities required by this Interim Site Management Plan:

| | |
|---|---|
| Site Identification: | C442065 20 Forbes Avenue, City of Rensselaer, County of Rensselaer, New York |
| Institutional Controls: | 1. The property is anticipated to be cleaned up to restricted residential use. The property is vacant and will not be occupied prior to completion of the remedy; |
| | 2. All ECs must be inspected at a frequency and in a manner defined in the final SMP. |
| | 3. The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Rensselaer County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department; |
| | 4. Environmental or public health monitoring required during redevelopment activities must be performed as defined in this ISMP; |
| | 5. Data and information associated with redevelopment activities as it relates to the BCP must be reported at the frequency and in a manner as defined in this this ISMP; |
| | 6. All future activities that will disturb remaining contaminated material must be conducted in accordance with this ISMP; |

| | |
|---|---|
| Site Identification: | C442065 20 Forbes Avenue, City of Rensselaer, County of Rensselaer, New York |

| | |
|---|---|
| | 7. Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this ISMP; |
| | 8. A mitigation system can be installed, or the potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries to be included in the final SMP, and any potential impacts that are identified must be monitored or mitigated; |
| | 9. Vegetable gardens and farming on the site are prohibited; and |
| Engineering Controls: | 1. Engineering controls will be detailed in the final SMP. |

| Inspections: | Frequency |
|---|---|
| 1. TBD | TBD |
| Monitoring: | |
| 1. TBD | TBD |
| Maintenance: | |
| 1. TBD | TBD |
| Reporting: | |
| TBD | TBD |
| TBD | TBD |

Further descriptions of the above requirements are provided in detail in the latter sections of this Interim Site Management Plan.

# 1.0 INTRODUCTION

## 1.1 General

Based on planned redevelopment earthwork construction at the Site, this Interim Site Management Plan (ISMP) is a required element of the remedial program for the Former Barnet Mills Site located at 20 Forbes Avenue, Rensselaer, New York (hereinafter referred to as the "Site"). See Figure 1. The Site is currently in the New York State (NYS) Brownfield Cleanup Program (BCP) Site No. C442065, which is administered by New York State Department of Environmental Conservation (NYSDEC or Department).

BBL Barnett, LLC entered into a Brownfield Cleanup Agreement (BCA) on April 3, 2023, with the NYSDEC to remediate the site. A figure showing the site location and boundaries of this site is provided in Figure 2. The boundaries of the site will be more fully described in the metes and bounds site description that will be part of the Environmental Easement to be included in the final SMP.

This ISMP was prepared to manage remaining contamination at the site during redevelopment activities involving earthwork construction until a Site Remedy and final SMP are developed and approved by NYSDEC. This ISMP shall be followed during all subsurface work.

There are nine (9) existing buildings on the Site. Buildings 1, 4, 5, 6, 7, 9, 10, 11 will be redeveloped for commercial and residential uses. Redevelopment will include partial to full replacement of the floor slabs in Buildings 1, 4, 5, 6, 7, 9, 10, 11. Building 8 will be demolished. Buildings 2 and 3 were demolished prior to execution of the BCA. The Excavation Work Plan included in Appendix 2 shall be followed during all ground intrusive work. Refer to Figure 4 for a conceptual redevelopment plan. Refer to Figure 6 and Figure 7 for Site Sketch and Site Survey.

ICs and ECs will likely be incorporated into the site remedy to control exposure to remaining contamination to ensure protection of public health and the environment. An Environmental Easement will be granted to the NYSDEC and recorded with the

Rensselaer County Clerk, requiring compliance with the final SMP and all ICs and ECs placed on the site.

It is important to note that:

- Failure to comply with this ISMP is also a violation of Environmental Conservation Law, 6 NYCRR Part 375 and the BCA Site #C442065 for the site, and thereby subject to applicable penalties.

All reports associated with the site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State. A list of contacts for persons involved with the site is provided in Appendix 1 of this SMP.

This ISMP was prepared by LaBella Associates, DPC, on behalf of BBL Barnett, LLC in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated May 2010, and the guidelines provided by the NYSDEC. This ISMP addresses the means for implementing the ICs and/or ECs that will be required prior to placement of an Environmental Easement for the site and the final SMP as well as the management of contaminated soil and fill material during development activities prior to COC issuance.

### 1.2 Revisions and Alterations

Revisions and alterations to this plan will be proposed in writing to the NYSDEC's project manager. The NYSDEC can also make changes to the ISMP or request revisions from the remedial party. All approved alterations must conform with Article 145 Section 7209 of the Education Law regarding the application of professional seals and alterations. For example, any changes to as-built drawings must be stamped by a New York State Professional Engineer. I NYSDEC project manager will provide a notice of any approved changes to the ISMP, and append these notices to the ISMP that is retained in its files. This ISMP will be replaced by the final SMP following completion of the final remedy.

## 1.3 Notifications

Notifications will be submitted by the property owner to the NYSDEC, as needed, in accordance with NYSDEC's DER – 10 for the following reasons:

1. 60-day advance notice of any proposed changes in site use that are required under the terms of the BCA, 6 NYCRR Part 375 and/or Environmental Conservation Law.

2. 7-day advance notice of any field activity associated with the remedial program.

3. 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan. If the ground-intrusive activity qualifies as a change of use as defined in 6 NYCRR Part 375, the above mentioned 60-day advance notice is also required.

4. Notice within 48 hours of any damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.

5. Notice within 48 hours of any non-routine maintenance activities.

6. Verbal notice by noon of the following day of any emergency, such as a fire; flood; or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

7. Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the site or the responsibility for implementing this ISMP will include the following notifications:

8. At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the BCA, and all approved work plans and reports, including this ISMP.

9. Within 15 days after the transfer of all or part of the site, the new owner's name, contact representative, and contact information will be confirmed in writing to the NYSDEC.

Table 1 on the following page includes contact information for the above notifications. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Appendix 1.

Table 1: Notifications*

| Name | Contact Information | Required Notification** |
|---|---|---|
| NYSDEC Project Manager<br>Matthew Dunham | 518-357-2396<br>Matthew.dunham@dec.ny.gov | All Notifications |
| NYSDEC Project Manager's Supervisor<br>Christopher O'Neill | 518-357-2394<br>Christopher.oneill@dec.ny.gov | All Notifications |
| NYSDEC Site Control<br>Kelly Lewandowski | 518-402-9547<br>Kelly.lewandowski@dec.ny.gov | Notifications 1 and 8 |
| NYSDOH Project Manager<br>Christopher Budd | 518-402-1769<br>christopher.budd@health.ny.gov | Notifications 4, 6, and 7 |

* Note: Notifications are subject to change and will be updated as necessary.

** Note: Numbers in this column reference the numbered bullets in the notification list in this section.

# 2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

## 2.1 Site Location and Description

The site is located in Rensselaer, Rensselaer County, New York and is identified as Section 133 Block 3 and Lot 7 on the Rensselaer County Tax Map (see Figure 2). The site is an approximately 6.33-acre area and is bounded by vacant wooded land to the north, residential properties to the south and east, and a rail line and Hilton Park and Boat Ramp with the Hudson River beyond to the west (see Figure 2 – Site Layout Map). The boundaries of the site will be more fully described in the Environmental Easement to be included in the final SMP. The owner(s) of the site parcel(s) at the time of issuance of this SMP is/are:

BBL Barnett, LLC

## 2.2 Physical Setting

### 2.2.1 Land Use

The Site consists of the following: nine (9) vacant buildings (1, and 4 through 11), former substation foundation, unmaintained parking areas, and a roadway. The Site is zoned industrial and is currently vacant.

The properties adjoining the Site and in the neighborhood surrounding the Site primarily include commercial and residential properties. The properties immediately south of the Site include residential properties; the properties immediately north of the Site include vacant properties; the properties immediately east of the Site include residential properties; and the properties to the west of the Site include a railroad and park.

### 2.2.2 Geology

The Remedial Investigation (RI) is currently in progress and the geology will be further detailed in the RI Report. According to the NYSDOT Geotechnical Design Manual Chapter 3 NYS Geology, the region is located within the Hudson-Mohawk Lowland Physiographic Province. The USGS NYS Region Geologic Map, indicates the area is underlain by the Austin Glen Formation (Middle Ordovician).

The Site's bedrock is mapped on the Geologic Map of New York as Normanskill Shale, which is of Middle Ordovician origin. A review of the Surficial Geologic Map of New York indicates that surficial soils in the area are mapped as Hoosic gravelly-sand loam, transitioning to silty-clay udorthents. Based on soil boring findings, on-Site unconsolidated geology consists of medium to coarse sand and gravel with fine sand, silt, and fine gravel fill materials between 5 – 10 feet below ground surface (bgs). Portions of the Site, particularly at the northern end where historic land filling operations reportedly occurred, are entirely comprised of a mixture of fill material. Fill material was generally a mixture of bricks, wood, concrete, metal, sand, and gravel. Bedrock was not encountered in the soil borings advanced at the Site. Field logs are included in Appendix 5.

A geologic cross section will be completed following the RI and will be included in the final RI report and the final SMP.

### 2.2.3 Hydrogeology

Based on a review of available information, including area topography, regional groundwater flow in the vicinity of the Site is expected to be west towards the Hudson River. Municipal water supply is provided by the City of Rensselaer. Depth to groundwater is documented between 3 feet to 18.5 feet bgs.

A groundwater contour map, groundwater elevation data and groundwater monitoring well construction logs will be completed following completion of the RI and included in the RI Report and final SMP,

## 2.3 Investigation and Remedial History

The RI is currently in progress and the Final SMP will include all RI and IRM results. The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the Site. Full titles for each of the reports referenced below are provided in Section 8.0 – References. Refer to Figure 3 for previous testing locations.

### 2.3.1 Phase I Environmental Site Assessment – July 2021

A Phase I Environmental Site Assessment (ESA) was performed at the Site in July 2021 by Alpine Environmental Services, Inc (Alpine) of Albany, New York. The Phase I ESA identified the following Recognized Environmental Conditions (RECs):

- The facility was originally constructed as a brewery but was then converted to a textile mill called William Barnet & Sons All Wool Shoddy Mill. This industrial use occurred from 1905 into the 1960's. The industrial use of the mill with extensive industrial equipment that had to be maintained throughout this timeframe required lubricating chemicals, solvents and other types of chemicals that had to be stored, used and disposed. No accounting for how these materials were used, stored and disposed is known. It is presumed that spills or spills from storage or disposal could have occurred over sixty years of industrial operations. Some testing of site soil and groundwater will be necessary to determine if adverse impacts to the subsurface have occurred.
- Use of the facility by The Hilton Center for decades renting to industrial and commercial tenants has included manufacturing, automotive repair and possible salvaging and other chemicals. Spills including discharge of oil to the ground, storage of large quantities of drummed chemicals and leaks in the storage areas have occurred and were documented by the City of Rensselaer and the New York State Department of Environmental Conservation in the 1980's and 1990's. Additional storage of chemicals in areas used to store vehicles, service and repair vehicles has also occurred during the Hilton Center timeframe and these areas are not documented. Extensive soil and ground water sampling across the Site will be necessary to determine if the

documented spills and other spills that may have occurred and not been documented, have degraded site soil and groundwater quality to the extent that current regulatory cleanup standards may be exceeded in the site subsurface.

- Land filling has reportedly occurred in the northern end of the Site. A 2013 site inspection performed by CHA Consulting Inc. (CHA) reported an apparent dumping area for various debris was noted in the northern site area. A significant amount of construction and demolition type debris was noted in this area. CHA noted that based on appearances in this area in conjunction with past documented actions of the property owner (at that time), including the attempted burial of polychlorinated biphenyl (PCB)-contaminated electrical transformers, "there is reason to suspect the dumping or burial of potentially hazardous waste materials in this area". CHA recommended that test pits should be completed in this area to evaluate subsurface conditions and the potential presence of buried debris. Alpine agrees with this recommendation to address this REC.
- Multiple petroleum and chemical storage tanks have existed on the Site. Three tanks were registered with the DEC, two were reportedly closed, the third, a 550-gallon underground fuel oil tank remains listed on the registration as "Active". The location of this tank is not clearly identified in the PBS records obtained from the DEC. Other tanks referenced documents reviewed (i.e., spill reports, Sanborn maps, etc.) were not registered with the DEC. It is possible that any of these tanks may have leaked or that spills from filling the tanks could have occurred and contaminated site soil and groundwater quality. Any tanks still present must be properly registered and closed through the NYSDEC Petroleum Bulk Storage Program.
- A vent that may be a petroleum storage tank vent is present along the south side of Building #1. The site owner did not know the purpose of this vent. This vent should be investigated to determine if a storage tank is still present in this area of the Site. If present, this tank will have to be investigated and properly closed in accordance with NYSDEC storage tank closure regulations.

- According to historic mapping, a 100,000-gallon storage tank is present at or near the south end of building 5 and "large vaults" were reported by NYSDEC to exist beneath portions of the mill buildings. These tanks could contain chemicals or chemical residue from manufacturing operations or petroleum or chemicals that may have leaked beneath the building floors from storage or use of these liquids within the buildings. Additionally, it is presumed that all floor drains observed within the mill buildings are likely to discharge to the stormwater system and ultimately to the river. Stormwater basins and other storm and floor drain structures may contain contaminants and would have to be inspected and sediments and liquids in them sampled to determine if contaminants remain within this system.
- An electrical power substation is present along the west side of the Site, to the east of Building 5. Multiple PCB oil containing transformers are likely to have been present within this substation. If transformers within the substation leaked to the ground, PCB and petroleum contaminated soil may exist within or adjacent to the substation area. If contaminants are present, and if the levels are above regulatory cleanup standards, remedial actions may be necessary to achieve regulatory compliance.
- Given the spills that have been documented on the Site by NYSDEC, including the uses and storage of drummed chemicals in the site buildings and evidence of spills from drummed chemicals, vapor intrusion from chemicals that may have leaked or spilled beneath the site buildings is possible. Vapor sampling should be completed beneath the lowest level building area floor slabs to determine if vapor mitigation will be necessary for re-use of any of the site buildings.

### 2.3.2 Phase II Environmental Site Assessment – October 2021

A Phase II ESA was performed at the Site by Alpine between July and August 2021 to address the RECs identified in the Phase I ESA, issued July 2021. The findings and conclusions of the October 2021 Phase II ESA are as follows:

*Ground Penetrating Radar Survey*

An anomaly, which appeared to be an underground storage tank (UST), was observed in the general area where a large vent pipe was observed along the southwest side of Building #1. The vent pipe was traced away from the building and an apparent underground storage tank was delineated in the gravel surfaced parking lot near the building. A second potential UST was identified along the western side of Building #5. This area was delineated and marked for further exploration. No other USTs were evident in the areas of the Site explored during this survey. Refer to Section 2.3.3 for UST removal.

*Soil and Groundwater Quality Investigation*

Analysis of soil and groundwater samples indicated the presence of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), mostly petroleum in nature, in multiple locations on the Site as follows:

- **Building 1 Area**: A #6 heating oil storage tank was identified along the southwest side of Building 1. Oily contamination which appeared to be #6-heating fuel oil was observed in test borings and in monitoring wells MW-1 and MW-2 along the western or downgradient side of this tank as well as test boring/monitoring well MW-20, at the northeastern corner of this building. Free phase oil was observed in borings B-1 and B-2 and in excavations when this tank was removed. This condition was reported to the NYSDEC at the time of discovery and was assigned NYSDEC Spill ID #2104385. The NYSDEC was present during the tank removal.
- **Fill Area North End of Site**: A series of test pits were excavated in the northern end of the Site where fill was reportedly placed on the Site during historic site ownership. Soil was screened in these test pits and samples were submitted to a testing laboratory from test pits where evidence of petroleum or chemical impacts appeared evident through field screening. Soil samples were submitted from test pits TP-1, TP-9 and TP-11. No contaminants exceeding NYSDEC soil cleanup standards were identified in the soil sample analyzed from

test pit TP-9. Test pits TP-1 and TP-11 are adjacent in this area, and both were found to be impacted by odorous and oily contaminated soil conditions, generally below 6-ft bgs. Laboratory analysis of soil samples identified the presence of acetone, methyl ethyl ketone (MEK) and Toluene, polychlorinated biphenyls (PCBs), and metals (barium, cadmium, chromium, and lead) above applicable SCOs. Groundwater monitoring well MW-11 was intalled in the vicinity of test pit TP-1 and the water sample was found to exceed NYSDEC groundwater quality standards for Bis-(2-ethylhexyl) Phthalate, a SVOC.

- **Test Boring B-8 Area:** Soil boring B-8 and Monitoring well MW-8 were placed along the west side of Buildings 6 and 7. Soil from this boring had oily staining and elevated PID readings, demonstrating concerns for the presence of volatile and semi-volatile organic petroleum or other similar contaminants. The sample was analyzed, and concentrations of acetone, chrysene and arsenic were all found to exist in the soil at concentrations above applicable SCOs.
- **Historic Substation:** Sample analysis results for two (2) soil samples collected from 0-1 foot of depth within the former electrical substation concrete enclosure did not indicate the presence of VOC or PCB contamination above current standards.
- **Stormwater System**: Soil sample analysis results indicate the presence of low concentrations of VOC and SVOC compounds in storm drain sediments. Minor exceedances of some SVOC compounds were identified in the storm drain sediments. Low concentrations of PCBs and metals, below cleanup standards, were also present in these sediment samples. There was no visual or odorous evidence of contamination in these sediments.

*Soil Vapor Intrusion*

Due to building conditions, Alpine performed sub slab air quality sampling in representative of lower level building areas. Sub slab soil gas test results from Building 1 suggest residential use indoor air screening levels will not be exceeded in the building. Sub slab soil gas test results from Building 4, 5, 6, 9, 10, and 11 suggest

vapor intrusion is likely to occur. Vapor mitigation in these buildings is likely necessary dependent on building usage (except Building 4). An engineered sub-slab depressurization system will be designed and installed during the building renovation process to ensure that vapor intrusion is minimized in each of the buildings with soil gas exceedances of the target screening levels. Buildings 7 and 8 should be assumed to exceed the target screening level for VOCs in soil gas and treated accordingly when renovations occur.

### 2.3.3 Underground Storage Tank Removal Oversight and Sampling for Closure (Alpine Environmental Services, Inc., February 28, 2022)

On August 31, 2021, Alpine performed oversight and documentation of the removal of two (2) USTs from the Site. A summary of UST removal activities is provided below:

*1,000-gallon Oil/Water Separator Removal – August 31, 2021*

West of Building #5 was a steel tank with unconnected pipes. The tank was 4 feet in diameter and 10'-6" long and separated internally with a baffle system. No clear inlet or discharge pipe connections. The tank content appeared to be clean water with sandy sediment and was pumped by Mac-Son Industrial Services of Selkirk, NY. No evidence of oil or other chemical content in the tank (PID 0.0 ppm), and no evidence of impacts surrounding the tank. Tank was disposed off-site by Mac-Son Industrial Services.

Sampling included collection of a bottom sample and four sidewall samples, representing conditions near center depth of the tank. LaBella notes that SVOC concentrations in the east and south wall samples reported SVOC concentrations greater than 6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Restricted-Residential SCOs (RRUSCOs).

*20,000-gallon UST Removal – August 31, 2021*

South of Building #1 was a tank 10 feet in diameter and 31 feet in length with a capacity of 20,000 gallons. Top of the tank was four feet below ground and bottom of

the tank was approximately 14 feet below grade. Mac-Son Industrial previously removed between 6,000 and 7,000 gallons of #6 fuel oil from the tank. Tank removal procedures are summarized below:

- Concrete covered the west end of the tank where piping for the tank vent and transfer lines exited the tank and traveled northward into the adjacent building; concrete and lines removed with an excavator.
- Soil removed along the east end and along the north side of the tank in an effort to break it free for removal. Staged clean soil in a pile to the east of the tank and along the south edge. All stage soil was observed and screened with a PID to ensure that no contaminated soil was staged with clean soil. Petroleum-impacted soil was encountered at 14-15 feet below grade throughout the length of the tank excavation.
- Approximately 20-30 cubic yards of petroleum-impacted soil was staged on polyethylene sheeting along east side of the building with a soil berm and secured with plastic and stones.
- UST loosened out of the excavation and staged along the north side of Building #1 for off-site disposal.
- Additional exploration identified that impacted soil extended at least 16 feet below grade from near the bottom depth of the tank. Because the quantity of impacted soil was determined to be substantial undefined, it was decided to leave impacts in place and delineate at a later date. Samples collected from the excavation walls (10 – 12 feet below grade) and bottom (17 feet below grade).
- Free product of #6 fuel oil warranted the installation of two 2-foot diameter observation/ recovery wells to depths of 15 feet below grade prior to backfilling.
- Excavation backfilled with clean soil and imported crushed stone near the surface.
- Waste characterization for disposal included one composite sample from the staged impacted soil.

### 2.3.4 Supplemental Site Investigation (SSI) – July 2022

A Supplemental Site Investigation (SSI) was completed on July 7, 2022, by LaBella in response to NYSDEC BCP Pre-Application meeting input that additional analytical data are required to support the application for this Site's acceptance into the BCP. The SSI included an assessment of soil and groundwater conditions within the northern fill area, south of Building 4 in the 1,1,1-TCA area, and within the former substation area. The investigation included the installation of eleven (11) soil borings and four (4) temporary groundwater sampling points (TGSP), Site-wide groundwater elevation monitoring, and the collection and analysis of soil and groundwater samples to evaluate soil and groundwater quality.

Soil borings (SB-1 through SB-3) were advanced 20-feet below ground surface (ft bgs) within the northern fill area identified as TP-1, TP-9, and TP—11 in the October 2021 Phase II ESA. Groundwater was encountered in each boring location ranging from approximately 15 to 18.5 feet bgs. Shallow soil samples were collected from the two-foot depth interval and analyzed for PCBs. Subsurface soil samples were collected from the interval exhibiting the greatest field evidence of impacts and analyzed for PCBs and RCRA metals. Soil borings SB-1 through SB-4 were converted to temporary monitoring wells (TMP-1 through TMP-4). Grab groundwater samples were collected and analyzed for NYSDEC Part 375 list VOCs and RCRA metals (total and dissolved).

The findings of the July 2022 SSI are as follows:

- Former 20,000-gallon UST: Light nonaqueous phase liquid (LNAPL) was observed in downgradient well MW-2.
- Former substation area: The concentration of PCB, Aroclor 1268, exceeded its RRUSCOs at SB-3
- Northern fill area: Total lead, cadmium, and/ or chromium concentrations in three groundwater samples (TMP-1 through TMP-3) were greater than their respective NYSDEC Division of Water Technical and Operational Guidance (TOGS) 1.1.1 groundwater quality criteria (GWQC). However, the corresponding dissolved concentrations at these three locations were significantly lower and

less than respective GWQCs, suggesting that the reported total concentrations were associated with sample turbidity and not actual groundwater quality.

- Building 4 1,1,1-TCA area: VOCs were not detected at SB-4 near Building 4, except for a low-level acetone concentration that is consistent with a laboratory artifact.
- PFAS were not detected in the three groundwater samples analyzed from existing monitoring wells MW-4, MW-8, and MW-11 with the exception of 2.3 ppt PFOA and 1.9 ppt PFOA in MW-4.

#### 2.3.5 Phase I Environmental Site Assessment – February 2023

A Phase I ESA was performed at the Site in February 2023 by Alpine. The Phase I ESA revealed evidence of RECs in connection with the Site as follow:

- Industrial usage and commercial auto storage & repair (and possibly salvage) usage of the Site: A long history of industrial manufacturing usage, and auto repair usage, of the Site was identified through this ESA process. Evidence was found showing chlorinated and non-chlorinated volatile organic compounds were used and stored at the site. This type of usage, predating regulations requiring special handling and disposal of hazardous substances and waste, presents a high risk for environmental contamination at the Site. A Phase II ESA (Alpine; 10/2021) and Supplemental Phase II ESA (Labella; 7/2022) were performed at the Site, both assessments showing exceedances of standards for volatile and semi volatile organic compounds in soil and groundwater, at several test locations, including west of buildings #6 and #7 (B-8/MW-8 location); south and west of Site building #4 (B-4/MW-4 location).
- The west side of Site building #9 was filled with automobiles during the 2021 Phase I and Phase II ESAs. At the time of this assessment, the automobiles have been removed and three waste drums, possibly containing waste motor oil are present, along with waste tires, in this area. Sampling beneath this section of the building may be necessary to determine if the storage or repair of automobiles in this building area has impacted subsurface soil or groundwater quality beneath this building area. Waste drums should be removed and disposed according to waste characterized in each drum.

- Stormwater basin sediment: Soil sample analysis results from a Phase II ESA (Alpine; 10/2021) indicate the presence of VOC's and SVOC compounds in storm drain sediments. Exceedances of some SVOC compounds were identified in the storm drain sediments. Low concentrations of PCB's and metals, below cleanup standards, were also present in these sediment samples. Floor drain sediments at the Site should be assumed to contain contaminants exceeding standards unless tested to show otherwise and cleaned and disposed of properly.
- Land filling of hazardous substances at the Site: Land filling has reportedly occurred in the northern end of the Site. CHA reported as a result of a 2013 site inspection, that an apparent dumping area for various debris was noted in the northern site area. A significant amount of construction and demolition type debris was noted in this area. CHA noted that based on appearances in this area in conjunction with past documented actions of the property owner (at that time), including the attempted burial of PCB-contaminated electrical transformers, "there is reason to suspect the dumping or burial of potentially hazardous waste materials in this area". A Phase II ESA (Alpine;10/2021) included excavating eleven test pits in this area with sample collection and analysis. Volatile organic compounds, polychlorinated bi phenols (PCBs), and metals were detected at multiple locations in excess of NYS DEC standards. Groundwater collected in this area (location MW-11) indicates the groundwater standard was exceeded for bis(2-ethylhexyl) phthalate, a semi volatile organic compound. The results indicate that dumping of hazardous substances has likely occurred in this location and requires additional testing and/or remediation. The Brownfield Program application included these results for inclusion into the remedial investigation and remediation process.
- 1,000-gallon "oil water separator" tank soil sample exceedances: The 1,000 gallon "oil/water separator" tank was removed by the Site owner in 2021. No evidence of petroleum products being stored in the 1,000-gallon removed tank was observed. Soil samples collected from the tank excavation boundaries at

the time of removal show several semi volatile organic compounds exceeded standards. Further investigation/ remediation may be necessary.

- Active spill listing for Site: The July 2021 Phase I ESA identified a potential tank south of Site building #1. The October 2021 Phase II ESA GPR scanning found a large sub surface anomaly at the location consistent with an underground tank. On August 31, 2021, and September 1, 2021, Bath Springs Development excavated and removed the tank, an estimated 20,000-gallon #6 fuel oil tank, and discovered the tank had leaked, prompting the spill reporting to the NYS DEC (Spill number 2104385). The contamination was still present greater than 30 ft below grade, beyond standard equipment excavation reach, given the limitations on expanding the sides of the excavation due to building foundation, adjoining roads, railroad tracks, and utilities. Free product was noted as evident on the groundwater surface, The spill remains open, and was included in the active Brownfield Program application submitted to the NYS DEC, for potential further investigation/remediation under that program.
- The appendix includes a 1989 Domernuth Environmental Services Environmental Field Study that identified a 550-gallon UST on the southern end of Building. A 550-gallon UST is listed as active in the PBS registration, but Alpine's geophysical survey of this area did not identify a UST and the nearby soil boring did not identify impacts greater than applicable SCOs.
- Vapor intrusion potential: Based on sub slab soil gas samples collected at the site presented in the Phase II ESA report (Oct 2021), vapor intrusion of volatile organic compounds is likely in the buildings at this site. Vapor mitigation design and installation is recommended before occupation of the buildings.

### 2.3.6 Site Visit by LaBella May 19, 2023

LaBella performed a Site visit on May 19, 2023, with the NYSDEC, to confirm Site conditions and features and discuss the proposed site sampling plan prior to preparing this RIWP. The following Areas of Concern (AOCs) have been identified based on review of previous environmental reports and Site observations and will be further investigated during the RI. Refer to Figure 3 for AOCs.

Petroleum-Impacted Soil – Former 20,000-gallon UST (AOC-1)

Petroleum-impacted soil remains in place following removal of a 20,000-gallon #6 Fuel Oil UST in the vicinity of Building 1. Samples obtained from the #6 fuel oil tank excavation walls and bottom (17 feet) indicated elevated levels of PAHs in exceedance of RRUSCOs and CUSCO for Benzo(a)pyrene. Residual impacts are present to depths of at least 16 – 17 feet bgs per the UST removal report and to 30 feet per the February 2023 Phase I report. Further delineation is required to determine the size of the impacted area, and determine the extent of remedial actions, including removal of free phase oil from the ground, that will be necessary to meet NYSDEC cleanup objectives and close this spill. Delineation efforts will include sampling for insitu waste characterization of impacted soil should off-Site disposal be needed. In addition, RI will include sampling the soil pile that was generated during the 2021 UST removal.

Petroleum-Impacted Soil – Former 1,000-gallon UST (AOC-2)

Petroleum-impacted soil remains in place following removal of a 1,000-gallon oil-water separator UST west of Building 5. Two excavation sidewall samples identified elevated levels of PAHs in exceedance of RRUSCOs. Further delineation is required to assess the limits of the previously identified SVOCs.

Area of 1,1,1-TCA (AOC-3)

Previous borings/monitoring wells SB-4/MW-4 and SB-19/MW-19 were installed in the area west and south of Building 4. A chlorinated volatile organic compound known as 1,1,1-trichloroethane (1,1,1-TCA) was detected in both of these wells. The groundwater quality standard for this compound is 5 parts per billion (ppb) and the standard was exceeded at 32 PPB in MW-4, and was present, but below the standard at 0.71 ppb in MW-19. Further investigation of groundwater quality in this area will be necessary to look for an on-site source, assess the apparent extent of this impact, and evaluate potential remedial action.

Contaminated Historic Fill Material – Northern Site Area (AOC-4)

Contaminated historic fill material (CHFM) was observed during the Phase II ESA and specifically in the northern portion of the Site within a reported historical

filling area. Construction & demolition (C&D) debris including bricks, wood, concrete, metal, and sand and gravel were observed during the Phase II ESA. In addition, potential disposal of hazardous materials in the landfill is also likely due to reported on-Site disposal of PCB-containing transformers.

The results of the Phase II ESA performed within this area indicate the presence of elevated concentrations of VOCs in exceedance of RRSCOs for toluene, PCBs, and metals (i.e., barium, cadmium, chromium, and lead), but explorations were limited to 11 feet bgs. A groundwater sample was found to exceed NYSDEC groundwater quality standards for Bis-(2-ethylhexyl) Phthalate, a SVOC. Additional investigation is needed to assess the vertical extent of impacts. It appears that contaminated soil, or some source of waste that has contaminated the soil in this area, was buried in this portion of the fill area and has contaminated the subsurface soils to levels that are likely to require mitigative measures.

Building 8 Trench Drain– (AOC-5)

During the May 2023 site visit, NYSDEC requested investigation of the trench drain of Building 8 to assess for impacts from prior site activities.

Arsenic and SVOCs at B-8/MW-8– AOC-6

During the Phase II ESA, boring/monitoring well B-8/MW-8 were installed along the west side of Buildings 6 and 7. Soil from this boring had oily staining and elevated PID readings, demonstrating concerns for the presence of volatile and semi-volatile organic petroleum or other similar contaminants. Results indicated elevated concentrations of chrysene and arsenic in the soil at concentrations greater than UUSCO and RRUSCO, respectively. Other petroleum related SVOCs were also present but at concentrations less than UUSCOs. Further investigation in this area is planned, including surface soil sampling, to assess the extent of this impact and determine if remedial efforts are needed. Nearby monitoring wells MW-9 and MW-10 did not show evidence of VOCs in the Phase II sampling.

Additional Site Coverage –AOC-7a and 7b

The total acreage of the remaining open Site area is approximately 1.2 acres

- 7A: During the May 2023 site visit with NYSDEC, investigation was requested in the southern leg of the Site that is a central section of a mowed area and a slight slope with trees. This area measures approximately 0.2 acres and does not extend to the curb, road, or railroad.
- 7B: As confirmed during the May 2023 site visit with NYSDEC, the eastern open Site area for investigation is limited to the area west of the base of the slope on the eastern Site area. This area measures approximately 1 acre, and much of this area is currently roadway and is planned to be road and parking areas.

Suspect 550-Gallon UST–AOC-8

A 1989 Domernuth Environmental Services Environmental Field Study identified a 550-gallon UST on the southern end of Building 4. This area will again be assessed during the geophysical for evidence of a UST. If an anomaly suggestive of a UST is identified, then it will be uncovered via test pit. If a UST is confirmed, it will be removed and closed as a Site Preparation effort with post-excavation confirmation soil sampling consistent with DER-10. If the geophysical survey does not identify evidence of a UST or a backfilled excavation, a test pit will still be installed in this area to assess subsurface conditions.

Debris Piles –AOC-9

Five debris piles were observed on the Site and including building material debris from an unknown source(s). These materials will be assessed for waste disposal relative to asbestos content as well as lead.

Soil Vapor

The results of the October 2021 Phase II ESA indicated the presence of VOCs in on-Site soil vapor exceeding their respective NYSDOH standards. Given the conditions of buildings, a soil vapor intrusion investigation cannot effectively be conducted.

We understand that after the buildings are airtight, indoor air sampling will be required. A sub-slab depressurization system (SSDS) may be installed as an IRM or site remedy.

## 2.4 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site will be finalized in the Decision Document.

## 2.5 Remaining Contamination

The RI is currently in progress. A summary of any contamination remaining after implementation of remedial actions, including interim remedial measures, will be included in the Final Engineering Report (FER) and the Final SMP.

# 3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

## 3.1 General

The final SMP for the Site will include all ICs/ECs as defined in the Decision Document for this Site.

## 4.0 MONITORING AND SAMPLING PLAN

Required monitoring associated with evaluating the overall performance and effectiveness of the remedy will be determined following remedy selection and implementation. If warranted, a Monitoring and Sampling Plan will be included in the final SMP.

# 5.0 OPERATION AND MAINTENANCE PLAN

If operation and maintenance of any ECs are required following the final remedy, an operation and maintenance plan will be included in the final SMP.

# 6.0 PERIODIC ASSESSMENTS/EVALUATIONS

## 6.1 Climate Change Vulnerability Assessment

Increases in both the severity and frequency of storms/weather events, an increase in sea level elevations along with accompanying flooding impacts, shifting precipitation patterns and wide temperature fluctuation, resulting from global climactic change and instability, have the potential to significantly impact the performance, effectiveness and protectiveness of a given site and associated remedial systems. Vulnerability assessments provide information so that the site and associated remedial systems are prepared for the impacts of the increasing frequency and intensity of severe storms/weather events and associated flooding.

The final SMP will provide a current vulnerability assessment that evaluates the vulnerability of the site and/or engineering controls to severe storms/weather events and associated flooding.

## 6.2 Green Remediation Evaluation

NYSDEC's DER-31 Green Remediation requires that green remediation concepts and techniques be considered during all stages of the remedial program including site management, with the goal of improving the sustainability of the cleanup and summarizing the net environmental benefit of any implemented green technology. The final SMP will provide an environmental footprint analysis of the remedy, as implemented at the time of the SMP

## 6.3 Remedial System Optimization

A Remedial System Optimization (RSO) study will be addressed in the final SMP.

# 7.0. REPORTING REQUIREMENTS

## 7.1 Site Management Reports

All ISMP activities will be reported in the Site's monthly progress reports. The Site's final SMP will provide details on all relevant inspections. Procedures for any required monitoring and associated forms as well as Periodic Review Reports (including certification of ICs and ECs) will be detailed in the final SMP.

# 8.0 REFERENCES

6 NYCRR Part 375, Environmental Remediation Programs. December 14, 2006.

NYSDEC DER-10 – "Technical Guidance for Site Investigation and Remediation".

NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. June 1998 (April 2000 addendum).

Phase I Environmental Site Assessment, Alpine Environmental Services, Inc., February 2023

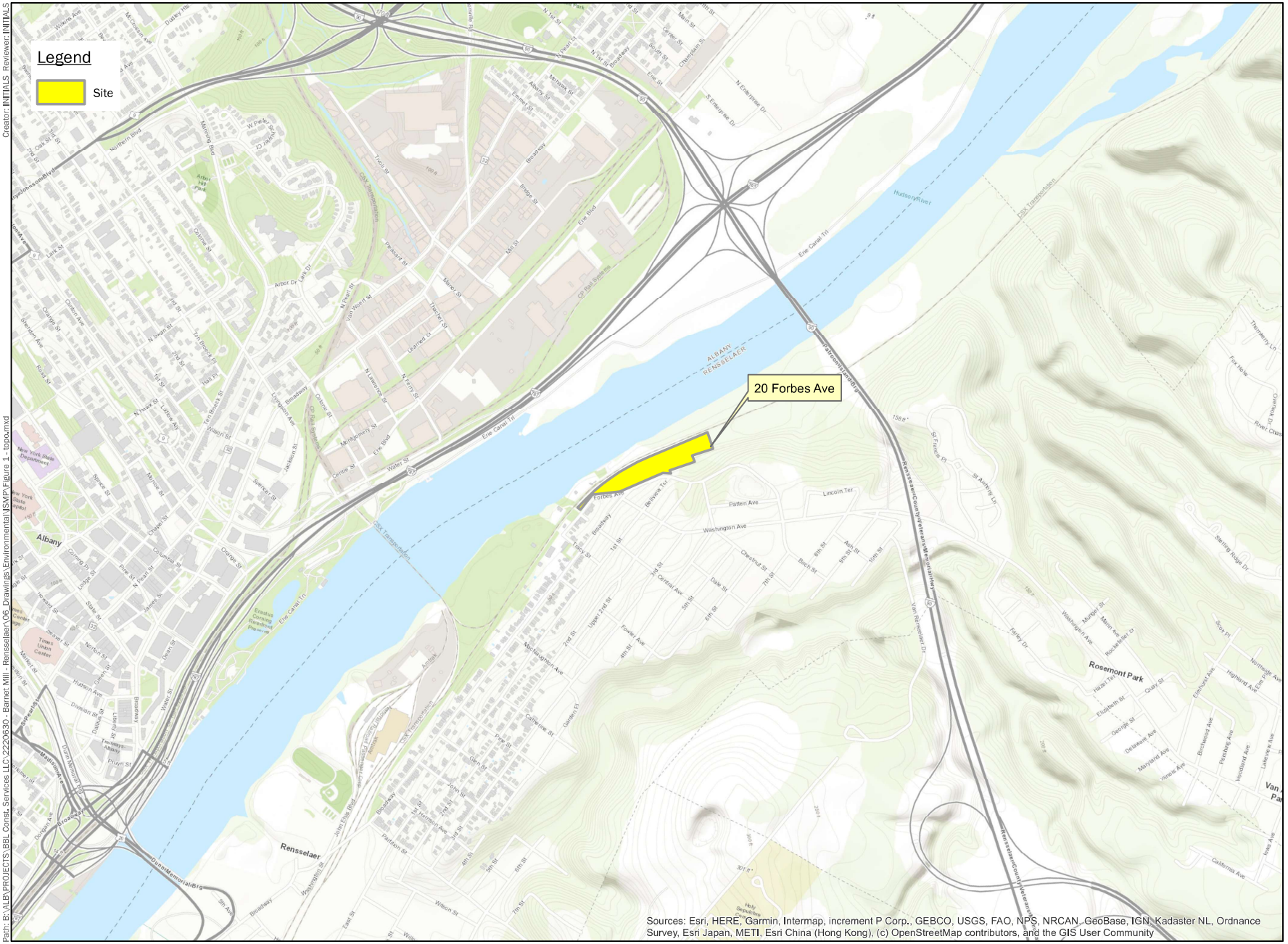
Supplemental Site Investigation, LaBella Associates, July 2022

Underground Storage Tank Removal Oversight and Sampling for Closure, Alpine Environmental Services, Inc., February 28, 2022

Phase II Environmental Site Assessment, Alpine Environmental Services, Inc., October 2021

Phase I Environmental Site Assessment, Alpine Environmental Services, Inc., July 2021

# FIGURES




Creator: INITIALS Reviewer: INITIALS

Path: B:\ALB\PROJECTS\BBL Const. Services LLC\2220630 - Barnet Mill - Rensselaer\06 Drawings\Environmental\SMP\ Figure 1 - topo.mxd

LaBella
Powered by partnership

**BBL Barnet, LLC**

**Former Barnet Mills**
**BCP No. C442065**

N

0 1,000 Feet

1 inch = 1,000 feet

Intended to print as 11" x 17"

LaBella Project No: 2220630
Date: March 2024

**SITE LOCATION**

**FIGURE 1**




Creator: INITIALS Reviewer: INITIALS

Path: \\cash.lab.pvt\ALB\PROJECTS\BBL Const. Services LLC\2220630 - Barnet Mill - Rensselaer\06_Drawings\Environmental\SMP\ Figure 2 - Site Layout.mxd

LaBella
Powered by partnership.

**BBL Barnet, LLC**

**Former Barnet Mills**
**BCP No. C442065**

N

0 125 Feet

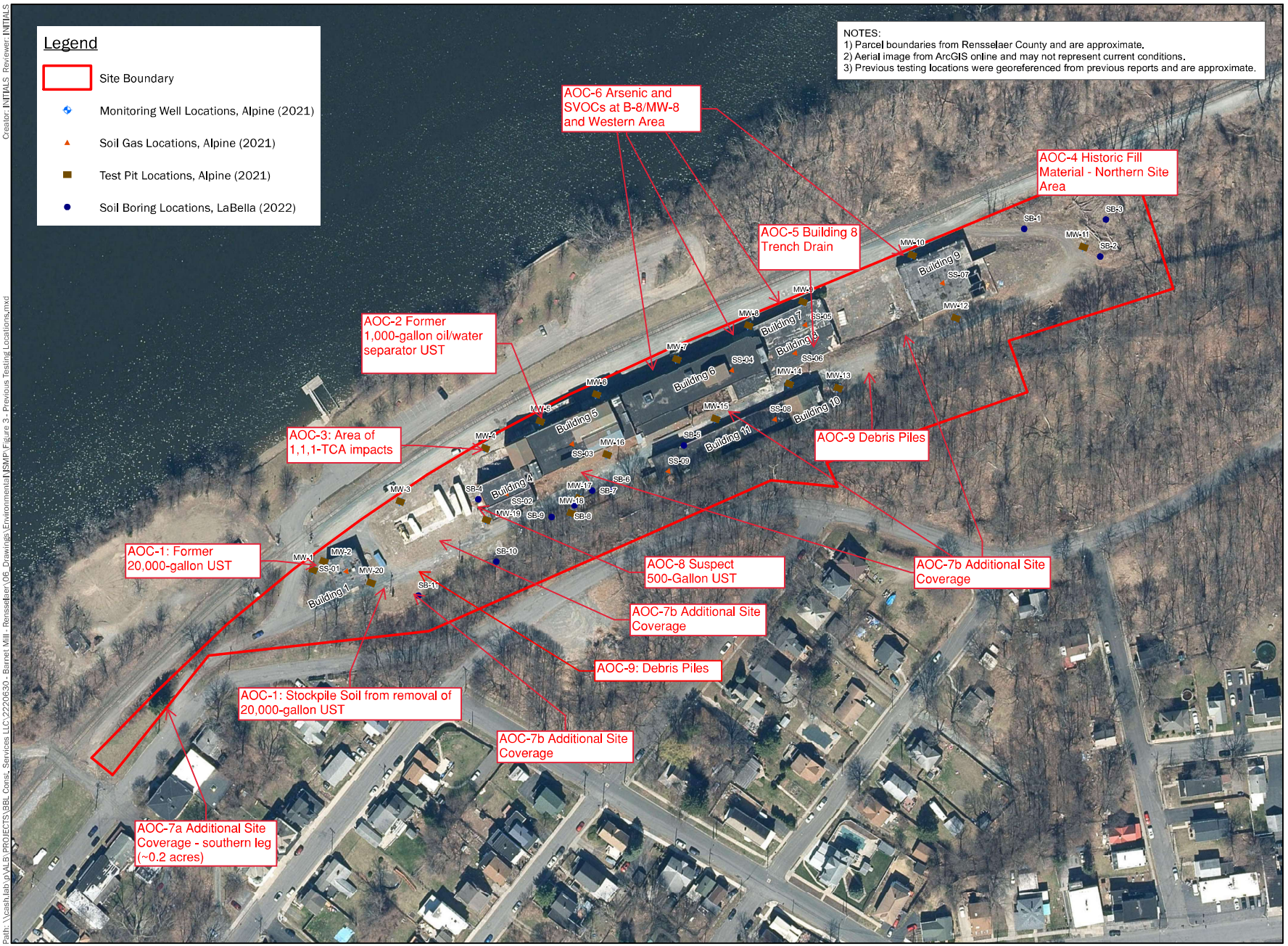
1 inch = 125 feet

Intended to print as 11" x 17"

LaBella Project No: 2220630
Date: March 2024

**SITE LAYOUT**

**FIGURE 2**




LaBella
Powered by partnership

**BBL Barnet, LLC**

**Former Barnet Mills**
**BCP No. C442065**

N

0 125 Feet

1 inch = 125 feet

Intended to print as 11" x 17"

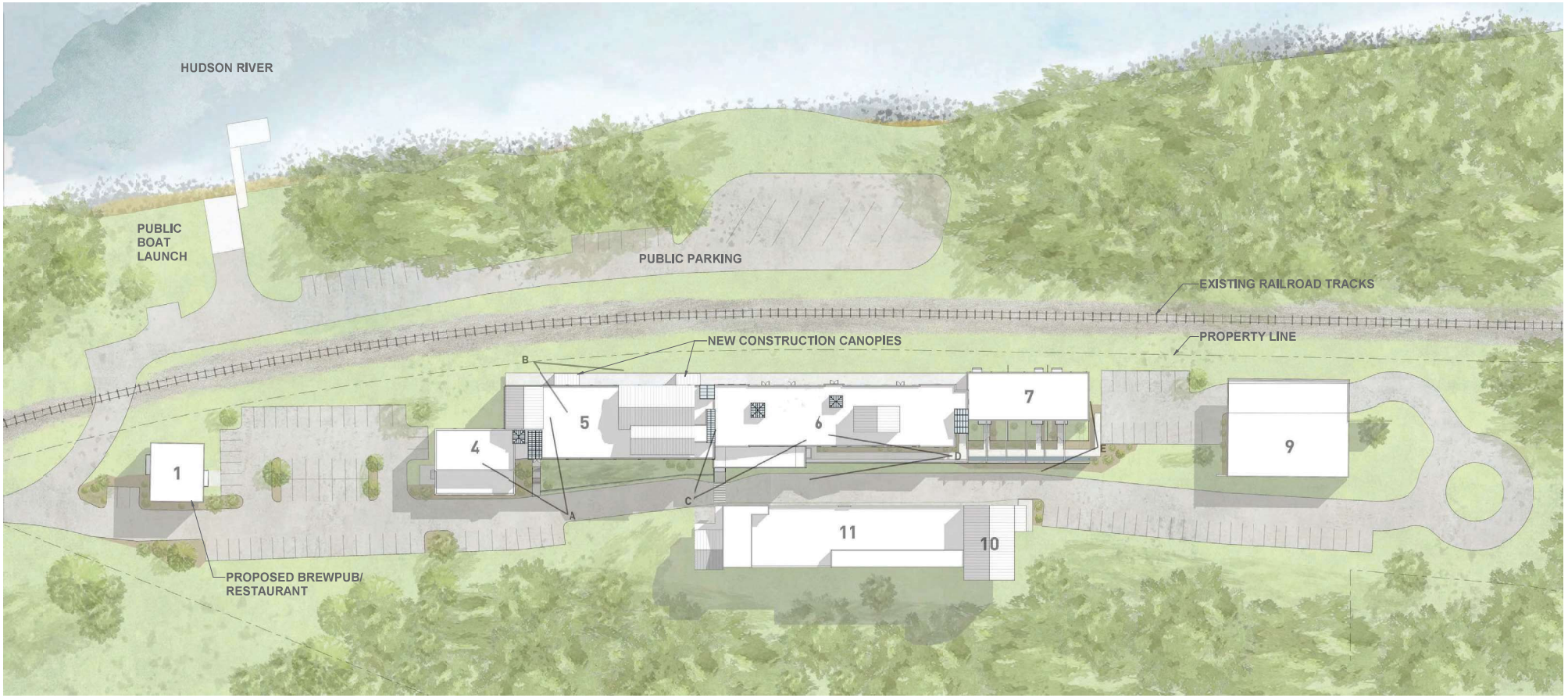
LaBella Project No: 2220630
Date: March 2024

**PREVIOUS TESTING LOCATIONS & AREAS OF CONCERN**

**FIGURE 3**

Creator: INITIALS Reviewer: INITIALS

Path: \\cash.lab.pv\ALB\PROJECTS\BBL Const. Services LLC\2220630 - Barnet Mill - Rensselaer\06_Drawings\Environmental\SMP\Figure 3- Previous Testing Locations.mxd





A


B


C



D


E

hbt ARCHITECTS

RENDERED SITE PLAN AND VIGNETTES
MARCH 18, 2022

# BARNET MILLS REDEVELOPMENT

BBL CONSTRUCTION

FIGURE 4 - CONCEPTUAL REDEVELOPMENT PLAN




LaBella
Powered by partnership

**BBL Barnet, LLC**

**Former Barnet Mills**
**BCP No. C442065**

N

0 125 Feet

1 inch = 125 feet

Intended to print as 11" x 17"

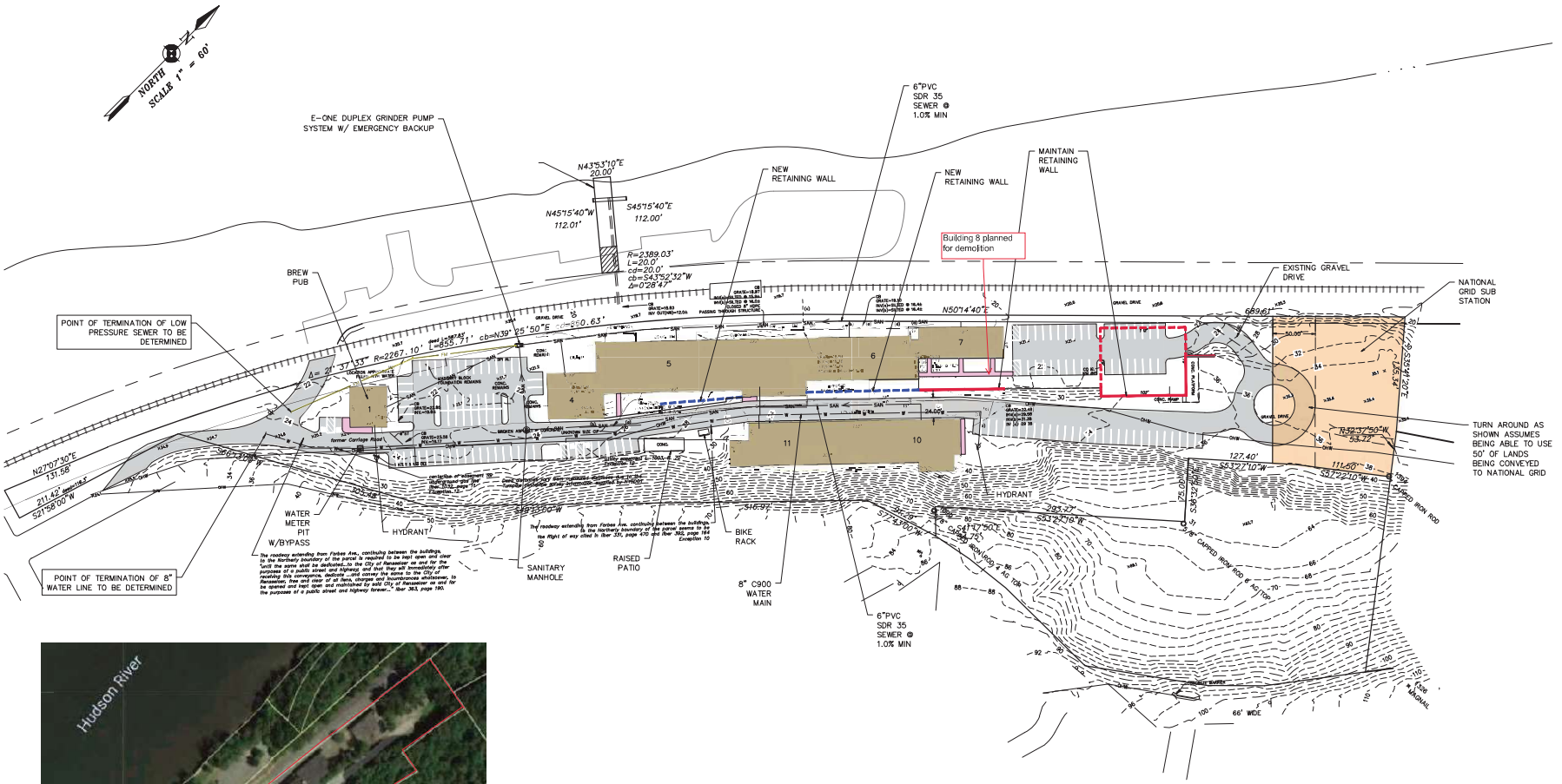
LaBella Project No: 2220630
Date: March 2024

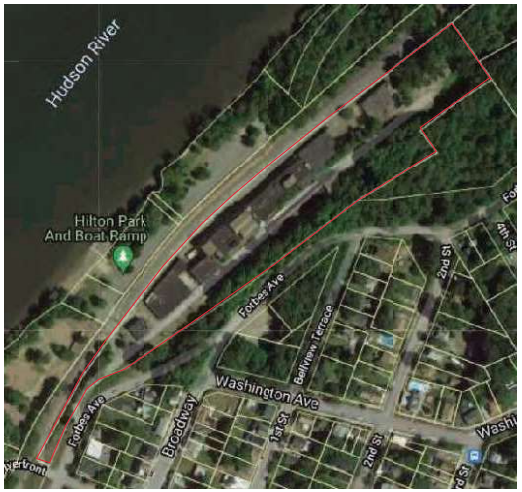
# ANTICIPATED AIR MONITORING STATION LOCATIONS

## FIGURE 5

Creator: INITIALS Reviewer: INITIALS

Path: \\cash.lab.pvt\ALB\PROJECTS\BBL Const. Services LLC\2220630 - Barnet Mill - Rensselaer\06_Drawings\Environmental\SMP\Figure 5 - Air monitoring locations.mxd




SKETCH PLAN
SCALE : 1" = 60'

0 60 120 180 FT
1" = 60' SCALE BAR

LEGEND:
- SIDEWALKS/ENTRY
- NEW RETAINING WALLS
- EXISTING RETAINING WALLS
- DEMOLISHED BUILDING
- SAN — SAN — GRAVITY SEWER
- FM — FM — FORCE MAIN
- W — W — WATER LINE
- HYDRANT

FIGURE 6 - SITE SKETCH PLAN

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Only copies from the original drawing marked with the original signature in red ink shall be considered to be valid, true copies and the preparer shall be considered to have not certified any copies that do not bear such marking.

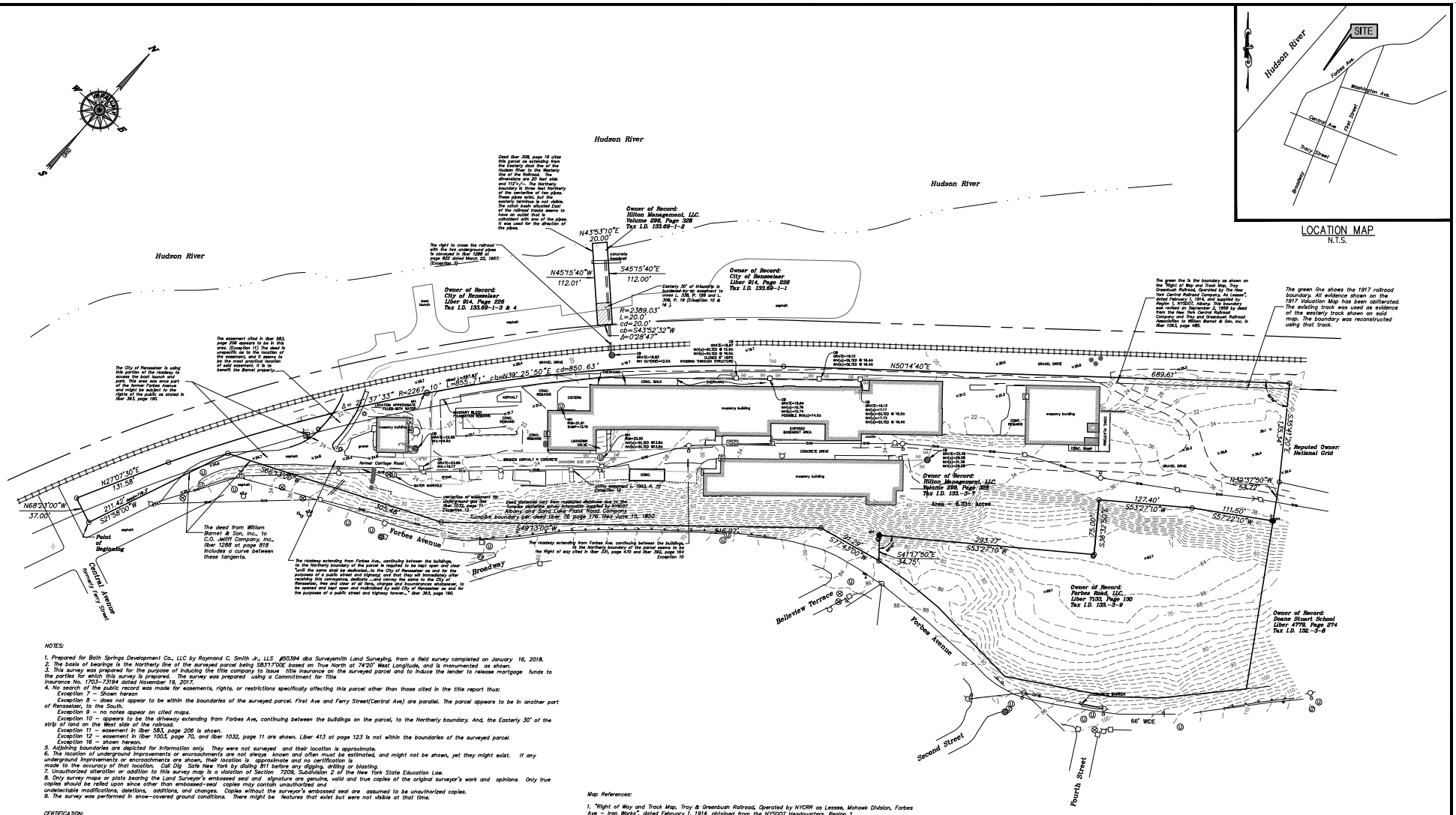
HART ENGINEERING
1909 TERRACE ROAD
CASTLETON, NY, 12033
Phone: (518) 479-4014
Fax: (518) 477-8371
STEVEN P. HART, P.E. #065539

| NO. | DATE | DESCRIPTION | REVD. | CK'D |
|---|---|---|---|---|

SKETCH PLAN

BARNETT MILLS
FORBES AVE
CITY: RENSSELAER COUNTY: RENSSELAER STATE: NEW YORK

ENGINEER: STEVEN P. HART, P.E.
DRAWN BY: DAH
DATE ISSUED: SEPTEMBER 24, 2021
SCALE: 1" = 60'
DRAWING NUMBER: C100
1 OF 1




LOCATION MAP
N.T.S.

NOTES:

1. Prepared for Bath Springs Development Co., LLC by Raymond C. Smith Jr., LLS #50394 dba Surveysmith Land Surveying, from a field survey completed on January 16, 2018.
2. The basis of bearings is the Northerly line of the surveyed parcel being S83°17'00E based on True North at 74°20' West Longitude, and is monumented as shown.
3. This survey was prepared for the purpose of inducing the title company to issue title insurance on the surveyed parcel and to induce the lender to release mortgage funds to the parties for which this survey is prepared. The survey was prepared using a Committment for Title Insurance No. 1703-73194 dated November 19, 2017.
4. No search of the public record was made for easements, rights, or restrictions specifically affecting this parcel other than those cited in the title report thus:
   Exception 7 – Shown hereon
   Exception 8 – does not appear to be within the boundaries of the surveyed parcel. The parcel appears to be in another part of Rensselaer, to the South.
   Exception 9 – no notes appear on cited maps.
   Exception 10 – appears to be the driveway extending from Forbes Ave, continuing between the buildings on the parcel, to the Northerly boundary. And, the Easterly 30' of the strip of land on the West side of the railroad.
   Exception 11 – easement in liber 583, page 206 is shown.
   Exception 12 – easement in liber 1003, page 70, and liber 1032, page 11 are shown. Liber 413 at page 123 is not within the boundaries of the surveyed parcel.
   Exception 16 – shown hereon.
5. Adjoining boundaries are depicted for information only. They were not surveyed and their location is approximate.
6. The location of underground improvements or encroachments are not always known and often must be estimated, and might not be shown, yet they might exist. If any underground improvements or encroachments are shown, their location is approximate and no certification is made to the accuracy of that location. Call Dig Safe New York by dialing 811 before any digging, drilling or blasting.
7. Unauthorized alteration or addition to this survey map is a violation of Section 7209, Subdivision 2 of the New York State Education Law.
8. Only survey maps or plats bearing the Land Surveyor's embossed seal and signature are genuine, valid and true copies of the original surveyor's work and opinions. Only true copies should be relied upon since other than embossed-seal copies may contain unauthorized and undetectable modifications, deletions, additions, and changes. Copies without the surveyor's embossed seal are assumed to be unauthorized copies.
9. The survey was performed in snow-covered ground conditions. There might be features that exist but were not visible at that time.

CERTIFICATION:

The sole purpose of certifying a survey to a client, title company, or lending institution is to confirm the opinion of the Surveyor to his client and to the title company, or lending institution for a specific transaction. It is does not extend this obligation beyond such transaction, or to additional title companies, lending institutions, or subsequent owners. (NYSAPLS Code of Practice, Sec.A, Par. 6.) This survey is therefore certified only to:

Bath Springs Development Co., LLC
Chicago Title Insurance Company

DEED REFERENCE:

1. Deed to Hilton Management LLC, recorded in the Rensselaer County Clerk's Office on in Volume 299 of Deeds at Page 328.

Map References:

1. "Right of Way and Track Map, Troy & Greenbush Railroad, Operated by NYCRR as Lessee, Mohawk Division, Forbes Ave – Iron Works", dated February 1, 1914, obtained from the NYSDOT Headquarters, Region 1.
2. "Map Showing a portion of lands of The Forbes Manor Realty Company", prepared by John Flynn Jr., C.E. dated January 20, 1914 and filed in the Rensselaer County Clerk's Office in Drawer 1985 as map 150.
3. "Map of Bath on the Hudson" filed on July 24, 1895in the Rensselaer County Clerk's Office in drawer 35 as map 2, refiled in drawer 1985 as map 20.

# FIGURE 7 - SITE SURVEY

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It is a violation of the State Education Law for any person, unless acting under the direction of a licensed surveyor, to alter an item in any way.

Only copies from the original of this map bearing an original signature and the embossed seal of the preparer shall be considered to be true and valid copies.

Raymond C. Smith Jr., LLS
NYS LLS No. 050394

REVISIONS

| NO. | DATE | DESCRIPTION | BY |
|---|---|---|---|
| | | | |

HORIZONTAL SCALE
60 30 0 60 120 180
1"=60'

CITY OF RENSSELAER
RENSSELAER COUNTY * NEW YORK
BOUNDARY RETRACEMENT SURVEY
LANDS N/F
HILTON MANAGEMENT, LLC
FORBES AVENUE

DESIGNED BY ____
DRAWN BY MLH
REVIEWED BY RCS

GURLEY ENGINEERING
Surveying and Mapping Group, P.C.
4 Computer Drive West • Albany, New York 12205
Phone: (518) 458-7112 • www.labergegroup.com

DATE 05/19/21
SCALE 1"=60'
SHEET 1

Laberge Group – J:\2021\058\Survey Folders\Dwg\2021058-Survey.dwg [24x36] May 27, 2021 – 2:54pm rcs

## APPENDIX 1 – LIST OF SITE CONTACTS

| Name | Phone/Email Address |
|---|---|
| Site Owner & Remedial Party<br>Jon deForest<br>BBL Barnett, LLC | 518-452-8200<br>jdeforest@bblinc.com |
| Qualified Environmental Professional<br>Arlette St.Romain<br>LaBella Associates | 518-824-1928<br>astromain@labellapc.com |
| NYSDEC DER Project Manager<br>Matthew Dunham | 518-357-2396<br>Matthew.dunham@dec.ny.gov |
| NYSDEC DER Project Manager's Supervisor<br>Christopher O'Neill | 518-357-2394<br>Christopher.oneill@dec.ny.gov |
| NYSDEC Site Control<br>Kelly Lewandowski | 518-402-9547<br>Kelly.lewandowski@dec.ny.gov |
| NYSDOH Project Manager<br>Christopher Budd | 518-402-1769<br>christopher.budd @health.ny.gov |
| Remedial Party Attorney<br>Dean Sommer, Esq.<br>Young Sommer LLC | 518-438-9907<br>dsommer@youngsommer.com |

# APPENDIX 2– EXCAVATION WORK PLAN (EWP)

## 2-1 NOTIFICATION

There are several known areas of contamination at the Site. The Site is currently in the Remedial Investigation (RI) phase as of the date of this ISMP and the Site Remedy has not yet been implemented. This EWP shall be followed during all ground intrusive work at the Site. At least 15 days prior to the start of any ground intrusive work, the site owner or their representative will notify the NYSDEC contacts listed in the table below. Table 2-1 includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Appendix 1.

**Table 2-1: Notifications***

| | |
|---|---|
| NYSDEC Project Manager<br>Matthew Dunham | 518-357-2396<br>Matthew.dunham@dec.ny.gov |
| NYSDEC Project Manager's Supervisor<br>Christopher O'Neill | 518-357-2394<br>Christopher.oneill@dec.ny.gov |
| NYSDEC Site Control<br>Kelly Lewandowski | 518-402-9547<br>Kelly.lewandowski@dec.ny.gov |

* Note: Notifications are subject to change and will be updated as necessary.

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated, any modifications of truck routes, and any work that may impact an engineering control;

- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work, and submittals (e.g., reports) to the NYSDEC documenting the completed intrusive work;
- A summary of the applicable components of this EWP;
- A statement that the work will be performed in compliance with this EWP, 29 CFR 1910.120 and 29 CFR 1926 Subpart P;
- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in Appendix 4 of this SMP;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with the required request to import form and all supporting documentation including, but not limited to, chemical testing results.

The NYSDEC project manager will review the notification and may impose additional requirements for the excavation that are not listed in this EWP. The alteration, restoration and modification of engineering controls must conform with Article 145 Section 7209 of the Education Law regarding the application professional seals and alterations.

## 2-2 SOIL SCREENING METHODS

Visual, olfactory and instrument-based (e.g. photoionization detector) soil screening will be performed during all excavations into known or potentially contaminated material (remaining contamination) or a breach of the cover system. A qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State will perform the screening. Soil screening will be performed when invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil. Further discussion of off-site disposal of materials and on-site reuse is provided in Section 2-6 of this Appendix.

## 2-3 SOIL STAGING METHODS

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC.

## 2-4 MATERIALS EXCAVATION AND LOAD-OUT

A qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State will oversee all invasive work and the excavation and load-out of all excavated material.

The owner of the property and remedial party (if applicable) and its contractors are responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site. A site utility stakeout will be completed for all utilities prior to any ground intrusive activities at the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements). Trucks transporting contaminated soil must have either tight-fitting opaque covers that are secured on the sides and/or back, or opaque covers that are locked on all sides.

A truck wash will be operated on-site, as appropriate. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the site until the activities performed under this section are complete. Truck wash waters will be collected and disposed of off-site in an appropriate manner.

Locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials. Material accumulated from the street cleaning and egress cleaning activities will be disposed off-site at a permitted landfill facility in accordance with all applicable local, State, and Federal regulations.

## 2-5 MATERIALS TRANSPORT OFF-SITE

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the site will be secured with either tight-fitting opaque covers that are secured on the sides and/or back, or opaque covers that are locked on all sides. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

Truck transport routes will be determined based on the work to be performed and included in the 15-day notification to NYSDEC. All trucks loaded with site materials will exit the vicinity of the site using only these approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project site.

Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.

Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be prohibited.

## 2-6 MATERIALS DISPOSAL OFF-SITE

All material excavated and removed from the site will be treated as contaminated and regulated material and will be transported and disposed off-site in a permitted facility in accordance with all local, State and Federal regulations. If disposal of material from this site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC project manager. Unregulated off-site management of materials from this site will not occur without formal NYSDEC project manager approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, (e.g. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C&D debris recovery facility). Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include, but will not be limited to: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled consistent with 6 NYCRR Parts 360, 361, 362, 363, 364 and 365. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State C&D debris recovery facility (6 NYCRR Subpart 360-15 registered or permitted facility).

## 2-7 MATERIALS REUSE ON-SITE

The qualified environmental professional, as defined in 6 NYCRR Part 375, will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material (i.e. contaminated) does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for reuse on-site will be placed below the demarcation layer or impervious surface, and will not be reused within the cover system or within landscaping berms. Contaminated on-site

material may only be used beneath the site cover as backfill for subsurface utility lines with prior approval from the DEC project manager.

Proposed materials for reuse on-site must be sampled for full suite analytical parameters including per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. The sampling frequency will be in accordance with DER-10 Table 5.4(e)10 unless prior approval is obtained from the NYSDEC project manager for modification of the sampling frequency. The analytical results of soil/fill material testing must meet the site use criteria presented in NYSDEC DER-10 Appendix 5 – Allowable Constituent Levels for Imported Fill or Soil for all constituents listed, and the NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances April 2023. Approvals for modifications to the analytical parameters must be obtained from the NYSDEC project manager prior to the sampling event.

Soil/fill material for reuse on-site will be segregated and staged as described in Sections 2-2 and 2-3 of this EWP. The anticipated size and location of stockpiles will be provided in the 15-day notification to the NYSDEC project manager. Stockpile locations will be based on the location of site excavation activities and proximity to nearby site features. Material reuse on-site will comply with requirements of NYSDEC DER-10 Section 5.4(e)4. Any modifications to the requirements of DER-10 Section 5.4(e)4 must be approved by the NYSDEC project manager.

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the site will not be reused on-site.

## 2-8 FLUIDS MANAGEMENT

All liquids to be removed from the site, including but not limited to, excavation dewatering, decontamination waters and groundwater monitoring well purge and development waters, will be handled, transported and disposed off-site at a permitted

facility in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the site, and will be managed off-site, unless prior approval is obtained from NYSDEC.

Discharge of water generated during large-scale construction activities to surface waters (i.e. a local pond, stream or river) will be performed under a SPDES permit.

## 2-9 COVER SYSTEM RESTORATION

The Site does not currently have a cover system installed. There are nine (9) existing buildings. Buildings 1, 4, 5, 6, 7, 9, 10, 11 will be redeveloped for commercial and residential uses. Redevelopment will include partial to full replacement of the floor slabs in Buildings 1, 4, 5, 6, 7, 9, 10, 11. Building 8 will be demolished (refer to Figure 4). The remainder of the Site will be completed with a cap consisting of asphalt pavement, sidewalks, etc. or a cover system consisting of a minimum 2-ft soil that meets Restricted Residential Use, crushed stone, etc. All cover materials will be approved by the DER Project Manager prior to use by submitting the Request to Import/Reuse Fill or Soil form included in Appendix 6. The details of the final site cover will be determined in the Decision Document for this site. Temporary cover may be placed during redevelopment as needed. Any future excavations through the cover/ cap such as remedial excavations will be restored in kind or with approval from the DER Project Manager to another type of cover system. After the completion of soil removal and any other invasive activities the cover system will be restored in a manner that complies with this ISMP. The alteration, restoration and modification of engineering controls must conform with Article 145 Section 7209 of the Education Law regarding the application professional seals and alterations.

## 2-10 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the site will be approved by the qualified environmental professional, as defined in 6 NYCRR Part 375, and will be in compliance with provisions in this ISMP prior to receipt at the site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html, will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review. A copy of the form is presented in Appendix 6.

Material from industrial sites, spill sites, other environmental remediation sites, or potentially contaminated sites will not be imported to the site.

All imported soils will meet the backfill and cover soil quality standards established in DER-10 Appendix 5 for restricted residential use. Based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria, the resulting soil quality standards are listed in Appendix 7. Soils that meet 'general' fill requirements under 6 NYCRR Part 360.13, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC project manager. Soil material will be sampled for the full suite of analytical parameters, including PFAS and 1, 4-dioxane. Solid waste will not be imported onto the site.

Trucks entering the site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

## 2-11 STORMWATER POLLUTION PREVENTION

A Stormwater Pollution Prevention Plan (SWPPP) will be completed by the site contractor for use during redevelopment. The SWPPP will include details for managing stormwater throughout the development project. Elements to be included in the SWPPP are summarized below.

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.

All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

## 2-12 EXCAVATION CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition. The NYSDEC project manager will be promptly notified of the discovery.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes [TAL metals, TCL volatiles and semi-volatiles (including 1,4-dioxane), TCL pesticides and PCBs, and PFAS], unless the site history and previous sampling results provide sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC

project manager for approval prior to sampling. Any tanks will be closed as per NYSDEC regulations and guidance.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone within two hours to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the Periodic Review Report.

## 2-13 COMMUNITY AIR MONITORING PLAN

Community Air Monitoring is required for all ground intrusive work. LaBella notes that a modified CAMP was presented in the Interim Remedial Measure Work Plan for removal of floor slabs. The NYSDOH Generic Community Air Monitoring Plan (CAMP) included in Appendix 8 will be utilized for Site work under this ISMP. The CAMP includes monitoring for VOCs and dust at upwind and downwind locations. Prevailing wind direction in Rensselaer is south to north. A figure showing the location of air monitoring stations based on generally prevailing wind conditions is shown in Figure 5. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and a downwind monitoring station as well as a fixed downwind station located in proximity to the residential neighborhood to the east/ southeast. Refer to the CAMP in Appendix 8.

Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

## 2-13A: Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures

Land within 20 feet of the Site boundaries is wooded, roads or a railroad; and there are no structures within 20 feet of the Site. Forbes Avenue crosses the Site south of Building 1, and is used to access the properties west of the Site. As such, this section is not expected to be applicable to the Site work.

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 part-per-million, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 micrograms per cubic meter, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 micrograms per cubic meter or less at the monitoring point.

- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

## 2-14 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors off-site. The routine use of odor control methods is not anticipated to be required. If nuisance odors are identified at the site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the remedial party's Remediation Engineer, and any measures that are implemented will be discussed in the Periodic Review Report.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

## 2-15 DUST CONTROL PLAN

Particulate monitoring must be conducted according to the Community Air Monitoring Plan (CAMP) provided in Section 2-13. If particulate levels at the site exceed the thresholds listed in the CAMP or if airborne dust is observed on the site or leaving the site, the dust suppression techniques listed below will be employed. The remedial party will also take measures listed below to prevent dust production on the site.

A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved using a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

## 2-16 OTHER NUISANCES

The following plans are not currently anticipated to be required; however, they may be developed if needed during redevelop work.

A plan for rodent control will be developed and utilized by the contractor prior to and during site clearing and site grubbing, and during all remedial work.

A plan will be developed and utilized by the contractor for all remedial work to ensure compliance with local noise control ordinances.

# APPENDIX 3 – QUALITY ASSURANCE PROJECT PLAN

# Quality Assurance Project Plan

Location:
Former Barnet Mills Site (BCP No.: C442065)
20 Forbes Avenue
Rensselaer, New York 12144

Prepared For:
BBL Barnett, LLC
302 Washington Avenue Extension
Albany, NY 12203

LaBella Project No. 2220630

March 2024

# Field Book and Photographs

**Standard Operating Procedure #001**

**NOTE: See SOP #006 for relevant Field Log changes for projects that include PFAS sampling**

## A. Purpose and Scope:

To produce an accurate and reliable record of all field activities, including field observations, sample collection activities, etc.

All pertinent field survey and sampling information shall be recorded in a logbook or on field logs during each day of the field effort.

In addition to keeping logs, photographs will be taken to provide a physical record to augment the field worker's written observations. They can be valuable to the field team during future inspections, informal meetings, and hearings. Photographs should be taken with a camera-lens system having a perspective similar to that afforded by the naked eye. A photograph must be documented if it is to be a valid representation of an existing situation.

## B. Equipment and Materials:

- Bound Field Book (with waterproof paper) or Field Logs
- Chain-of-Custody, Other Appropriate Forms
- Indelible Ink Pens
- Digital Camera with 50 mm lens or similar

## C. Procedure:

1. At a minimum, entries in a logbook shall include:
    a. Date and time of starting work
    b. Names of all personnel at site
    c. Summary of key conversations with contractors, agency representatives, etc.
    d. Purpose of proposed work effort
    e. Sampling equipment to be used
    f. Field calibration of equipment or documentation of calibration of rented equipment
    g. Description of work area
    h. Location of work area, including map reference. Document sample locations with references to fixed landmarks (e.g., 10 feet from southwest corner of building)
    i. Details of work effort, particularly any deviation from the field operations plan or standard operating procedures
    j. Field observations and field measurements (e.g., pH)
    k. Field laboratory analytical results
    l. Personnel and equipment decontamination procedures
    m. Daily health and safety entries, including levels of protection
    n. Type and number of samples
    o. Sampling method, particularly deviations from the standard operating procedures
    p. Sample location and number
    q. Sample handling, packaging, labeling, and shipping information (including destination)
    r. Time of leaving site

For each photograph taken, several items shall be recorded in the field logbooks:

A. Date and time – Camera set to record on photo
B. Name of photographer
C. General direction faced and description of the subject
D. Sequential number of the photograph
E. Always attempt to include an object in the photograph that helps show scale
F. Always try to shoot at approximately 50mm focal length (what human eye sees)

2. Each day's entries will be initialed and dated at the end by the author, and a line will be drawn through the remainder of the page.

**D. QA/QC Requirements:**

All entries in the logbook shall be made in indelible ink. All corrections shall consist of single line-out deletions that are initialed.

The field task leader shall be responsible for ensuring that sufficient detail is recorded in the logbooks, and shall review the site logbooks daily.

**E. Special Conditions:**

Photographs should be downloaded from the camera to the project folder and notes regarding the photographs should accompany the photos. Photographs should be no larger than 3 MB each unless they are being utilized for presentation purposes. LaBella has software available to decrease file sizes if necessary.

As noted above, if a bound logbook is not used, then a field observation form must be used and information above should be captured on the form.

**F. References:**

None.

**G. Appendices or Forms:**

None.

# Sample Naming and Numbering

**Standard Operating Procedure #002**

## A. Purpose and Scope:

The success of large environmental programs is greatly affected by the efficiency of data management and analysis. When performing environmental sampling, one of the most critical steps is appropriately naming or numbering samples so that they are uniquely identified and can be distinguished from all other samples by all future users.

Some of the potential benefits that can be obtained by adopting a naming convention include the following:

a) To ensure that every sample collected at a site has a unique identifier

b) To enhance clarity in cases of potential ambiguity

c) To help avoid "naming collisions" that might occur when the data is imported into our Equis or other databases

d) To provide meaningful data to be used in project handovers

Note that many of our sampling programs are performed at sites with previously established sample locations and in these cases, we would not change sample names. Additionally, this process shall be applied at larger, more complex sites, and/or sites that are required to follow a site- specific QAAP. Simpler naming conventions may be implemented for small, simple sites

## B. Equipment and Materials:

- Field Logbook
- Field Sample Login Sheet
- Site Map / Work Plan
- Sampling Forms
- Chain of Custody
- Sample Containers with Labels

## C. Procedure:

1. Once Each sample shall be uniquely defined by a multi-field name. In general, three fields are required:

   **[Project # or Name] – [Media Type] – [Location Name/Sequential Number].**

2. If using a site name, abbreviate to 2-3 letters. (e.g., Congress St site would be “CS”).

3. Use the following example abbreviations for media types:

Subsurface Soil.....SOIL
Surface Soil.....SURF
Sediment.....SED
Groundwater.....GW
Surface Water.....SW
Waste Water.....WW
Soil Vapor.....SV
Storm Water.....STORM

4. All samples collected at a site shall be numbered sequentially for each media type, regardless of the field event or project phase. The use of hyphens to separate segments of a sample name is beneficial for sample name readability. It is also beneficial to use enough leading zeros to accommodate the Sequential Number (or sys_loc_code) portion of the sample name, which will assist in sorting sample IDs in the data management program or database (see EQUIS discussion below).

5. Do not include information such as time, sample depths, etc. in the name. This information should be recorded as defined in Section F (below).

6. In no cases shall the multi-field name be longer than 30 characters, including dashes. Ensure that each name is clearly written on both the sample label as well as the Chain of Custody.

7. Do not use special characters (e.g. #, ‘, “, @, !) when naming samples. Including such characters in the Serial Number (sys_loc_codes) or Sample Number (sys_sample_codes) can be incompatible with the database.

8. For QA/QC blank samples use the following abbreviations in place of the media type:

Trip Blank.....TB
Equipment Rinse (Field Blank)..... FB
Duplicate.....DUP
Matrix Spike..... MS
Matrix Spike Duplicate.....MSD

For Duplicate and MS/MSD samples we need to make sure we include the parent sample name. Add the DUP, MS or MSD indicator after the Sequential Number.

For Blind Duplicate samples, use the LaBella indicator in place of the Sequential Number. The location should be recorded in the field logs for our evaluation purposes. For example, a blind duplicate sample number for soil collected at the 005 location would be “CS-SOIL-AZT-1.”

You would record in the field log that the blind soil duplicate AZT-1 has SOIL-12345-005 as its parent sample.

9. Option to Include the Sample Collection Date - As an option, the date may be included in the sample name. NYS Electronic Data Deliverable guidance suggests using dates in the YYYYDDMM format. Placing the year first provides for ease of sorting data in the database:

   However, adding the date adds 9 characters to the sample name thus increasing the complexity of sample numbering. The date is captured on the Chain-of-Custody and in field records.

**D. QA/QC Requirements:**

The All data must be documented on field data sheets or within site logbooks.

Field personnel should verify that all sample data and supporting information in log books is correct prior to leaving the site.

**E. Special Conditions:**

NYSDEC EQUIS Considerations:

NYSDEC uses EQuIS for data management and generally requires data to be submitted in EQuIS format. EQuIS has three different sample name related fields, a sample_name, a sys_sample_code and a location_ name. Location_name will almost always be simplified to something like SW-1, GW-2 etc. and is usually the last field of the sample name.

In terms of the other two, sample_name is what we record in the field. That is limited to 30 characters of text.

The laboratory generates the sys_sample_code by taking the sample_name field and adding another qualifier, such as the sample delivery group or work order number. EQuIS requires that the sys_sample_code field be unique within a database. This is limited to 40 characters of text so it typically will be the sample name plus up to 10 characters.

It is recommended to keep the LaBella sample name as short as possible to work with the EQuIS format. The basic sample names identified above are 14 to 17 characters long. If the optional date format is used, sample names will be 23 to 26 characters which is near the limit for what EQuIS can accommodate (and you may have issues physically fitting the sample names legibly into the COC form).

**References:**

NYSDEC, DER-10, Technical Guidance for Site Investigation and Remediation, May 2010, http://www.dec.ny.gov/docs/remediation_hudson_pdf/der10.pdf

NYSDEC, Electronic Data Delivery Manual, January 2013, http://www.dec.ny.gov/docs/remediation_hudson_pdf/eddmanual.pdf

## F. Appendices or Forms:

None

# Sample Containers, Volumes, Preservations and Holding Times

**Standard Operating Procedure #003**

## A. Purpose and Scope:

The following standard operating procedure (SOP) presents general guidelines for sample containers, volumes, preservations and holding times associated with air, water and soil/sediment samples. Field personnel are responsible for ensuring that state-specific standards/guidelines/regulations are followed, where applicable.

Proper preserving, storing and handling of air, water and soil/sediment samples are critical if the integrity of the samples are to be maintained. Samples collected in the field may undergo biological, chemical or physical changes following removal from their environment. In order to minimize those changes, many samples must have preservatives in the form of strong acids or bases added prior to delivery to the laboratory. If samples are to be collected as part of a government program, the governing agency typically must be notified 30 days prior to sample collection

## B. Equipment and Materials:

Pre-cleaned sample containers along with associated preservations within the sample containers will be provided to LaBella from the analytical laboratory. The field geologist/engineer will provide the necessary personal protective equipment to place samples collected within the appropriate sample containers. However, if field preservation is required the following equipment and materials shall be obtained:

- Hydrochloric (HCl) Acid Reagent A.S.C. 38%
- Nitric (HNO3) Acid Reagent A.S.C. 71%
- Sodium Hydroxide (NaOH) 97%
- 10 mL glass pipettes
- Narrow range (0-3 and 12-14) pH paper
- Nitrile gloves

## C. Procedure:

1. Review Table 1 which details typical parameters of interest at environmental sites and the associated methods, preservation, container type, holding time and required sample volume.
2. Obtain pre-cleaned and pre-preserved sample containers from the laboratory. If pre-preserved sample containers were provided skip to Step 7; if not proceed to Step 3.
3. Put on a clean pair of nitrile gloves.
4. In a clean, non-dusty environment, remove the cap of the sample container.
5. Using a clean, 10 mL glass pipette draw the required amount of acid or base and insert into the sample container.
    a. PFAS –Trizma powder (water samples),
    b. Volatile Organic Compounds – 2 mL of HCl acid (water samples).
    c. Total and Dissolved Metals (including mercury) – 5 mL Nitric acid (water samples).
    d. Cyanide – 15-20 Sodium Hydroxide pellets (water samples).

e. Chemical Oxygen Demand, Oil and Grease, Organic Carbon, Phenolics, Total Dissolved Phosphorous, Hydrolyzable Phosphorus, Ammonia, Nitrate and Nitrite – 5 mL Sulfuric acid (water samples).

6. Immediately replace and tighten the sample container cap.
7. Collect sample using equipment and procedures outlined in other SOPs as appropriate. The volume of the sample collected shall be sufficient to conduct the analysis required, as well as associated quality assurance/quality control samples (QA/QC).
8. Place samples immediately in the pre-preserved sample containers.
9. Chill all samples to 4°C from sample collection until laboratory analysis.
10. Package and ship samples.

## D. QA/QC Requirements:

This section includes QA/QC requirements associated with sample containers, volumes, preservations, and holding times. The following general requirements apply to this SOP:

1. All data must be documented on field data sheets or within site logbooks.
2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan.
3. Equipment checkout and calibration activities must occur prior to sampling/operation, and must be documented.
4. QA/QC samples shall be collected in accordance with SOP #005.

The following procedure shall be conducted to provide a QA/QC check of water (aqueous) samples to ensure the samples were preserved to the proper pH prior to shipping for laboratory analysis.

Volatile Organic Compounds:

1. Collect one additional VOA vial at every third aqueous sampling location.
2. Fill the extra vial with the sample.
3. Using the extra VOA vial, remove the cap and using a clean, 10 mL glass pipette extract approximately 1 mL of water.
4. Place two drops of the water on a 1-inch strip of 0-3 range pH paper.
5. Compare pH strip's color while wet with that of the color key included on the pH paper container.
6. If pH is not less than 2, add additional HCL to the remaining 3 VOA vials prior to collecting the sample.
7. Discard the vial used to check the pH.

Total and Dissolved Metals, Mercury, Ammonia, Nitrate plus Nitrite, Total Dissolved Phosphorus, COD, Oil & Grease, Organic Carbon, Phenolics:

1. Collect sample and tightly reseal the cap.
2. Agitate the sample by gently shaking the sample bottle to mix the acid and water.
3. Remove the cap and using a clean, 10 mL glass pipette extract approximately 1 mL of sample.
4. Place approximately two drops of sample on a 1 inch strip of 0-3 range pH paper.

5. Compare pH strip's color while wet with that of the color key included on the pH paper container.
6. If pH is not less than 2, add appropriate additional Sulfuric Acid to the sample using a clean pipette.
7. Recheck sample using steps 2 through 6 until sample pH is less than 2.

Cyanide:

1. Collect sample and tightly reseal the cap.
2. Agitate the sample by gently shaking the sample bottle until the NaOH pellets are dissolved.
3. Remove the cap and using a clean 10 mL glass pipette extract approximately 1 mL of sample.
4. Place approximately two drops of sample on a 1-inch strip of 12-14 range pH paper.
5. Compare pH strip's color while wet with that of the color key included on the pH paper container.
6. If pH is not greater than 12, add additional NaOH to the sample using standard procedures.
7. Recheck sample using steps 2 through 6 until sample pH is greater than 12.

## E. Special Conditions:

None

## F. References:

Eurofins Test America

## G. Appendices or Forms:

Table 1 Laboratory Analysis: Summarizing parameters, methods, preservations, container type, holding times and minimum sample volumes are included as an attachment to this SOP.

Table 1

| Laboratory Analysis | EPA Method | Standard Method and/or SW846 Method | Preservation | Container | Holding Time | Minimum Volume |
|---|---|---|---|---|---|---|
| **WATER** | | | | | | |
| Acid Soluble & Insoluble Sulfide | ----- | 9030B | Cool to 4 deg C No Headspace | P or G | 7 Days | 8 oz. |
| Acidity as CaCO3 | 305.1 | 2310B | Cool to 4 deg C | P or G | 14 Days | 100 mL |
| Alkalinity | ----- | 2320B | Cool to 4 deg C | P or G | 14 Days | 100 mL |
| Alkalinity as CaCO3 | 310.1 | 2320B | Cool to 4 deg C | P or G | 14 Days | 100 mL |
| Ammonia | 350.2/.3 | 4500-NH3 B,E | Cool to 4 deg C, H2SO4 to pH<2 | P or G | 28 Days | 400 mL |
| Aromatic Hydrocarbons | 602 | 8021B | 1:1 HCl to pH <2, Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present | G, Vial screw cap with center hole Teflon- faced silicone septum | 14 Days | 40 mL |
| Biochemical Oxygen Demand | 405.1 | 5210B | Cool to 4 deg C | P or G | 48 Hrs. | 500 mL |
| Bromide | 300 | ----- | None | P or G | 28 Days | 250 mL |
| Calcium | ----- | 3120B | HNO3 to pH<2 | P or G | 6 Months | 100 mL |
| Calcium- Hardness | 200.7 | 3111B | HNO3 to pH<2 | P or G | 6 Months | 100 mL |
| Carbamates | 531.1 | ----- | Cool to 4 deg C, 0.08% Na2S2O3 if residual chlorine present | G, screw cap Teflon faced silicone septum | 14 Days | 100 mL mL |
| Carbonaceous BOD | ----- | 5210B | Cool to 4 deg C | P or G | 48 Hrs. | 1000 mL |
| Chloride | 300 | 4500-CL D 4110 | Cool to 4 deg C | P or G | 28 Days | 100 mL |
| Chloride, Residual Disinfectant | ----- | 4500Cl-G | Cool to 4 deg C | P or G | Analyze Immediately | 200 mL |
| COD | 410.4 | 5220D | H2S04 to pH<2, Cool to 4 deg C | P | 28 days | 250 mL |
| Color | ----- | 2120B | Cool to 4 deg C | P or G | 24 Hrs | 100 mL |
| Conductivity | ----- | 2510B | Cool to 4 deg C | P or G | 28 Days | 100 mL |
| Cyanide | 335.4 | 4500-CN C&E | Cool to 4 deg C NaOH pH>12 | P or G | 14 Days | 250 mL |
| Cyanide | 335.2 | 9010B, 9012A, 9014 | Cool to 4 deg C, NaOH to pH>12 0.6 g ascorbic acid if residual chlorine present | P or G | Sulfide absent, 14 days; sulfide present 24 Hrs | 250 mL |
| Cyanide, Amenable | 335.1 | | | | | |
| Dioxin | ----- | 8280A | Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present | G, Amber Teflon-lined screw cap | 7 days until extraction 40 days after extraction | 1000 mL |
| DRO | ----- | 8015B | Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present | G, Amber Teflon-lined screw cap | 7 days until extraction 40 days after extraction | 1000 mL |
| Escherichia Coli | ----- | 9222B | 0.008% Na2S203 if residual chlorine present 0.3 mL/125 mL 15% EDTA if > 0.01 mg/L heavy metals | Sterile P or G | 30 Hrs. for Drinking Water 6 Hrs. for Waste Water | 125 mL |
| Extractable Org. Compounds | | | Cool to 4 deg C, Store in dark | G, Amber Teflon-lined screw cap | *7 days | 4000 mL |

Table 1

| Laboratory Analysis | EPA Method | Standard Method and/or SW846 Method | Preservation | Container | Holding Time | Minimum Volume |
|---|---|---|---|---|---|---|
| Fecal Coliform | ----- | 9222B or D | 0.008% Na2S203 if residual chlorine present<br>0.3 mL/125 mL<br>15% EDTA if ><br>0.01 mg/L heavy metals | Sterile<br>P or G | 30 Hrs. for Drinking Water<br>6 Hrs. for Waste Water | 125 mL |
| Fecal Streptococci | ----- | 9230C | Cool to 4 deg C<br>0.008% Na2S2O3 if residual chlorine present | Sterile<br>P or G | 30 Hrs. for Drinking Water<br>6 Hrs. for Waste Water | 125 mL |
| Fluoride | 300 | 4500 F-B,C S | Cool to 4 deg C | P or G | 28 Days | 300 mL |
| Foaming Agents (MBAS) | ----- | 5540C | Cool to 4 deg C | P or G | 48 Hrs | 250 mL |
| Gases | ----- | 3810 | Cool to 4 deg C<br>0.008% Na2S2O3 if residual chlorine present<br>1:1 HCl to pH <2 | G, Vial screw cap with center hole Teflon- faced silicone septum | 7 days without HCl<br>14 days with HCl | 40 mL |
| GRO | ----- | 8015B | 1:1 HCl to pH <2, Cool to 4 deg C<br>0.008% Na2S2O3 if residual chlorine present | G, Vial screw cap with center hole Teflon- faced silicone septum | 7 days w/o HCl<br>14 days w/HCl | 40 mL |
| Hardness | | | HNO3 to pH<2 | P | 6 months | 1000 mL |
| Heterotrophic Plate Count | ----- | 9215B | Cool to 4 deg C<br>0.008% Na2S2O3 if residual chlorine present | Sterile<br>P or G | 30 Hrs. for Drinking Water<br>6 Hrs. for Waste Water | 125 mL |
| Hexavalent Chromium | 7196A | 3500Cr-D | Cool to 4 deg C | P | 24 hours | 500 mL |
| HPLC (Explosive) | ------ | 8330 | Cool to 4 deg C | G, Amber Teflon-lined screw cap | 7 days until extraction 40 days after extraction | 1000mL |
| HPLC (Explosive) | ------ | 8310 | Cool to 4 deg C | G, Amber Teflon-lined screw cap | | 1000mL |
| Mercury | ----- | 7470A | Cool to 4 deg C | P or G | 28 Days | 8 oz. |
| Metals | 200.7 | ----- | HNO3 to pH<2 | P | 6 Months | 100 mL |
| Nitrate | 300 | ----- | Cool to 4 deg C | P or G | 48 Hrs. | 100 mL |
| Nitrate (Chlorinated) | 353.2 | 4500-NO3 F | Cool to 4 deg C | P or G | 48 Hrs | 250 mL |
| Nitrate (Non- chlorinated) | 353.2 | 4500-NO3 F | H2SO4 to pH<2, Cool to 4 deg C | P or G | 14 Days | 250 mL |
| Nitrite | 300, 353.2, 354.1 | 4500-NO3 D | Cool to 4 deg C | P or G | 48 Hrs | 100 mL |
| Odor | ----- | 2150B | Cool to 4 deg C | G only | 24 Hrs | 200 mL |
| Oil and Grease | | 1664 | HCl to pH<2, Cool to 4 deg C | G, Amber Teflon-lined screw cap | 28 days | 1000 mL |
| Organic Nitrogen | 351.1 | ----- | Cool to 4 deg C, H2SO4 to pH<2 | G | 28 Days | 500 mL |

**Table 1**

| Laboratory Analysis | EPA Method | Standard Method and/or SW846 Method | Preservation | Container | Holding Time | Minimum Volume |
|---|---|---|---|---|---|---|
| Organochlorine Pesticides/PCB | 608 | 8081A,8082 | Cool to 4 deg C 0.008% $Na_2S_2O_3$ if residual chlorine present If aldrin is to be determined bind to pH 5-9. | G, Amber Teflon-lined screw cap | 7 days until extraction 40 days after extraction | 1000 mL |
| Ortho Phosphate | 300 | 4500 P-E | Cool to 4 deg C | P or G | 48 Hrs | 50 mL |
| Orthophosphate | 365.2 | ----- | Filter immediately, Cool to 4 deg C | P or G | 48 Hrs. | 50 mL |
| pH, Hydrogen ion | ----- | 4500-H-B | Cool to 4 deg C | P or G | Analyze Immediately | 25 mL |
| Phenols | 420.1 | 9065, 510ABC | Cool to 4 deg C, $H_2SO_4$ to pH<2 | G | 28 Days | 500 mL |
| Pseudomanas Aeruginosa | ----- | 9213E | Cool to 4 deg C 0.008% $Na_2S_2O_3$ if residual chlorine present | Sterile P or G | 30 Hrs. for Drinking Water 6 Hrs. for Waste Water | 125 mL |
| Purgeable Halocarbons | 601 | 8021B | Cool to 4 deg C 0.008% $Na_2S_2O_3$ if residual chlorine present | G, Vial screw cap with center hole Teflon- faced silicone septum | 14 Days | 40 mL |
| Radiological | ----- | ----- | $HNO_3$ to pH<2 | P or G | 6 Months | 100 mL |
| Residue- Settleable (SS) | 160.5 | ----- | Cool to 4 deg C | P or G | 48 Hrs. | 1000 mL |
| Residue-filtered (TDS) | 160.1 | ----- | Cool to 4 deg C | P or G | 7 Days | 100 mL |
| Residue-non- filtered (TSS) | 160.2 | ----- | Cool to 4 deg C | P or G | 7 Days | 100 mL |
| Residue-Total Volatile Solids | 160.4 | 2540 E | Cool to 4 deg C | P or G | 7 Days | 100 mL |
| Salinity | ----- | 2520 C | Cool to 4 deg C | G | 28 Days | 100 mL |
| Semivolatile Organic Compounds (Unregulated) | 525.2 | ----- | If residual chlorine is present, add 40-50 mg Sodium Thiosulfate. If not chlorinated, add 6N HCl to pH<2 Cool to 4 deg C | G, Amber Teflon-lined screw cap | 7 Days for extraction, 30 after extraction | 1000 mL |
| Semivolatile Organics | 625 | 8270C | Cool to 4 deg C 0.008% $Na_2S_2O_3$ if residual chlorine present | G, Amber Teflon-lined screw cap | 7 days for extraction 40 days after extraction | 1000 mL |
| Silica | 200.7 | ----- | Cool to 4 deg C | P only | 7 Days | 50 mL |
| Specific Conductance | 120.1 | ----- | Cool to 4 deg C | P or G | 28 Days | 100 mL |
| Sulfate | 300 | 4500-$SO_4$ | Cool to 4 deg C | P or G | 28 Days | 50 mL |
| Sulfate | 375.4 | ----- | Cool to 4 deg C | P or G | 28 Days | 50 mL |
| Sulfide | 376.2 | 9030 B, 4500S2-AD | Cool to 4 deg C, add zinc plus NaOH to pH>9 | P or G | 7 Days | 50 mL |
| Sulfite ($SO_3$) | 377.1 | ----- | None Required | G, Bottle and Top | Analyze immediately | 50 mL |
| Surfactants (MBAS) | 425.1 | ----- | Cool to 4 deg C | P or G | 48 Hrs. | 250 mL |

Table 1

| Laboratory Analysis | EPA Method | Standard Method and/or SW846 Method | Preservation | Container | Holding Time | Minimum Volume |
|---|---|---|---|---|---|---|
| TDS | | | Cool to 4 deg C | P | 7 days | 500 mL |
| Temperature | ----- | 2550B | None | P or G | Analyze Immediately | 1000 mL |
| Temperature | 170.1 | ----- | None Required | G, Bottle and Top | Analyze immediately | 1000 mL |
| Total Kjeldahl Nitrogen | 353.3/.1 | 4500Norg-C | H2S04 to pH<2 , Cool to 4 deg C | P | 28 days | 250 mL |
| Total Coliform | ----- | 9221D | 0.008% Na2S203 if residual chlorine present<br>0.3 mL/125 mL<br>15% EDTA if ><br>0.01 mg/L heavy metals | Sterile<br>P or G | 30 Hrs. for Drinking Water<br>6 Hrs. for Waste Water | 125 mL |
| Total Dissolved Solids | 160.1 | 2540C | Cool to 4 deg C | P or G | 7 Days | 100 mL |
| Total Hardness | 130.2 , 200.7 | ----- | HNO3 to pH<2<br>H2SO4 to pH<2 | P or G | 6 Months | 100 mL |
| Total Kjeldahl Nitrogen | 351.3 | ----- | H2SO4 to pH<2 | P or G | 28 Days | 500 mL |
| Total Metals | 200.7<br>200.8 | 6010B, 6020, 7000A | HNO3 to pH<2 | P | 6 months<br>(Hg 28 days) | 500 mL |
| Total Organic Carbon (TOC) | 415.1 | 9060, 5310C | H2SO4 to pH<2, Cool to 4 deg C | G, Amber Teflon-lined screw cap | 28 days | 80 mL |
| Total Organic Halides | | 5320B | 1N H2SO4 to pH<2 | P or G | 28 Days | 50 mL |
| Total Phosphorus | 365.2 | ----- | Cool to 4 deg C, H2SO4 to pH<2 | G | 28 Days | 50 mL |
| Total Recoverable Oil & Grease | 413.1,166 4A | ----- | Cool to 4 deg C, HCL or H2SO4 to pH<2 | G | Petroleum Based 3 Days; Non-Petroleum Based 24 hours | 1000 mL |
| Total-Residue (TS) | 160.3 | 2540B | Cool to 4 deg C | P or G | 7 Days | 100 mL |
| Turbidity | 180.1 | 2130B | Cool to 4 deg C | P or G | 48 Hrs | 100 mL |
| Volatile Organics | 624 | 8260B | 1:1 HCl to pH <2, Cool to 4 deg C<br>0.008% Na2S2O3 if residual chlorine present | G, Vial screw cap with center hole Teflon-faced silicone septum | 7 days w/o HCl<br>14 days w/HCl | 40 mL |
| Volatiles (Regulated) | 524.2 | ----- | Cool to 4 deg C HCl to pH<2 | G, Vial screw cap with center hole Teflon-faced silicone septum | 14 Days | 60-120 mL |
| **SOIL** | | | | | | |
| Acid Soluble & Insoluble Sulfide | ----- | 9030B | Cool to 4 deg C, no headspace | P or G | 7 Days | 8 oz. |
| Amenable Cyanide | ----- | 9213 | Cool to 4 deg C | P or G | 14 Days | 4 oz. |
| Bromide | ----- | 9211 | Cool to 4 deg C | P or G | 28 Days | 8 oz. |
| Cation - Exchange Capacity | ----- | 9080, 9081 | None | P | ----- | 8 oz. |
| Chloride | ----- | 9212, 9056, 9253 | None | P or G | 28 Days | 8 oz. |
| Chlorinated Herbicides | ----- | 8151A | Cool to 4 deg C | G, wide mouth, teflon liner | 14 Days | 8 oz. |
| Corrosivity pH Waste>20% water | ----- | 9040B | Cool to 4 deg C | P | Analyze Immediately | 4 oz. |

Table 1

| Laboratory Analysis | EPA Method | Standard Method and/or SW846 Method | Preservation | Container | Holding Time | Minimum Volume |
|---|---|---|---|---|---|---|
| Corrosivity Toward Steel | ----- | 1110 | Cool to 4 deg C | P | 14 Days | 4 oz. |
| Cyanide | | 9010B, 4500CN | Cool to 4 deg C | G, Amber | 14 Days | 4 oz |
| Dioxin | ----- | 8280A | Cool to 4 deg C | G | 14 Days | 8 oz. |
| DRO | ----- | 8015B | Cool to 4 deg C | G, Amber | 14 Days | 4 oz. |
| Extractable Organic Compounds | | | Cool to 4 deg C, Store in dark | G | 14 days | 8 oz |
| Extractable Sulfide | ----- | 9031 | Cool to 4 deg C, fill top of sample with 2N Zinc Acetate until moistened | P or G | 7 Days | 8 oz. |
| Fluoride | ----- | 9214 | None | P | 28 Days | 8 oz. |
| Gases | ----- | 3810 | Cool to 4 deg C | G, Amber | 14 Days | 8 oz. |
| Grain Size | | | N/A | G | N/A | 8 oz |
| GRO | ----- | 8015B | Cool to 4 deg C, check state regulations for proper preservative. NJ (methanol), PA (encore samplers) NY (cool to 4 deg C). | G, Amber VOA vial | 14 Days | 15 Grams |
| HPLC (PAH) | ------ | 8310 | Cool to 4 deg C | G, Amber Teflon-lined screw cap | 14 days until extraction 40 days after extraction | 4 oz. |
| Ignitability | ----- | 1010 | None | P or G | None | 8 oz. |
| Ignitability of Solids | | 1030 | None | P or G | None | 8 oz. |
| Mercury | 245.1 | 7471A | Cool to 4 deg C | G, Amber | 28 Days | 4 oz. |
| Metals | ----- | 6010B, 6020, 7000A | Cool to 4 deg C | G, Amber | 6 Months | 8 oz. |
| Moisture Content | | | Store in airtight jar 3-30 deg C | G | N/A | 8 oz |
| Nitrate | ----- | 9210 | Cool to 4 deg C | P or G | 48 Hrs | 8 oz. |
| Oil & Grease (Sludge, Sludge- Hem) | ----- | 9071B | Cool to 4 deg C | G | 28 Days | 8 oz. |
| Organochlorine | ----- | 8081A | Cool to 4 deg C | P or G | 14 Days | 8 oz. |
| Paint Filter Liquids Test | ----- | 9095A | Cool to 4 deg C | P or G | ----- | 8 oz. |
| PCBs | ----- | 8082 | Cool to 4 deg C | G, Amber Teflon-lined screw cap | 14 Days | 4 oz. |
| pH | ----- | 9045C | Cool to 4 deg C | G, Amber | Analyze Immediately | 4 oz. |
| pH, Soil and Waste | ----- | 9045A | Cool to 4 deg C | G | Analyze Immediately | 8 oz. |
| Phenol | ----- | 9065, 9066, 9067 | Cool to 4 deg C | G, Amber | 28 Days | 4 oz. |
| Radiological | ----- | ----- | Cool to 4 deg C | G | 6 Months | 8 oz. |
| Reactivity Cyanide | ----- | SW-846 7.3.3.2 | Cool to 4 deg C | P | 14 Days | 8 oz. |
| Reactivity Sulfide | ----- | SW-846 7.3.4.2 | Cool to 4 deg C | P | 14 Days | 8 oz. |
| Semivolatile Organics | ----- | 8270C | Cool to 4 deg C | G, Amber | 14 Days | 8 oz. |

**Table 1**

| Laboratory Analysis | EPA Method | Standard Method and/or SW846 Method | Preservation | Container | Holding Time | Minimum Volume |
|---|---|---|---|---|---|---|
| Sulfate | ----- | 9035, 9036, 9038 | Cool to 4 deg C | P or G | 28 Days | 8 oz. |
| Sulfides | ----- | 9215 | Cool to 4 deg C | P or G | 7 Days | 8 oz. |
| TCLP Metals | ----- | 1311, 6010B, 6020, 7000A, 7470A | Cool to 4 deg C | G, Amber | 180 Days (Hg 28 days) | 8 oz |
| TCLP Herbicides | ----- | 1311 | Cool to 4 deg C | G, Amber | 14 Days | 8 oz. |
| TCLP Pesticides | ----- | 1311 | Cool to 4 deg C | G, Amber | 14 Days | 8 oz. |
| TCLP Semivolatile Organics | ----- | 1311, 8270C, 8081A, 8151A | Cool to 4 deg C | G, Amber Teflon Lined | 14 Days | 8 oz. |
| TCLP Volatile Organics | ----- | 1311, 8260B | Cool to 4 deg C | G, Amber VOA Vial Teflon Lined | 14 Days | 8 oz. |
| Temperature | ----- | 2550 | ----- | P | Analyze Immediately | 4 oz. |
| TOC | | Lloyd Kahn Method | Cool to 4 deg C | G, Amber | 14 days | 4 oz. |
| Total Coliform | ----- | 9131 | Cool to 4 deg C | Sterile, P or G | 6 Hrs | 4 oz. |
| Total Coliform | ----- | 9132 | Cool to 4 deg C | Sterile, P or G | 6 Hrs | 4 oz. |
| Total Cyanide | ----- | 9013 | Cool to 4 deg C | P or G | 14 Days | 8 oz. |
| Volatile Organic Compounds | ----- | 8260B | Cool to 4 deg C Check individual state regulations for proper preservative. NJ (methanol), PA (encore samplers), NY (cool to 4 deg C) | G, wide mouth, teflon liner | 14 Days | 4 oz. |
| Volatile Organic Compounds | ----- | 8021 | | G, wide mouth, teflon liner | 14 Days | 4 oz. |
| CLP Sampling and Holding Time Information | | | | | | |
| Cyanide (aqueous) | ILM04.1 | | NaOH to pH>12, Cool to 4 deg C | P | 12 Days VTSR | 1000ml |
| Cyanide** | ILM04.1 | | Cool to 4 deg C | G | | 8 oz |
| Mercury (aqueous) | ILM04.1 | | HNO3 to pH<2, Cool to 4 deg C | P | 26 Days VTSR | 1000ml |
| Mercury (solid/soils) | ILM04.1 | | Cool to 4 deg C | G | | 8 oz |
| Metals (aqueous) | ILM04.1 | | HNO3 to pH<2, Cool to 4 deg C | P | 180 Days VTSR | 1000ml |
| Metals (solid/soils) | ILM04.1 | | Cool to 4 deg C | G | | 8 oz |
| PCBs (aqueous) | OLM04.2 | | Na2S203, Cool to 4 deg C | G | See Note 7 | 1000ml |
| PCBs (solid/soils) | OLM04.2 | | Cool to 4 deg C | G | See Note 6 | 8 oz |
| Pesticides (aqueous) | OLM04.2 | | Na2S203, Cool to 4 deg C | G | See Note 7 | 1000ml |
| Pesticides (solid/soils) | OLM04.2 | | Cool to 4 deg C | G | See Note 6 | 8 oz |
| Semivolatile Organic Compounds (aqueous) | OMLO4.2 | | Cool to 4 deg C | G | See Note 8 | 1000ml |
| Semivolatile Organic Compounds (solid/soils) | OLM04.2 | | Cool to 4 deg C | G | See Note 6 | 8 oz |
| Volatile Organic Compounds (aqueous) | OLM04.2 | | HCL pH < 2, Cool to 4 deg C | G | W/preservative: 10 days VTSR; W/O: 7 days VTSR | 40ml |
| Volatile Organic Compounds (solid/soils) | OLM04.2 | | Cool to 4 deg C | G | 10 Days VTSR | 4 oz |

Table 1

| Laboratory Analysis | EPA Method | Standard Method and/or SW846 Method | Preservation | Container | Holding Time | Minimum Volume |
|---|---|---|---|---|---|---|

**Notes:**

1. P - Plastic.
2. G - Glass.
3. Minimum volume is the minimum volume required by the laboratory to conduct the analysis. The laboratory will likely require additional sample volume.
4. * Extraction within seven (7) days of collection; analysis within 40 days of extraction.
5. **When chlorine is present ascorbic acid is used to remove the interference (0.6 g ascorbic acid).
6. VTSR - Validated time of sample receipt.
7. Ten (10) days from VTSR for extraction and 40 days following extraction.
8. Five (5) days from VTSR for extration 14 days after extraction.
9. Five (5) days from VTSR for extraction 40 days after extraction.
10. Holding times are from the time of sample collection unless otherwise noted.

**Table 1**

| Laboratory Analysis | EPA Method | Standard Method and/or SW846 Method | Preservation | Container | Holding Time | Minimum Volume |
|---|---|---|---|---|---|---|
| 1, 4 Dioxane (Soil) | - | 8270D | Cool to 4 deg C | G, Amber | 14 Days | 4 oz. |
| 1,4 Dioxane (Water) | - | 8270 SIM | Cool to 4 deg C | G, Amber | 14 Days | 1000 mL |
| PFAS (Soil) | - | 1633 | Cool to 4 deg C | P, Non-Teflon Lined | 28 Days | 8 oz. |
| PFAS (Water) | - | 1633 | Cool to 4 deg C | P, Non-Teflon Lined | 28 Days | 250 mL |

**Notes:**

1. P - Plastic
2. G - Glass
3. Minimum volume is the minimum volume required by the laboratory to conduct analysis. The laboratory will likely require additional sample volume.
4. * Extraction within seven (7) days of collection; analysis within 40 days of extraction.
5. ** When chlorine is present ascorbis is used to remove the interference (0.6 g ascorbic acid).
6. VTSR - Validated time of sample receipt.
7. Ten (10) days from VTSR for extraction and 40 days following extraction.
8. Five (5) days from VTSR for extraction 14 days after extraction.
9. Five (5) days from VTSR for extraction 40 days after extraction.
10. Holding times are from the time of sample collection unless otherwise noted.

# Completing a Chain of Custody Record

**Standard Operating Procedure #004**

## A. Purpose and Scope:

This protocol provides a standard operating procedure (SOP) for initiating and maintaining a Chain of Custody (COC) document. A COC is a legal document designed to track persons who are responsible for the preparation of the sample container, sample collection, sample delivery, sample storage, and sample analysis. A COC is an appropriate format to record important data associated with each individual sample. In general, a sample requiring a COC will follow a path as follows:

**Sample Collector → Sample Courier/Operator → Sample Manager**

Verification of who has possessed the samples and data and where the samples have been is completed when staff follow chain-of-custody procedures.

## B. Equipment and Materials:

- Chain of Custody form
- Ball-point/permanent pens
- Gallon sized Ziploc Bag (to keep document dry)
- Field Logbook
- Custody seals
- Padlock(s) (if needed)

## C. Procedure:

1. Once a sample has been determined to require a COC, the Sample Collector must initiate the COC. The Sample Collector must fill in the fields provided on the COC. The words “Chain of Custody” must be located in a conspicuous location at the top of the document.

2. The form is generally a three-page carbon copy document, including a white, yellow and pink sheet. While LaBella generally uses COCs provided by the applicable laboratory, it is important to ensure that the COC from each lab contains places for all necessary information.

3. The COC at that time should include the applicable project number, the project name and location.

4. The Client Information Section must be completed. In most cases the “client” will be LaBella Technologies, Inc. or entity procuring services.

5. The first field of information is the Sample Identification or Sample Identification Number. This identification/number must match the identification/number located on the sample container.

6. An information line for the date, time, phone number, printed name of Sample Collector, signature of Sample Collector, organization name (no acronyms), organization’s full mailing address, and sample description must also be included.

7. Sampling personnel should enter the sample Identification or number(s) (which should correspond with a unique number on each sample container, and parameters to be analyzed. The "Sample ID" must be included and must match the number on the sample.

8. Subsequent fields must be provided to allow for documentation of information about any subsequent Sample Couriers/Operators or Sample Managers. These fields must contain the date, time, phone number, printed name of person taking custody of sample, signature of person taking custody of sample and organization name (no acronyms).

9. Field Information - The COC must contain places to enter the following field information: sample number, sampling date, and type of sample. Other field information may be recorded as specified in the field sampling plan or proposal for the project. It is imperative that there be only one (1) sample with a particular sample number per project/study so as to prevent duplicates in Excel files and EQuIS databases.

10. Laboratory Information - Once the sample is delivered to the lab, the laboratory personnel will sign and date the "received by" line located at the bottom of the COC. Other laboratory information may be recorded as specified in the project/study work plan/proposal.

11. Signatures - The COC must contain places for all people who handle the sample to sign his/her name. This is a record of persons who had custody of the sample during all steps of the process from container preparation, sample collection, sample storage and transport, and sample analysis. There should be signature lines to relinquish custody of the sample and to receive custody of the sample.

## D. QA/QC Requirements:

The Field Team Leader or senior person on the sampling team will review the completed COC form to verify that all fields are properly completed. For purposes of this SOP, signing the form under Collected/Delivered by is considered evidence that the COC form has been checked for accuracy and completeness. Any project related questions concerning the COC should be directed toward the Project Manager.

## E. Special Conditions:

Whenever samples are split with a source or government agency, a separate chain of custody form should be completed for the samples and the relinquisher (sampler) and recipient should sign. If a representative is unavailable or refuses to sign for the samples, this can be noted in the "remarks" area of the form. When appropriate, as in the case where the representative is unavailable, the custody record should contain a statement that the samples were delivered to the designated location at the designated time. A copy of the chain of custody form for split samples must be kept with the project file.

Samples may require short term storage in field locations prior to delivery to the laboratory for analyses. The storage may be in vehicles or lodging locations. The samples must be secured to limit access to them. A locked vehicle is considered controlled access. However, simply a locked lodging room is not secure due to potential custodial access. If an unattended lodging room is used for sample storage, the samples must be further secured. This may entail a padlock on the ice chest, samples in an ice chest secured in an inner bag with a custody seal on it, and/or ice chest taped shut with custody seal on the outside of it.

**F. References:**

Sampling Guidelines and Protocols, NYSDEC, DER-10 Chapter 2

**G. Appendices or Forms:**

The COC used should be specific to each laboratory.

# Quality Assurance Quality Control Samples

**Standard Operating Procedure #005**

## A. Purpose and Scope:

This standard operating procedure explains the purpose and correct usage of Quality Assurance/Quality Control (QA/QC) samples. QA/QC samples are intended to validate the results of sample analysis by providing the means to determine the influence of outside factors on the sample and analysis. There are several types of QA/QC samples in use to ensure the best practices are being followed by both the laboratory preforming the analysis and the sampling team in the field. This is a general procedure for the use of QA/QC samples. Also refer to any guidelines provided by the laboratory.

## B. Equipment and Materials:

QA/QC samples require the following materials:

- Sample containers:
  - They should be the same containers in number and type of preservative as the containers for the samples for which QA/QC samples are being taken
- Analyte-free water
- Any laboratory supplied QA/QC materials

## C. Procedure:

The following are types of QA/QC samples.

1. Duplicate Sample

   A duplicate sample is a sample that is collected concurrently with the routine samples. It consists of an additional set of sample containers to be analyzed for the same parameters as the routine samples. It is taken at a sample point of the samplers choosing and at the same time as the routine sample for that sample point is taken. It is labeled and included on the Chain of Custody (COC) with a name unknown to the laboratory.

   **Example:**
   - Sample Point ID is **MW-1**
   - Duplicate Sample ID is **AZT-1**

   The duplicate sample is submitted as a 'blind' sample to the laboratory. The purpose of a duplicate sample is to allow the sampler to determine the precision of laboratory analysis. The results of the duplicate sample are compared with the results of the concurrent routine sample by the sampler. These results should be within the margin of error for the test being performed.

   One (1) duplicate sample should be taken for every twenty (20) routine samples. For example if 16 samples points were sampled, there would be 1 duplicate sample taken at one (1) of the sample points for a total of 17 sample sets submitted to the lab.

2. Field Blank

   The Field Blank sample is a type of QA/QC sample used to account for possible external contamination of the routine samples, usually by exposure to the air from being on site. It consists

of an additional set of sample containers to be analyzed for the same parameters as the routine samples. It is common to only conduct a Field Blank for volatile organic compound (VOC) parameters even when sampling to additional parameters. This is because VOCs are more likely to be present in the atmosphere at the site then a parameter like metals. However a Field Blank can be conducted for any parameter.

The containers are prepared prior to sampling by filling the containers with analyte-free water. The containers are then transported with the routine sample containers to the site. Once at the site the containers are placed in a location representative of the site conditions and their caps are removed. At the end of the sampling event the caps are then replaced. The sample is labeled and included on the COC as **Field Blank** or **FB**.

If any results are positive for the Field Blank it can be assumed that the routine samples have also been exposed to a similar amount of contaminant and that contaminant is probably present in the atmosphere at the site.

One (1) Field Blank should be taken as required for each day of sampling at the site. They are only used for the collection of aqueous samples.

3. Equipment Blank

An Equipment Blank is a QA/QC sample designed to measure the effectiveness of the decontamination of field equipment. It consists of an additional set of sample containers being analyzed for the same parameters as the routine samples.

An Equipment Blank is collected by pouring analyte-free water directly over/on/into the decontaminated sampling equipment coming into contact with the samples being collected. The water is then collected in the sample containers. Once the containers are filled they are capped and sent to the lab with the other routine samples. The sample is labeled and included on the COC as **Equipment Blank** or **EQ Blank**.

A positive result for the analysis of the Equipment Blank could signal inadequate decontamination of the equipment which may result in cross-contaminated samples and thus suspect results.

One (1) Equipment Blank should be taken for every twenty (20) routine samples collected. The Equipment Blank is not necessary when using dedicated sampling equipment or sampling equipment that is disposed of between each sample point.

4. Matrix Spike/Matrix Spike Duplicate Sample

The Matrix Spike/Matrix Spike Duplicate (MS/MSD) Sample is a quality control system used by the laboratory to check the accuracy of their instruments. It consists of a set of two (2) samples taken at a sample point concurrently with the routine sample for a total of three (3) sets of containers for that sample point. Therefore, the MS/MSD samples should be collected from sample points with sufficient sample volume (e.g., monitoring wells that have low recharge are not good candidates). They are labeled and included on the COC as 'Sample ID' MS and 'Sample ID MSD'

**Example:**

- Sample Point ID is **MW-1**
- Matrix Spike would be **MW-1 MS**
- Matrix Spike Duplicate would be **MW-1 MSD**

The MS/MSD samples are submitted to the laboratory with the routine samples. Once at the laboratory, they will have a known amount of an analyte added, known as the spike. The sample will then be run as a routine sample. Once the results are received they are compared to the results of the routine sample (MW-1 results are compared to MW-1 MS results). There should be a difference in the amount of analyte detected between the samples that should be within the margin of error of the amount of analyte spike that was added to the MS sample. This process is repeated for the MSD sample. This process is an internal review of results for the laboratory to determine the accuracy of their instruments.

One (1) MS/MSD set should be taken for every twenty (20) samples (including Duplicate Samples and Field or Equipment Blank Samples). For example if 12 samples are taken, there should also be a set of MS/MSD samples taken for a total of 14 sample sets submitted to the lab. If 20 samples will be taken, only one set of MS/MSD samples needs to be submitted (total number of samples being 22).

*The following QA/QC samples are used for only specific analyses or functions.*

5. Trip Blank

A Trip Blank is a form of QA/QC that is utilized to account for possible exposure to an external source of VOCs during storage and transport of the sample containers and samples to and from the laboratory. It consists of a VOC sample container prepared by the laboratory and filled with analyte-free water. Trip Blanks are only required when aqueous samples are being collected for VOC analysis, all other parameters do not need one.

The Trip Blank is placed in the cooler with the sample containers when they are sent form the lab to the client. The Trip Blanks will remain in the cooler with the sample containers at all times. When the samples are collected they are placed in the cooler and put on ice with the Trip Blanks for shipment to the lab. At no time should the Trip Blanks be opened or removed from the coolers containing VOC samples. The Trip Blank should be labeled and included on the COC as **Trip Blank** or **TB**.

Each cooler that contains samples for VOC analysis must have a Trip Blank. It is good practice to combine all VOC containers from a site into one (1) cooler to minimize the number of Trip Blanks required. For example if there are five (5) coolers of samples, place all the VOC containers into one (1) cooler and the remaining containers in the other four (4) coolers. Thus only the VOC cooler requires a Trip Blank, which saves on the cost of analysis.

A positive result on the Trip Blank for a VOC could indicate the samples had been exposed during transportation which can have an effect on the results of the routine samples.

Different laboratories have different practices concerning their Trip Blanks. For example some laboratories will include just one (1) VOA vial as their trip blank while others will utilize multiple vials for theirs. The extra vials are often included only as a backup in the event one of the Trip Blank vials is broken during transport, and will not be analyzed unless necessary.

**D. QA/QC Requirements:**

None

**A. Special Conditions:**

**Temperature Blanks** are a type of QA/QC that fall outside of the umbrella of QA/QC Samples.

A Temperature Blank is a container provided by the lab and is used to obtain the temperature of the cooler upon receipt at the lab, usually with an infrared thermometer. It is generally a ~125 mL plastic bottle filled with tap water.

- The Temperature Blank should be left in the cooler during sampling. When the cooler is being prepared for shipment, place the Temperature Blank in the center of the cooler next to the sample containers. There is no need to open the container; it is filled with tap water and therefore harmless unless otherwise noted on the container.

- It should be noted that not all laboratories require a Temperature Blank. There is no cost associated with the Temperature Blanks in the coolers.

**B. References:**

United States Environmental Protection Agency (July 2007), *Samplers Guide, Contract Laboratory Program Guidance for Field Samplers*, Section 3.4, retrieved April 6, 2009, from http://www.epa.gov/superfund/programs/clp/download/sampler/clp_sampler_guidance.pdf

United States Environmental Protection Agency (May 2002), *Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers*, Page 34, retrieved December 15, 2010, from http://www.epa.gov/tio/tsp/download/gw_sampling_guide.pdf

NYSDEC, DER, May 2010, DER-10, Technical Guidance for Site Investigation and Remediation, Chapter 2.

**C. Appendices or Forms:**

None

# Sampling Perfluoroalkyl Substances (PFAS) and Perfluorinated Compounds (PFCS)

**Standard Operating Procedure #006**

## A. Purpose and Scope:

The objective of this SOP is to ensure proper and uncontaminated collection of Perfluoroalkyl Substances (PFASs) and other Perfluorinated Compounds (PFCs). PFASs and PFCs are large groups of compounds used in industrial applications, applied to many household products for grease, water, and stain resistance, and heavily used in Aqueous Film Forming Foams (AFFF) which are often used in firefighting. Although there are no federal regulations currently requiring remedial action for these chemicals, many states are adopting rules and regulation regarding these compounds. As rules continue to develop for these contaminants permitted and non-permitted equipment, materials, and procedure are subject to change. The user of this SOP should consult with applicable regulatory agencies to determine a final list of compounds that need to be analyzed.

Note: This SOP has been developed assuming that there are no elevated concentrations of more toxic chemicals present at the site warranting additional personal protective equipment. However, prior to commencing sampling activities, the sampler should consider all potential contaminants at the site and determine if additional protocols are necessary.

Due to the prevalence of these chemicals in common goods, it is imperative that field personnel are conscious of potential cross contamination. This contamination can be from field equipment, field clothing and PPE, sample containers, decontamination, and food.

## B. Equipment and Materials:

Field equipment, field clothing, PPE, sample containers, and any other items used or present on site made of or containing the following materials **ARE NOT PERMITTED**:

- Low Density Polyethylene (LDPE) – pumps and tubing Only [permitted for sample containers]
- Aluminum foil
- Glass
- Polytetrafluoroethylene (PTFE) / Teflon™
- Waterproofed clothing or boots
- Clothing containing PTFE material (i.e. GORE-TEX®)
- New clothing (clothing not washed a minimum of 6 times) or clothing washed with fabric softeners
- Tyvek® material
- Waterproof/treated paper or field books
- Plastic clipboards, binders, or spiral hard cover notebooks
- Post-it notes or other adhesives
- Sharpies or other permanent markers
- Paint pens, marking paint, etc.
- Most repellents, sunscreens, moisturizers, cosmetics, or other related products
- Decon 90

This list is a general guideline for items not permitted other items may also not be permitted. Check with the LaBella Project Manager before using an uncertain item.

Materials such as Teflon™ or PTFE may be found in common sampling equipment. It is important that field personnel examine and assess existing equipment to avoid accidental contamination. The following materials are **ALWAYS PERMITTED** in sampling equipment:

- Stainless steel
- High density polyethylene (HDPE)
- PVC
- Silicone
- Acetate
- Polypropylene
- Loose paper on aluminum clipboards
- Ballpoint pens

The following equipment considerations should be noted when sampling for PFASs and PFCs.

Borehole Installation and Sampling:

- If using hollow stem augers/split spoons or similar, they must be carbon steel and not coated
- If collecting a soil or sediment core sample (e.g. Geoprobe®), it must be collected directly from single-use PVC liners that must not be decontaminated or reused at different locations.

Soil Sampling with a Hand Auger:

- A stainless steel hand auger without any coatings must be used when sampling.
- Scoops and spatula used must be stainless steel.

Well Development:

- Do not use bailers, unless entirely made of PVC or stainless steel. Teflon in any part of the baileris not acceptable.
- Do not use bladder pumps, most bladders are made of Teflon. Only bladder pumps with a bladder made of natural rubber are acceptable.
- Other pump types are typically okay but should still be examined for Teflon or other prohibited materials.

Conventional Groundwater Sampling / Low-Flow Groundwater Purging/ Residential Well Sampling:

- Bailers should not be used unless entirely made of PVC or stainless steel. Teflon is not acceptable. Single use disposable polyethylene or silicone materials are also acceptable.
- Tubing can only be made of HDPE or silicone.
- Do not use bladder pumps, most bladders are made of Teflon. Only bladder pumps with a bladder made of natural rubber are acceptable.

- Other pump types are typically okay but should still be examined for Teflon or other prohibited materials.

Surface Soil Sampling:

- A stainless steel spoon and bowl should be used. Cover the bowl with a stainless steel lid where possible between the addition of each aliquot. Do NOT cover the bowl with aluminum foil.

Small Equipment Decontamination:

- Water used for decontamination on site should be laboratory certified "PFAS-free" water.

Field Handling, Packaging, and Shipping:

- Plastic bags must be polyethylene.
- Only ice from water should be used, not chemical (blue) ice.
- These equipment changes can be applied to other SOPs if PFASs and/or PFCs are being sampled.
- Separate coolers that have not stored PTFE or Teflon lids.

**C. Procedure:**

Standard operating procedures for sampling as outlined in a number of LaBella SOPs should be followed, but with the specific considerations noted below:

Borehole Installation and Sampling:

- When drilling the well use PFAS-free drilling fluids.
- Don't use detergent to decon drilling equipment with the exception of Alconox and Liquinox. Scrub with equipment a plastic brush to remove heavy soiling and rinse thoroughly in tap water. Use a steam cleaner or a triple-rinse of PFOA-free water as the final step. If large quantities of PFOA-free water are not available from the lab, additional QA/QC sampling may be required to verify the source as a potential source of cross-contamination, then triple-rinse in distilled or deionized water.
- Collect a representative water sample used during drilling activities.
- If using an auger, it must be carbon steel and un-coated.

Conventional Groundwater Sampling / Low-Flow Groundwater Purging/ Residential Well Sampling:

- Collect samples from the pump discharge tubing only. Never collect a water sample that has passed through a flow through cell or similar.
- When sampling prioritize drinking water, followed by surface water, followed by groundwater.
- When sampling groundwater; start with the upgradient well(s), then the furthest downgradient of the interpreted or known source, then wells downgradient to the source, and lastly the wells closest to the interpreted or known source.
- When sampling residential wells, any plumber's sealing tape should be noted, as these typically contain PFCs.

- Prior to sample collection, field personnel must wash their hands and wear a new set of nitrile gloves.
- PFAS/PFC samples should be taken first, prior to collecting samples for any other parameters into any other containers. Field personnel should avoid contact with any other type of sample container or package materials.
- When samples are collected and capped, place the sample bottle(s) in an individual sealed plastic bag (i.e. Ziploc®) separate from all other sample parameter bottles, and place in a shipping container packed only with ice made from frozen water.
- After collecting PFOA samples conduct the "Shaker Test:" A small portion of the sample (~10-25 ml) should be shaken by the sample collector on site. If foaming is noted within the sample, this should be documented when samples are submitted for analysis.

Surface Water Sampling:

- Surface water must be collected by inserting a capped sampling container with the opening pointing down to avoid the collection of surface films.
- Where conditions permit, sampling devices should be rinsed with site medium to be sampled prior to collection of the sample.

Surface Soil Sampling:

- PFAS/PFC samples should be taken first, prior to collecting samples for any other parameters into any other containers. Field personnel should avoid contact with any other type of sample container or package materials.

Large Equipment Decontamination:

- Don't use detergent to decon drilling equipment, scrub with a plastic brush and rinse thoroughly in tap water, then triple-rinse in distilled or deionized water.

Field Handling, Packaging, and Shipping:

- Ice should be double-bagged and secured to avoid meltwater from contacting sample containers, and/or samples should be in an individual sealed plastic bag

**D. QA/QC Requirements:**

A variety of blanks should be collected to trace the sources of any artificially introduced contamination. Rinsate or equipment blanks, field blanks, and trip or travel blanks should all be collected during the sampling event. Rinsate or equipment blanks and field blanks should be collected once per day per matrix or once per 20 samples per matrix, whichever comes first. One trip blank is required per cooler. Matrix Spike and Matrix Spike Duplicate samples should be collect at the same one (1) per 20 frequency as noted above.

Samples should be immediately placed in a cooler maintained at 4±2º Celsius.

**E. Special Conditions:**

In the event of wet weather field personnel must avoid using personal waterproof or water-resistant rain gear unless the gear is made of PVC or Polypropylene. An alternative is to use a gazebo tent that is only touched or moved prior to or after sampling activities.

No food or drink is permitted on-site, except for bottled water and hydration drinks, such as Gatorade. These drinks should only be consumed in the staging area. When field personnel require a break to eat or drink, they should remove their gloves and coveralls and move away from the sampling location, preferably downwind. When finished eating, field personnel should clean up and put their coveralls back on and don a new pair of gloves prior to returning to the work area.

Visitors to the site are asked to remain at least 30 feet from sampling areas.

**F. References:**

Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS), NYSDEC, April 2023.

Chiang, D., Ph.D., P.E., Davis, K., Ph.D., Bogdan, D., Ph.D., Aucoin, M., & Woodward, D. (n.d.).

PFAS Sampling. AECOM.

Shoemaker, J. A., Grimmet, P. E., & Boutin, B. K. (2009). Method 537. Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) (EPA/600/R-08/092) (USA, EPA, Office of Research and Development). Cincinnati, OH: U.S. Environmental Protection Agency.

**G. Appendices or Forms:**

None

# Small Equipment Decontamination

**Standard Operating Procedure #007**

## A. Purpose and Scope:

The Proper decontamination of small equipment prevents cross-contamination of samples, introduction of contaminants to clean sites, and the mixture of incompatible substances. Equipment decontamination also assures the health and safety of all equipment users. Procedures for decontamination procedures vary depending on the matrix sampled, level of contamination, type of contaminants, and the target analytes of the sampling event. The procedure outlined in this SOP is a general procedure for field/ warehouse decontamination of equipment associated with water, soil and other surficial sampling activities.

Decontamination should be performed before sampling work commences and after each sampling event. Decontaminated equipment should be protected from contact with surroundings during storage and transport, and should be handled as little as possible before its use and always with disposable gloves. Note that all waste generated by decontamination procedures including liquids, solids, rags, gloves, etc., will be collected and disposed of properly.

## B. Equipment and Materials:

- Alconox®
- Tap water
- Distilled and deionized water
- 10% Nitric acid rinse
- Acetone (or other pesticide grade organic solvent)
- 1-Gallon pressure spray bottles
- Long-handled brushes
- 5-Gallon plastic buckets

## C. Procedure:

Note that if it is logistically impractical/ impossible to complete all steps listed below at the field site, Steps 1-4 should be performed prior to transport of equipment to a facility where all steps can be completed if required. All field decontamination should take place over a container and liquids should be properly disposed of.

1. Disassemble equipment as necessary.
2. Remove gross contamination from equipment by scraping, brushing and rinsing with tap water
3. Wash with Alconox® or other laboratory grade detergent to remove all visible particulate matter and residual oils and grease.
4. Rinse with tap water to remove detergent.
5. Rinse with distilled and deionized water.
6. Field personnel will use a new pair of outer gloves before handling sample equipment after it is cleaned.
7. If equipment will not be used immediately, wrap in aluminum foil (unless sampling for metals or PFAS analysis) or seal in plastic bags (unless sampling for organics analysis) and store.
8. Record the date and method of decontamination on foil/bag and equipment log

**D. QA/QC Requirements:**

When necessary, field equipment rinsate blanks will be collected by pouring analyte-free water over decontaminated equipment and submitting them to the lab with the other blanks and samples. These blanks are used to assess the quality of equipment decontamination.

**E. Special Conditions:**

Reusable PPE such as respirators, chemical-resistant overboots and gloves shall also undergo the equipment decontamination sequence.

If acetone is a known or expected contaminant another solvent may be substituted. Note that methanol cannot be used for decontamination when sampling gasoline or its by-products. Additional decontamination procedures may be required for particular contaminants or when samples are to be analyzed at very low concentrations.

**F. References:**

NYSDEC "Spill Guidance Manual, Section 2.4, https://www.dec.ny.gov/regulations/2634.html.

USEPA, 1994. Sampling Equipment Decontamination. Environmental Response Team SOP #2006, Revision #0.0. Edison, NJ. http://www.ert.org.

USEPA, 1996. *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*. Region 4, Science and Ecosystem Support Division. Athens, GA. http://www.epa.gov/region04/sesd/eisopqam/eisopqam.html

Wilde, F.D., ed., 2004. *Cleaning of Equipment for water sampling (ver. 2.0)*: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A3, April, accessed January 5, 2009 at http://pubs.water.usgs.gov/twri9A3/

**G. Appendices or Forms:**

None

# Residual Waste Management

**Standard Operating Procedure #008**

## A. Purpose and Scope:

The following standard operating procedure (SOP) presents a description of the methods generally employed for the management of residual waste. Field personnel are responsible for ensuring that state-specific standards/guidelines/regulations are followed, where applicable. In addition, field personnel are responsible for coordination efforts associated with the waste disposal facility, if known.

Improper handling and storage of residual waste can result in leaks and spills and pose a serious threat to the quality of the environment. Timely characterization and disposal of residual wastes shall be conducted in order to not exceed onsite quantity and/or storage regulations.

## B. Equipment and Materials:

Off-Site transportation and disposal of residual waste will be performed by a licensed waste hauler under the direction of LaBella. The company will supply the necessary equipment and materials needed to remove the residual waste from the Site and transport it to an approved waste disposal facility.

The field geologist/engineer will obtain the necessary sample bottles with the associated preservatives, if required, from the analytical laboratory. In addition, a flame ionization detector (FID), photoionization detector (PID) and/or gas meter will be used to screen waste containers soils for the presence of volatile organic compounds (VOCs).

All other equipment required during transportation/disposal activities is the responsibility of the Contractor (waste hauler).

## C. Procedure:

1. During remedial activities all residual waste, including, but not limited to, soil cuttings, decontamination wash/rinse water, purge water and personal protective equipment (PPE) shall be containerized in United States Department of Transportation (USDOT) approved 55-gallon drums or similar waste containers, unless the Work Plan indicates otherwise. Each drum shall contain similar materials/matrices (e.g., soil, water, PPE).

2. Label each waste container using a permanent marker and weather proof label with the following:
   a. Description of the container contents
   b. Site name and address
   c. Name of Site contact and associated phone number

Waste container labels shall be legible and easily understood by those unfamiliar with the Site.

3. Upon completion of remedial activities, the field geologist/engineer will conduct waste characterization of the residual waste prior to off-Site transportation and disposal. Depending upon the type of waste present, various waste disposal facilities may have different testing requirements. LaBella will complete the required analytical testing. Upon receipt of analytical data and

coordination with the disposal facility, the field geologist/engineer will supervise the removal of the waste from the Site

4. Waste containers shall be transported and stored in a secure location on-Site. All waste containers shall be located in one location, if possible.

5. If waste containers are stored for a period of time prior to collecting waste characterization samples, all waste containers shall be inspected for signs of the potential presence of explosive/flammable gases and/or toxic vapors. These signs include pressurization (bulging/dimples); crystals formed around the drum opening; leaks, holes, stains; labels, marking; composition and type (steel/poly and open/bung); condition, age, rust; and sampling accessibility. Drums showing evidence of pressurization and crystals shall be further assessed to determine proper drum opening techniques.

6. All metal waste containers not in direct contact with the earth shall be grounded.

7. Open the waste container with spark resistant tools (e.g., brass, beryllium).

8. Screen the waste containers for explosive gases and/or toxic vapor with appropriate air monitoring instruments as necessary.

9. Obtain the necessary sample bottles with the associated preservatives, if required, from the analytical laboratory.

10. Each matrix (e.g., soil, water) shall be sampled for waste characterization purposes. The field geologist/engineer shall determine the quantity of similar waste characterization samples to be collected from the waste containers in conjunction with the project manager and/or waste disposal facility. Containers with similar wastes (e.g., soil, water) generated from one area of the site may require only one composite sample from each of the waste containers. This determination shall also be made in conjunction with the project manager and/or waste disposal facility.

11. Use a decontaminated spade or shovel to collect representative solid waste samples from each waste container or use a beaker, bailer or similar mechanism to collect representative liquid waste samples from each waste container.

12. Immediately place sample in the pre-preserved sample containers and close the waste container(s).

13. Chill all samples to 4$^{o}$C from sample collection until laboratory analysis.

14. Package and ship samples.

**D. QA/QC Requirements:**

This section includes QA/QC requirements associated with tank closure activities. The following general requirements apply to this SOP:

1. All data must be documented on field data sheets or within site logbooks.
2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan.
3. Equipment checkout and calibration activities must occur prior to sampling/operation, and must be documented.

**DI. Special Conditions:**

In no case, will LaBella be considered the generator of the waste. The site owner shall always take responsibility for waste disposal. Additionally, LaBella may only act as agent for the owner relative to signing manifests with specific permission from LaBella in-house counsel. In most every case, the owner should sign waste manifests.

**DII. References:**

DER-10, Chapter 3, Section 3.3, Subdivision (e) - Management of investigation derived waste.

**DIII. Appendices or Forms:**

None

# Borehole Installation and Sampling

**Standard Operating Procedure #009**

## A. Purpose and Scope:

The following SOP presents a description of the methods generally employed for the installation of boreholes and the collection of subsurface soil samples. Boreholes are typically advanced to define geologic conditions; allow the installation of monitoring wells and piezometers; and allow the collection of subsurface soil samples (generally above the water table) for chemical analysis. Although several manual methods are available for the collection of subsurface soils samples (e.g. hand augers, post-hole augers, the most common method used by LaBella to advance boreholes is a drill rig equipped with hollow-stem augers (HSA) or direct-push technology (DPT). Representative samples are most often collected utilizing split-spoon samplers or Macrocore technology.

The purpose of drilling test borings is typically to characterize the lateral and vertical extent of contamination in the unsaturated zone. The test borings may also be used to allow the installation of ground water monitoring wells. Test borings may also be used to determine the subsurface characteristics for the purpose of geotechnical investigations.

## B. Equipment and Materials:

Drilling will be performed either by LaBella or by a licensed drilling firm under the direction of LaBella staff. The drilling field crew will consist of a driller, a driller's assistant, and an LaBella field geologist/engineer. The field geologist/engineer will supervise drilling operations and conduct the geologic logging of the boreholes. Typical equipment needed for installation of monitoring wells will vary somewhat between drill rigs but will generally include the following:

- Truck or Track mounted Drill Rig equipped with a rotary head
- Rig with hydraulic hammer for direct push methods
- Split spoon or Macrocore sample Barrels
- Hollow stem augers with cutter head lead auger
- Auger fork
- Flush joint casing with a drive shoe
- Drill rods
- Auger plug or disposable point

## C. Procedure:

1. Subcontractor Responsible for Utility Clearance - Subcontractor shall take all reasonable precautions, including contacting the appropriate utility organizations (UFPO, Dig Safe, etc.), in order to verify there are no buried utilities at the test boring and test pit locations.

2. The drilling rig and sampling equipment may be required to be decontaminated by steam-cleaning (high pressure, hot water) prior to drilling and in between borings, depending on the job requirements.

3. The borings will be drilled with direct push technology (DPT), hollow-stem augers, flush joint casing, open hole or any combination depending on the type of information needed, geologic

conditions, and other limitations that may be imposed due to contamination or state or federal guidelines. The boring shall be advanced to match the sampling interval (continuous or standard sampling).

4. Drilling progress and information about the formations encountered shall be recorded by the geologist on the field boring log. The information should include total depth drilled, depths and thickness of strata, problems with borehole advancement, fill materials encountered, and water levels.

Hollow Stem Auger/Flush Joint Driven Casing

a) At the chosen depth interval, drive a clean, standard, 24-inch long, 2-inch O.D. split-spoon sampler into the soil a distance of 24 inches using a 140 lb hammer, free falling 30 inches. Record the number of blows required to drive the sampler every 6 inches on the field boring log. Discontinue driving the sampler if 100 blows have been applied and the sampler has not been driven 6 inches. If 6 inches of penetration has been achieved, discontinue driving the sampler after 50 blows has failed to penetrate fully any of the remaining 6 inch intervals. The first six inches seats the spoon, the next 12 inches represents the Standard Penetration Resistance, and the last six inches is driven to insure sample recovery.

b) Retrieve the sampler from the borehole and place it on a clean, flat surface. Open the sampler and immediately scan the sample with an air monitoring instrument (e.g., PID) if appropriate to the purpose of the investigation. Record instrument readings on the field boring log.

Direct Push Technology

a) The DPT is hydraulically powered and mounted in a customized four-wheel drive vehicle. Position the base of the sampling device on the ground over the sampling location and hydraulically raise the vehicle on the base. As the weight of the vehicle is transferred to the probe, the probe is pushed into the ground.

b) Soil samples will be collected with a Macrocore (or equivalent). The sample tube is pushed and/or vibrated to a specified depth. The interior plug of the sample tube is then removed by inserting small-diameter threaded rods and retracting the plug. Drive the sample tube an additional four (4) to five (5) feet to the sampler terminal depth. Withdraw the probe sections and sample tube.

Sample Review

a) Further, describe and record the following properties of the sample: Sample length recovered, presence of any slough in sampler, basic soil type (e.g., sand, gravel, clay), structure, texture, sorting, grain size, grain shape, degree of saturation, competency, color, odor, staining, and presence of foreign material(s).

b) After the soil within the sampler has been described, it will be placed in sealed sample jars directly from the sampling device.

c) If appropriate to the investigation, the air space surrounding the borehole shall be scanned with a FID or PID and Explosimeter during all drilling activities to determine the presence or absence of volatile organic compounds. Results of this air monitoring shall be recorded on the Geologic Field Log. Activities shall proceed according to the site HSP if the presence of volatile organic compounds is indicated.

5. Upon completion of the test boring, all drill cuttings shall either be placed back in the borehole or will be drummed based on potential contaminants encountered.

6. Note the locations of the borings on a site map and/or mark the locations of the boreholes with a labeled wooden stake

**D. QA/QC Requirements:**

The Follow QA/QC requirements for field documentation.

**E. Special Conditions:**

1. Drilling Subcontract - The Field Team Leader must be familiar with the scope, fee, schedule, and all the terms and conditions of the drilling subcontract. When contractual issues or questions arise during the fieldwork, the Field Team Leader should communicate with the Project Manager and with the owner/client as appropriate.

2. Abandoned Borehole - If the contractor is not able to finish the drilling or has to abandon the borehole due to loss of tools, accidents or any unforeseeable circumstances, the contractor should remove the casings or drive pipes already in the hole and refill it with native soil cuttings, sand, grout, or as approved by the Engineer. All materials extracted from the hole, after refilling it will be managed as investigation derived material and will be disposed of accordingly. Typically, another borehole will be attempted in the area of the initial borehole attempt.

3. Subcontractor/Driller Standby Time - Document any conditions that may result in driller/subcontractor standby time. Such conditions may include adverse weather conditions, lack of access to the property, utilities not marked out, etc. Standby time may result in additional costs from our subcontractor that may not be planned for or approved. Communicate any conditions that may result in standby time to the LaBella Project Manager as soon as possible

**F. References:**

ASTM Standard D 1586
NYSDEC DER-10, May 2010 (or current version)

## G. Appendices or Forms:

Standard Boring Log Form

# Field Description of Soils

**Standard Operating Procedure #010**

## A. Purpose and Scope:

The objective of this SOP is to establish a consistent method for field staff to follow when completing the description of soil samples and entry onto borehole logs. Consistency with description is important because many employees are involved in logging soils, frequently within the same project. Uniformity is critical to allowing meaningful subsurface interpretations using data generated from multiple sources.

This procedure will be used during all field activities when borehole subsurface drilling or surface soil sampling is occurring. These activities should be documented as described herein.

## B. Equipment and Materials:

Some or all of the following equipment may be required for completing the procedures outlined in this SOP:

- Hand lens
- Field notebook and borehole log forms
- Pencils
- Stiff scraper
- Standard grain size examples
- Squirt bottle with water
- Small clear containers with lids

## C. Procedure:

a. LaBella utilizes a combination of the USCS and Modified Burmister methods of soil descriptions.

The Unified Soil Classification System (USCS) is the most widely used engineering/geotechnical soil classification method. The USCS is based on engineering properties of soil which are effected by grain size, water content, grain size distribution, and compaction. This system is often used for classifying soils encountered in boreholes, test pits, and at the surface. The following properties form the basis of USCS soil classification: SOP:

- Hand lens
- Percentage of gravel, sand, and fines;

1. Shape of the grain size distribution curve; and
2. Plasticity and compressibility characteristics.

b. The Modified Burmister Method is used for the verbal description of soil samples. The Modified Burmister classification system is based on grain size and plasticity, but differs from the Unified Soil Classification System in that it includes nomenclature to describe the soil's texture, color, mineralogy, and geological origin.

c. The following step by step procedure will be used for the field classification of soils encountered during subsurface activities (i.e. borehole drilling, trenching, etc.). References to aid in the development of a soil description are included in Appendix A and Appendix B.

A complete soil description should contain the following information in the order indicated:

1. Color
2. Soil Moisture
3. Major grain size component.
4. Minor grain size component(s) with modifier
5. Gradation or Plasticity
6. Density/Consistency
7. Soil Structure or Mineralogy (if necessary)
8. Evidence of Contamination (odor, staining, etc.)
9. USCS symbol

**Example:** Brown, wet, SAND, some Silt, trace gravel, no petroleum odor.

a. Grain Size: There are five major grain sizes: Boulders, Cobbles, Gravel, Sand, and Silt/Clay.

- Boulders are > 8"
- Cobbles are 3" to 8"
- Gravels range in size from 0.2" to 3.0" in diameter and are subdivided into Fine gravel (>0.2" to 0.75") in diameter and Coarse gravel (>0.75" to 3.0")
- Sands range in size from 0.002" to 0.2" and are subdivided into coarse, medium and fine. Standard comparison cards are available for field use.
- Silt and clay are difficult to distinguish in the field. An attempt is made, however, to describe the soil as one of the six following classifications: silt, clayey silt, silt and clay, clay and silt, silty clay, or clay. The field description may be later verified in a lab hydrometer test if required by the project. For field descriptions of silts and clays, the following guidelines should be used:

SILT: ----------gritty, no threads can be rolled
Clayey SILT: ----------rough to smooth, difficult to roll threads
SILT and CLAY: -------rough to smooth, difficult to roll threads
CLAY and SILT: -------smooth and dull, threads can be rolled readily
Silty CLAY: ----------smooth and shiny, threads can be rolled very readily
CLAY: ----------very shiny and waxy, threads can be rolled very easily

Grain size descriptions are written with the major grain size component listed first. In order to be considered a major grain size component, the component must constitute greater than 50% of the sample. Major grain size components are written in all capital letters and are underlined. If no grain size component constitutes greater than 50% of the sample, the sample is classified by describing the distribution of the sand component of the sample first (ex. f.m. Sand). Then, the other grain size components are described and the appropriate percentage modifier (see below) is assigned. The reader can then determine the percentage of sand in the sample by subtracting the sum of the modifier percentages from 100%. An example is shown below.

Other grain size components, if present, are listed in order of decreasing percentage.

The following modifiers are used to indicate the relative proportion of a minor grain size component in the soil:

Estimated amount: Modifier

- 35 percent to 50 percent: .... And
- 20 percent to 35 percent: .... Some
- 10 percent to 20 percent: .... Little
- < 10 percent: ..... Trace

Minor grain size components assigned a trace or little modifier are written in lower case letters. Minor grain size components assigned a "some" or "and" modifier are written with the first letter of the grain size capitalized (ex. f. Sand). When multiple minor grain size components are described with the same modifier, finer grain sizes precede coarser grain sizes.

b. Gradation or Plasticity. Granular soils (i.e., sands or gravels) should be described as well- graded, poorly-graded, uniform, or gap-graded, depending on the gradation of the minus 3-inch fraction. Cohesive soils (i.e., silts and clays) should be described as nonplastic, slightly plastic, moderately plastic, or highly plastic, depending on results of the manual evaluation for plasticity.

c. Color: Common colors and their abbreviations are listed below.
   - Orange: ----Or
   - Tan: ---------Tan
   - Black: -------Blk
   - Brown: -----Br
   - Grey: -------Gr
   - Red: --------Red

d. Moisture Content: The moisture content is determined in the field and is described using the following terms:
   - Dry: ---------- (dab finger in soil, no moisture on finger)
   - Moist: ---------- (dab finger in soil, moisture on finger)
   - Wet:---------- (water visible)
   - Saturated: ------ (all pore spaces filled

e. Density/Consistency: The density or consistency of the soils is classified according to the "N" value of the soil. The "N" value is the sum of the middle two blow counts determined during a standard penetration test. The following classifications are used:

**Table 1**
**Standard Penetration Test for Soil Density**

| N-Blows/Feet | Relative Density |
|---|---|
| **Cohesionless Soils** | |
| 0 - 4 | Very loose |
| 5 - 10 | Loose |
| 11 - 30 | Medium |
| 31 - 50 | Dense |
| >50 | Very dense |
| **Cohesive Soils** | |
| 0 - 2 | Very soft |
| 3 - 4 | Soft |
| 5 - 8 | Medium |
| 9 - 15 | Stiff |
| 16 - 30 | Very stiff |
| >30 | Hard |

f. Odor (if present): Odor is described from a warm, moist sample. The odor should only be described it is organic or unusual. An organic odor will have distinctive decaying vegetation smell. Unusual odors such as petroleum product, chemical, etc. should be described appropriately.

g. Soil Texture and Structure (if present): Description of particle size distribution, arrangement of particles into aggregates, and their structure. This description includes joints, fissures, slicked sides, mottling, bedding, veins, root holes, debris, organic content, and residual or relict structure (laminations, etc.), as well as other characteristics that may influence the movement or retention of water or contaminants.

h. USCS symbol: A USCS symbol is assigned to each symbol. The USCS recognizes 15 soil groups and uses names and letter symbols to distinguish between these groups.

The coarse grained soils are subdivided into gravels (G) and sands (S). Both the gravel and sand groups are divided into four secondary groups. Fine grained soils are subdivided into silts (M) and clays (C).

Soils are also classified according to their plasticity and grading. Plastic soils are able to change shape under the influence of applied stress and to retain the shape once the stress is removed. Soils are referred to either low (L) or high (H) plasticity. The grading of a soil sample refers to the particle size distribution of the sample. A well graded (W) sand or gravel has a wide range of particle sizes and substantial amounts of particles sized between the coarsest and finest grains. A poorly graded (P) sand or gravel consists predominately of one size or has a wide range of sizes with some intermediate sizes missing.

Soils which have characteristics of two groups are given boundary classifications using the names that most nearly describe the soil. The two groups are separated by a slash. The same is true when a soil could be well or poorly graded. Again the two groups are separated by a slash

| **First and/or second letters** | |
|---|---|
| **Symbol** | **Definition** |
| G | gravel |
| S | sand |
| M | silt |
| C | clay |
| O | organic |

| **Second letter** | |
|---|---|
| **Letter** | **Definition** |
| P | poorly graded (uniform particle sizes) |
| W | well graded (diversified particle sizes) |
| H | high plasticity |
| L | low plasticity |

Example:

A. Sample with Major Component:
Brown, wet, **f. SAND**, Some Silt, little m.c. sand and f. gravel, trace c. gravel, , m. compact, petroleum odor (SM)

B. Sample with No Major Component:
Brown, moist, f.m.c. Sand, Some Silt and f. Gravel, , v. compact, no evidence of contamination (SM)
*(In this sample, the describer classified the sample as containing 30% silt and 30% f. gravel. The percentage of sand would then be determined as: 100%-30%-30%=40%).*

**D. QA/QC Requirements:**

None

**C. Special Conditions:**

None

**D. References:**

DER-10, Chapter 3, Section 3.5, Subsection 3.5.1, Subdivision (c), Paragraph 2.

Burmister, D.M., Suggested Methods of Test for Identification of Soils.

The Unified Soil Classification System (USCS).

Classification of Soils for Engineering Purposes: Annual Book of ASTM Standards, D 2487-83, American Society for Testing and Materials,

**E. Appendices or Forms:**

ASTM Criteria for Describing Soils

Legend to Subsurface Logs

# Low Flow Groundwater Purging and Sampling

**Standard Operating Procedure #011**

## A. Purpose and Scope:

Low-flow purging is purging using a pumping mechanism that produces low-flow rates [less than 1 liter per minute (lpm) or less than 0.26 gallon per minute (gpm)] that cause minimal drawdown of the static water table and usually employs a flow-through cell in which geochemical parameters are continuously monitored. These parameters may include dissolved oxygen content, oxidation-reduction potential (redox), conductivity, turbidity, and pH.

The intent of this sampling protocol is to collect a representative sample from the monitored groundwater zone. A representative sample may be obtained when all the monitored chemical parameters have stabilized, thus qualitatively demonstrating that the groundwater being purged is in equilibrium (refer to Table 3). Samples are collected directly from the pumping mechanism with minimum disturbance to the aquifer groundwater. The low-flow/low volume purging method (purging to parameter stability) tends to isolate the interval being sampled, which provides more accurate water quality measurements and reduces the volume of purge water generated. This method has an advantage in that it can limit vertical mixing and volatilization of volatile organic compounds in solution within the well casing or borehole as compared to high-flow purging and sampling.

Low-flow purging and sampling is appropriate for collection of groundwater samples for all groundwater contaminants, including inorganic compounds, metals, pesticides, PCBs, volatile and semi-volatile organic compounds (VOCs and SVOCs), other organic compounds, radiochemical and microbiological constituents. This method is not applicable to the collection LNAPL or DNAPL.

## B. Equipment and Materials:

The require equipment and materials include the following:

- Inertial pump
- Submersible pump
- Disposable bailers
- Generator
- Sample bottles
- Bailing twine and rope
- Field analyses meters
- Sampling gloves
- Water level meters
- Filtration system
- 2-Inch grundfos rediflow pump and controller
- Well sampling forms

Depending on the purging method to be used, there are specific equipment limitations. **Table 1** provides a description of the various methodologies and their applicability. The proper selection of sampling devices or pumps is critical to the quality and representation of the sampling results. The following table provides a summary of the acceptable sampling methods for the various compounds of concern.

**LOW-FLOW GROUNDWATER PURGING/SAMPLING**

**Table 1**

**Acceptable Sampling Methods for Compounds of Concern**

| Method | VOCs | Semi-VOCs | Metals and Inorganics | PFAS | Petroleum Hydrocarbons | | General Chemistry |
|---|---|---|---|---|---|---|---|
| | | | | | C3-C16 | C16+ | |
| Peristaltic Pump | X | 1 | 3 | 3 | X | 1 | 2 |
| Centrifugal Pump | 2 | 3 | 3 | 2 | 2 | 2 | 3 |
| Submersible Pump W/Controller | 2 | 3 | 3 | 2 | 2 | 3 | 3 |
| Bailer | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Bladder Pump | 3 | 3 | 3 | 2 | 3 | 3 | 3 |
| DPIS | 3 | 3 | 2 | 1 | 2 | 2 | 2 |
| Diffusion Sampler | 2 | 2 | X | 1 | 2 | 2 | X |

1 – Not Recommended
2 – Useful with limitations
3 – Recommended method
X – Unacceptable
**Note:** Centrifugal Pump – assumed at a low-flow rate (no greater than 1 Lpm)

## C. Procedure:

The following procedures should be followed:

1. The wells will be sampled in order from the least contaminated well to the most contaminated well.
2. Using a decontaminated measurement probe, determine the water level in the well; then calculate the fluid volume in the casing.
3. Setting up the Pump:
   a. Dedicated Systems

      Installation of any device into a well disturbs the stratification typically exhibited in a well due to laminar flow of groundwater in the well. Insertion also potentially mobilizes suspended solids in the water column due to disturbance of settled and solids in the casing and agitation of water in the filter pack. Dedicated systems result in lower initial turbidity values and lower purge volumes to achieve stabilized indicator parameter readings, and should be considered when a well will be sampled multiple times.

b. Portable Systems

If portable systems are used, they must be placed carefully into the well and lowered into the screen zone as slowly as possible to avoid disturbance of the groundwater resulting in non-equilibrium conditions. As a result, longer purge times and greater purge volumes may be necessary to achieve indicator parameter stabilization. In general, this may require that after installation, the portable pump should remain in place for a minimum of 1-2 hours to allow settling of solids and re- establishment of horizontal flow through the screen zone. If initial turbidity readings are excessive (>50 NTU), pumping should cease and the well should rest for another 1-2 hours before initiating pumping again. In wells set in very fine-grained formations, longer waiting periods may be required.

4. The flow rate used during purging must be low enough to avoid increasing the water turbidity. The following measures should be taken to determine the appropriate flow rate:
    a. The flow rate shall be determined for each well, based on the hydraulic performance of the well.
    b. The flow must be adjusted to obtain stabilization of the water level in the well as quickly as possible.
    c. The maximum flow rate used should not exceed 1 liter per minute (0.26 gpm).
    d. Once established, this rate should be reproduced with each subsequent sampling event.
    e. If a significant change in initial water level occurs between events, it may be necessary to re- establish the optimum flow rate at each sampling event.
5. Water Level Monitoring:
    a. Should not fluctuate more than 0.1 meters (~4 inches).

6. Measurement of indicator parameters (Dissolved oxygen content, redox potential, specific conductance, temperature and pH) is required. Continuous monitoring of water quality indicator parameters is used to determine when purging is competed and sampling should begin. Stabilized values, based on selected criteria listed in **Table 2** should be met prior to sampling. The use of an in-line flow cell (closed) system is recommended for measuring indicator parameters, except for turbidity.

    For turbidity measurement, a separate field nephalometer should be used. Indicator parameter collection is more important when low-flow purging is used compared to the high-flow purging method. Generally, measurements are taken every 3 to 5 minutes and water chemistry parameters are considered to be stable when they are within the following ranges for three (3) consecutive readings:

**Table 2**
**Stability Criteria for Low-Flow Purging**

| Constituent | Criteria |
|---|---|
| Dissolved Oxygen Content (DO) | ± 10% |
| Oxidation-Reduction Potential (redox) | ± 10 mv |
| Specific Conductance | ± 03% of reading |
| pH | ± 0.1 units |
| Turbidity | ± 10% |
| Temperature | NA |

Turbidity should be below 50 NTU, if possible. If sample turbidity cannot be reduced below 50 NTU, a field filtered sample shall be collected for metals analysis in addition to an unfiltered sample. Record these readings on the well sampling log.

7. The order in which samples are to be collected is as follows:
    - Volatile Organic Compounds (VOCs)
    - Semi-Volatile Organic Compounds (SVOCs)
    - Purgeable organic carbon (POC)
    - Purgeable organic halogens (POX)
    - Total organic carbon (TOC)
    - Total organic halogens (TOX)
    - Extractable organics
    - Total metals
    - Dissolved metals
    - Phenols
    - Cyanide
    - Sulfate and chloride
    - Turbidity
    - Nitrate and ammonia
    - Radionuclides

8. When collecting aliquots for analysis of volatile organic compounds, make absolutely certain that there are no bubbles adhering to the walls or the top of the VOA container.
9. Add appropriate preservatives to samples, as required.
10. Label the sample containers with all necessary information and complete all chain-of-custody documents and seals.
11. Place the properly labeled and sealed sample bottles in a cooler with ice and maintain at 4°C for the duration of the sampling and transportation period. Do not allow samples to freeze.

**D. QA/QC Requirements:**

To the extent possible, all samples should be collected using the same type of equipment and in the same manner to ensure comparability of data.

**E. Special Conditions:**

Because the methodology requires that disturbance to the water column in the well be minimized, the same pumping device used for purging should be used for sampling.

Sample collection will be performed utilizing either an inertial pump system or disposable bailer. If the inertial pump system is used, samples will be obtained through the dedicated polyethylene tubing while maintaining a low-flow. Should disposable bailers be utilized, the sampling will be performed as follows:

Attach a new bailer line to the disposable bailer equipped with a single check valve. Check the operation of the check valve assembly to confirm free operation. Lower the single check valve bailer slowly into the well until it contacts the water surface. Then lower the bailer just below the water surface with a minimum of disturbance. When filled with groundwater, slowly raise the bailer to the surface. Discharge the first bailer to the ground. Tip the bailer to allow the water to slowly discharge from the top and to flow gently down the inside of the sample bottle with minimum entry turbulence and aeration

**A. References:**

Low-Flow (Minimal Drawdown) Ground-Water Samp*ling Procedures*" by Robert Puls and Michael J. Barcelona dated April 1996.

**B. Appendices or Forms:**

Low Flow Sampling Form

# APPENDIX 4 – HEALTH AND SAFETY PLAN

# Site Health and Safety Plan

Location:
Former Barnet Mills Site (BCP No.: C442065)
20 Forbes Avenue
Rensselaer, New York 12144

Prepared For:
BBL Barnett, LLC
302 Washington Avenue Extension
Albany, NY 12203

LaBella Project No. 2220630

March 2024

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# 1.0 STATEMENT OF COMMITMENT

This Health and Safety Plan (HASP) has been prepared to reduce worker exposure to chemical, biological, and physical hazards during redevelopment activities performed at the Brownfield Cleanup Program (BCP) Site, Former Barnet Mill Site, located at 20 Forbes Avenue, Rensselaer, New York (BCP No.: C442065). LaBella Associates, DPC (LaBella) policy is to minimize the possibility of work-related exposure through awareness and qualified supervision, health and safety training, medical monitoring, use of appropriate personal protective equipment (PPE), and the following activity-specific safety protocols contained in this HASP.

This HASP, which applies to LaBella personnel present at the site actually or potentially exposed to health or safety hazards, describes emergency response procedures for actual and potential physical, biological, and chemical hazards. This HASP is also intended to inform and guide LaBella personnel entering the work area or exclusion zone. LaBella personnel are to acknowledge that they understand the potential hazards and the contents of this health and safety plan.

# 2.0 INTRODUCTION

## 2.1 Purpose

This HASP addresses the minimum health and safety practices that will be employed by LaBella site workers participating in monitoring associated with redevelopment activities taking place at the Former Barnet Mill Site, located at 20 Forbes Avenue, Rensselaer, New York (BCP No.: C442065).

The HASP takes into account the specific hazards inherent to the site and presents the minimum requirements which are to be met by LaBella in order to avoid and, if necessary, protect against health and/or safety hazards. LaBella sub-contractors will have the option of adopting this HASP or developing their own site-specific document. If a subcontractor chooses to prepare their own HASP, it must meet the minimum requirements as detailed in this HASP and must be made available to LaBella for its approval.

Activities performed under this HASP will comply with applicable parts of the Occupational Safety and Health Administration (OSHA) Regulations, primarily 29 Code of Federal Regulations (CFR) Parts 1910 and 1926 and all other applicable federal, state, and local regulations. Modifications to the HASP may be made with the approval of the LaBella Director of Health & Safety (DHS) and/or Project Manager (PM). A copy of this HASP will be maintained on-site during all work activities.

Refusal to comply with the HASP or violation of any health and safety procedures by field personnel may result in their immediate removal from the site following

consultation with the DHS and the Field Team Leader (FTL).

### 2.2 Scope

This HASP addresses the potential hazards related to implementation of the Interim Site Management Plan during redevelopment. The primary investigation activities may include the following:

- Site Mobilization/Demobilization;
- Demolition;
- Soil Excavation;
- Drilling, and;
- Soil, Groundwater, and Soil Vapor Sampling

The potential hazards associated with this scope are listed below and are discussed in more detail in this HASP after the project organization and responsibilities section.

- Chemical hazards;
- Biological hazards; and
- Physical hazards.

### 2.3 Application

The HASP applies solely to LaBella Associates personnel involved in the above tasks who wish to gain access to active work areas.

## 3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

This section specifies the project organization and responsibilities.

### 3.1 Project Manager

- Participates in major incident investigations;
- Ensures that the HASP has all of the required approvals before site work is conducted; and
- Has the overall project responsibility for project health and safety.

### 3.2 Field Team Leader / Site Health and Safety Officer (SHSO)

- Ensures that the HASP is implemented;
- Ensures that fieldwork is scheduled with adequate equipment to complete the job safely;
- Enforces site health and safety rules;
- Ensures that proper PPE is utilized;
- Ensures that the procedure modifications are implemented;

- Investigates incidents;
- Conducts the site safety briefing;
- Reports to NYSDEC to provide summaries of field operations and progress; and
- Acts as the emergency coordinator.

### 3.3 Director of Health & Safety

- Provides for the development of the HASP;
- Serves as the primary contact to review health and safety matters that may arise;
- Approves individuals who are assigned SHSO responsibilities;
- Coordinates revisions of this HASP with field personnel; and
- Assists in the investigation of major accidents.

### 3.4 Site Personnel

- Report any unsafe or potentially hazardous conditions to the FTL/SHSO;
- Maintain knowledge of the information, instructions and emergency response actions contained in this HASP; and
- Comply with rules, regulations, and procedures as set forth in this HASP and any revisions.

| Title/Project Responsibility | Name | Email | Mobile/Other Phone |
|---|---|---|---|
| **Project Personnel** | | | |
| Program Director | Arlette St. Romain | astromain@labellapc.com | 518-824-1928 |
| Project Manager, Field Operations Leader and on-site Health & Safety Representative | Branson Fields | bfields@labellapc.com | 518-266-7355 |
| Health & Safety Program Manager | Tim Ruddy | truddy@labellapc.com | 845-486-1557 |

## 4.0 SITE HISTORY AND PROJECT DESCRIPTION

### 4.1 Project Background

This HASP has been prepared by LaBella, on behalf of BBL Barnett, LLC. Based on previous investigations at the Site, the primary chemicals of potential concern (COPC) likely to be encountered at the Site are petroleum (BTEX) and chlorinated volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) including Polycyclic Aromatic Hydrocarbons (PAHs),

Polychlorinated biphenyls (PCBs), and metals above standards in soil; VOCs, SVOCs, and metals above standards and/or guidance levels in groundwater; and VOCs above guidance values in soil vapor at the site.

## 4.2 Site Description

The Site is comprised of one (1) 6.33-acre parcel (Tax Parcel No. 133.-3-7) that includes nine vacant buildings, former substation foundation, and unmaintained parking areas, and a roadway. The Site is situated in an urban area with mixed commercial, residential, and utility land uses and is approximately 100 to 200 feet southeast of the Hudson River and 1,630 feet southwest of Interstate I-90. Residential properties are located south/southeast of the Site, a rail line and Hilton Park and Boat Ramp are located to the west, and vacant wooded land is located to the north.

## 4.3 Site History

From 1873 until the 1960s, the Site uses included brewery operations, and a wool shoddy mill (which reclaimed wool scraps from textile mills and restored them into batched wool fabric for resale). In the 1960s, the Site buildings began being leased to numerous tenants for a wide spectrum of commercial, industrial, and fine arts uses that included an architectural firm, a photography studio, automobile repair, industrial manufacturing of wire products, studio space for musicians, storage space, and numerous other commercial uses. Landfilling occurred in the northeastern Site area. The Site operations ceased and is currently vacant with abandoned buildings that are not in use. Initial limited Site remedial efforts included the removal of the two Site USTs in August 2021. An area of petroleum-impacted soil was discovered and excavated following removal of a 20,000-gallon fuel oil UST southwest of Building 1 (open Spill #2104385) but impacted soil and free product remains.

## 4.4 Site Features

The topography of the Site slopes to the west towards the Hudson River. The central nominal site elevation is approximately 31 feet above mean sea level (amsl) with the grade varying between the eastern side at 70 amsl and 20 – 25 amsl along the western boundary. The Site is developed with vacant industrial use buildings covering a large portion of the parcel in addition to former parking areas and roadway.

## 4.5 Current and Future Site Use

The Site is currently unoccupied and contains nine vacant buildings previously used for industrial and commercial purposes including but not limited to textile

mill operations. The proposed project would rehabilitate existing abandoned textile mill buildings into 72 apartments for non-transient residential occupation and commercial space. The apartments will consist of studio, one-, and two-bedroom apartments. The commercial areas will potentially be restaurant, office and self-storage uses. As part of the redevelopment, one of the current structures (Building 8) is proposed to be demolished. The buildings vary in size and number of stories. The project site is eligible to be listed in the National Register of Historic Places.

## 5.0 POTENTIAL HAZARDS OF THE SITE

This section presents an assessment of the chemical, biological, and physical hazards that may be encountered during the tasks specified under Section 2.2. Additional information can be found in **Appendix A** - Safety Data Sheets, or in **Appendix B** - Task Hazard Analysis.

### 5.1 Chemical Hazards

A review of historical information indicates that the soil, soil vapor, and / or groundwater at the Site may include, but is not limited to, the following regulated constituents:

- VOCs
- SVOCs
- PCBs
- Metals

Specific information on each chemical may be found on the Safety Data Sheets included in **Appendix A.**

#### *5.1.1 Biological Hazards*

Work will be performed in an urban environment; however, during the project there is potential for workers to come into contact with biological hazards such as animals, insects, and plants. The Task Hazard Analysis found in **Appendix B** includes specific hazards and control measures for each task, if applicable.

#### *5.1.2 Animals*

The Site is located in a predominantly urban area. It is possible that dogs, cats, rats, and mice may be present. Workers shall use discretion and avoid all contact with animals.

#### *5.1.3 Insects*

Insects, such as mosquitoes, bees, and wasps may be present during certain times of the year. Workers will be encouraged to wear repellents

and PPE, if deemed necessary, when working in areas where insects are expected to be present.

### *5.1.4 Tick-Borne Disease*

Ticks can carry a number of diseases. In the United States, these diseases include:

- Lyme Disease
- Ehrlichiosis
- Rocky Mountain Spotted Fever (throughout the United States but most prevalent in the east)

Lyme Disease - The disease commonly occurs in New York State in the spring and summer and is transmitted during extended attachment (minimum 24 hours) of an infected tick. Symptoms of Lyme disease usually emerge approximately two weeks after exposure and may include a rash or a peculiar red spot, like a bull's eye, which expands outward in a circular manner. The victim may have recurring headaches, weakness, a stiff neck, swelling and pain in the joints, and eventually, arthritis. Ehrlichiosis - The disease also commonly occurs in New York State in the summer and is similarly transmitted by the bite of infected ticks. Symptoms of ehrlichiosis include more immediate muscle aches, fever, joint aches, and flu-like symptoms, but there is typically no skin rash.

Rocky Mountain Spotted Fever (RMSF) - This disease is also transmitted via the extended bite of an infected tick. The tick must be attached 4 to 6 hours before the disease-causing organism (Rickettsia rickettsii) becomes reactivated and can infect humans. The primary symptom of RMSF is the sudden appearance of a moderate-to-high fever. The fever may persist for 2 to 3 weeks. The victim may also have a headache, deep muscle pain, and chills. A rash appears on the hands and feet on about the third day and eventually spreads to all parts of the body. For this reason, RMSF may be confused with measles or meningitis. The disease may cause death, if untreated.

The best way to prevent tick borne diseases is to avoid tick bites. Preventative measures to reduce the potential for tick bites include, but are not limited to, the following:

- Where possible, land scheduled for eventual clearing should be cleared of brush and overgrown vegetation in advance of environmental investigation.
- Wearing long pants and long sleeved shirts
- Tucking shirts into pants. Tucking pants into socks or boots, or

using tape to close the opening where they meet.

- Using an EPA approved insect repellant or arachnicide (pesticide) which is effective for ticks, such as DEET (N,N-diethyl-m-toluamide) or pyrethrin. Be sure to heed all precautionary information, and be aware that some people are sensitive to these chemicals.
- Wearing light colored clothing so that a tick can be seen more easily.
- Changing clothes when you return from an area where ticks may be located.
- Showering to wash off any loose ticks, followed by self-examination for ticks.
- Throughout the work day, perform Tick Checks and Removal Procedures as follows:
- Check clothing for ticks. If you find a tick, do a more thorough tick check.
- Inspect parts that bend (back of knee, between fingers and toes, underarms), pressure points where clothing presses against skin (underwear elastic, belts, neck); other common areas (belly button, around or in ear, hairline, and top of head).
- Once indoors, do a final tick check and change clothes.
- If you are in a tick infested area or an area known to have disease carrying ticks, perform checks on a more regular basis
- Remove unattached ticks promptly.
- Remove attached ticks are removed using fine pointed tweezers:
  - The mouth parts of the tick are grasped with the tweezers as close to the skin as possible
  - Apply firm steady pressure upward until the tick releases - do not jerk, twist, squash or squeeze the tick
  - Clean the wound and the tweezers with an antiseptic. Do not use petroleum jelly, nail polish remover, or prick or burn the tick. These actions can cause infected secretions to enter the wound.

### *5.1.5 Plants*

Poisonous plants, such as poison ivy and sumac, maybe present on the site and present a hazard for site personnel. Signs and symptoms of exposure to such poisonous plants include itching, burning, redness, rash, blistering and swelling.

Preventative measures will be implemented to avoid contact with

poisonous plants on the site property. These measures will include, but are not limited to, the following activities:

- Wear clothing that covers arms and hands if possible
- Frequently wash exposed skin
- Avoid skin contact with objects or protective clothing that have touched the plants
- Treat every surface that may have touched the plant as contaminated, and practice contamination avoidance
- If skin contact is made, the area should be washed immediately with soap and water and observed for signs of reddening.

## 5.2 Physical Hazards

Most safety hazards are discussed in the THAs in **Appendix B** for the different phases of the project. In addition to the THAs, general work rules and other safety procedures are described in Section 10 of this HASP.

### *5.2.1 Temperature Extremes*

Heat Stress

Heat stress is a significant potential hazard, which is greatly exacerbated by the use of PPE in hot environments. The potential hazards of working in hot environments include dehydration, cramps, heat rash, heat exhaustion, and heat stroke.

Cold Stress

At certain times of the year, workers may be exposed to the hazards of working in cold environments. Potential hazards in cold environments include frostbite, trench foot or immersion foot, and hypothermia, as well as slippery surfaces, brittle equipment, and poor judgment.

### *5.2.2 Steam, Heat, and Splashing*

Exposure to steam/heat/splashing hazards can occur during steam cleaning activities. Splashing can also occur during well development and sampling activities. Exposure to steam/heat/splashing can result in scalding/burns, eye injury, and puncture wounds.

### *5.2.3 Noise*

Noise is a potential hazard associated with the operation of heavy equipment, drill rigs, pumps, and engines. Workers will wear hearing protection while in the work zone when these types of machinery are operating.

### 5.2.4 *Fire and Explosion*

When conducting drilling activities, the opportunity of encountering fire and explosion hazards may exist from encountering underground utilities, from the use of diesel engine equipment, and other potential ignition sources. During dry periods there is an increased chance of brush fires starting at the job site. If these conditions occur, no smoking will be permitted at the site and all operations involving potential ignition sources will be monitored continuously (fire watch).

### 5.2.5 *Manual Lifting/Material Handling*

Manual lifting of heavy objects may be required. Failure to follow proper lifting techniques can result in back injuries and strains. Back injuries are a serious concern, as they are the most common workplace injury, often resulting in lost or restricted work time, and long treatment and recovery periods.

### 5.2.6 *Slips, Trips, and Falls*

Working in and around the site will pose slip, trip, and fall hazards due to slippery surfaces that may be oil-covered; or from rough terrain, surfaces that are steep inclines; surfaced debris; or surfaces that are wet from rain or ice. Falls may result in twisted ankles, broken bones, head trauma, or back injuries.

### 5.2.7 *Heavy Equipment Operation*

A drill rig will be used to install borings where required. Working with or near heavy equipment poses many potential hazards, including electrocution, fire/explosion, being struck-by or -against, or pinched/caught/ crushed by, and can result in serious physical harm.

### 5.2.8 *Electrocution & Electrical Hazards*

Encountering underground utilities may pose electrical hazards to workers. Additionally, overhead electrical lines can be a concern during drilling operations. Potential adverse effects of electrical hazards include burns and electrocution, which could result in death. Drill rigs will be used on the site to install soil borings and excavators will be used to dig soil. The presence of overhead utilities and underground obstacles poses a hazard if equipment contacts them. As indicated in Table 1, electrical hazards are considered to be a concern for the installation of borings on the site.

## 6.0 TASK HAZARD ANALYSES

The Task Hazard Analysis is a systematic way of identifying the potential health and safety hazards associated with major phases of work on the project and the methods to avoid, control, and mitigate those hazards. The THAs will be used to train work crews in proper safety procedures during phase preparatory meetings.

THAs will be developed by LaBella for the following phases of work:

- Site mobilization/demobilization;
- Concrete removal and replacement;
- Sealing Cracks;
- Drilling and excavation oversight,
- Soil and groundwater sampling, and;
- Sub-slab and soil-vapor sampling.

Task Hazard Analysis are included in **Appendix B** of this HASP.

## 7.0 PERSONAL PROTECTIVE EQUIPMENT

The PPE specified in **Table 7-1** represents the hazard analysis and PPE selection required by 29 CFR 1910.132. Specific information on known potential hazards can be found under Section 4.0 and **Appendix B** – Task Hazard Analysis. For the purposes of PPE selection, the DHS and FTL/SHSO are considered competent persons. The signatures on the approval page of the HASP constitute certification of the hazard assessment. For activities not covered by **Table 7-1**, the FTL/SHSO will conduct the hazard assessment, select the PPE, and document changes in the appropriate field logs. PPE selection will be made in consultation with the DHS.

Modifications for initial PPE selection may also be made by the FTL/SHSO in consultation with the DHS and changes documented accordingly. If major modifications occur, the DHS will notify the PM.

### 7.1 PPE Abbreviations

HEAD PROTECTION

HH = hard hat

HEARING PROTECTION

EP = earplugs EM = ear muffs

HAND PROTECTION

Cot = cotton But = Butyl

LWG = Leather Work Gloves Neo = Neoprene

Nit = Nitrile Sur = Surgical

BODY PROTECTION

WC = work clothes

Cot Cov = Cotton Coveralls Poly = Polyethylene coated Tyvek® coveralls

Saran = Saranex-coated coveralls

Tyvek® = Uncoated Tyvek® coveralls

EYE/FACE PROTECTION

APR = Full Face Air-Purifying Respirator

MFS = Mesh Face shield PFS =Plastic Face shield

SG = ANSI-approved safety glasses with side shields

FOOT PROTECTION

Neo = Neoprene OB = Overboot

Poly = polyethylene-coated boot Rub = rubber slush boots

STB = Leather work boots with safety toe

RESPIRATORY PROTECTION

APR = Full-face air-purifying respirator with organic vapor cartridges

ASR = Full face air-supplied respirator with escape bottle SCBA = Self-contained breathing apparatus.

## 7.2 Hazard Assessment for Selection of Personal Protective Equipment

The initial selection of personal protective equipment for each task was done by performing a hazard assessment taking into consideration the following:

- Potential chemical and physical hazards present;
- Work operations to be performed;
- Potential routes of exposure;
- Concentrations of contaminants present; and
- Characteristics, capabilities, and limitations of PPE; and any hazard that the PPE presents or magnifies.

A review of the analytical data from previous sampling events indicates that VOCs, SVOCs, PCBs, and metals identified in Section 5.1 are the primary COPC.

The exposure routes for these chemicals are inhalation, skin absorption, skin/eye contact, and ingestion. Chemical protective gloves will be required for

all activities that involve sample-handling and the likelihood of skin contact. The proper use of PPE and strict adherence to decontamination and personal hygiene procedures will effectively minimize skin contact and ingestion as potential routes of exposure.

**Table 7-1**

**Personal Protective Equipment Selection**

| TASK | HEAD | EYE/FACE | FEET | HANDS | BODY | HEARING |
|---|---|---|---|---|---|---|
| Mobilization/ Demobilization | HH | SG | STB | WG | WC | None |
| Drilling Activities | HH | SG | STB | WG | WC | EM or EP |
| Environmental sampling | HH | SG | STB | WG, Nit & Sur as needed | WC, Tyvek® as needed | None |
| Decontamination | HH | SG | STB | Nit + Sur | WC, Tyvek® as needed | None |

## 7.3 Respirator Cartridge Change-Out Schedule

A respirator cartridge change-out schedule has been developed in order to comply with 29 CFR 1910.134. If the use of respirators is necessary, the respirator cartridge change-out schedule for this project will be as follows:

- Cartridges shall be removed and disposed of at the end of each shift, when cartridges become wet, or wearer experiences a breakthrough, whichever occurs first; and
- If the humidity exceeds 85%, then cartridges shall be removed and disposed of after 4 hours of use.

Respirators shall not be stored at the end of the shift with contaminated cartridges left on them. Cartridges shall not be worn on the second day, no matter how short of a time period they were used the day before.

The schedule was developed based on the following scientific information and assumptions:

- Analytical data that is available regarding site contaminants;
- Using the criteria provided by the THA;
- All of the chemicals have boiling points greater than 70°C;
- Total airborne concentration of contaminants is anticipated to be less than 200 ppm;
- The humidity is expected to be less than 85%; and
- Desorption of the contaminants (including those with poor warning

properties) after partial use of the chemical cartridge can occur after a short period (hours) without use (e.g., overnight) and result in a non-use exposure.

The following is a partial list of factors that may affect the usable cartridge service life and/or the degree of respiratory protection attainable under actual workplace conditions. These factors have been considered when developing the cartridge change-out schedule.

- Type of contaminant(s);
- Contaminant concentration;
- Relative humidity;
- Breathing rate;
- Temperature;
- Changes in contaminant concentration, humidity, breathing rate, and temperature;
- Mixtures of contaminants;
- Accuracy in the determination of the conditions;
- The contaminant concentration in the workplace can vary greatly. Consideration must be given to the quality of the estimate of the workplace concentration;
- Storage conditions between multiple uses of the same respirator cartridges. It is recommended that the chemical cartridges be replaced after each work shift. Contaminants adsorbed on a cartridge can migrate through the carbon bed without airflow;
- Age of the cartridge;
- Condition of the cartridge and respirator;
- Respirator and cartridge selection respirator fit;
- Respirator assembly, operation, and maintenance;
- User training, experience, and medical fitness;
- Warning properties of the contaminant; and
- The quality of the warning properties should be considered when establishing the chemical cartridge change schedule. Good warning properties may provide a secondary or back-up indication for cartridge change-out.

## 8.0 AIR MONITORING

Air monitoring for volatile organic compounds and particulates will be periodically performed in the work area breathing zone during outdoor site activities. Monitoring will be performed with a hand-held PID and particulate meter. Results will be compared to

exposure values listed in Table 2 and appropriate responsive action taken, as needed, including moving to upwind locations, reducing scale or pace of work advance, or adjustments of PPE.

Periodic air monitoring will also be conducted as described in the Exposure Monitoring Plan in **Appendix C**, to document ambient concentrations of particulates and VOCs at the downwind perimeter of the work zone and at an upwind location.

## 9.0 ZONES, PROTECTION, AND COMMUNICATION

### 9.1 Site Control

Site zones are intended to control the potential spread of contamination throughout the site and to assure that only authorized individuals are permitted into potentially hazardous areas. A three-zone approach will be utilized. It shall include an Exclusion Zone (EZ), a Contamination Reduction Zone (CRZ), and a Support Zone (SZ). Specific zones shall be established on the worksite when operations begin.

The zones are based upon current knowledge of proposed site activities. It is possible that the zone configurations may be altered due to work plan revisions. Should this occur, the work zone will be adjusted accordingly and documented through the use of a field-change request form.

The following shall be used for guidance in revising these preliminary zone designations, if necessary.

**Support Zone** - The SZ is an uncontaminated area that will be the field support area for most operations. The SZ provides for field team communications and staging for emergency response. Appropriate safety and rescue equipment will be located in this zone. Potentially contaminated personnel/materials are not allowed in this zone. The only exception will be appropriately packaged/decontaminated and labeled samples.

**Contamination Reduction Zone** - The CRZ is established between the EZ and the SZ. The CRZ contains the contamination reduction corridor and provides for an area for decontamination of personnel and portable hand-held equipment, tools, and heavy equipment. A personnel decontamination area will be prepared at each exclusion zone. The CRZ will be used for EZ entry and egress in addition to access for heavy equipment and emergency support services.

**Exclusion Zone** - All activities, which may involve exposure to site contaminants, hazardous materials, and/or conditions, should be considered an EZ. The FTL/SHSO may establish more than one EZ where different levels of protection may be employed or different hazards exist. The size of the EZ shall be

determined by the SHSO allowing adequate space for the activity to be completed, field members, and emergency equipment.

## 9.2 Contamination Control

Decontamination areas will be established for the following activities.

- Drilling/Sampling Activities
- Excavation

All personnel and portable equipment used in the EZ shall be subject to a thorough decontamination process, as deemed necessary by the FTL/SHSO. Sampling equipment shall be decontaminated. As necessary, all boots and gloves will be decontaminated using soap and water solution and scrub brushes or simple removal and disposal. All used respiratory protective equipment will be decontaminated daily and sanitized with appropriate sanitizer solution.

All drums generated as a result of sampling and decontamination activities will be marked and stored at a designated area at the site until the materials can be property disposed of off-site.

All non-expendable sampling equipment will be decontaminated. This usually entails the use of Alconox, solvent and distilled/deionized water rinses to eliminate contaminants.

### *9.2.1 Personnel Decontamination Station*

All personnel and portable equipment used in the EZ shall be subject to a thorough decontamination process, as deemed necessary by the FTL/SHSO. Sampling equipment shall be decontaminated or properly disposed of. As necessary, all boots and gloves will be decontaminated using soap and water solution and scrub brushes or simple removal and disposal. All used respiratory protective equipment will be decontaminated daily and sanitized with an appropriate sanitizer solution.

All drums generated as a result of sampling and decontamination activities will be marked and stored at a designated area at the site until the materials can be properly disposed of off-site.

All non-expendable sampling equipment will be decontaminated, if necessary. This usually entails the use of Alconox, solvent, and distilled/deionized water rinses to eliminate contaminants.

## 9.3 Communication

Each team member will have a cell phone for communication with the PM, SHSO, and other team members during field activities.

Hand Signals - Hand signals shall be used by field teams, along with the buddy system. The entire field team shall know them before operations commence and their use covered during site-specific training. Typical hand signals are the following:

| SIGNAL | MEANING |
|---|---|
| Hand gripping throat | Out of air, can't breathe |
| Grip on a partner's wrist or placement of both hands around a partner's waist. | Leave the area immediately, no debate. |
| Hands on top of head | Need assistance |
| Thumbs up | Okay, I'm all right, I understand. |
| Thumbs down | No, negative |

## 10.0 MEDICAL SURVEILLANCE PROCEDURES

All contractor and subcontractor personnel performing fieldwork where potential exposure to contaminants exists at the site are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120(f).

### 10.1 Medical Surveillance Requirements

A physician's medical release for work will be confirmed by the DHS before an employee can work in the exclusion zone. The examination will be taken annually at a minimum and upon termination of hazardous waste site work if the last examination was not taken within the previous six months. Additional medical testing may be required by the DHS in consultation with the Corporate Medical Consultant and the FTL/SHSO if an over-exposure or accident occurs, if an employee exhibits symptoms of exposure, or if other site conditions warrant further medical surveillance.

## 11.0 SAFETY CONSIDERATIONS

### 11.1 The Buddy System

At a minimum, employees shall work in groups of two in such a manner that they can observe each other and maintain line-of-sight for each employee within the workgroup. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

### 11.2 Sample Handling

Personnel responsible for the handling of samples should wear the prescribed level of protection. Samples should be identified as to their hazard and

packaged to prevent spillage or breakage. Sample containers shall be decontaminated in the CRZ or EZ before entering a clean SZ area. Any unusual sample conditions, odors, or real-time readings should be noted. Laboratory personnel should be advised of the sample hazard level and the potential contaminants present. This can be accomplished by a phone call to the lab coordinator and/or including a written statement with the samples reviewing lab safety procedures in handling to assure that the practices are appropriate for the suspected contaminants in the sample.

### 11.3 Drill Rigs

When conducting drilling activities, the opportunity of encountering fire and explosion hazards exists from underground utilities and gases. The locations of underground utilities will be verified prior to performing any intrusive activities. Additionally, because of the inherently hazardous nature of drilling operations, safety and accident prevention are crucial when drilling operations are performed. Most drilling accidents occur as a direct result of lack of training and supervision, improper handling of equipment, and unsafe work practices. Hazards include assembling and disassembling rigs, rotary and auger drilling, and grouting. The drilling contractor shall perform drilling in accordance with its own Health & Safety Program for Drill Rig Safety.

### 11.4 Safety During Drilling Operations

- Safety requires the attention and cooperation of every worker and site visitor.
- Do not drive the drill rig from hole to hole with the mast (derrick) in the raised position.
- Before raising the mast (derrick), look up to check for overhead obstructions.
- Maintain a minimum of 15 feet clearance from all overhead electric lines.
- Before raising the mast (derrick), all drill rig personnel (with the exception of the operator) and visitors shall be cleared from the areas immediately to the rear and the sides of the mast. All drill rig personnel and visitors shall be informed that the mast is being raised prior to raising it.
- Before the mast (derrick) of a drill rig is raised and drilling is commenced, the drill rig must first be leveled and stabilized with leveling jacks and/or solid cribbing. Lower the mast (derrick) only when the leveling jacks are down and do not raise the leveling jack pads until the mast (derrick) is lowered completely.
- The operator of a drill rig shall only operate a drill rig from the position of the controls.

- Throwing or dropping tools shall not be permitted. All tools shall be carefully passed by hand between personnel or a hoist line shall be used.
- Do not consume alcoholic beverages or other depressants or chemical stimulants prior to starting work on a drill rig or while on the job.
- All unattended boreholes must be adequately covered or otherwise protected to prevent drill rig personnel, site visitors, or animals form stepping or falling into the hole.
- Terminate drilling operations during an electrical storm and move the entire crew away from the drill rig.

## 12.0 DISPOSAL PROCEDURES

All discarded materials, waste materials, or other objects shall be handled in such a way as to preclude the potential for spreading contamination, creating a sanitary hazard or causing litter to be left on-site.

All potentially contaminated materials, e.g., clothing, gloves, etc., will be bagged or drummed as necessary, labeled, and segregated for disposal. All non-contaminated materials will be collected and bagged for appropriate disposal as non-hazardous solid waste. Additional waste disposal procedures may be developed as applicable.

## 13.0 EMERGENCY RESPONSE PLAN

Support procedures that are addressed in the following subsections include communications, local emergency support units, preparation for medical emergencies, first aid for injuries incurred on- This section establishes procedures and provides information for use during a project emergency. Emergencies happen unexpectedly and quickly, and require an immediate response; therefore, contingency planning and advanced training of staff are essential. Specific elements of emergency site, record keeping, and emergency site evacuation procedures.

### 13.1 Responsibilities

#### *13.1.1 Director of Health & Safety (DHS)*

The DHS oversees and approves the Emergency Response/Contingency Plan and performs audits to determine that the plan is in effect and that all pre-emergency requirements are met. The DHS acts as a liaison to applicable regulatory agencies and notifies OSHA of reportable accidents.

#### *13.1.2 Field Team Leader/Site Health and Safety Officer (FOL/SHSO)*

The FTL/SHSO is responsible for ensuring that all personnel are evacuated safely and that machinery and processes are shut down or

stabilized in the event of a stop-work order or evacuation. The FTL/SHSO is required to immediately notify the DHS of any fatalities or catastrophes (three or more workers injured and hospitalized) so that the DHS can ensure that OSHA is notified within the required time frame. The DHS will be notified of all OSHA recordable injuries, fires, spills, releases, or equipment damage exceeding $500 within 24 hours.

#### *13.1.3 Emergency Coordinator (EC)*

The Emergency Coordinator for the project is the FTL/SHSO.

The Emergency Coordinator shall make contact with Local Emergency Response personnel prior to beginning work on site. In these contacts the emergency coordinator will inform interested parties about the nature and duration of work expected on the site and the type of contaminants and possible health or safety effects of emergencies involving these contaminants. The emergency coordinator will locate emergency phone numbers and identify hospital routes prior to beginning work on site. The emergency coordinator shall make the necessary arrangements to be prepared for any emergencies that could occur.

The Emergency Coordinator will implement the Emergency Response/Contingency Plan whenever conditions at the site warrant such action.

#### *13.1.4 Site Personnel*

Site personnel are responsible for knowing the Emergency Response/Contingency Plan and the procedures contained herein. Personnel are expected to notify the Emergency Coordinator of situations that could constitute a site emergency.

### 13.2 Communication

A variety of communication systems may be utilized during emergencies. These are discussed in the following sections.

#### *13.2.1 Hand Signals*

Downrange field teams will employ hand signals where necessary for communication during emergencies. Hand signals are found in Section 8.3.

#### *13.2.2 Field Radios and Cell Phones*

LaBella field personnel are provided cellular phones for site communication and emergency use.

### 13.3 Local Emergency Support Units

A route map from the site to the nearest hospital is provided in section 13.7. This map will be placed with the above emergency telephone numbers in all on-site vehicles.

### 13.4 Pre-Emergency Planning

Before the start of the project, LaBella will communicate directly with administrative personnel from the emergency room at the hospital to determine whether the hospital has the facilities and personnel needed to treat cases of trauma resulting from exposure to any of the contaminants expected to be found on the site. Instructions for finding the appropriate hospital will be posted conspicuously in the site office and in each site vehicle.

**Table 13-1**
**Emergency Telephone Numbers**

| Contact | Firm or Agency | Telephone Number |
|---|---|---|
| Police | | 911 |
| Fire | | 911 |
| Hospital | Albany Memorial Hospital | (518) 471-3221 |
| Ambulance | | 911 |
| Project Director/Health and Safety Manager | Arlette St. Romain, LaBella | (518) 824-1928 |
| Health & Safety Officer | Catherine Monian, LaBella | (845) 486-1557 |
| NYSDEC Site Contact | Matthew Dunham | (518) 357-2396 |
| Poison Control Center | | (800) 962-1253 |
| Chemtrec | | (800) 424-9300 |

### 13.5 Emergency Medical Treatment

- The procedures and rules in this HASP are designed to prevent employee injury. However, should an injury occur, no matter how slight, it will be reported to the FTL/SHSO immediately. First aid equipment will be available on-site at the following locations:
- First Aid Kit: Support Zone (or designated by FTL/SHSO upon arrival)
- Emergency Eye Wash:Support Zone (or designated by FTL/SHSO upon

arrival)

During site-specific training, project personnel will be informed of the location of the first aid station(s) that has been set up. Unless they are in immediate danger, severely injured persons will not be moved until paramedics can attend to them. Some injuries, such as severe cuts and lacerations or burns, may require immediate treatment. Any first aid instructions that can be obtained from doctors or paramedics, before an emergency-response squad arrives at the site or before the injured person can be transported to the hospital, will be followed closely.

There will be at least one person with current First Aid and CPR certification on each active work shift. When personnel are transported to the hospital, the FTL/SHSO will provide a copy of the Medical Data Sheet to the paramedics and treating physicians.

Only in non-emergency situations will an injured person be transported to the hospital by means other than an ambulance. A map and directions to the hospital can be found in section 13.7.

## 13.6 Emergency Site Evacuation Routes and Procedures

In order to mobilize the manpower resources and equipment necessary to cope with a fire or other emergency, a clear chain of authority will be established. The EC will take charge of all emergency response activities and dictate the procedures that will be followed for the duration of the emergency. The EC will report immediately to the scene of the emergency, assess the seriousness of the situation, and direct whatever efforts are necessary until the emergency response units arrive. At his/her discretion, the EC also may order the closure of the site for an indefinite period.

All project personnel will be instructed on proper emergency response procedures and locations of emergency telephone numbers during the initial site safety meeting. If an emergency occurs, including but not limited to fire, explosion, or significant release of toxic gas into the atmosphere, an air horn will be sounded on the site. The horn will sound continuously for one blast, signaling that immediate evacuation of all personnel is necessary due to an immediate or impending danger. All heavy equipment will be shut down and all personnel will evacuate the work areas and assemble at the evacuation meeting point, which will be determined upon arrival at the site by the FTL/SHSO, prior to work beginning. This will then be conveyed to all crew members during the site-specific briefing.

The EC will give directions for implementing whatever actions are necessary. Any

project team member may be assigned to be in charge of emergency communications during an emergency. He/she will attend the site telephone specified by the EC from the time the alarm sounds until the emergency has ended.

After sounding the alarm and initiating emergency response procedures, the EC will check and verify that access roads are not obstructed. If traffic control is necessary, as in the event of a fire or explosion, a project team member, who has been trained in these procedures and designated at the site safety meeting, will take over these duties until local police and firefighters arrive.

The EC will remain at the site to provide any assistance requested by emergency-response squads as they arrive to deal with the situation. A map showing evacuation routes, meeting places, and the location of emergency equipment will be posted in all trailers and used during site-specific training.

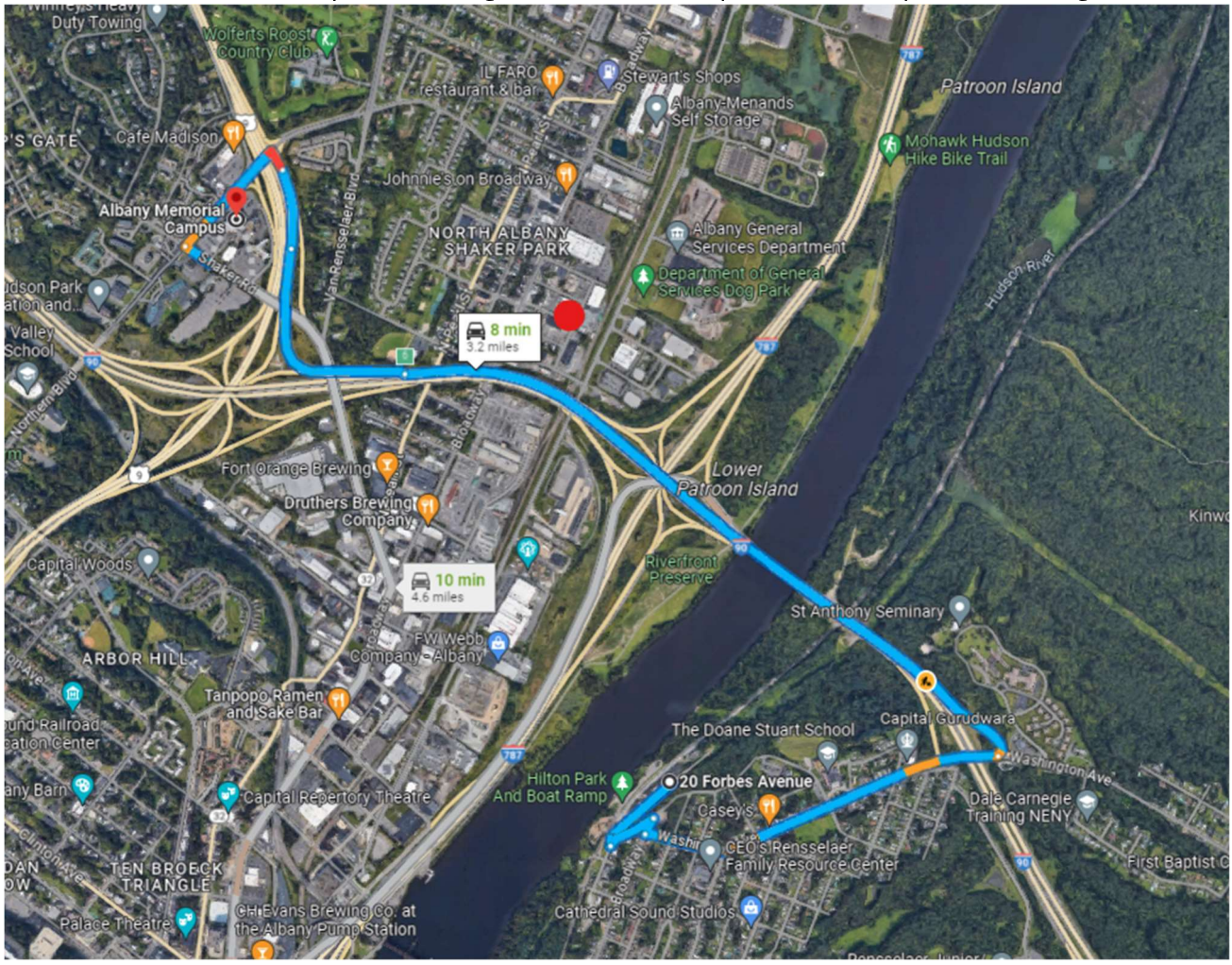
## 13.7 Hospital Route

Albany Memorial Hospital is located approximately 3.2 miles from the Site. The travel time from the Site to Albany Memorial Hospitaler is approximately eight minutes. Directions are provided below and a route plan map is shown on the following page.

| | | |
|---|---|---|
| 1. | Head southwest on Forbes Ave towards Broadway | 0.2 miles |
| 2. | Turn right onto Broadway | 0.1 miles |
| 3. | Turn left onto Washington Ave. | 0.7 miles |
| 4. | Turn left to merge onto I-90W | 1.4 miles |
| 5. | Take Exit 6 for US-9N toward Loudonville, keep right fort Northern Blvd. | 0.5 miles |
| 6. | Turn left onto Northern Blvd. | 0.3 mile |
| 7. | Turn Left onto Shaker Rd | 250 feet |
| | Total estimated time = 8 minutes | 3.2 miles |

### ***13.7.1*** *Fire Prevention and Protection*

In the event of a fire or explosion, procedures will include immediately evacuating the site (air horn will sound for a single continuous blast), and notification of local fire and police departments. No personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher




(incipient stage).

### ***13.7.2*** *Fire Prevention*

Adhering to the following precautions will prevent fires:

- Good housekeeping and storage of materials;
- Storage of flammable liquids and gases away from oxidizers;
- No smoking in the exclusion zone or any work area;
- No hot work without a properly executed hot work permit;
- Shutting off engines to refuel;

- Grounding and bonding metal containers during transfer of flammable liquids;
- Use of UL approved flammable storage cans;
- Fire extinguishers rated at least 10 pounds ABC located on all heavy equipment, in all trailers and near all hot work activities; and
- Monthly inspections of all fire extinguishers.

### 13.8 Overt Chemical Exposure

The following are standard procedures to treat chemical exposures. Other, specific procedures detailed on the Safety Data Sheet or recommended by the Corporate Medical Consultant will be followed, when necessary.

SKIN AND EYE CONTACT: Use copious amounts of soap and water. Wash/rinse affected areas thoroughly, and then provide appropriate medical attention. Eyes should be rinsed for 15 minutes upon chemical contamination. Skin should also be rinsed for 15 minutes if contact with caustics, acids or hydrogen peroxide occurs.

INHALATION: Move to fresh air. Decontaminate and transport to hospital or local medical provider.

INGESTION: Decontaminate and transport to emergency medical facility. Do NOT cause vomiting, unless the SDS instructs to do so.

PUNCTURE WOUND OR LACERATION: Decontaminate and transport to emergency medical facility.

### 13.9 Decontamination During Medical Emergencies

If emergency life-saving first aid and/or medical treatment is required, normal decontamination procedures may need to be abbreviated or postponed. The FTL/SHSO or designee will accompany contaminated victims to the medical facility to advise on matters involving decontamination, when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment, or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed on-site, a plastic barrier placed between the injured individual and clean surfaces should be used to help prevent contamination of the inside of ambulances and/or medical personnel. Outer garments may then be removed at the medical facility. No attempt will be made to wash or rinse the victim if his/her injuries are life-threatening, unless it is known that the individual has been contaminated with an extremely toxic or corrosive material which could also cause

severe injury or loss of life to emergency response personnel. For minor medical problems or injuries, the normal decontamination procedures will be followed.

### 13.10 Accident/Incident Reporting

As soon as first aid and/or emergency response needs have been met, the following parties are to be contacted by telephone:

- FTL/SHSO
- DHS;
- PM; and
- The employer of any injured worker who is not a LaBella employee.

Written confirmation of verbal reports is to be completed by the FTL/SHSO using the Incident Report Form and submitted within 24 hours. The incident report and investigation form is found in **Appendix F**. If the employee involved is not a LaBella employee, his employer will receive a copy of the report.

### 13.11 Adverse Weather Conditions

In the event of adverse weather conditions, the FTL/SHSO will determine if work can continue without potentially risking the safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress and heat-related injuries;
- Potential for cold stress and cold-related injuries;
- Treacherous weather-related working conditions (hail, rain, snow, ice, high winds);
- Limited visibility (fog);
- Potential for electrical storms;
- Earthquakes; and
- Other major incidents.

Site activities will be limited to daylight hours, or when suitable artificial light is provided, and acceptable weather conditions prevail. The FTL/SHSO will determine the need to cease field operations or observe daily weather reports and evacuate, if necessary, in case of severe inclement weather conditions.

### 13.12 Spill Control and Response

All small hazardous spills/environmental releases shall be contained as close to the source as possible. Whenever possible, the SDS will be consulted to assist in determining the best means of containment and cleanup. For small spills, sorbent materials such as sand, sawdust, or commercial sorbents should be placed directly

on the substance to contain the spill and aid recovery. Any acid spills should be diluted or neutralized carefully prior to attempting recovery. Berms of earthen or sorbent materials can be used to contain the leading edge of the spills. Drains or drainage areas should be blocked. All spill containment materials will be properly disposed of. An exclusion zone of 50 to 100 feet around the spill area should be established depending on the size of the spill. The following seven steps should be taken by the Emergency Coordinator:

- Determine the nature, identity, and amounts of major spill components;
- Make sure all unnecessary persons are removed from the spill area;
- Notify appropriate response teams and authorities;
- Use proper PPE in consultation with the FTL/SHSO;
- If a flammable liquid, gas or vapor is involved, remove all ignition sources and use non-sparking and/or explosive proof equipment to contain or clean up the spill (diesel only vehicles, air-operated pumps, etc.);
- If possible, try to stop the leak with appropriate material; and,
- Remove all surrounding materials that can react or compound with the spill.

### 13.13 Emergency Equipment

The following minimum emergency equipment shall be kept and maintained on-site:

- Industrial first aid kit;
- Burn kit and portable eye washes (one per field team);
- Fire extinguishers (one per work area); and
- Absorbent material /spill kit.

## 14.0 TRAINING

### 14.1 General Health and Safety Training

In accordance with LaBella corporate policy, and pursuant to 29 CFR 1910.120, hazardous waste site workers shall, at the time of job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations unless otherwise (HAZWOPER) noted in the above reference. At a minimum, the training shall have consisted of instruction in the topics outlined in the standard. Personnel who have not met the requirements for initial training shall not be allowed to work in any site activities in which they may be exposed to hazards (chemical or physical).

#### ***14.1.1*** *Three Day Supervised on the Job Training*

In addition to the required 40-hour initial hazardous waste operations training, each employee shall have received three days of directly supervised on-the-job training. This training will address the duties the employees are expected to perform.

### 14.2 Annual Eight-Hour Refresher Training

Annual eight-hour HAZWOPER refresher training will be required of all hazardous waste site field personnel in order to maintain their qualifications for fieldwork. The training will cover a review of 1910.120 requirements and related company programs and procedures.

#### ***14.2.1*** *Site-Specific Training*

Prior to commencement of field activities, all field personnel assigned to the project will have completed training that will specifically address the activities, procedures, monitoring, and equipment used in the site operations. It will include site and facility layout, hazards and emergency services at the site, and will highlight all provisions contained within this HASP. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity.

### 14.3 On-Site Safety Briefings

#### ***14.3.1*** *Start of the Shift*

At the start of each shift, project personnel and visitors will be given on-site health and safety briefings daily by the FTL/SHSO to assist site personnel in safely conducting their work activities. A copy of the Daily Tailgate Meeting Form is contained in **Appendix D**. The briefings will include information on new operations to be conducted, changes in work practices or changes in the site's environmental conditions, as well as periodic reinforcement of previously discussed topics. The briefings will also provide a forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety inspections. The meetings will also be an opportunity to periodically update the crews on monitoring results. Prior to starting any new activity, a training session using the Task Hazard Analysis will be held for crew members involved in the task.

#### ***14.3.2*** *End of the Shift*

At the end of each shift, project personnel will hold a de-brief to discuss lessons learned from any near-misses and any other health and safety matters that will help with planning the next day's activities.

### 14.4 First Aid and CPR

The DHS will identify those individuals requiring first aid and CPR training to ensure that emergency medical treatment is available during field activities. It is required that a minimum of one field person on-site at any one time will have first aid and CPR training. The training will be consistent with the requirements of the American Red Cross Association or American Heart Association. If none are available on-site, then the DHS shall be notified.

### 14.5 Supervisory Training

Supervisors and health and safety personnel shall have completed an additional eight hours of specialized HAZWOPER training in accordance with 29 CFR 1910.120.

## 15.0 LOGS, REPORTS AND RECORDKEEPING

Changes to the HASP will be documented in the Health and Safety logbook and as appropriate, the DHS and/or PM will be notified. Daily tailgate meetings will be documented in the H&S logbook as well as personnel on-site. The daily tailgate meeting form can be found in **Appendix D**.

### 15.1 Medical and Training Records

Copies or verification of training (40-hour, 8-hour, supervisor, site-specific training and documentation of three day OJT) and medical clearance for hazardous waste site work and respirator use will be maintained on-site. Records for all subcontractor employees will also be kept on-site.

### 15.2 Incident Report and Investigation Form

The incident report and investigation form is to be completed for all accidents and incidents, including near misses. The form can be found in **Appendix E**.

### 15.3 and Safety Logbooks

The FTL/SHSO will maintain a logbook during site work. The daily site conditions, personnel, monitoring results and significant events will be recorded. The original logbooks will become part of the exposure records file

## 16.0 FIELD PERSONNEL REVIEW

This form serves as documentation that field personnel have read, or have been informed of, and understand the provisions of the HASP. It is maintained on site by the FTL/SHSO as a project record. Each field team member shall sign this section after site-specific training is completed and before being permitted to work on site.

I have read, or have been informed of, the HASP and understand the information presented. I will comply with the provisions contained therein.

| Name (Print and Sign) | Date |
|---|---|
| | |
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# SAFETY DATA SHEET

Version 8.5
Revision Date 03/17/2023
Print Date 10/21/2023

## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### 1.1 Product identifiers

Product name : 1,1,1-Trichloroethane

Product Number : T54704
Brand : Aldrich
Index-No. : 602-013-00-2
CAS-No. : 71-55-6

### 1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

### 1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

### 1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

## SECTION 2: Hazards identification

### 2.1 Classification of the substance or mixture

**GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Acute toxicity, Inhalation (Category 4), H332
Carcinogenicity (Category 1B), H350
Short-term (acute) aquatic hazard (Category 3), H402
Hazardous to the ozone layer (Category 1), H420

For the full text of the H-Statements mentioned in this Section, see Section 16.

### 2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word Danger



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Hazard statement(s)

| | |
|---|---|
| H332 | Harmful if inhaled. |
| H350 | May cause cancer. |
| H402 | Harmful to aquatic life. |
| H420 | Harms public health and the environment by destroying ozone in the upper atmosphere. |

Precautionary statement(s)

| | |
|---|---|
| P201 | Obtain special instructions before use. |
| P202 | Do not handle until all safety precautions have been read and understood. |
| P261 | Avoid breathing mist or vapors. |
| P271 | Use only outdoors or in a well-ventilated area. |
| P273 | Avoid release to the environment. |
| P280 | Wear protective gloves/ protective clothing/ eye protection/ face protection. |
| P304 + P340 + P312 | IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell. |
| P308 + P313 | IF exposed or concerned: Get medical advice/ attention. |
| P405 | Store locked up. |
| P501 | Dispose of contents/ container to an approved waste disposal plant. |
| P502 | Refer to manufacturer/ supplier for information on recovery/ recycling. |

### 2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

May form explosive peroxides.

## SECTION 3: Composition/information on ingredients

### 3.1 Substances

| | | |
|---|---|---|
| Formula | : | C2H3Cl3 |
| Molecular weight | : | 133.4 g/mol |
| CAS-No. | : | 71-55-6 |
| EC-No. | : | 200-756-3 |
| Index-No. | : | 602-013-00-2 |

| Component | Classification | Concentration |
|---|---|---|
| **1,1,1-Trichloroethane** | | |
| | Acute Tox. 4; Aquatic Acute 3; Ozone 1; H332, H402, H420 | <= 100 % |

| | | |
|---|---|---|
| **1,4-Dioxane** | | |
| | Flam. Liq. 2; Eye Irrit. 2A; Carc. 1B; STOT SE 3; H225, H319, H350, H335<br>Concentration limits:<br>>= 20 %: STOT SE 3, H335; | >= 1 - < 5 % |



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For the full text of the H-Statements mentioned in this Section, see Section 16.

## SECTION 4: First aid measures

### 4.1 Description of first-aid measures

**General advice**
Show this material safety data sheet to the doctor in attendance.

**If inhaled**
After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

**In case of skin contact**
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

**In case of eye contact**
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

**If swallowed**
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

### 4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

### 4.3 Indication of any immediate medical attention and special treatment needed
No data available

## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

**Suitable extinguishing media**
Water Foam Carbon dioxide (CO2) Dry powder

**Unsuitable extinguishing media**
For this substance/mixture no limitations of extinguishing agents are given.

### 5.2 Special hazards arising from the substance or mixture
Carbon oxides
Hydrogen chloride gas
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

### 5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

### 5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.



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## SECTION 6: Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

### 6.2 Environmental precautions

Do not let product enter drains.

### 6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

### 6.4 Reference to other sections

For disposal see section 13.

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

**Advice on safe handling**
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

**Hygiene measures**
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

### 7.2 Conditions for safe storage, including any incompatibilities

**Storage conditions**
Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Test for peroxide formation periodically and before distillation.

**Storage class**
Storage class (TRGS 510): 6.1C: Combustible, acute toxic Cat.3 / toxic compounds or compounds which causing chronic effects

### 7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

**Ingredients with workplace control parameters**



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| Component | CAS-No. | Value | Control parameters | Basis |
|---|---|---|---|---|
| 1,1,1-Trichloroethane | 71-55-6 | TWA | 350 ppm | USA. ACGIH Threshold Limit Values (TLV) |
| | Remarks | Not classifiable as a human carcinogen | | |
| | | STEL | 450 ppm | USA. ACGIH Threshold Limit Values (TLV) |
| | | Not classifiable as a human carcinogen | | |
| | | C | 350 ppm<br>1,900 mg/m3 | USA. NIOSH Recommended Exposure Limits |
| | | TWA | 350 ppm<br>1,900 mg/m3 | USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants |
| | | PEL | 350 ppm<br>1,900 mg/m3 | California permissible exposure limits for chemical contaminants (Title 8, Article 107) |
| | | STEL | 450 ppm<br>2,450 mg/m3 | California permissible exposure limits for chemical contaminants (Title 8, Article 107) |
| | | C | 800 ppm | California permissible exposure limits for chemical contaminants (Title 8, Article 107) |
| 1,4-Dioxane | 123-91-1 | TWA | 20 ppm | USA. ACGIH Threshold Limit Values (TLV) |
| | | Confirmed animal carcinogen with unknown relevance to humans<br>Danger of cutaneous absorption | | |
| | | TWA | 25 ppm<br>90 mg/m3 | USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values) |
| | | Skin notation | | |
| | | TWA | 100 ppm<br>360 mg/m3 | USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants |
| | | Skin designation | | |
| | | C | 1 ppm<br>3.6 mg/m3 | USA. NIOSH Recommended Exposure Limits |
| | | Potential Occupational Carcinogen | | |
| | | PEL | 0.28 ppm<br>1 mg/m3 | California permissible exposure limits for chemical contaminants (Title 8, Article 107) |
| | | Skin | | |

**Biological occupational exposure limits**

| Component | CAS-No. | Parameters | Value | Biological specimen | Basis |
|---|---|---|---|---|---|



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| | | | | | |
|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 71-55-6 | Methyl chloroform | 20parts per million | In end-exhaled air | ACGIH - Biological Exposure Indices (BEI) |
| | Remarks | Prior to last shift of workweek | | | |
| | | Methyl chloroform | 700 µg/l | Urine | ACGIH - Biological Exposure Indices (BEI) |
| | | End of shift | | | |

## 8.2 Exposure controls

**Appropriate engineering controls**
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

**Personal protective equipment**

**Eye/face protection**
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

**Skin protection**
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Viton®
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 60 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

**Body Protection**
protective clothing

**Respiratory protection**
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

**Control of environmental exposure**
Do not let product enter drains.



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## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

| | | |
|---|---|---|
| a) | Appearance | Form: liquid |
| b) | Odor | No data available |
| c) | Odor Threshold | No data available |
| d) | pH | No data available |
| e) | Melting point/freezing point | Melting point: -30.4 °C (-22.7 °F) |
| f) | Initial boiling point and boiling range | 74 °C 165 °F at 1,013 hPa |
| g) | Flash point | ()No data available |
| h) | Evaporation rate | No data available |
| i) | Flammability (solid, gas) | No data available |
| j) | Upper/lower flammability or explosive limits | Upper explosion limit: 15.5 %(V)<br>Lower explosion limit: 8.0 %(V) |
| k) | Vapor pressure | No data available |
| l) | Vapor density | No data available |
| m) | Density | 1.34 g/cm3 at 20 °C (68 °F) |
| | Relative density | No data available |
| n) | Water solubility | 1.25 g/l at 20 °C (68 °F) |
| o) | Partition coefficient: n-octanol/water | log Pow: 2.49 at 20 °C (68 °F) - Bioaccumulation is not expected., (ECHA) |
| p) | Autoignition temperature | No data available |
| q) | Decomposition temperature | No data available |
| r) | Viscosity | No data available |
| s) | Explosive properties | No data available |
| t) | Oxidizing properties | none |

### 9.2 Other safety information

No data available

## SECTION 10: Stability and reactivity

### 10.1 Reactivity

Formation of peroxides possible.



The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

### 10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .
Contains the following stabilizer(s):
1,4-Dioxane (>1 - <=3 %)

### 10.3 Possibility of hazardous reactions
Risk of explosion with:
nitrogen dioxide
Potassium
Risk of ignition or formation of inflammable gases or vapours with:
Generates dangerous gases or fumes in contact with:
Exothermic reaction with:
alkali hydroxides
Aluminum
magnesium
Oxygen
Aluminum
aluminium oxide
Heavy metals
Alkaline earth metals
magnesium
hydrides
Oxygen

### 10.4 Conditions to avoid
Moisture.

### 10.5 Incompatible materials
Aluminum, various plastics

### 10.6 Hazardous decomposition products
Peroxides
In the event of fire: see section 5

## SECTION 11: Toxicological information

### 11.1 Information on toxicological effects

**Acute toxicity**
LD50 Oral - Rat - 9,600 mg/kg
Symptoms: Nausea, Vomiting, Risk of aspiration upon vomiting., Aspiration may cause pulmonary edema and pneumonitis.
Remarks: (RTECS)
Acute toxicity estimate Inhalation - 4 h - 11 mg/l - vapor(Calculation method)

Inhalation: absorption
Dermal: absorption

**Skin corrosion/irritation**
Remarks: Repeated or prolonged exposure may cause skin irritation and dermatitis, due to degreasing properties of the product.

**Serious eye damage/eye irritation**
Remarks: No data available



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**Respiratory or skin sensitization**
Maximization Test - Guinea pig
Result: negative
(OECD Test Guideline 406)

**Germ cell mutagenicity**
Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

**Carcinogenicity**

IARC: 2B - Group 2B: Possibly carcinogenic to humans (1,4-Dioxane)

IARC: 2A - Group 2A: Probably carcinogenic to humans (1,1,1-Trichloroethane)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (1,4-Dioxane)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

**Reproductive toxicity**
No data available

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**
No data available

**Aspiration hazard**
No data available

## 11.2 Additional Information

RTECS: KJ2975000
burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Exposure to and/or consumption of alcohol may increase toxic effects., prolonged or repeated exposure can cause:, narcosis, Liver injury may occur., Kidney injury may occur.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Systemic effects:

After absorption:

Headache
Dizziness
Tiredness
narcosis
drop in blood pressure
Unconsciousness

After uptake of large quantities:

depressed respiration
cardiovascular disorders



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## SECTION 12: Ecological information

### 12.1 Toxicity

| | |
|---|---|
| Toxicity to fish | static test LC50 - Pimephales promelas (fathead minnow) - 52.8 mg/l - 96 h<br>(US-EPA) |
| Toxicity to daphnia and other aquatic invertebrates | static test EC50 - Daphnia magna (Water flea) - > 530 mg/l - 48 h<br>(US-EPA) |
| Toxicity to algae | static test EC50 - Pseudokirchneriella subcapitata (algae) - 41 mg/l - 72 h<br>(OECD Test Guideline 201) |
| | static test NOEC - Pseudokirchneriella subcapitata (green algae) - 7.8 mg/l - 72 h<br>(OECD Test Guideline 201) |
| | IC50 - Scenedesmus capricornutum (fresh water algae) - > 670 mg/l - 96 h<br>Remarks: (Lit.) |
| Toxicity to bacteria | EC50 - Sewage sludge - 360 mg/l - 30 min<br>(OECD Test Guideline 209) |

### 12.2 Persistence and degradability

| | |
|---|---|
| Biodegradability | Result: 0 % - Not readily biodegradable.<br>(OECD Test Guideline 301C) |

### 12.3 Bioaccumulative potential

No data available

### 12.4 Mobility in soil

No data available

### 12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

### 12.6 Endocrine disrupting properties

No data available

### 12.7 Other adverse effects

Biological effects:
Hazard for drinking water supplies.
Further information on ecology
Substance which may present a danger to the structure and/or the functioning of the stratospheric ozone layer according to EC Regulation No 2037/2000 (listed in Annex I, Group V).
Discharge into the environment must be avoided.



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## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

**Product**
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

## SECTION 14: Transport information

**DOT (US)**
UN number: 2831 Class: 6.1 Packing group: III
Proper shipping name: 1,1,1-Trichloroethane
Reportable Quantity (RQ): 1000 lbs
Reportable Quantity (RQ): 10 lbs
Reportable Quantity (RQ): 10 lbs
Poison Inhalation Hazard: No

**IMDG**
UN number: 2831 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: 1,1,1-TRICHLOROETHANE

**IATA**
UN number: 2831 Class: 6.1 Packing group: III
Proper shipping name: 1,1,1-Trichloroethane

## SECTION 15: Regulatory information

**SARA 302 Components**
This material does not contain any components with a section 302 EHS TPQ.

**SARA 313 Components**
The following components are subject to reporting levels established by SARA Title III, Section 313:

| | CAS-No. | Revision Date |
|---|---|---|
| 1,1,1-Trichloroethane | 71-55-6 | 2020-07-14 |
| 1,4-Dioxane | 123-91-1 | 2007-07-01 |

**SARA 311/312 Hazards**
Acute Health Hazard, Chronic Health Hazard

**Reportable Quantity** : F001 lbs

F002 lbs

**Massachusetts Right To Know Components**



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| | CAS-No. | Revision Date |
|---|---|---|
| 1,1,1-Trichloroethane | 71-55-6 | 2020-07-14 |
| 1,4-Dioxane | 123-91-1 | 2007-07-01 |

**Pennsylvania Right To Know Components**

| | CAS-No. | Revision Date |
|---|---|---|
| 1,1,1-Trichloroethane | 71-55-6 | 2020-07-14 |
| 1,4-Dioxane | 123-91-1 | 2007-07-01 |

**California Prop. 65 Components**

| | CAS-No. | Revision Date |
|---|---|---|
| , which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.1,4-Dioxane | 123-91-1 | 2007-09-28 |

## SECTION 16: Other information

**Further 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. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 8.5 Revision Date: 03/17/2023 Print Date: 10/21/2023



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# SAFETY DATA SHEET

**Creation Date** 11-Jun-2009 **Revision Date** 25-Dec-2021 **Revision Number** 6

## 1. Identification

**Product Name** **Toluene**

**Cat No. :** **AC326980000; AC326980010; AC326980025; AC326981000; AC326982500**

**CAS No** 108-88-3
**Synonyms** Tol; Methylbenzene

**Recommended Use** Laboratory chemicals.
**Uses advised against** Food, drug, pesticide or biocidal product use.

**Details of the supplier of the safety data sheet**

**Company**
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

**Emergency Telephone Number** For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
**CHEMTREC** Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

## 2. Hazard(s) identification

**Classification**
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

| | |
|---|---|
| Flammable liquids | Category 2 |
| Skin Corrosion/Irritation | Category 2 |
| Serious Eye Damage/Eye Irritation | Category 2 |
| Reproductive Toxicity | Category 2 |
| Specific target organ toxicity (single exposure) | Category 3 |
| Target Organs - Respiratory system, Central nervous system (CNS). | |
| Specific target organ toxicity - (repeated exposure) | Category 2 |
| Target Organs - Kidney, Liver, spleen, Blood, Neurological effects, Eyes, Ears. | |
| Aspiration Toxicity | Category 1 |

**Label Elements**

**Signal Word**

Danger

**Hazard Statements**
Highly flammable liquid and vapor
May be fatal if swallowed and enters airways
Causes skin irritation
Causes serious eye irritation
May cause drowsiness or dizziness
Suspected of damaging the unborn child
May cause damage to organs through prolonged or repeated exposure



**Precautionary Statements**
**Prevention**
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Wear eye/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Keep cool
**Response**
IF exposed or concerned: Get medical attention/advice
**Inhalation**
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
**Skin**
If skin irritation occurs: Get medical advice/attention
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
**Eyes**
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
**Ingestion**
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Do NOT induce vomiting
**Fire**
In case of fire: Use CO2, dry chemical, or foam for extinction
**Storage**
Store locked up
Store in a well-ventilated place. Keep container tightly closed
**Disposal**
Dispose of contents/container to an approved waste disposal plant
**Hazards not otherwise classified (HNOC)**
Harmful to aquatic life with long lasting effects
WARNING. Reproductive Harm - https://www.p65warnings.ca.gov/.

## 3. Composition/Information on Ingredients

| Component | CAS No | Weight % |
|---|---|---|
| Toluene | 108-88-3 | <=100 |

## 4. First-aid measures

**General Advice** If symptoms persist, call a physician.

**Eye Contact** Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

**Skin Contact** Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.

**Inhalation** Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur. Risk of serious damage to the lungs (by aspiration).

**Ingestion** Clean mouth with water and drink afterwards plenty of water. Do NOT induce vomiting. Call a physician or poison control center immediately. If vomiting occurs naturally, have victim lean forward.

**Most important symptoms and effects** . Causes central nervous system depression: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

**Notes to Physician** Treat symptomatically

## 5. Fire-fighting measures

**Suitable Extinguishing Media** Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam. Water mist may be used to cool closed containers.

**Unsuitable Extinguishing Media** No information available

**Flash Point** 4 °C / 39.2 °F

**Method -** No information available

**Autoignition Temperature** 535 °C / 995 °F

**Explosion Limits**
**Upper** 7.1 vol %
**Lower** 1.1 vol %

**Oxidizing Properties** Not oxidising

**Sensitivity to Mechanical Impact** No information available
**Sensitivity to Static Discharge** No information available

**Specific Hazards Arising from the Chemical**
Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back.

**Hazardous Combustion Products**
Carbon monoxide (CO). Carbon dioxide ($CO_2$).
**Protective Equipment and Precautions for Firefighters**
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

**NFPA**

| Health | Flammability | Instability | Physical hazards |
|---|---|---|---|
| 3 | 3 | 0 | N/A |

## 6. Accidental release measures

**Personal Precautions** Use personal protective equipment as required. Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.

**Environmental Precautions** Do not flush into surface water or sanitary sewer system.

**Methods for Containment and Clean Up** Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

## 7. Handling and storage

**Handling** Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Ensure adequate ventilation. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Take precautionary measures against static discharges.

**Storage.** Keep containers tightly closed in a dry, cool and well-ventilated place. Flammables area. Keep away from heat, sparks and flame. Incompatible Materials. Strong oxidizing agents. Strong acids. Strong bases. Halogenated compounds.

## 8. Exposure controls / personal protection

**Exposure Guidelines**

| Component | ACGIH TLV | OSHA PEL | NIOSH IDLH | Mexico OEL (TWA) |
|---|---|---|---|---|
| Toluene | TWA: 20 ppm | (Vacated) TWA: 100 ppm<br>(Vacated) TWA: 375 mg/m$^3$<br>Ceiling: 300 ppm<br>(Vacated) STEL: 150 ppm<br>(Vacated) STEL: 560 mg/m$^3$<br>TWA: 200 ppm | IDLH: 500 ppm<br>TWA: 100 ppm<br>TWA: 375 mg/m$^3$<br>STEL: 150 ppm<br>STEL: 560 mg/m$^3$ | TWA: 20 ppm |

*Legend*

*ACGIH - American Conference of Governmental Industrial Hygienists*
*OSHA - Occupational Safety and Health Administration*
*NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health*

**Engineering Measures** Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting equipment. Ensure adequate ventilation, especially in confined areas.

**Personal Protective Equipment**

**Eye/face Protection** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

**Skin and body protection** Wear appropriate protective gloves and clothing to prevent skin exposure.

**Respiratory Protection** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

**Hygiene Measures** Handle in accordance with good industrial hygiene and safety practice.

## 9. Physical and chemical properties

| | |
|---|---|
| **Physical State** | Liquid |
| **Appearance** | Colorless |
| **Odor** | aromatic |
| **Odor Threshold** | 1.74 ppm |
| **pH** | No information available |
| **Melting Point/Range** | -95 °C / -139 °F |
| **Boiling Point/Range** | 111 °C / 231.8 °F @ 760 mmHg |
| **Flash Point** | 4 °C / 39.2 °F |
| **Evaporation Rate** | 2.4 (Butyl acetate = 1.0) |
| **Flammability (solid,gas)** | Not applicable |
| **Flammability or explosive limits** | |
| **Upper** | 7.1 vol % |
| **Lower** | 1.1 vol % |
| **Vapor Pressure** | 29 mbar @ 20 °C |
| **Vapor Density** | 3.1 |
| **Specific Gravity** | 0.866 |
| **Solubility** | Insoluble in water |
| **Partition coefficient; n-octanol/water** | No data available |
| **Autoignition Temperature** | 535 °C / 995 °F |
| **Decomposition Temperature** | No information available |
| **Viscosity** | 0.6 mPa.s @ 20 °C |
| **Molecular Formula** | C7 H8 |
| **Molecular Weight** | 92.14 |

## 10. Stability and reactivity

**Reactive Hazard** None known, based on information available

**Stability** Stable under normal conditions.

**Conditions to Avoid** Incompatible products. Excess heat. Keep away from open flames, hot surfaces and sources of ignition.

**Incompatible Materials** Strong oxidizing agents, Strong acids, Strong bases, Halogenated compounds

**Hazardous Decomposition Products** Carbon monoxide (CO), Carbon dioxide ($CO_2$)

**Hazardous Polymerization** Hazardous polymerization does not occur.

**Hazardous Reactions** None under normal processing.

## 11. Toxicological information

**Acute Toxicity**

**Product Information**

**Component Information**

| Component | LD50 Oral | LD50 Dermal | LC50 Inhalation |
|---|---|---|---|
| Toluene | > 5000 mg/kg ( Rat ) | 12000 mg/kg ( Rabbit ) | 26700 ppm ( Rat ) 1 h |

**Toxicologically Synergistic Products** No information available

**Delayed and immediate effects as well as chronic effects from short and long-term exposure**

**Irritation** Irritating to eyes, respiratory system and skin

**Sensitization** No information available

**Carcinogenicity** The table below indicates whether each agency has listed any ingredient as a carcinogen.

| Component | CAS No | IARC | NTP | ACGIH | OSHA | Mexico |
|---|---|---|---|---|---|---|
| Toluene | 108-88-3 | Not listed | Not listed | Not listed | Not listed | Not listed |

**Mutagenic Effects** Not mutagenic in AMES Test

**Reproductive Effects** Experiments have shown reproductive toxicity effects on laboratory animals.

**Developmental Effects** Developmental effects have occurred in experimental animals.

**Teratogenicity** Possible risk of harm to the unborn child.

**STOT - single exposure** Respiratory system Central nervous system (CNS)
**STOT - repeated exposure** Kidney Liver spleen Blood Neurological effects Eyes Ears

**Aspiration hazard** No information available

**Symptoms / effects,both acute and delayed** Causes central nervous system depression: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

**Endocrine Disruptor Information** No information available

**Other Adverse Effects** The toxicological properties have not been fully investigated.

## 12. Ecological information

**Ecotoxicity**

The product contains following substances which are hazardous for the environment. Contains a substance which is:. Toxic to aquatic organisms.

| Component | Freshwater Algae | Freshwater Fish | Microtox | Water Flea |
|---|---|---|---|---|
| Toluene | EC50: = 12.5 mg/L, 72h static (Pseudokirchneriella subcapitata)<br>EC50: > 433 mg/L, 96h (Pseudokirchneriella subcapitata) | 50-70 mg/L LC50 96 h<br>5-7 mg/L LC50 96 h<br>15-19 mg/L LC50 96 h<br>28 mg/L LC50 96 h<br>12 mg/L LC50 96 h | EC50 = 19.7 mg/L 30 min | EC50: = 11.5 mg/L, 48h (Daphnia magna)<br>EC50: 5.46 - 9.83 mg/L, 48h Static (Daphnia magna) |

**Persistence and Degradability** Persistence is unlikely

**Bioaccumulation/ Accumulation** No information available.

**Mobility** Is not likely mobile in the environment due its low water solubility.

| Component | log Pow |
|---|---|
| Toluene | 2.7 |

## 13. Disposal considerations

**Waste Disposal Methods** Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

| Component | RCRA - U Series Wastes | RCRA - P Series Wastes |
|---|---|---|
| Toluene - 108-88-3 | U220 | - |

## 14. Transport information

**DOT**

**UN-No** UN1294
**Proper Shipping Name** TOLUENE
**Hazard Class** 3
**Packing Group** II

**TDG**

| | |
|---|---|
| **UN-No** | UN1294 |
| **Proper Shipping Name** | TOLUENE |
| **Hazard Class** | 3 |
| **Packing Group** | II |

**IATA**

| | |
|---|---|
| **UN-No** | UN1294 |
| **Proper Shipping Name** | TOLUENE |
| **Hazard Class** | 3 |
| **Packing Group** | II |

**IMDG/IMO**

| | |
|---|---|
| **UN-No** | UN1294 |
| **Proper Shipping Name** | TOLUENE |
| **Hazard Class** | 3 |
| **Packing Group** | II |

## 15. Regulatory information

**United States of America Inventory**

| Component | CAS No | TSCA | TSCA Inventory notification - Active-Inactive | TSCA - EPA Regulatory Flags |
|---|---|---|---|---|
| Toluene | 108-88-3 | X | ACTIVE | - |

**Legend:**
**TSCA** US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

**TSCA 12(b) -** Notices of Export Not applicable

**International Inventories**
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

| Component | CAS No | DSL | NDSL | EINECS | PICCS | ENCS | ISHL | AICS | IECSC | KECL |
|---|---|---|---|---|---|---|---|---|---|---|
| Toluene | 108-88-3 | X | - | 203-625-9 | X | X | X | X | X | KE-33936 |

**KECL** - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

**U.S. Federal Regulations**

**SARA 313**

| Component | CAS No | Weight % | SARA 313 - Threshold Values % |
|---|---|---|---|
| Toluene | 108-88-3 | <=100 | 1.0 |

**SARA 311/312 Hazard Categories** See section 2 for more information

**CWA (Clean Water Act)**

| Component | CWA - Hazardous Substances | CWA - Reportable Quantities | CWA - Toxic Pollutants | CWA - Priority Pollutants |
|---|---|---|---|---|
| Toluene | X | 1000 lb | X | X |

**Clean Air Act**

| Component | HAPS Data | Class 1 Ozone Depletors | Class 2 Ozone Depletors |
|---|---|---|---|
| Toluene | X | | - |

**OSHA -** Occupational Safety and Health Administration Not applicable

**CERCLA** This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

| Component | Hazardous Substances RQs | CERCLA EHS RQs |
|---|---|---|
| Toluene | 1000 lb 1 lb | - |

**California Proposition 65** This product contains the following Proposition 65 chemicals.

| Component | CAS No | California Prop. 65 | Prop 65 NSRL | Category |
|---|---|---|---|---|
| Toluene | 108-88-3 | Developmental | - | Developmental |

**U.S. State Right-to-Know Regulations**

| Component | Massachusetts | New Jersey | Pennsylvania | Illinois | Rhode Island |
|---|---|---|---|---|---|
| Toluene | X | X | X | X | X |

**U.S. Department of Transportation**

Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

**U.S. Department of Homeland Security** This product does not contain any DHS chemicals.

**Other International Regulations**

**Mexico - Grade** Serious risk, Grade 3

**Authorisation/Restrictions according to EU REACH**

| Component | REACH (1907/2006) - Annex XIV - Substances Subject to Authorization | REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances | REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC) |
|---|---|---|---|
| Toluene | - | Use restricted. See item 48. (see link for restriction details) Use restricted. See item 75. (see link for restriction details) | - |

*https://echa.europa.eu/substances-restricted-under-reach*

**Safety, health and environmental regulations/legislation specific for the substance or mixture**

| Component | CAS No | OECD HPV | Persistent Organic Pollutant | Ozone Depletion Potential | Restriction of Hazardous Substances (RoHS) |
|---|---|---|---|---|---|
| Toluene | 108-88-3 | Listed | Not applicable | Not applicable | Not applicable |

| Component | CAS No | Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification | Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements | Rotterdam Convention (PIC) | Basel Convention (Hazardous Waste) |
|---|---|---|---|---|---|
| Toluene | 108-88-3 | Not applicable | Not applicable | Not applicable | Annex I - Y42 |

## 16. Other information

**Prepared By** Regulatory Affairs
Thermo Fisher Scientific

Email: EMSDS.RA@thermofisher.com

| | |
|---|---|
| **Creation Date** | 11-Jun-2009 |
| **Revision Date** | 25-Dec-2021 |
| **Print Date** | 25-Dec-2021 |
| **Revision Summary** | This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS). |

**Disclaimer**

**The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text**

## End of SDS

# Chemical Safety Data Sheet MSDS / SDS

# Bis(2-ethylhexyl) phthalate

Revision Date:2023-10-28 Revision Number:1

## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### Product identifier

| | |
|---|---|
| Product name | : Bis(2-ethylhexyl) phthalate |
| CBnumber | : CB8708555 |
| CAS | : 117-81-7 |
| EINECS Number | : 204-211-0 |
| Synonyms | : dop,DEHP |

### Relevant identified uses of the substance or mixture and uses advised against

| | |
|---|---|
| Relevant identified uses | : For R&D use only. Not for medicinal, household or other use. |
| Uses advised against | : none |

### Company Identification

| | |
|---|---|
| Company | : Chemicalbook |
| Address | : Building 1, Huihuang International, Shangdi 10th Street, Haidian District, Beijing |
| Telephone | : 400-158-6606 |

## SECTION 2: Hazards identification

### GHS Label elements, including precautionary statements

Symbol(GHS)



Signal word Danger

**Precautionary statements**

P405 Store locked up.

P311 Call a POISON CENTER or doctor/physician.

P308+P313 IF exposed or concerned: Get medical advice/attention.

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P210 Keep away from heat/sparks/open flames/hot surfaces. — No smoking.

P202 Do not handle until all safety precautions have been read and understood.

P201 Obtain special instructions before use.

**Hazard statements**

H370 Causes damage to organs

H360 May damage fertility or the unborn child

H225 Highly Flammable liquid and vapour

**Disposal**

WARNING.Cancer - https://oehha.ca.gov/proposition-65/chemicals/di2-ethylhexylphthalate-dehp

---

## SECTION 3: Composition/information on ingredients

### Substance

| | |
|---|---|
| Product name | : Bis(2-ethylhexyl) phthalate |
| Synonyms | : dop,DEHP |
| CAS | : 117-81-7 |
| EC number | : 204-211-0 |
| MF | : C24H38O4 |
| MW | : 390.56 |

---

## SECTION 4: First aid measures

### Description of first aid measures

**General advice**

Show this material safety data sheet to the doctor in attendance.

**If inhaled**

After inhalation: fresh air. Call in physician.

**In case of skin contact**

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

**In case of eye contact**

After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

**If swallowed**

After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

### Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

### Indication of any immediate medical attention and special treatment needed

No data available

---

## SECTION 5: Firefighting measures

### Extinguishing media

**Suitable extinguishing media**

Foam Carbon dioxide (CO2) Dry powder

**Unsuitable extinguishing media**

For this substance/mixture no limitations of extinguishing agents are given.

### Special hazards arising from the substance or mixture

Carbon oxides Combustible.

Vapors are heavier than air and may spread along floors. Forms explosive mixtures with air on intense heating.

Development of hazardous combustion gases or vapours possible in the event of fire.

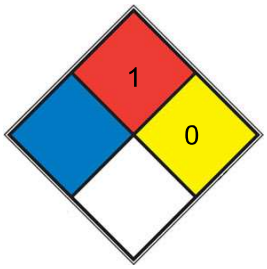
### Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

### Further information

Prevent fire extinguishing water from contaminating surface water or the ground water system.

### NFPA 704




| | | | |
|---|---|---|---|
| | HEALTH | | |
| | FIRE | 1 | Materials that require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur. Includes some finely divided suspended solids that do not require heating before ignition can occur. Flash point at or above 93.3 °C (200 °F). (e.g. mineral oil, ammonia) |
| | REACT | 0 | Normally stable, even under fire exposure conditions, and is not reactive with water (e.g. helium,N2) |
| | SPEC. HAZ. | | |

## SECTION 6: Accidental release measures

### Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

For personal protection see section 8.

### Environmental precautions

Do not let product enter drains.

### Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-

absorbent material (e.g.

Chemizorb?). Dispose of properly. Clean up affected area.

### Reference to other sections

For disposal see section 13.

---

## SECTION 7: Handling and storage

### Precautions for safe handling

### Advice on safe handling

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

### Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

For precautions see section 2.2.

### Conditions for safe storage, including any incompatibilities

### Storage conditions

Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

### Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

---

## SECTION 8: Exposure controls/personal protection

### control parameter

#### Hazard composition and occupational exposure limits

Does not contain substances with occupational exposure limits.

### Exposure controls

#### Personal protective equipment

**Eye/face protection**

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

**Body Protection**

protective clothing

**Respiratory protection**

required when vapours/aerosols are generated.

Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Recommended Filter type: Filter type ABEK

The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer.

These measures have to be properly documented.

**Control of environmental exposure**

Do not let product enter drains.

**Exposure limits**

Potential occupational carcinogen. NIOSH REL: TWA 5, STEL 10, IDLH 5,000; OSHA PEL: TWA 5; ACGIH TLV: TWA 5 (adopted).

## SECTION 9: Physical and chemical properties

### Information on basic physicochemical properties

| | |
|---|---|
| Appearance | Form: oily Color: colorless |
| Odour | odorless |
| Odour Threshold | Not applicable |
| pH | at 20 °C neutral |
| Melting point/freezing point | Melting point/range: -50 °C - lit. |
| Initial boiling point and boiling range | 384 °C - lit. |
| Flash point | 207 °C - closed cup |
| Evaporation rate | No data available |
| Flammability (solid, gas) | No data available |
| Upper/lower flammability or explosive limits | Lower explosion limit: 0,3 %(V) |
| Vapour pressure | 1,6 hPa at 93,0 °C |
| Vapour density | >16 (vs air) |
| Relative density | 0,985 g/cm3 at 25 °C - lit. No data available |
| Water solubility | ca.0,086 g/l at 25 °C - OECD Test Guideline 105- insoluble |
| Partition coefficient: n-octanol/water | No data available |
| Autoignition temperature | 390,0 °C |
| Decomposition temperature | No data available |
| Viscosity | Viscosity, kinematic: ca.78,17 mm2/s at 20 °C - OECD Test Guideline 114 Viscosity, dynamic: 81 mPa.s at 20 °C |
| Explosive properties | No data available |
| Oxidizing properties | No data available |
| Henry's Law Constant | (x $10^{-5}$ atm?$m^3$/mol): 1.1 at 25 °C (calculated, Howard, 1989) |

### Other safety information

No data available

## SECTION 10: Stability and reactivity

### Reactivity

Forms explosive mixtures with air on intense heating.

A range from approx. 15 Kelvin below the flash point is to be rated as critical.

### Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

### Possibility of hazardous reactions

No data available

### Conditions to avoid

Strong heating.

### Incompatible materials

Strong oxidizing agents

### Hazardous decomposition products

In the event of fire: see section 5

---

## SECTION 11: Toxicological information

### Information on toxicological effects

**Acute toxicity**

LD0 Oral - Rat - male and female - > 20.000 mg/kg (OECD Test Guideline 401)

LC0 Inhalation - Rat - male and female - 4 h - > 10,62 mg/l (OECD Test Guideline 403)

Remarks: (highest concentration to be prepared) LD50 Dermal - Rabbit - 19.800 mg/kg

Remarks: (ECHA)

**Skin corrosion/irritation**

Skin - Rabbit

Result: slight irritation - 4 h (OECD Test Guideline 404)

**Serious eye damage/eye irritation**

Eyes - Rabbit

Result: No eye irritation - 72 h (OECD Test Guideline 405)

**Respiratory or skin sensitization**

(OECD Test Guideline 406)

- Mouse

Result: Does not cause respiratory sensitization. Remarks: (ECHA)

**Germ cell mutagenicity**

Test Type: In vitro mammalian cell gene mutation test Test system: Mouse lymphoma test

Metabolic activation: with and without metabolic activation Method: OECD Test Guideline 476

Result: negative

Test Type: Ames test

Test system: Salmonella typhimurium

Metabolic activation: with and without metabolic activation Method: OECD Test Guideline 471

Result: negative

Test Type: Mutagenicity (mammal cell test): chromosome aberration. Test system: Chinese hamster ovary cells

Metabolic activation: with and without metabolic activation Method: OECD Test Guideline 473

Result: negative

Test Type: sister chromatid exchange assay Test system: Chinese hamster ovary cells

Metabolic activation: with and without metabolic activation Method: OECD Test Guideline 479

Result: negative

Test Type: Micronucleus test

Test system: Chinese hamster lung cells

Metabolic activation: with and without metabolic activation Result: negative

Remarks: (ECHA)

Test Type: Chromosome aberration test Species: Rat

Cell type: Bone marrow Application Route: Oral

Method: OECD Test Guideline 475 Result: negative

Test Type: unscheduled DNA synthesis assay Species: Rat

Cell type: Liver cells Application Route: Oral

Method: OECD Test Guideline 486 Result: negative

**Carcinogenicity**

No data available

**Reproductive toxicity**

May damage the unborn child. May damage fertility.

**Specific target organ toxicity - single exposure**

No data available

**Specific target organ toxicity - repeated exposure**

No data available

**Aspiration hazard**

No data available

**Toxicity**

Acute oral $LD_{50}$ for guinea pigs 26 gm/kg, mice 30 gm/kg, rats 30,600 mg/kg, rabbits 34 gm/kg (quoted, RTECS, 1985).

---

## SECTION 12: Ecological information

### Toxicity

**Toxicity to fish**

flow-through test LC50 - Pimephales promelas (fathead minnow) - > 0,67 mg/l - 96 h

(OECD Test Guideline 203)

Remarks: (above the solubility limit in the test medium)

**Toxicity to daphnia and other aquatic invertebrates**

Immobilization EC50 - Daphnia magna (Water flea) - > 0,16 mg/l - 48 h

Remarks: (ECOTOX Database)

**Toxicity to algae**

EC50 - Pseudokirchneriella subcapitata - > 0,003 mg/l - 72 h (OECD Test Guideline 201)

**Toxicity to bacteria**

static test NOEC - activated sludge - 1.000 mg/l - 3 h (OECD Test Guideline 209)

### Persistence and degradability

Biodegradability aerobic - Exposure time 29 d

Result: 82 % - Readily biodegradable. (OECD Test Guideline 301B)

### Bioaccumulative potential

Bioaccumulation Oncorhynchus mykiss (rainbow trout) - 100 d

- 0,014 mg/l(Bis(2-ethylhexyl) phthalate)

Bioconcentration factor (BCF): 113 Remarks: Does not bioaccumulate.

### Mobility in soil

No data available

### Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

### Other adverse effects

No data available

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## SECTION 13: Disposal considerations

### Waste treatment methods

### Product

See www.retrologistik.com for processes regarding the return of chemicals and

containers, or contact us there if you have further questions.

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## SECTION 14: Transport information

### UN number

ADR/RID: - IMDG: - IATA: -

### UN proper shipping name

ADR/RID: Not dangerous goods IMDG: Not dangerous goods IATA: Not dangerous goods

### Transport hazard class(es)

ADR/RID: - IMDG: - IATA: -

### Packaging group

ADR/RID: - IMDG: - IATA: -

### Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

### Special precautions for user

No data available

---

## SECTION 15: Regulatory information

### Safety, health and environmental regulations/legislation specific for the substance or mixture

**Regulations on the Safety Management of Hazardous Chemicals**

China Catalog of Hazardous chemicals 2015:Not Listed. website: https://www.mem.gov.cn/

**Measures for Environmental Management of New Chemical Substances**

New Zealand Inventory of Chemicals (NZIoC):Listed. website: https://www.epa.govt.nz/

Chinese Chemical Inventory of Existing Chemical Substances (China IECSC):Listed. website: https://www.mee.gov.cn/

Vietnam National Chemical Inventory:Listed. website: https://chemicaldata.gov.vn/

EC Inventory:Listed.

European Inventory of Existing Commercial Chemical Substances (EINECS):Listed. website: https://echa.europa.eu/

Philippines Inventory of Chemicals and Chemical Substances (PICCS):Listed. website: https://emb.gov.ph/

Korea Existing Chemicals List (KECL):Listed. website: http://ncis.nier.go.kr

United States Toxic Substances Control Act (TSCA) Inventory:Listed. website: https://www.epa.gov/

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## SECTION 16: Other information

### Abbreviations and acronyms

CAS: Chemical Abstracts Service

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

RID: Regulation concerning the International Carriage of Dangerous Goods by Rail

IMDG: International Maritime Dangerous Goods

IATA: International Air Transportation Association

TWA: Time Weighted Average

STEL: Short term exposure limit

LC50: Lethal Concentration 50%

LD50: Lethal Dose 50%

EC50: Effective Concentration 50%

### References

【1】CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple

【2】ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp

【3】ECHA - European Chemicals Agency, website: https://echa.europa.eu/

【4】eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en

【5】ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg

【6】Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp

【7】HSDB - Hazardous Substances Data Bank, website: https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm

【8】IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/

【9】IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home

【10】Sigma-Aldrich, website: https://www.sigmaaldrich.com/

**Disclaimer:**
The information in this MSDS is only applicable to the specified product, unless otherwise specified, it is not applicable to the mixture of this product and other substances. This MSDS only provides information on the safety of the product for those who have received the appropriate professional training for the user of the product. Users of this MSDS must make independent judgments on the applicability of this SDS. The authors of this MSDS will not be held responsible for any harm caused by the use of this MSDS.

# SAFETY DATA SHEET

**Revision Date** 20-Feb-2020 **Revision Number** 2

## 1. Identification

**Product Name** **Arsenic powder**

**Cat No. :** **10101**

**CAS-No** 7440-38-2
**Synonyms** No information available

**Recommended Use** Laboratory chemicals.
**Uses advised against** Food, drug, pesticide or biocidal product use.

**Details of the supplier of the safety data sheet**

**Company**
Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
**Email:** tech@alfa.com
www.alfa.com

**Emergency Telephone Number**
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660.
After normal business hours, call Carechem 24 at (866) 928-0789.

## 2. Hazard(s) identification

**Classification**
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

| | |
|---|---|
| Acute oral toxicity | Category 3 |
| Acute Inhalation Toxicity - Dusts and Mists | Category 3 |
| Carcinogenicity | Category 1A |

**Label Elements**

**Signal Word**
Danger

**Hazard Statements**
May cause cancer
Toxic if swallowed or if inhaled



**Precautionary Statements**
**Prevention**
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
**Response**
IF exposed or concerned: Get medical attention/advice
**Inhalation**
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician
**Ingestion**
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Rinse mouth
**Storage**
Store locked up
Store in a well-ventilated place. Keep container tightly closed
**Disposal**
Dispose of contents/container to an approved waste disposal plant
**Hazards not otherwise classified (HNOC)**
Very toxic to aquatic life with long lasting effects
WARNING. Cancer - https://www.p65warnings.ca.gov/.

## 3. Composition/Information on Ingredients

| Component | CAS-No | Weight % |
|---|---|---|
| Arsenic | 7440-38-2 | <=100 |

## 4. First-aid measures

**General Advice**
Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

**Eye Contact**
In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.

**Skin Contact**
Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

**Inhalation**
Remove to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

**Ingestion**
Do NOT induce vomiting. Call a physician or poison control center immediately.

| | |
|---|---|
| **Most important symptoms and effects** | None reasonably foreseeable. |
| **Notes to Physician** | Treat symptomatically |

## 5. Fire-fighting measures

| | |
|---|---|
| **Suitable Extinguishing Media** | approved class D extinguishers. Do not use water or foam. |
| **Unsuitable Extinguishing Media** | No information available |
| **Flash Point** | No information available |
| **Method -** | No information available |
| **Autoignition Temperature** | No information available |
| **Explosion Limits** | |
| **Upper** | No data available |
| **Lower** | No data available |
| **Sensitivity to Mechanical Impact** | No information available |
| **Sensitivity to Static Discharge** | No information available |

**Specific Hazards Arising from the Chemical**
Do not allow run-off from fire-fighting to enter drains or water courses.

**Hazardous Combustion Products**
arsenic oxides.
**Protective Equipment and Precautions for Firefighters**
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

**NFPA**

| Health | Flammability | Instability | Physical hazards |
|---|---|---|---|
| 3 | 0 | 0 | - |

## 6. Accidental release measures

| | |
|---|---|
| **Personal Precautions** | Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust formation. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas. |
| **Environmental Precautions** | Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained. Should not be released into the environment. |
| **Methods for Containment and Clean Up** | Sweep up and shovel into suitable containers for disposal. Avoid dust formation. |

## 7. Handling and storage

| | |
|---|---|
| **Handling** | Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Avoid dust formation. Use only under a chemical fume hood. Do not breathe (dust, vapor, mist, gas). Do not ingest. If swallowed then seek immediate medical assistance. |
| **Storage** | Keep containers tightly closed in a dry, cool and well-ventilated place. |

## 8. Exposure controls / personal protection

**Exposure Guidelines**

| Component | ACGIH TLV | OSHA PEL | NIOSH IDLH | Mexico OEL (TWA) |
|---|---|---|---|---|
| Arsenic | TWA: 0.01 mg/m³ | (Vacated) TWA: 0.5 mg/m³ | IDLH: 5 mg/m³<br>Ceiling: 0.002 mg/m³ | TWA: 0.01 mg/m³ |

*Legend*

*ACGIH - American Conference of Governmental Industrial Hygienists*
*OSHA - Occupational Safety and Health Administration*
*NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health*

**Engineering Measures** Ensure adequate ventilation, especially in confined areas.

**Personal Protective Equipment**

**Eye/face Protection** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

**Skin and body protection** Wear appropriate protective gloves and clothing to prevent skin exposure.

**Respiratory Protection** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

**Hygiene Measures** Handle in accordance with good industrial hygiene and safety practice.

## 9. Physical and chemical properties

| | |
|---|---|
| **Physical State** | Solid |
| **Appearance** | No information available |
| **Odor** | Odorless |
| **Odor Threshold** | No information available |
| **pH** | No information available |
| **Melting Point/Range** | 817 °C / 1502.6 °F |
| **Boiling Point/Range** | 614 °C / 1137.2 °F |
| **Flash Point** | No information available |
| **Evaporation Rate** | Not applicable |
| **Flammability (solid,gas)** | No information available |
| **Flammability or explosive limits** | |
| **Upper** | No data available |
| **Lower** | No data available |
| **Vapor Pressure** | 0.01 hPa @ 267 °C |
| **Vapor Density** | Not applicable |
| **Specific Gravity** | 5.778 g/cm3 |
| **Solubility** | No information available |
| **Partition coefficient; n-octanol/water** | No data available |
| **Autoignition Temperature** | No information available |
| **Decomposition Temperature** | No information available |
| **Viscosity** | Not applicable |
| **Molecular Formula** | As |
| **Molecular Weight** | 74.92 |

## 10. Stability and reactivity

**Reactive Hazard** None known, based on information available

**Stability** Stable under normal conditions.

**Conditions to Avoid** Incompatible products.

**Incompatible Materials** Oxidizing agent

**Hazardous Decomposition Products** arsenic oxides

**Hazardous Polymerization** Hazardous polymerization does not occur.

**Hazardous Reactions** None under normal processing.

## 11. Toxicological information

**Acute Toxicity**

**Product Information**
**Component Information**

| Component | LD50 Oral | LD50 Dermal | LC50 Inhalation |
|---|---|---|---|
| Arsenic | LD50 = 15 mg/kg ( Rat )<br>LD50 = 763 mg/kg ( Rat ) | Not listed | Not listed |

**Toxicologically Synergistic Products** No information available

**Delayed and immediate effects as well as chronic effects from short and long-term exposure**

**Irritation** No information available

**Sensitization** No information available

**Carcinogenicity** The table below indicates whether each agency has listed any ingredient as a carcinogen.

| Component | CAS-No | IARC | NTP | ACGIH | OSHA | Mexico |
|---|---|---|---|---|---|---|
| Arsenic | 7440-38-2 | Group 1 | Known | A1 | X | A1 |

*IARC (International Agency for Research on Cancer)*

*NTP: (National Toxicity Program)*

*ACGIH: (American Conference of Governmental Industrial Hygienists)*

*Mexico - Occupational Exposure Limits - Carcinogens*

*IARC (International Agency for Research on Cancer)*
*Group 1 - Carcinogenic to Humans*
*Group 2A - Probably Carcinogenic to Humans*
*Group 2B - Possibly Carcinogenic to Humans*
*NTP: (National Toxicity Program)*
*Known - Known Carcinogen*
*Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen*
*A1 - Known Human Carcinogen*
*A2 - Suspected Human Carcinogen*
*A3 - Animal Carcinogen*
*ACGIH: (American Conference of Governmental Industrial Hygienists)*
*Mexico - Occupational Exposure Limits - Carcinogens*
*A1 - Confirmed Human Carcinogen*
*A2 - Suspected Human Carcinogen*
*A3 - Confirmed Animal Carcinogen*
*A4 - Not Classifiable as a Human Carcinogen*
*A5 - Not Suspected as a Human Carcinogen*

**Mutagenic Effects** No information available

**Reproductive Effects** No information available.

**Developmental Effects** No information available.

**Teratogenicity** No information available.

**STOT - single exposure** None known
**STOT - repeated exposure** None known

**Aspiration hazard** No information available

**Symptoms / effects,both acute and delayed** No information available

**Endocrine Disruptor Information** No information available

**Other Adverse Effects** The toxicological properties have not been fully investigated.

## 12. Ecological information

**Ecotoxicity**

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment. May cause long-term adverse effects in the environment. Do not allow material to contaminate ground water system.

**Persistence and Degradability** Insoluble in water May persist

**Bioaccumulation/ Accumulation** No information available.

**Mobility** Is not likely mobile in the environment due its low water solubility.

## 13. Disposal considerations

**Waste Disposal Methods** Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

## 14. Transport information

**DOT**

| | |
|---|---|
| **UN-No** | UN1558 |
| **Proper Shipping Name** | ARSENIC |
| **Hazard Class** | 6.1 |
| **Packing Group** | II |

**TDG**

| | |
|---|---|
| **UN-No** | UN1558 |
| **Proper Shipping Name** | ARSENIC |
| **Hazard Class** | 6.1 |
| **Packing Group** | II |

**IATA**

| | |
|---|---|
| **UN-No** | UN1558 |
| **Proper Shipping Name** | ARSENIC |
| **Hazard Class** | 6.1 |
| **Packing Group** | II |

**IMDG/IMO**

| | |
|---|---|
| **UN-No** | UN1558 |
| **Proper Shipping Name** | ARSENIC |
| **Hazard Class** | 6.1 |
| **Packing Group** | II |

## 15. Regulatory information

**United States of America Inventory**

| Component | CAS-No | TSCA | TSCA Inventory notification - Active/Inactive | TSCA - EPA Regulatory Flags |
|---|---|---|---|---|
| Arsenic | 7440-38-2 | X | ACTIVE | - |

**Legend:**
**TSCA** - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

**TSCA 12(b) -** Notices of Export Not applicable

## International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

| Component | CAS-No | DSL | NDSL | EINECS | PICCS | ENCS | AICS | IECSC | KECL |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 7440-38-2 | X | - | 231-148-6 | X | X | X | X | KE-01933 |

## U.S. Federal Regulations

**SARA 313**

| Component | CAS-No | Weight % | SARA 313 - Threshold Values % |
|---|---|---|---|
| Arsenic | 7440-38-2 | <=100 | 0.1 |

**SARA 311/312 Hazard Categories** See section 2 for more information

**CWA (Clean Water Act)**

| Component | CWA - Hazardous Substances | CWA - Reportable Quantities | CWA - Toxic Pollutants | CWA - Priority Pollutants |
|---|---|---|---|---|
| Arsenic | - | - | X | X |

**Clean Air Act**

| Component | HAPS Data | Class 1 Ozone Depletors | Class 2 Ozone Depletors |
|---|---|---|---|
| Arsenic | X | | - |

**OSHA** - Occupational Safety and Health Administration Not applicable

| Component | Specifically Regulated Chemicals | Highly Hazardous Chemicals |
|---|---|---|
| Arsenic | 10 µg/m³ TWA<br>5 µg/m³ Action Level | - |

**CERCLA** Not applicable

| Component | Hazardous Substances RQs | CERCLA EHS RQs |
|---|---|---|
| Arsenic | 1 lb | - |

**California Proposition 65** This product contains the following Proposition 65 chemicals.

| Component | CAS-No | California Prop. 65 | Prop 65 NSRL | Category |
|---|---|---|---|---|
| Arsenic | 7440-38-2 | Carcinogen | 0.06 µg/day<br>10 µg/day | Carcinogen |

**U.S. State Right-to-Know Regulations**

| Component | Massachusetts | New Jersey | Pennsylvania | Illinois | Rhode Island |
|---|---|---|---|---|---|
| Arsenic | X | X | X | X | X |

**U.S. Department of Transportation**

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

**U.S. Department of Homeland Security** This product does not contain any DHS chemicals.

## Other International Regulations

**Mexico - Grade** No information available

# 16. Other information

| | |
|---|---|
| **Prepared By** | Health, Safety and Environmental Department<br>Email: tech@alfa.com<br>www.alfa.com |
| **Revision Date** | 20-Feb-2020 |
| **Print Date** | 20-Feb-2020 |
| **Revision Summary** | SDS authoring systems update, replaces ChemGes SDS No. 7440-38-2/1. |

**Disclaimer**

**The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text**

## End of SDS

# Chemical Safety Data Sheet MSDS / SDS

## Barium

Revision Date:2023-10-21 Revision Number:1

## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### Product identifier

| | |
|---|---|
| Product name | : Barium |
| CBnumber | : CB0854186 |
| CAS | : 7440-39-3 |
| EINECS Number | : 231-149-1 |
| Synonyms | : barium,BARIUM STANDARD SOLUTION |

### Relevant identified uses of the substance or mixture and uses advised against

| | |
|---|---|
| Relevant identified uses | : For R&D use only. Not for medicinal, household or other use. |
| Uses advised against | : none |

### Company Identification

| | |
|---|---|
| Company | : Chemicalbook |
| Address | : Building 1, Huihuang International, Shangdi 10th Street, Haidian District, Beijing |
| Telephone | : 400-158-6606 |

## SECTION 2: Hazards identification

### GHS Label elements, including precautionary statements

Symbol(GHS)



Signal word Danger

**Precautionary statements**

P210 Keep away from heat/sparks/open flames/hot surfaces. — No smoking.

P223 Keep away from any possible contact with water, because of violent reaction and possible flash fire.

P231+P232 Handle under inert gas. Protect from moisture.

P240 Ground/bond container and receiving equipment.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P335+P334 Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages.

P370+P378 In case of fire: Use … for extinction.

P402+P404 Store in a dry place. Store in a closed container.

**Hazard statements**

H228 Flammable solid

H261 In contact with water releases flammable gas

## SECTION 3: Composition/information on ingredients

### Substance

| | |
|---|---|
| Product name | : Barium |
| Synonyms | : barium,BARIUM STANDARD SOLUTION |
| CAS | : 7440-39-3 |
| EC number | : 231-149-1 |
| MF | : Ba |
| MW | : 137.33 |

## SECTION 4: First aid measures

### Description of first aid measures

**General advice**
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.
**If inhaled**
After inhalation: fresh air. Call in physician.
**In case of skin contact**
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Call a physician immediately.
**In case of eye contact**
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.
**If swallowed**
If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 - 40 g in a 10% slurry) and consult a doctor as quickly as possible. Do not attempt to neutralise.

### Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

### Indication of any immediate medical attention and special treatment needed

No data available

## SECTION 5: Firefighting measures

### Extinguishing media

**Suitable extinguishing media**
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
**Unsuitable extinguishing media**
Water Foam

### Special hazards arising from the substance or mixture

Barium oxide Not combustible.
May not get in touch with: Water
Ambient fire may liberate hazardous vapours.

### Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

### Further information

Prevent fire extinguishing water from contaminating surface water or the ground water system.

**NFPA 704**

| | | |
|---|---|---|
| ◇ HEALTH | 1 | Exposure would cause irritation with only minor residual injury (e.g. acetone, sodium bromate, potassium chloride) |

| | | | |
|---|---|---|---|
| 1 | | 3 | |
| ◇ | FIRE | 4 | Will rapidly or completely vaporize at normal atmospheric pressure and temperature, or is readily dispersed in air and will burn readily. Includes pyrophoric substances. Flash point below room temperature at 22.8 °C (73 °F). (e.g. acetylene, propane, hydrogen gas) |
| ◇ | REACT | 3 | Capable of detonation or explosive decomposition but requires a strong initiating source, must be heated under confinement before initiation, reacts explosively with water, or will detonate if severely shocked (e.g. ammonium nitrate, cesium, hydrogen peroxide) |
| ◇ | SPEC. HAZ. | | |

## SECTION 6: Accidental release measures

### Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

### Environmental precautions

Do not let product enter drains. Risk of explosion.

### Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

### Reference to other sections

For disposal see section 13.

## SECTION 7: Handling and storage

### Precautions for safe handling

### Advice on safe handling

Keep workplace dry. Do not allow product to come into contact with water.

### Advice on protection against fire and explosion

Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

### Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

### Conditions for safe storage, including any incompatibilities

### Storage conditions

Tightly closed. Keep away from heat and sources of ignition. Keep locked up or in an area accessible only to qualified or authorized persons.
Never allow product to get in contact with water during storage. Store under inert gas.

### Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

## SECTION 8: Exposure controls/personal protection

### control parameter

**Hazard composition and occupational exposure limits**

Does not contain substances with occupational exposure limits.

### Exposure controls

**Personal protective equipment**

**Eye/face protection**

Use equipment for eye protection tested and approved under appropriate
government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

**Skin protection**

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0,11 mm Break through time: 480 min

Material tested:KCL 741 Dermatril? L

Splash contact Material: Nitrile rubber

Minimum layer thickness: 0,11 mm Break through time: 480 min

Material tested:KCL 741 Dermatril? L

**Body Protection**

Flame retardant antistatic protective clothing.

**Respiratory protection**

required when dusts are generated.

Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Recommended Filter type: Filter type P3

The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer.

These measures have to be properly documented.

**Control of environmental exposure**

Do not let product enter drains. Risk of explosion.

**Exposure limits**

TLV-TWA 0.5 mg/m$^3$ (for soluble compounds) (ACGIH and MSHA); IDLH (for soluble compounds) 250 mg/m$^3$ (NIOSH). .

## SECTION 9: Physical and chemical properties

### Information on basic physicochemical properties

| | |
|---|---|
| Appearance | Form: Pieces Color: gray |
| Odour | No data available |
| Odour Threshold | No data available |
| pH | No data available |
| Melting point/freezing point | Melting point/range: 725 °C - lit. |
| Initial boiling point and boiling range | 1.640 °C - lit. |
| Flash point | Not applicable |
| Evaporation rate | No data available |
| Flammability (solid, gas) | The substance or mixture is a flammable solid with the category 1. |
| Upper/lower flammability or explosive limits | No data available |
| Vapour pressure | No data available |
| Vapour density | No data available |
| Relative density | 3.51 |

| | |
|---|---|
| Water solubility | No data available |
| Partition coefficient: n-octanol/water | Not applicable for inorganic substances |
| Autoignition temperature | No data available |
| Decomposition temperature | No data available |
| Viscosity | Viscosity, kinematic: No data available Viscosity, dynamic: No data available |
| Explosive properties | No data available |
| Oxidizing properties | No data available |
| resistivity | 50.0 µΩ-cm, 20°C |

### Other safety information

No data available

## SECTION 10: Stability and reactivity

### Reactivity

No data available

### Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

### Possibility of hazardous reactions

No data available

### Conditions to avoid

Heat. Moisture.

### Incompatible materials

Oxidizing agents, Water, acids, Oxygen, Chlorinated solvents, Carbon dioxide (CO2), Halogens, Halogenated hydrocarbon, Alcohols, Sulfur compounds, Hydrogen sulfide gas

### Hazardous decomposition products

In the event of fire: see section 5

## SECTION 11: Toxicological information

### Information on toxicological effects

**Acute toxicity**
Oral
**Skin corrosion/irritation**
Causes severe burns. (ECHA)
**Serious eye damage/eye irritation**
No data available
**Respiratory or skin sensitization**
No data available
**Germ cell mutagenicity**
Test Type: In vitro mammalian cell gene mutation test Test system: mouse lymphoma cells
Metabolic activation: with and without metabolic activation Method: OECD Test Guideline 476
Result: negative
Test Type: Chromosome aberration test in vitro Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation Method: OECD Test Guideline 473
Result: negative
Test Type: Ames test

Test system: S. typhimurium
Metabolic activation: with and without metabolic activation Method: OECD Test Guideline 471
Result: negative

**Carcinogenicity**

No data available

**Reproductive toxicity**

No data available

**Specific target organ toxicity - single exposure**

No data available

**Specific target organ toxicity - repeated exposure**

No data available

**Aspiration hazard**

No data available

**Toxicity**

An element; the heaviest of the stable alkaline earths. Barium sulfate is used as a diagnostic aid in radiology due to its radio-opaqueness and, because of its insolubility and lack of absorption, it is safe barring iatrogenic episodes. Poisoning usually results from deliberate or accidental ingestion of soluble barium compounds. The Ba2+ ion is a muscle poison due to the blocking of the K1 channels of the Na+/K+ pump in cell membranes. Because cases of barium poisoning are accompanied by severe hypokalemia, potassium infusion is an effective antidote. The toxicity of barium compounds depends on their solubility, with the free ion being readily absorbed from gastrointestinal tract or lung, whereas the sulfate is essentially unabsorbed. Thus, administration of soluble sulfates immediately after ingestion is another effective antidote.

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## SECTION 12: Ecological information

### Toxicity

**Toxicity to fish**

static test LC50 - Danio rerio (zebra fish) - > 3,5 mg/l - 96 h (OECD Test Guideline 203)

**Toxicity to daphnia and other aquatic invertebrates**

static test EC50 - Daphnia magna (Water flea) - 14,5 mg/l - 48 h Remarks: (ECHA)

**Toxicity to algae**

Growth inhibition ErC50 - Pseudokirchneriella subcapitata (green algae) - > 1,15 mg/l - 72 h
(OECD Test Guideline 201)

**Toxicity to bacteria**

static test EC50 - activated sludge - > 1.000 mg/l - 3 h (OECD Test Guideline 209)

### Persistence and degradability

The methods for determining the biological degradability are not applicable to inorganic substances.

### Bioaccumulative potential

No data available

### Mobility in soil

No data available

### Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

### Other adverse effects

Biological effects:
Product reacts with water. Hazardous decomposition products Harmful effect due to pH shift.
Discharge into the environment must be avoided.

---

## SECTION 13: Disposal considerations

### Waste treatment methods

### Product

See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

**Incompatibilities**

Barium powder may spontaneously ignite on contact with air. It is a strong reducing agent and Barium 337 reacts violently with oxidizers and acids. Reacts with water, forming combustible hydrogen gas and barium hydroxide. Reacts violently with halogenated hydrocarbon solvents, causing a fire and explosion hazard.

**Waste Disposal**

Barium in solution (see spill handling) may be precipitated with soda ash and the sludge may be landfilled.

---

## SECTION 14: Transport information

### UN number

ADR/RID: 1400 IMDG: 1400 IATA: 1400

### UN proper shipping name

ADR/RID: BARIUM IMDG: BARIUM
IATA: Barium

### Transport hazard class(es)

ADR/RID: 4.3 IMDG: 4.3 IATA: 4.3

### Packaging group

ADR/RID: II IMDG: II IATA: II

### Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

### Special precautions for user

No data available

---

## SECTION 15: Regulatory information

### Safety, health and environmental regulations/legislation specific for the substance or mixture

**Regulations on the Safety Management of Hazardous Chemicals**

China Catalog of Hazardous chemicals 2015:Listed. website: https://www.mem.gov.cn/

**Measures for Environmental Management of New Chemical Substances**

Chinese Chemical Inventory of Existing Chemical Substances (China IECSC):Listed. website: https://www.mee.gov.cn/
EC Inventory:Listed.
European Inventory of Existing Commercial Chemical Substances (EINECS):Listed. website: https://echa.europa.eu/
Korea Existing Chemicals List (KECL):Listed. website: http://ncis.nier.go.kr
New Zealand Inventory of Chemicals (NZIoC):Listed. website: https://www.epa.govt.nz/
Philippines Inventory of Chemicals and Chemical Substances (PICCS):Listed. website: https://emb.gov.ph/
United States Toxic Substances Control Act (TSCA) Inventory:Listed. website: https://www.epa.gov/
Vietnam National Chemical Inventory:Listed. website: https://chemicaldata.gov.vn/

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## SECTION 16: Other information

### Abbreviations and acronyms

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
CAS: Chemical Abstracts Service
EC50: Effective Concentration 50%
IATA: International Air Transportation Association
IMDG: International Maritime Dangerous Goods
LC50: Lethal Concentration 50%
LD50: Lethal Dose 50%
RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
STEL: Short term exposure limit
TWA: Time Weighted Average

### References

【1】CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple
【2】ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp
【3】ECHA - European Chemicals Agency, website: https://echa.europa.eu/
【4】eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
【5】ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg
【6】Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp
【7】HSDB - Hazardous Substances Data Bank, website: https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm
【8】IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/
【9】IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home
【10】Sigma-Aldrich, website: https://www.sigmaaldrich.com/

### Other Information

Reacts violently with fire extinguishing agents such as water, bicarbonate, powder, foam, and carbon dioxide.Rinse contaminated clothing with plenty of water because of fire hazard.

***Disclaimer:***
*The information in this MSDS is only applicable to the specified product, unless otherwise specified, it is not applicable to the mixture of this product and other substances. This MSDS only provides information on the safety of the product for those who have received the appropriate professional training for the user of the product. Users of this MSDS must make independent judgments on the applicability of this SDS. The authors of this MSDS will not be held responsible for any harm caused by the use of this MSDS.*

## Recommended Products

Pigment Red 53:1 SDS BARIUM FOD, DIHYDRATE SDS Barium carbonate SDS Barium acetate SDS Barium hydroxide SDS Barium fluoride SDS BARIUM CHLORANILATE SDS Barium chloride SDS BARIUM ETHYLSULFATE SDS

# SAFETY DATA SHEET

**Revision Date** 24-Dec-2021 **Revision Number** 4

## 1. Identification

**Product Name** **Cadmium**

**Cat No. :** **C3-500**

**CAS No** 7440-43-9
**Synonyms** No information available

**Recommended Use** Laboratory chemicals.
**Uses advised against** Food, drug, pesticide or biocidal product use.

**Details of the supplier of the safety data sheet**

**Company**
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

**Emergency Telephone Number** CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

## 2. Hazard(s) identification

**Classification**
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

| | |
|---|---|
| Flammable solids | Category 2 |
| Acute oral toxicity | Category 4 |
| Acute dermal toxicity | Category 4 |
| Acute Inhalation Toxicity - Dusts and Mists | Category 2 |
| Germ Cell Mutagenicity | Category 2 |
| Carcinogenicity | Category 1A |
| Reproductive Toxicity | Category 2 |
| Specific target organ toxicity (single exposure) | Category 3 |
| Target Organs - Respiratory system. | |
| Specific target organ toxicity - (repeated exposure) | Category 1 |
| Target Organs - Kidney, Blood. | |
| Combustible dust | Yes |

**Label Elements**

**Signal Word**

Danger

**Hazard Statements**
Flammable solid
May form combustible dust concentrations in air
Fatal if inhaled
Harmful if swallowed
Harmful in contact with skin
May cause respiratory irritation
Suspected of causing genetic defects
May cause cancer
Suspected of damaging fertility. Suspected of damaging the unborn child
Causes damage to organs through prolonged or repeated exposure



**Precautionary Statements**
**Prevention**
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting equipment
**Response**
IF exposed or concerned: Get medical attention/advice
**Inhalation**
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Immediately call a POISON CENTER or doctor/physician
**Skin**
IF ON SKIN: Wash with plenty of soap and water
Wash contaminated clothing before reuse
Call a POISON CENTER or doctor/physician if you feel unwell
**Ingestion**
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
**Fire**
Fight fire with normal precautions from a reasonable distance
Evacuate area
**Storage**
Store locked up
Store in a well-ventilated place. Keep container tightly closed
**Disposal**
Dispose of contents/container to an approved waste disposal plant
**Hazards not otherwise classified (HNOC)**
Very toxic to aquatic life with long lasting effects
WARNING. Cancer and Reproductive Harm - https://www.p65warnings.ca.gov/.

## 3. Composition/Information on Ingredients

| Component | CAS No | Weight % |
|---|---|---|
| Cadmium | 7440-43-9 | 100 |

## 4. First-aid measures

**General Advice** Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

**Eye Contact** Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

**Skin Contact** Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

**Inhalation** Remove to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

**Ingestion** Do NOT induce vomiting. Call a physician or poison control center immediately.

**Most important symptoms and effects** None reasonably foreseeable. . Kidney disorders: May cause harm to the unborn child: Blood disorders

**Notes to Physician** Treat symptomatically

## 5. Fire-fighting measures

**Unsuitable Extinguishing Media** No information available

**Flash Point** No information available
**Method -** No information available

**Autoignition Temperature** No information available

**Explosion Limits**
**Upper** No data available
**Lower** No data available
**Sensitivity to Mechanical Impact** No information available
**Sensitivity to Static Discharge** No information available

**Specific Hazards Arising from the Chemical**
Thermal decomposition can lead to release of irritating gases and vapors. Fine dust dispersed in air may ignite. Dust can form an explosive mixture with air. Pyrophoric properties of solids and liquids. Do not allow run-off from fire-fighting to enter drains or water courses.

**Hazardous Combustion Products**
Toxic fumes.
**Protective Equipment and Precautions for Firefighters**
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

**NFPA**

| Health | Flammability | Instability | Physical hazards |
|---|---|---|---|
| 4 | 1 | 0 | N/A |

## 6. Accidental release measures

**Personal Precautions** Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust

formation. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas.

**Environmental Precautions** Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.

**Methods for Containment and Clean Up** Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

## 7. Handling and storage

**Handling** Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Avoid dust formation. Use only under a chemical fume hood. Do not breathe (dust, vapor, mist, gas). Do not ingest. If swallowed then seek immediate medical assistance.

**Storage.** Keep containers tightly closed in a dry, cool and well-ventilated place. Store under an inert atmosphere. Incompatible Materials. Strong oxidizing agents. Strong acids. Sulfur oxides.

## 8. Exposure controls / personal protection

**Exposure Guidelines**

| Component | ACGIH TLV | OSHA PEL | NIOSH IDLH | Mexico OEL (TWA) |
|---|---|---|---|---|
| Cadmium | TWA: 0.01 mg/m³<br>TWA: 0.002 mg/m³ | Ceiling: 0.3 mg/m³<br>Ceiling: 0.6 mg/m³<br>(Vacated) STEL: 0.3 ppm<br>TWA: 0.1 mg/m³<br>TWA: 0.2 mg/m³<br>TWA: 5 µg/m³ | IDLH: 9 mg/m³ | TWA: 0.01 mg/m³<br>TWA: 0.002 mg/m³ |

*Legend*

*ACGIH - American Conference of Governmental Industrial Hygienists*
*OSHA - Occupational Safety and Health Administration*
*NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health*

**Engineering Measures** Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

**Personal Protective Equipment**

**Eye/face Protection** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

**Skin and body protection** Wear appropriate protective gloves and clothing to prevent skin exposure.

**Respiratory Protection** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

**Hygiene Measures** When using do not eat, drink or smoke. Provide regular cleaning of equipment, work area and clothing. Avoid contact with skin, eyes or clothing. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feeding stuffs.

## 9. Physical and chemical properties

**Physical State** Solid

| | |
|---|---|
| **Appearance** | Silver |
| **Odor** | Odorless |
| **Odor Threshold** | No information available |
| **pH** | No information available |
| **Melting Point/Range** | 321 °C / 609.8 °F |
| **Boiling Point/Range** | 765 °C / 1409 °F @ 760 mmHg |
| **Flash Point** | No information available |
| **Evaporation Rate** | Not applicable |
| **Flammability (solid,gas)** | No information available |
| **Flammability or explosive limits** | |
| **Upper** | No data available |
| **Lower** | No data available |
| **Vapor Pressure** | No information available |
| **Vapor Density** | Not applicable |
| **Specific Gravity** | 8.64 @ 25°C |
| **Solubility** | Insoluble in water |
| **Partition coefficient; n-octanol/water** | No data available |
| **Autoignition Temperature** | No information available |
| **Decomposition Temperature** | No information available |
| **Viscosity** | Not applicable |
| **Molecular Formula** | Cd |
| **Molecular Weight** | 112.40 |

## 10. Stability and reactivity

**Reactive Hazard** None known, based on information available

**Stability** Stable under recommended storage conditions. Moisture sensitive. Air sensitive.

**Conditions to Avoid** Incompatible products. Excess heat. Avoid dust formation. Exposure to air or moisture over prolonged periods.

**Incompatible Materials** Strong oxidizing agents, Strong acids, Sulfur oxides

**Hazardous Decomposition Products** Toxic fumes

**Hazardous Polymerization** Hazardous polymerization does not occur.

**Hazardous Reactions** None under normal processing.

## 11. Toxicological information

**Acute Toxicity**

**Product Information**

**Component Information**

| Component | LD50 Oral | LD50 Dermal | LC50 Inhalation |
|---|---|---|---|
| Cadmium | LD50 = 2330 mg/kg ( Rat ) | Not listed | LC50 = 25 mg/m³ ( Rat ) 30 min |

**Toxicologically Synergistic Products** No information available

**Delayed and immediate effects as well as chronic effects from short and long-term exposure**

**Irritation** No information available

**Sensitization** No information available

**Carcinogenicity** The table below indicates whether each agency has listed any ingredient as a carcinogen.

| Component | CAS No | IARC | NTP | ACGIH | OSHA | Mexico |
|---|---|---|---|---|---|---|
| Cadmium | 7440-43-9 | Group 1 | Known | A2 | X | A2 |

| | |
|---|---|
| *IARC (International Agency for Research on Cancer)* | *IARC (International Agency for Research on Cancer)*<br>*Group 1 - Carcinogenic to Humans*<br>*Group 2A - Probably Carcinogenic to Humans*<br>*Group 2B - Possibly Carcinogenic to Humans* |
| *NTP: (National Toxicity Program)* | *NTP: (National Toxicity Program)*<br>*Known - Known Carcinogen*<br>*Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen* |
| *ACGIH: (American Conference of Governmental Industrial Hygienists)* | *A1 - Known Human Carcinogen*<br>*A2 - Suspected Human Carcinogen*<br>*A3 - Animal Carcinogen*<br>*ACGIH: (American Conference of Governmental Industrial Hygienists)* |

**Mutagenic Effects** Possible risk of irreversible effects

**Reproductive Effects** Possible risk of impaired fertility. May cause harm to the unborn child.

**Developmental Effects** No information available.

**Teratogenicity** No information available.

**STOT - single exposure** Respiratory system
**STOT - repeated exposure** Kidney Blood

**Aspiration hazard** No information available

**Symptoms / effects,both acute and delayed** Kidney disorders: May cause harm to the unborn child: Blood disorders

**Endocrine Disruptor Information** No information available

**Other Adverse Effects** The toxicological properties have not been fully investigated.

## 12. Ecological information



**Ecotoxicity**

The product contains following substances which are hazardous for the environment. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

| Component | Freshwater Algae | Freshwater Fish | Microtox | Water Flea |
|---|---|---|---|---|
| Cadmium | Not listed | LC50: 0.0004 - 0.003 mg/L, 96h (Pimephales promelas)<br>LC50: = 0.016 mg/L, 96h (Oryzias latipes)<br>LC50: = 21.1 mg/L, 96h flow-through (Lepomis macrochirus)<br>LC50: = 0.24 mg/L, 96h static (Cyprinus carpio)<br>LC50: = 4.26 mg/L, 96h semi-static (Cyprinus carpio)<br>LC50: = 0.002 mg/L, 96h | Not listed | EC50: = 0.0244 mg/L, 48h Static (Daphnia magna) |

| | | | | |
|---|---|---|---|---|
| | | (Cyprinus carpio) LC50: = 0.006 mg/L, 96h static (Oncorhynchus mykiss) LC50: = 0.003 mg/L, 96h flow-through (Oncorhynchus mykiss) | | |

**Persistence and Degradability** No information available

**Bioaccumulation/ Accumulation** No information available.

**Mobility** No information available.

## 13. Disposal considerations

**Waste Disposal Methods** Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

## 14. Transport information

**DOT**

| | |
|---|---|
| **UN-No** | UN2930 |
| **Proper Shipping Name** | Toxic solid, flammable, organic, n.o.s. |
| **Technical Name** | Cadmium |
| **Hazard Class** | 6.1 |
| **Subsidiary Hazard Class** | 4.1 |
| **Packing Group** | I |

**TDG**

| | |
|---|---|
| **UN-No** | UN2930 |
| **Proper Shipping Name** | Toxic solid, flammable, organic, n.o.s. |
| **Hazard Class** | 6.1 |
| **Subsidiary Hazard Class** | 4.1 |
| **Packing Group** | I |

**IATA**

| | |
|---|---|
| **UN-No** | UN2930 |
| **Proper Shipping Name** | Toxic solid, flammable, organic, n.o.s. |
| **Hazard Class** | 6.1 |
| **Subsidiary Hazard Class** | 4.1 |
| **Packing Group** | I |

**IMDG/IMO**

| | |
|---|---|
| **UN-No** | UN2930 |
| **Proper Shipping Name** | Toxic solid, flammable, organic, n.o.s. |
| **Hazard Class** | 6.1 |
| **Subsidiary Hazard Class** | 4.1 |
| **Packing Group** | I |

## 15. Regulatory information

**United States of America Inventory**

| Component | CAS No | TSCA | TSCA Inventory notification - Active-Inactive | TSCA - EPA Regulatory Flags |
|---|---|---|---|---|
| Cadmium | 7440-43-9 | X | ACTIVE | - |

**Legend:**
**TSCA** US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

**TSCA 12(b) -** Notices of Export Not applicable

**International Inventories**

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

| Component | CAS No | DSL | NDSL | EINECS | PICCS | ENCS | ISHL | AICS | IECSC | KECL |
|---|---|---|---|---|---|---|---|---|---|---|
| Cadmium | 7440-43-9 | X | - | 231-152-8 | X | X | | X | X | KE-04397 |

**KECL** - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

**U.S. Federal Regulations**

**SARA 313**

| Component | CAS No | Weight % | SARA 313 - Threshold Values % |
|---|---|---|---|
| Cadmium | 7440-43-9 | 100 | 0.1 |

**SARA 311/312 Hazard Categories** See section 2 for more information

**CWA (Clean Water Act)**

| Component | CWA - Hazardous Substances | CWA - Reportable Quantities | CWA - Toxic Pollutants | CWA - Priority Pollutants |
|---|---|---|---|---|
| Cadmium | - | - | X | X |

**Clean Air Act**

**OSHA** - Occupational Safety and Health Administration: Not applicable

| Component | Specifically Regulated Chemicals | Highly Hazardous Chemicals |
|---|---|---|
| Cadmium | 5 µg/m³ TWA<br>2.5 µg/m³ Action Level | - |

**CERCLA** This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

| Component | Hazardous Substances RQs | CERCLA EHS RQs |
|---|---|---|
| Cadmium | 10 lb | - |

**California Proposition 65** This product contains the following Proposition 65 chemicals.

| Component | CAS No | California Prop. 65 | Prop 65 NSRL | Category |
|---|---|---|---|---|
| Cadmium | 7440-43-9 | Carcinogen<br>Developmental<br>Male Reproductive | 0.05 µg/day | Developmental<br>Carcinogen |

**U.S. State Right-to-Know Regulations**

| Component | Massachusetts | New Jersey | Pennsylvania | Illinois | Rhode Island |
|---|---|---|---|---|---|
| Cadmium | X | X | X | X | X |

**U.S. Department of Transportation**

Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

**U.S. Department of Homeland Security** This product does not contain any DHS chemicals.

**Other International Regulations**

**Mexico - Grade** No information available

**Authorisation/Restrictions according to EU REACH**

| Component | REACH (1907/2006) - Annex XIV - Substances Subject to Authorization | REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances | REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC) |
|---|---|---|---|
| Cadmium | - | Use restricted. See item 72. (see link for restriction details) Use restricted. See item 23. (see link for restriction details) Use restricted. See item 28. (see link for restriction details) Use restricted. See item 75. (see link for restriction details) | SVHC Candidate list - 231-152-8 - Carcinogenic, Article 57a;Specific target organ toxicity after repeated exposure, Article 57(f) - human health |

After the sunset date the use of this substance requires either an authorization or can only be used for exempted uses, e.g. use in scientific research and development which includes routine analytics or use as intermediate.

*https://echa.europa.eu/authorisation-list*
*https://echa.europa.eu/substances-restricted-under-reach*
*https://echa.europa.eu/candidate-list-table*

**Safety, health and environmental regulations/legislation specific for the substance or mixture**

| Component | CAS No | OECD HPV | Persistent Organic Pollutant | Ozone Depletion Potential | Restriction of Hazardous Substances (RoHS) |
|---|---|---|---|---|---|
| Cadmium | 7440-43-9 | Listed | Not applicable | Not applicable | 0.01% (Max. Conc.) |

| Component | CAS No | Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification | Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements | Rotterdam Convention (PIC) | Basel Convention (Hazardous Waste) |
|---|---|---|---|---|---|
| Cadmium | 7440-43-9 | Not applicable | Not applicable | Not applicable | Annex I - Y26 |

## 16. Other information

**Prepared By** Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

**Revision Date** 24-Dec-2021
**Print Date** 24-Dec-2021
**Revision Summary** This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

**Disclaimer**
**The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text**

**End of SDS**

# Chemical Safety Data Sheet MSDS / SDS

## Chromium

Revision Date:2023-10-21 Revision Number:1

## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### Product identifier

| | |
|---|---|
| Product name | : Chromium |
| CBnumber | : CB7854190 |
| CAS | : 7440-47-3 |
| EINECS Number | : 231-157-5 |
| Synonyms | : Chromium ,chrome |

### Relevant identified uses of the substance or mixture and uses advised against

| | |
|---|---|
| Relevant identified uses | : For R&D use only. Not for medicinal, household or other use. |
| Uses advised against | : none |

### Company Identification

| | |
|---|---|
| Company | : Chemicalbook |
| Address | : Building 1, Huihuang International, Shangdi 10th Street, Haidian District, Beijing |
| Telephone | : 400-158-6606 |

## SECTION 2: Hazards identification

### GHS Label elements, including precautionary statements

Symbol(GHS)



Signal word Warning

**Precautionary statements**

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and understood.

P210 Keep away from heat/sparks/open flames/hot surfaces. — No smoking.

P240 Ground/bond container and receiving equipment.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P308+P313 IF exposed or concerned: Get medical advice/attention.

P405 Store locked up.

**Hazard statements**

H228 Flammable solid

H351 Suspected of causing cancer

H410 Very toxic to aquatic life with long lasting effects

**Disposal**

WARNING.Cancer - https://oehha.ca.gov/proposition-65/chemicals/chromium-hexavalent-compounds

## SECTION 3: Composition/information on ingredients

### Substance

| | |
|---|---|
| Product name | : Chromium |
| Synonyms | : Chromium ,chrome |
| CAS | : 7440-47-3 |
| EC number | : 231-157-5 |
| MF | : Cr |
| MW | : 52 |

## SECTION 4: First aid measures

### Description of first aid measures

**If inhaled**

If breathed in, move person into fresh air. If not breathing, give artificial respiration.

**In case of skin contact**

Wash off with soap and plenty of water.

**In case of eye contact**

Flush eyes with water as a precaution.

**If swallowed**

Never give anything by mouth to an unconscious person. Rinse mouth with water.

### Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

### Indication of any immediate medical attention and special treatment needed

No data available

## SECTION 5: Firefighting measures

### Extinguishing media

**Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

### Special hazards arising from the substance or mixture

Chromium oxides

### Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

### Further information

No data available

## SECTION 6: Accidental release measures

### Personal precautions, protective equipment and emergency procedures

Avoid dust formation. Avoid breathing vapors, mist or gas. For personal protection see section 8.

### Environmental precautions

No special environmental precautions required.

### Methods and materials for containment and cleaning up

Sweep up and shovel. Keep in suitable, closed containers for disposal.

### Reference to other sections

For disposal see section 13.

---

## SECTION 7: Handling and storage

### Precautions for safe handling

### Advice on protection against fire and explosion

Provide appropriate exhaust ventilation at places where dust is formed.

### Hygiene measures

General industrial hygiene practice. For precautions see section 2.2.

### Conditions for safe storage, including any incompatibilities

### Storage conditions

Keep container tightly closed in a dry and well-ventilated place. Store in cool place.

### Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

---

## SECTION 8: Exposure controls/personal protection

### control parameter

**Hazard composition and occupational exposure limits**
Does not contain substances with occupational exposure limits.

### Exposure controls

**Personal protective equipment**
**Eye/face protection**
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).
**Skin protection**
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.
The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard EN 374 derived from it.
Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm Break through time: 480 min
Material tested:Dermatril? (KCL 740 / Aldrich Z677272, Size M)
Splash contact Material: Nitrile rubber
Minimum layer thickness: 0,11 mm Break through time: 480 min
Material tested:Dermatril? (KCL 740 / Aldrich Z677272, Size M)
data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.
**Body Protection**

Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**Respiratory protection**

Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Control of environmental exposure**

No special environmental precautions required.

**Exposure limits**

TLV-TWA: chromium metal 0.5 mg/m$^3$ (ACGIH and MSHA), 1 mg/m$^3$ (OSHA); Cr(II) and Cr(III) compounds 0.5 mg/m$^3$ (ACGIH); Cr(VI) compounds, water soluble and certain water insoluble, 0.05 mg/m$^3$ (ACGIH).

## SECTION 9: Physical and chemical properties

### Information on basic physicochemical properties

| | |
|---|---|
| Appearance | Form: chips Color: light gray |
| Odour | odorless |
| Odour Threshold | No data available |
| pH | <1 ($H_2O$, 20°C) |
| Melting point/freezing point | Melting point/range: 1.857 °C - lit. |
| Initial boiling point and boiling range | 2,672 °C - lit. |
| Flash point | Not applicable |
| Evaporation rate | No data available |
| Flammability (solid, gas) | No data available |
| Upper/lower flammability or explosive limits | No data available |
| Vapour pressure | No data available |
| Vapour density | No data available |
| Relative density | 7.2 |
| Water solubility | No data available |
| Partition coefficient: n-octanol/water | No data available |
| Autoignition temperature | No data available |
| Decomposition temperature | No data available |
| Viscosity | Viscosity, kinematic: No data available Viscosity, dynamic: No data available |
| Explosive properties | No data available |
| Oxidizing properties | No data available |
| resistivity | 12.7 µΩ-cm, 20°C |

### Other safety information

No data available

## SECTION 10: Stability and reactivity

### Reactivity

No data available

### Chemical stability

Stable under recommended storage conditions.

### Possibility of hazardous reactions

No data available

### Conditions to avoid

No data available

### Incompatible materials

Strong acids, Strong oxidizing agents

### Hazardous decomposition products

In the event of fire: see section 5

---

## SECTION 11: Toxicological information

### Information on toxicological effects

**Acute toxicity**
No data available
**Skin corrosion/irritation**
No data available
**Serious eye damage/eye irritation**
No data available
**Respiratory or skin sensitization**
No data available
**Germ cell mutagenicity**
No data available
**Carcinogenicity**
No data available
**Reproductive toxicity**
No data available
**Specific target organ toxicity - single exposure**
No data available
**Specific target organ toxicity - repeated exposure**
No data available
**Aspiration hazard**
No data available
**Toxicity**
Elemental chromium and certain chromium compounds have been designated as carcinogens, hazardous substances, hazardous waste constituents, and priority toxic pollutants. Some of those compounds designated as hazardous are chromic acetate, chromic acid, chromic sulfate, and chromous chloride. Although chromium in the 6+ state is regarded as being the most carcinogenic, there are 6+ compounds that appear to be non-carcinogenic. In addition to their possible carcinogenicity, chromium compounds may have local allergic effects leading to dermatitis. Systemically, 6+ chromium compounds are irritants to the respiratory system and may give rise to pulmonary edema.

---

## SECTION 12: Ecological information

### Toxicity

**Toxicity to fish**
LC50 - Cyprinus carpio (Carp) - 14,3 mg/l - 96 h
**Toxicity to daphnia and other aquatic invertebrates**
EC50 - Daphnia magna (Water flea) - 0,07 mg/l - 48 h

### Persistence and degradability

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

### Bioaccumulative potential

Bioaccumulation Oncorhynchus mykiss (rainbow trout) - 30 d
- 50 µg/l(chromium)

Bioconcentration factor (BCF): 1,03 - 1,22

### Mobility in soil

No data available

### Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

### Other adverse effects

No data available

---

## SECTION 13: Disposal considerations

### Waste treatment methods

### Product

Offer surplus and non-recyclable solutions to a licensed disposal company.
**Incompatibilities**
Dust may be pyrophoric in air. Chromium metal (especially in finely divided or powder form) and insoluble salts reacts violently with strong oxidants, such as hydrogen peroxide, causing fire and explosion hazard. Reacts with diluted hydrochloric and sulfuric acids. Incompatible with alkalis and alkali carbonates
**Waste Disposal**
Recovery and recycling is a viable alternative to disposal for chromium in plating wastes; tannery wastes; cooling tower blowdown water and chemical plant wastes.

### Contaminated packaging

Dispose of as unused product.

---

## SECTION 14: Transport information

### UN number

ADR/RID: 3077 IMDG: 3077 IATA: 3077

### UN proper shipping name

ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. () IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. () IATA: Environmentally hazardous substance, solid, n.o.s. ()

### Transport hazard class(es)

ADR/RID: 9 IMDG: 9 IATA: 9

### Packaging group

ADR/RID: III IMDG: III IATA: III

### Environmental hazards

ADR/RID: yes IMDG Marine pollutant: yes IATA: yes

### Special precautions for user

### Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

## SECTION 15: Regulatory information

### Safety, health and environmental regulations/legislation specific for the substance or mixture

**Regulations on the Safety Management of Hazardous Chemicals**

China Catalog of Hazardous chemicals 2015:Not Listed. website: https://www.mem.gov.cn/

**Measures for Environmental Management of New Chemical Substances**

Chinese Chemical Inventory of Existing Chemical Substances (China IECSC):Listed. website: https://www.mee.gov.cn/

EC Inventory:Listed.

European Inventory of Existing Commercial Chemical Substances (EINECS):Listed. website: https://echa.europa.eu/

Korea Existing Chemicals List (KECL):Listed. website: http://ncis.nier.go.kr

New Zealand Inventory of Chemicals (NZIoC):Listed. website: https://www.epa.govt.nz/

Philippines Inventory of Chemicals and Chemical Substances (PICCS):Listed. website: https://emb.gov.ph/

United States Toxic Substances Control Act (TSCA) Inventory:Listed. website: https://www.epa.gov/

Vietnam National Chemical Inventory:Listed. website: https://chemicaldata.gov.vn/

## SECTION 16: Other information

### Abbreviations and acronyms

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

CAS: Chemical Abstracts Service

EC50: Effective Concentration 50%

IATA: International Air Transportation Association

IMDG: International Maritime Dangerous Goods

LC50: Lethal Concentration 50%

LD50: Lethal Dose 50%

RID: Regulation concerning the International Carriage of Dangerous Goods by Rail

STEL: Short term exposure limit

TWA: Time Weighted Average

### References

【1】CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple

【2】ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp

【3】ECHA - European Chemicals Agency, website: https://echa.europa.eu/

【4】eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en

【5】ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg

【6】Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp

【7】HSDB - Hazardous Substances Data Bank, website: https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm

【8】IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/

【9】IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home

【10】Sigma-Aldrich, website: https://www.sigmaaldrich.com/

### Other Information

The surface of the chromium particles is oxidized to chromium(III)oxide in air.See ICSC 1531.

***Disclaimer:***

*The information in this MSDS is only applicable to the specified product, unless otherwise specified, it is not applicable to the mixture of this product and other substances. This MSDS only provides information on the safety of the product for those who have received the appropriate professional training for the user of the product. Users of this MSDS must make independent judgments on the applicability of this SDS. The authors of this MSDS will not be held responsible for any harm caused by the use of this MSDS.*

## Recommended Products

CHROMIUM (IC) OXALATE SDS Mordant Black 17 SDS Chromic chloride hexahydrate SDS Pyridinium chlorochromate SDS Chromium(VI) oxide SDS Potassium dichromate SDS Potassium chromate SDS Chromium SDS Chromium(III) oxide SDS Ammonium dichromate SDS

# Chemical Safety Data Sheet MSDS / SDS

# Lead

Revision Date:2023-04-30 Revision Number:1

## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### Product identifier

| | |
|---|---|
| Product name | : Lead |
| CBnumber | : CB9854174 |
| CAS | : 7439-92-1 |
| EINECS Number | : 231-100-4 |
| Synonyms | : Pb,Lead |

### Relevant identified uses of the substance or mixture and uses advised against

| | |
|---|---|
| Relevant identified uses | : For R&D use only. Not for medicinal, household or other use. |
| Uses advised against | : none |

### Company Identification

| | |
|---|---|
| Company | : Chemicalbook |
| Address | : Building 1, Huihuang International, Shangdi 10th Street, Haidian District, Beijing |
| Telephone | : 400-158-6606 |

## SECTION 2: Hazards identification

### GHS Label elements, including precautionary statements

Symbol(GHS)



Signal word Danger

**Precautionary statements**

P405 Store locked up.
P391 Collect spillage. Hazardous to the aquatic environment
P322 Specific measures (see …on this label).
P308+P313 IF exposed or concerned: Get medical advice/attention.
P304+P340 IF INHALED: Remove victim to fresh air and Keep at rest in a position comfortable for breathing.
P302+P352 IF ON SKIN: wash with plenty of soap and water.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P273 Avoid release to the environment.
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P201 Obtain special instructions before use.

**Hazard statements**

H410 Very toxic to aquatic life with long lasting effects
H400 Very toxic to aquatic life
H373 May cause damage to organs through prolonged or repeated exposure
H360 May damage fertility or the unborn child
H351 Suspected of causing cancer

H350 May cause cancer
H332 Harmful if inhaled
H311 Toxic in contact with skin
H302 Harmful if swallowed
H301 Toxic if swalloed

## SECTION 3: Composition/information on ingredients

### Substance

| | |
|---|---|
| Product name | : Lead |
| Synonyms | : Pb,Lead |
| CAS | : 7439-92-1 |
| EC number | : 231-100-4 |
| MF | : Pb |
| MW | : 207.2 |

## SECTION 4: First aid measures

### Description of first aid measures

**General advice**
Show this material safety data sheet to the doctor in attendance.
**If inhaled**
After inhalation: fresh air. Call in physician.
**In case of skin contact**
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.
**In case of eye contact**
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.
**If swallowed**
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

### Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

### Indication of any immediate medical attention and special treatment needed

No data available

## SECTION 5: Firefighting measures

### Extinguishing media

**Suitable extinguishing media**
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
**Unsuitable extinguishing media**
For this substance/mixture no limitations of extinguishing agents are given.

### Special hazards arising from the substance or mixture

Nature of decomposition products not known. Not combustible.
Ambient fire may liberate hazardous vapours.

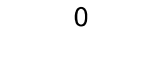
### Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

### Further information

Suppress (knock down) gases/vapors/mists with a water spray jet.

### NFPA 704




| | | |
|---|---|---|
| ◇ HEALTH | 2 | Intense or continued but not chronic exposure could cause temporary incapacitation or possible residual injury (e.g. diethyl ether, ammonium phosphate, iodine) |
| ◇ FIRE | 0 | Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand. Materials that will not burn in air when exposed to a temperature of 820 °C (1,500 °F) for a period of 5 minutes.(e.g. Carbon tetrachloride) |
| ◇ REACT | 0 | Normally stable, even under fire exposure conditions, and is not reactive with water (e.g. helium,N2) |
| ◇ SPEC. HAZ. | | |

## SECTION 6: Accidental release measures

### Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation.
Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

### Environmental precautions

No special precautionary measures necessary.

### Methods and materials for containment and cleaning up

Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

### Reference to other sections

For disposal see section 13.

## SECTION 7: Handling and storage

### Precautions for safe handling

### Advice on safe handling

Work under hood. Do not inhale substance/mixture.

### Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

### Conditions for safe storage, including any incompatibilities

### Storage conditions

Tightly closed. Dry. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

### Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

## SECTION 8: Exposure controls/personal protection

### control parameter

**Hazard composition and occupational exposure limits**

Does not contain substances with occupational exposure limits.

### Exposure controls

**Personal protective equipment**

**Eye/face protection**

Use equipment for eye protection tested and approved under appropriate
government standards such as NIOSH (US) or EN 166(EU). Safety glasses

**Skin protection**

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0,11 mm Break through time: 480 min

Material tested:KCL 741 Dermatril? L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Splash contact Material: Nitrile rubber

Minimum layer thickness: 0,11 mm Break through time: 480 min

Material tested:KCL 741 Dermatril? L

**Body Protection**

protective clothing

**Respiratory protection**

required when dusts are generated.

Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Recommended Filter type: Filter type P3

The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer.

These measures have to be properly documented.

**Control of environmental exposure**

No special precautionary measures necessary.

**Exposure limits**

TLV-TWA 0.15 mg/$m^3$ as Pb (ACGIH and MSHA), 0.05 mg (Pb)/$m^3$ (OSHA); 10-h TWA 0.1 mg(inorganic lead)/$m^3$ (NIOSH).

## SECTION 9: Physical and chemical properties

### Information on basic physicochemical properties

| | |
|---|---|
| Appearance | Form: powder |
| Odour | No data available |
| Odour Threshold | No data available |
| pH | No data available |
| Melting point/freezing point | Melting point: 326 °C at ca.1.013 hPa - OECD Test Guideline 102 |
| Initial boiling point and boiling range | 1.740 °C |

| | |
|---|---|
| Flash point | Not applicable |
| Evaporation rate | No data available |
| Flammability (solid, gas) | No data available |
| Upper/lower flammability or explosive limits | No data available |
| Vapour pressure | No data available |
| Vapour density | No data available |
| Relative density | 11,45 g/cm3 at 23,8 °C at 1.013 hPa - OECD Test Guideline 109 11,45 at 23,8 °C - OECD Test Guideline 109 |
| Water solubility | 0,185 g/l at 20 °C at 1.013 hPa - OECD Test Guideline 105- partly soluble |
| Partition coefficient: n-octanol/water | Not applicable for inorganic substances |
| Autoignition temperature | No data available |
| Decomposition temperature | No data available |
| Viscosity | Viscosity, kinematic: No data available Viscosity, dynamic: No data available |
| Explosive properties | No data available |
| Oxidizing properties | No data available |
| resistivity | 20.65 µΩ-cm |

### Other safety information

No data available

## SECTION 10: Stability and reactivity

### Reactivity

No data available

### Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

### Possibility of hazardous reactions

Risk of explosion with:
azides picrates
ammonium nitrate Strong oxidizing agents Exothermic reaction with:
Fluorine
hydrogen peroxide
Generates dangerous gases or fumes in contact with: Nitric acid

### Conditions to avoid

no information available

### Incompatible materials

No data available

### Hazardous decomposition products

In the event of fire: see section 5

## SECTION 11: Toxicological information

### Information on toxicological effects

**Acute toxicity**

LD50 Oral - Rat - male and female - > 2.000 mg/kg (OECD Test Guideline 423)
LC50 Inhalation - Rat - male and female - 4 h - > 5,05 mg/l (OECD Test Guideline 403)
LD50 Dermal - Rat - male and female - > 2.000 mg/kg (OECD Test Guideline 402)

**Skin corrosion/irritation**
Skin - Rabbit
Result: No skin irritation - 4 h (OECD Test Guideline 404)
**Serious eye damage/eye irritation**
Eyes - Rabbit
Result: No eye irritation - 72 h (OECD Test Guideline 405)
**Respiratory or skin sensitization**
(OECD Test Guideline 406)
**Germ cell mutagenicity**
Test Type: Micronucleus test Species: Rat
Cell type: Red blood cells (erythrocytes) Application Route: Oral
Result: positive Remarks: (ECHA)
Test Type: comet assay Species: Mouse
Cell type: Liver cells Application Route: Inhalation
Result: negative Remarks: (ECHA)
Test Type: Micronucleus test Species: Mouse
Cell type: Bone marrow Application Route: Oral
Result: Positive results were obtained in some in vivo tests. Remarks: (ECHA)
Test Type: Chromosome aberration test in vitro Species: Monkey
Cell type: lymphocyte Application Route: Oral
Result: Positive results were obtained in some in vivo tests. Remarks: (ECHA)
**Carcinogenicity**
No data available
**Reproductive toxicity**
May damage the unborn child. Positive evidence from human epidemiological studies. May damage fertility. Positive evidence from human epidemiological studies. Studies indicating a hazard to babies during the lactation period
**Specific target organ toxicity - single exposure**
No data available
**Specific target organ toxicity - repeated exposure**
Oral - Causes damage to organs through prolonged or repeated exposure. - Central nervous system, Blood, Immune system, Kidney
**Aspiration hazard**
No data available
**Toxicity**
LDLO oral (pigeon)
160 mg/kg
PEL (OSHA)
0.05 mg/m3
PEL (action level)
0.03 mg/m3
TLV-TWA (ACGIH)
0.05 mg/m3
(PEL and TLV apply to lead and inorganic lead compounds)

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## SECTION 12: Ecological information

### Toxicity

**Toxicity to fish**
static test LC50 - Oncorhynchus mykiss (rainbow trout) - 0,1 mg/l - 96 h
Remarks: (ECHA)

**Toxicity to algae**
mortality EC50 - Skeletonema costatum - 7,94 mg/l - 10 d Remarks: (ECOTOX Database)
(Lead)

### Persistence and degradability

Biodegradability Result: - According to the results of tests of biodegradability this product is not readily biodegradable.

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

### Bioaccumulative potential

Bioaccumulation Oncorhynchus kisutch - 2 Weeks
- 150 µg/l(Lead)

Bioconcentration factor (BCF): 12

### Mobility in soil

No data available

### Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

### Other adverse effects

Discharge into the environment must be avoided.

---

## SECTION 13: Disposal considerations

### Waste treatment methods

### Product

See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.
**Incompatibilities**
Violent reactions of lead with sodium azide, zirconium, sodium acetylide, and chlorine trifluoride have been reported. Reactivity of lead compounds varies depending on structure.
**Waste Disposal**
Excess lead and waste material containing this substance should be placed in an appropriate container, clearly labeled, and handled according to your institution's waste disposal guidelines. For more information on disposal procedures, see Chapter 7 of this volume.

---

## SECTION 14: Transport information

### UN number

ADR/RID: 2291 IMDG: 2291 IATA: 2291

### UN proper shipping name

ADR/RID: LEAD COMPOUND, SOLUBLE, N.O.S. (Lead) IMDG: LEAD COMPOUND, SOLUBLE, N.O.S. (Lead)
IATA: Lead compound, soluble, n.o.s. (Lead)

### Transport hazard class(es)

ADR/RID: 6.1 IMDG: 6.1 IATA: 6.1

### Packaging group

ADR/RID: III IMDG: III IATA: III

### Environmental hazards

ADR/RID: yes IMDG Marine pollutant: yes IATA: no

### Special precautions for user

No data available

## SECTION 15: Regulatory information

### Safety, health and environmental regulations/legislation specific for the substance or mixture

**Regulations on the Safety Management of Hazardous Chemicals**

China Catalog of Hazardous chemicals 2015:Not Listed. website: https://www.mem.gov.cn/

**Measures for Environmental Management of New Chemical Substances**

Chinese Chemical Inventory of Existing Chemical Substances (China IECSC):Listed. website: https://www.mee.gov.cn/

EC Inventory:Listed.

European Inventory of Existing Commercial Chemical Substances (EINECS):Listed. website: https://echa.europa.eu/

Korea Existing Chemicals List (KECL):Listed. website: http://ncis.nier.go.kr

New Zealand Inventory of Chemicals (NZIoC):Listed. website: https://www.epa.govt.nz/

Philippines Inventory of Chemicals and Chemical Substances (PICCS):Listed. website: https://emb.gov.ph/

United States Toxic Substances Control Act (TSCA) Inventory:Listed. website: https://www.epa.gov/

Vietnam National Chemical Inventory:Listed. website: https://chemicaldata.gov.vn/

## SECTION 16: Other information

### Abbreviations and acronyms

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

CAS: Chemical Abstracts Service

EC50: Effective Concentration 50%

IATA: International Air Transportation Association

IMDG: International Maritime Dangerous Goods

LC50: Lethal Concentration 50%

LD50: Lethal Dose 50%

RID: Regulation concerning the International Carriage of Dangerous Goods by Rail

STEL: Short term exposure limit

TWA: Time Weighted Average

### References

【1】CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple

【2】ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp

【3】ECHA - European Chemicals Agency, website: https://echa.europa.eu/

【4】eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en

【5】ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg

【6】Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp

【7】HSDB - Hazardous Substances Data Bank, website: https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm

【8】IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/

【9】IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home

【10】Sigma-Aldrich, website: https://www.sigmaaldrich.com/

### Other Information

Depending on the degree of exposure, periodic medical examination is suggested.Do NOT take working clothes home.

***Disclaimer:***

*The information in this MSDS is only applicable to the specified product, unless otherwise specified, it is not applicable to the mixture of this product and other substances. This MSDS only provides information on the safety of the product for those who have received the appropriate professional training for the user of the product. Users of this MSDS must make independent judgments on the applicability of this SDS. The authors of this MSDS will not be held responsible for any harm caused by the use of this MSDS.*

## Recommended Products

LEAD(II) THIOCYANATE SDS Lead(II) chloride SDS LEAD(II) BROMIDE SDS Lead(II) iodide SDS Lead monoxide SDS Lead(II) nitrate SDS BIS(2,2,6,6-TETRAMETHYL-3,5-HEPTANEDIONATO)LEAD(II) SDS LEAD(II) TETRAKIS(4-CUMYLPHENOXY)- SDS Chromium(III) oxide SDS Lead dioxide SDS

# Chemical Safety Data Sheet MSDS / SDS

## Polychlorinated Biphenyls (PCBs)

Revision Date:2023-05-06 Revision Number:1

## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### Product identifier

| | |
|---|---|
| Product name | : Polychlorinated Biphenyls (PCBs) |
| CBnumber | : CB7160460 |
| CAS | : 1336-36-3 |
| EINECS Number | : 215-648-1 |
| Synonyms | : Polychlorinated biphenyls,Pyranol |

### Relevant identified uses of the substance or mixture and uses advised against

| | |
|---|---|
| Relevant identified uses | : For R&D use only. Not for medicinal, household or other use. |
| Uses advised against | : none |

### Company Identification

| | |
|---|---|
| Company | : Chemicalbook |
| Address | : Building 1, Huihuang International, Shangdi 10th Street, Haidian District, Beijing |
| Telephone | : 400-158-6606 |

## SECTION 2: Hazards identification

### Classification of the substance or mixture

Specific target organ toxicity – repeated exposure, Category 2
Hazardous to the aquatic environment, short-term (Acute) - Category Acute 1
Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 1

### Label elements

**Pictogram(s)**



Signal word Warning

**Hazard statement(s)**

H373 May cause damage to organs through prolonged or repeated exposure
H410 Very toxic to aquatic life with long lasting effects

**Precautionary statement(s)**

**Prevention**

P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P273 Avoid release to the environment.

**Response**

P319 Get medical help if you feel unwell.
P391 Collect spillage.

**Storage**
none
**Disposal**
P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

### Other hazards

no data available

---

## SECTION 3: Composition/information on ingredients

### Substance

| | |
|---|---|
| Product name | : Polychlorinated Biphenyls (PCBs) |
| Synonyms | : Polychlorinated biphenyls,Pyranol |
| CAS | : 1336-36-3 |
| EC number | : 215-648-1 |
| MF | : N/A |
| MW | : 0 |

---

## SECTION 4: First aid measures

### Description of first aid measures

**If inhaled**
Move the victim into fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration and consult a doctor immediately. Do not use mouth to mouth resuscitation if the victim ingested or inhaled the chemical.
**Following skin contact**
Take off contaminated clothing immediately. Wash off with soap and plenty of water. Consult a doctor.
**Following eye contact**
Rinse with pure water for at least 15 minutes. Consult a doctor.
**Following ingestion**
Rinse mouth with water. Do not induce vomiting. Never give anything by mouth to an unconscious person. Call a doctor or Poison Control Center immediately.

### Most important symptoms and effects, both acute and delayed

no data available

### Indication of any immediate medical attention and special treatment needed

If PCB-containing substances have been ingested recently, gastric decontamination may be reasonable. Activated charcoal has not been proven beneficial, but is not contraindicated.

---

## SECTION 5: Firefighting measures

### Extinguishing media

Use dry chemical, carbon dioxide, or alcohol foam extinguishers. Vapors are heavier than air and will collect in low areas. Vapors in confined areas may explode when exposed to fire. Containers may explode in fire. Storage containers and parts of containers may rocket great distances, in many directions. If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated waters. Notify local health and fire officials and pollution control agencies. From a secure, explosion-proof location, use water spray to cool exposed containers. If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors, or shows any signs of deforming), withdraw immediately to a secure position ... The only respirators recommended for fire fighting are self-contained breathing apparatuses that have full facepieces and are operated in a pressure-demand or other positive pressure mode.

### Specific Hazards Arising from the Chemical

no data available

### Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

### NFPA 704




| | | |
|---|---|---|
| ◇ HEALTH | 2 | Intense or continued but not chronic exposure could cause temporary incapacitation or possible residual injury (e.g. diethyl ether, ammonium phosphate, iodine) |
| ◇ FIRE | 1 | Materials that require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur. Includes some finely divided suspended solids that do not require heating before ignition can occur. Flash point at or above 93.3 °C (200 °F). (e.g. mineral oil, ammonia) |
| ◇ REACT | 0 | Normally stable, even under fire exposure conditions, and is not reactive with water (e.g. helium,N2) |
| ◇ SPEC. HAZ. | | |

## SECTION 6: Accidental release measures

### Personal precautions, protective equipment and emergency procedures

Avoid dust formation. Avoid breathing mist, gas or vapours.Avoid contacting with skin and eye. Use personal protective equipment.Wear chemical impermeable gloves. Ensure adequate ventilation.Remove all sources of ignition. Evacuate personnel to safe areas.Keep people away from and upwind of spill/leak.

### Environmental precautions

Prevent further spillage or leakage if it is safe to do so. Do not let the chemical enter drains. Discharge into the environment must be avoided.

### Methods and materials for containment and cleaning up

Dry sand or earth should be spread on the leak, or spill area. ...

## SECTION 7: Handling and storage

### Precautions for safe handling

Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

### Conditions for safe storage, including any incompatibilities

PCB material should be stored in closed containers, in ventilated areas ... PCB's should be handled in isolated areas of the plant, where efficient ventilation systems remove airborne PCB's. ...

## SECTION 8: Exposure controls/personal protection

### Control parameters

**Occupational Exposure limit values**

| **Component** | 1,1'-Biphenyl, chloro derivs. | | | |
|---|---|---|---|---|
| **CAS No.** | 1336-36-3 | | | |
| | **Limit value - Eight hours** | | **Limit value - Short term** | |
| | **ppm** | **mg/m$^3$** | **ppm** | **mg/m$^3$** |

| | | | | |
|---|---|---|---|---|
| **Component** | 1,1'-Biphenyl, chloro derivs. | | | |
| **CAS No.** | 1336-36-3 | | | |
| **Canada - Ontario** | ? | 0,05 (1) | ? | ? |
| **Denmark** | ? | 0,01 | ? | 0,02 |
| **Finland** | ? | 0,003 (1) | ? | ? |
| **Germany (DFG)** | ? | 0,003 (1)(2)(3)(5) | ? | 0,024 (1)(2)(3)(4)(5) |
| **Hungary** | ? | POP | ? | ? |
| **Ireland** | ? | 0,1 | ? | ? |
| **Japan** | ? | 0,01 | ? | ? |
| **Japan - JSOH** | ? | 0,01 | ? | ? |
| **Latvia** | ? | 1 | ? | ? |
| **New Zealand** | ? | 0,1 | ? | ? |
| **Poland** | ? | 1 | ? | ? |
| **Sweden** | ? | 0,01 | ? | 0,03 (1) |
| **Switzerland** | 0,05 | 0,5 | 0,4 | 4 |
| **United Kingdom** | ? | 0,1 | ? | ? |
| | **Remarks** | | | |
| **Canada - Ontario** | (1) as sum of components assayed by chromatographic procedure with reference of the bulk sample | | | |
| **Finland** | (1) Total PCB = 5*([PCB 28] + [PCB 52] + [PCB 101 ] + [PCB 138] + [PCB 153] + [PCB 180]) | | | |
| **Germany (AGS)** | (1) 42% Chlorine (CAS-No. 53469-21-9) (2) 54% Chlorine (CAS-No. 11097-69-1) | | | |
| **Germany (DFG)** | (1) Only for chlorinated biphenyls with Cl | | | |
| **Hungary** | POP Persistent Organic Pollutant | | | |
| **Sweden** | (1) Short-term value, 15 minutes average value | | | |

**Biological limit values**

no data available

### Exposure controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

### Individual protection measures

**Eye/face protection**

Wear tightly fitting safety goggles with side-shields conforming to EN 166(EU) or NIOSH (US).

**Skin protection**

Wear fire/flame resistant and impervious clothing. Handle with gloves. Gloves must be inspected prior to use. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

**Respiratory protection**

If the exposure limits are exceeded, irritation or other symptoms are experienced, use a full-face respirator.

**Thermal hazards**

no data available

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## SECTION 9: Physical and chemical properties

### Information on basic physicochemical properties

| | |
|---|---|
| Physical state | no data available |
| Colour | Vary from mobile oily liquids to white crystalline solids and hard noncrystalline resins. |
| Odour | Practically odorless; mild aromatic odor |
| Melting point/freezing point | no data available |
| Boiling point or initial boiling point and boiling range | 340 ~ 375 |
| Flammability | no data available |
| Lower and upper explosion limit/flammability limit | no data available |
| Flash point | 195(O.C) |
| Auto-ignition temperature | no data available |

| | |
|---|---|
| Decomposition temperature | no data available |
| pH | no data available |
| Kinematic viscosity | no data available |
| Solubility | Solubility in water is extremely low; soluble in oils and organic solvents. |
| Partition coefficient n-octanol/water | ... literature Kow values will vary. These increase with increasing chlorination. log Kow values at 25 deg C: 3.76 (biphenyl); 5.7 (Cl4-PCB's); 6.0 (Cl5-PCB's); 7.0 (Cl6-PCB's); 8.26 (Cl10-PCB's). |
| Vapour pressure | 2.04E-07mmHg at 25°C |
| Density and/or relative density | 1.44(30°C) |
| Relative vapour density | no data available |
| Particle characteristics | no data available |

## SECTION 10: Stability and reactivity

### Reactivity

NIOSH considers chlorodiphenyl containing 54% chlorine to be a potential occupational carcinogen. Aroclor 1254
NIOSH considers chlorodiphenyl containing 54% chlorine to be a potential occupational carcinogen. Aroclor 1254

### Chemical stability

PCB's are chemically very inert and are stable to conditions of hydrolysis and oxidation in industrial use. Photochemical degradation may be one route of their breakdown in the environment. ...

### Possibility of hazardous reactions

Flame resistant.

### Conditions to avoid

no data available

### Incompatible materials

Liquid chlorine reacts exothermically with polychlorinated biphenyl heat transfer liquid. Polychlorinated biphenyl

### Hazardous decomposition products

When heated to decomposition it emits toxic fumes of Chloride.

## SECTION 11: Toxicological information

### Acute toxicity

Oral: LD50 Mouse (C57B1/6J) male oral 19 mg/kg/28 day
Inhalation: no data available
Dermal: no data available

### Skin corrosion/irritation

no data available

### Serious eye damage/irritation

no data available

### Respiratory or skin sensitization

no data available

### Germ cell mutagenicity

no data available

### Carcinogenicity

EPA: Possibly carcinogenic to humans, IARC: Probably carcinogenic to humans, NTP: Known to be a human carcinogen

### Reproductive toxicity

An epidemiological study of women occupationally exposed to high levels of PCBs suggested a relationship between PCB exposure and reduced birth weight and shortened gestational age of their babies; however, limitations of the study limit the strength of the conclusion. Two series of human studies that investigated exposure to PCBs through the consumption of contaminated fish suggest that exposure to PCBs may cause developmental effects in humans. Both studies reported an association between consumption of fish with high PCB levels by pregnant women and an increased incidence of neurodevelopmental effects, such as motor deficits at birth, impaired psychomotor index, impaired visual recognition, and deficits in short-term memory in infants. Human studies are not conclusive on the reproductive effects of PCBs. One study of men who were occupationally exposed to PCBs showed no fertility abnormalities, while another study of men with low sperm counts found elevated levels of PCBs in the blood and an association between certain PCB compounds in semen and decreased sperm motility. Animal studies have reported developmental effects, such as learning deficits, impaired immune functions, focal liver necrosis, and cellular alterations of the thyroid, in the offspring of animals exposed orally to PCBs. Reproductive effects, such as decreased fertility, decreased conception, and prolonged menstruation have also been noted in animal studies of dietary PCB exposures.

### STOT-single exposure

no data available

### STOT-repeated exposure

no data available

### Aspiration hazard

no data available

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## SECTION 12: Ecological information

### Toxicity

Toxicity to fish: no data available
Toxicity to daphnia and other aquatic invertebrates: no data available
Toxicity to algae: EC50; Species: Pseudokirchneriella subcapitata (green algae); Conditions: freshwater, static, 22 deg C; Concentration: 182 nmol/L for 48 hr; Effect: decreased population biomass />98% pure
Toxicity to microorganisms: no data available

### Persistence and degradability

AEROBIC: The microbial mineralization of three chlorophenols and a PCB mixture was studied using natural bacterial assemblages in laboratory model systems. The systems consisted of water and surface sediment from two lake types: one with a high content of humic substances and the other with a low content. Final PCB concentration in the model systems was 38 ug/L. Aerobic mineralization of the (14)C-ring-labelled compounds was determined as production of (14)CO2 in the systems over the course of 60 days. Mineralization of PCBs in the systems was low compared to the aromatics. The breakdown of PCB was 0.047 nM in the humic cultures and 0.052 nM in cultures from the clear water lake. The avg mineralization rates of PCBs over the 60 day test period for the clear-water and humic cultures were 1.1 and 1.2 pM/day. More than 90% of the PCBs adsorbed to the sediment, while <1% was found in the water phase.

### Bioaccumulative potential

Polychlorinated biphenyls (PCBs) are highly lipophilic and bioconcentrate in tissue from concentrations in water ...

### Mobility in soil

PCB mobility in aqueous soil-sediment systems has reported experimental Koc values ranging from 510 to 13,300,000 for a variety of Aroclors and PCB congeners; reported Koc values were mostly above 5000(1). Reviews of the PCB mobility literature have found that adsorption of PCBs to soil and sediment generally increases with an increase in the degree of chlorination(2,3). Organic solvents, found at hazardous waste sites, will also increase the solubility and mobility of PCBs(3). Using soil TLC, column leaching and five different soils, PCBs were found to be generally immobile when leached with water or aqueous landfill leachate, but highly mobile when leached with organic solvents(4). PCB fluids can penetrate and travel through the cracks and other connected void spaces found in soil formations(5). In the presence of organic material dissolved from soil, the water solubility of PCBs increases which may augment its leachability. Environmental releases of PCBs often accompany releases of carrier materials from utility equipment. The PCBs that are present in the mineral oil-PCB mixture become even less water soluble than before. This is due to the PCB partitioning into the mineral oil and the reduced interaction of the PCBs with

precipitation or groundwater caused by the hydrophobic nature of the oil matrix. The volatility of PCBs also affects their migration through the soil profile. Researchers have carried out simulations that indicate that PCBs can volatilize beneath the soil surface and potentially migrate through several meters of soil cover(5).

### Other adverse effects

no data available

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## SECTION 13: Disposal considerations

### Disposal methods

**Product**

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

**Contaminated packaging**

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

---

## SECTION 14: Transport information

### UN Number

ADR/RID: Not dangerous goods. (For reference only, please check.)
IMDG: Not dangerous goods. (For reference only, please check.)
IATA: Not dangerous goods. (For reference only, please check.)

### UN Proper Shipping Name

ADR/RID: Not dangerous goods. (For reference only, please check.)
IMDG: Not dangerous goods. (For reference only, please check.)
IATA: Not dangerous goods. (For reference only, please check.)

### Transport hazard class(es)

ADR/RID: Not dangerous goods. (For reference only, please check.)
IMDG: Not dangerous goods. (For reference only, please check.)
IATA: Not dangerous goods. (For reference only, please check.)

### Packing group, if applicable

ADR/RID: Not dangerous goods. (For reference only, please check.)
IMDG: Not dangerous goods. (For reference only, please check.)
IATA: Not dangerous goods. (For reference only, please check.)

### Environmental hazards

ADR/RID: Yes
IMDG: Yes
IATA: Yes

### Special precautions for user

no data available

### Transport in bulk according to IMO instruments

no data available

## SECTION 15: Regulatory information

### Safety, health and environmental regulations specific for the product in question

**European Inventory of Existing Commercial Chemical Substances (EINECS)**
Listed.
**EC Inventory**
Listed.
**United States Toxic Substances Control Act (TSCA) Inventory**
Listed.
**China Catalog of Hazardous chemicals 2015**
Not Listed.
**New Zealand Inventory of Chemicals (NZIoC)**
Not Listed.
**PICCS**
Listed.
**Vietnam National Chemical Inventory**
Listed.
**IECSC**
Listed.
**Korea Existing Chemicals List (KECL)**
Listed.

## SECTION 16: Other information

### Abbreviations and acronyms

CAS: Chemical Abstracts Service
ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
IMDG: International Maritime Dangerous Goods
IATA: International Air Transportation Association
TWA: Time Weighted Average
STEL: Short term exposure limit
LC50: Lethal Concentration 50%
LD50: Lethal Dose 50%
EC50: Effective Concentration 50%

### References

IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home
HSDB - Hazardous Substances Data Bank, website: https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm
IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/
eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple
ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp
ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg
Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp
ECHA - European Chemicals Agency, website: https://echa.europa.eu/

***Disclaimer:***
*The information in this MSDS is only applicable to the specified product, unless otherwise specified, it is not applicable to the mixture of this product and other substances. This MSDS only provides information on the safety of the product for those who have received the appropriate professional training for the user of the product. Users of this MSDS must make independent judgments on the applicability of this SDS. The authors of this MSDS will not be held responsible for any harm caused by the use of this MSDS.*

## Recommended Products

Aluminum acetylacetonate SDS METHYL ISOCYANOACETATE SDS N-BUTYLISOCYANIDE SDS PHENYLSELENOL SDS DICHLORO(ETHYLENEDIAMINE)PLATINUM(II) SDS Tosylmethyl isocyanide SDS Cupric acetylacetonate SDS Ethyl isocyanoacetate SDS TERT-BUTYL ISOCYANIDE SDS Ferric acetylacetonate SDS

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# Asbestos Safety Data Sheets

Characteristics

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# SAFETY DATA SHEETS

## According to the UN GHS revision 8

Creation
Revision

## SECTION 1: Identification

### 1.1 GHS Product identifier

**Product name** [Name confidential or not available]

### 1.2 Other means of identification

**Product number** -
**Other names** -

### 1.3 Recommended use of the chemical and restrictions on use

**Identified uses** Industrial and scientific research uses.
**Uses advised against** no data available

### 1.4 Supplier's details

**Company** Echemi.com
**Address** Echemi.com
**Telephone** Echemi.com

### 1.5 Emergency phone number

**Emergency phone number** Echemi.com
**Service hours** Monday to Friday, 9am-5pm (Standard time zone: UTC/GMT +8 hours).

## SECTION 2: Hazard identification

### 2.1 Classification of the substance or mixture

Carcinogenicity, Category 1A

### 2.2 GHS label elements, including precautionary statements

**Pictogram(s)**



**Signal word** Danger
**Hazard statement(s)** H350 May cause cancer
**Precautionary statement(s)**
**Prevention** P203 Obtain, read and follow all safety instructions before use.
P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...
**Response** P318 IF exposed or concerned, get medical advice.
**Storage** P405 Store locked up.
**Disposal** P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

### 2.3 Other hazards which do not result in classification

no data available

## SECTION 3: Composition/information on ingredients

### 3.1 Substances

| Chemical name | Common names and synonyms | CAS number | EC number | Concentrat |
|---|---|---|---|---|
| [Name confidential or not available] | [Name confidential or not available] | 1332-21-4 | 603-721-4 | 9% |

## SECTION 4: First-aid measures

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Help

### 4.1 Description of necessary first-aid measures

**If inhaled**

Move the victim into fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration and consult a doctor immediately. Do not use mouth to mouth resuscit the victim ingested or inhaled the chemical.

**Following skin contact**

Take off contaminated clothing immediately. Wash off with soap and plenty of water. Consult a doctor.

**Following eye contact**

Rinse with pure water for at least 15 minutes. Consult a doctor.

**Following ingestion**

Rinse mouth with water. Do not induce vomiting. Never give anything by mouth to an unconscious person. Call a doctor or Poison Control Center immediately.

### 4.2 Most important symptoms/effects, acute and delayed

no data available

### 4.3 Indication of immediate medical attention and special treatment needed, if necessary

no data available

## SECTION 5: Fire-fighting measures

### 5.1 Suitable extinguishing media

Use dry chemical, carbon dioxide or alcohol-resistant foam.

### 5.2 Specific hazards arising from the chemical

no data available

### 5.3 Special protective actions for fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary.

## SECTION 6: Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

Avoid dust formation. Avoid breathing mist, gas or vapours.Avoid contacting with skin and eye. Use personal protective equipment.Wear chemical impermeable gloves. Ensure adec ventilation.Remove all sources of ignition. Evacuate personnel to safe areas.Keep people away from and upwind of spill/leak.

### 6.2 Environmental precautions

Prevent further spillage or leakage if it is safe to do so. Do not let the chemical enter drains. Discharge into the environment must be avoided.

### 6.3 Methods and materials for containment and cleaning up

Collect and arrange disposal. Keep the chemical in suitable and closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof eq ıt Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Preve c by electrostatic discharge steam.

### 7.2 Conditions for safe storage, including any incompatibilities

Store the container tightly closed in a dry, cool and well-ventilated place. Store apart from foodstuff containers or incompatible materials.

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

**Occupational Exposure limit values**

no data available

**Biological limit values**

no data available

### 8.2 Appropriate engineering controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

### 8.3 Individual protection measures, such as personal protective equipment (PPE)

**Eye/face protection**

Wear tightly fitting safety goggles with side-shields conforming to EN 166(EU) or NIOSH (US).

**Skin protection**

Wear fire/flame resistant and impervious clothing. Handle with gloves. Gloves must be inspected prior to use. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

**Respiratory protection**

If the exposure limits are exceeded, irritation or other symptoms are experienced, use a full-face respirator.

**Thermal hazards**

no data available

## SECTION 9: Physical and chemical properties and safety characteristics

| | |
|---|---|
| **Physical state** | no data available |
| **Colour** | no data available |
| **Odour** | no data available |
| **Melting point/freezing point** | no data available |
| **Boiling point or initial boiling point and boiling range** | no data available |
| **Flammability** | no data available |

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| | |
|---|---|
| **Lower and upper explosion limit/flammability limit** | no data available |
| **Flash point** | no data available |
| **Auto-ignition temperature** | no data available |
| **Decomposition temperature** | no data available |
| **pH** | no data available |
| **Kinematic viscosity** | no data available |
| **Solubility** | no data available |
| **Partition coefficient n-octanol/water** | no data available |
| **Vapour pressure** | no data available |
| **Density and/or relative density** | no data available |
| **Relative vapour density** | no data available |
| **Particle characteristics** | no data available |

## SECTION 10: Stability and reactivity

### 10.1 Reactivity

no data available

### 10.2 Chemical stability

no data available

### 10.3 Possibility of hazardous reactions

no data available

### 10.4 Conditions to avoid

no data available

### 10.5 Incompatible materials

no data available

### 10.6 Hazardous decomposition products

no data available

## SECTION 11: Toxicological information

**Acute toxicity**

Oral: no data available
Inhalation: no data available
Dermal: no data available

**Skin corrosion/irritation**

no data available

**Serious eye damage/irritation**

no data available

**Respiratory or skin sensitization**

no data available

**Germ cell mutagenicity**

no data available

**Carcinogenicity**

no data available

**Reproductive toxicity**

no data available

**STOT-single exposure**

no data available

**STOT-repeated exposure**

no data available

**Aspiration hazard**

no data available

## SECTION 12: Ecological information

### 12.1 Toxicity

Toxicity to fish: no data available
Toxicity to daphnia and other aquatic invertebrates: no data available
Toxicity to algae: no data available
Toxicity to microorganisms: no data available

### 12.2 Persistence and degradability

no data available

### 12.3 Bioaccumulative potential

no data available

### 12.4 Mobility in soil

no data available

### 12.5 Other adverse effects

no data available

## SECTION 13: Disposal considerations

### 13.1 Disposal methods

**Product**

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The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed by storage or disposal. Do not discharge to sewer systems.

**Contaminated packaging**

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

## SECTION 14: Transport information

### 14.1 UN Number

ADR/RID: UN2212 (For reference only, please check.) IMDG: UN2212 (For reference only, please check.) IATA: UN2212 (For reference only, please check.)

### 14.2 UN Proper Shipping Name

ADR/RID: ASBESTOS, AMPHIBOLE (amosite, tremolite, actinolite, anthophyllite, crocidolite) (For reference only, please check.) IMDG: ASBESTOS, AMPHIBOLE (amosite, tremolite, actinolite, anthophyllite, crocidolite) (For reference only, please check.) IATA: ASBESTOS, AMPHIBOLE (amosite, tremolite actinolite, anthophyllite, crocidolite) (For reference or please check.)

### 14.3 Transport hazard class(es)

ADR/RID: 9 (For reference only, please check.) IMDG: 9 (For reference only, please check.) IATA: 9 (For reference only, please check.)

### 14.4 Packing group, if applicable

ADR/RID: II (For reference only, please check.) IMDG: II (For reference only, please check.) IATA: II (For reference only, please check.)

### 14.5 Environmental hazards

ADR/RID: No IMDG: No IATA: No

### 14.6 Special precautions for user

no data available

### 14.7 Transport in bulk according to IMO instruments

no data available

## SECTION 15: Regulatory information

### 15.1 Safety, health and environmental regulations specific for the product in question

| Chemical name | Common names and synonyms | CAS number | EC nu |
|---|---|---|---|
| [Name confidential or not available] | [Name confidential or not available] | 1332-21-4 | 603-7 |
| **European Inventory of Existing Commercial Chemical Substances (EINECS)** | | | Not L |
| **EC Inventory** | | | Not L |
| **United States Toxic Substances Control Act (TSCA) Inventory** | | | List |
| **China Catalog of Hazardous chemicals 2015** | | | |
| **New Zealand Inventory of Chemicals (NZIoC)** | | | |
| **Philippines Inventory of Chemicals and Chemical Substances (PICCS)** | | | |
| **Vietnam National Chemical Inventory** | | | |
| **Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)** | | | |
| **Korea Existing Chemicals List (KECL)** | | | |

## SECTION 16: Other information

**Information on revision**

**Creation Date** July 15, 2019
**Revision Date** July 15, 2019

**Abbreviations and acronyms**

CAS: Chemical Abstracts Service
ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
IMDG: International Maritime Dangerous Goods
IATA: International Air Transportation Association
TWA: Time Weighted Average
STEL: Short term exposure limit
LC50: Lethal Concentration 50%
LD50: Lethal Dose 50%
EC50: Effective Concentration 50%

**References**

IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home
HSDB - Hazardous Substances Data Bank, website: https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm
IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/
eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple
ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp
ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg
Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp
ECHA - European Chemicals Agency, website: https://echa.europa.eu/

*Disclaimer: The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. W supplier shall not be held liable for any damage resulting from handling or from contact with the above product.*

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## Related Products

Methanesulfonic anhydride | 98.0% Methanesulfonic anhydride; CAS 714... | Factory supply 99% high quality low price M... | Methanesulfonic Anhydride

Methanesulfonic anhydride

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- 1H-INDAZOLE-7-CARBOXYLIC ACID SDS
- N-(2-Methyl-5-nitrophenyl)-4-(3-pyridinyl)-...
- 1,1′-[(4R)-[4,4′-Bi-1,3-benzod
- Gabapentin SDS
- 2-Bromo-1-cyclopropylethanone SDS
- Methyl 4-[2-(2-amino-4,7-dihydro-4-oxo-3H...
- 1-Isopropyl-5-(4,4,5,5-tetram
- 4-Morpholinepropanesulfonic acid, sodium ...
- Tris(3,5-di-tert-butyl-4-hydroxybenzyl) isocy...

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# 6.02 TASK HAZARD ANALYSIS (THA) FORM

| THA Title: | | THA ID #: | Date: ☐ New ☐ Revised |
|---|---|---|---|
| Work Activity: | | Risk Code (Table Page 2): | Division: |
| Person Preparing THA: | | Person Assisting with THA: | |
| Sequence of Steps or Activities | Materials, Equipment & Tools Needed | Hazards | Recommended Controls Measures / PPE/ Training |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |

| **Risk** Assessment Codes (RACs)<br>Likelihood & Severity Classification | | | |
|---|---|---|---|
| **Likelihood of Harm**<br>(People, Environment, Facility) | **Severity of Harm/Consequences**<br>(People, Environment, Facility, Supply Chain Disruption, Brand Impact) | | |
| | **Slight Harm** | **Moderate Harm** | **Extreme Harm** |
| **Very Unlikely** | Very low risk | Very low risk | High risk |
| **Unlikely** | Very low risk | Medium risk | Very high risk |
| **Likely** | Low risk | Medium risk | Very high risk |
| **Very Likely** | Low risk | High risk | Very high risk |
| **Definitions** | | | |
| Likelihood of Harm Categories:<br>-Very Unlikely: Will not occur except in rare instances under certain conditions<br>-Unlikely: Typically would not occur<br>-Likely: May occur on a regular basis<br>-Very Likely: Will occur in most instances | Severity of Harm Categories:<br>-Slight harm: Only first aid required<br>-Moderate harm: Injury or illness resulting in inability to work for a short period of time<br>-Extreme harm: Death or serious injury or illness resulting in inability to work indefinitely | | |

| PREPARATION SIGN OFF | | | |
|---|---|---|---|
| Role | Name | Signature | Date |
| Preparer | | | |
| Reviewer with Relevant Task Technical Experience or Safety Expertise | | | |
| Safety Manager – Needed for High Risk or Very High Risk THAs | | | |

| **ACKNOWLEDGEMENT IF THA IS USED AS A TRAINING RESOURCE**<br>By signing I am indicating that I have read and understand the contents of this Task Hazard Assessment and the controls required to mitigate the risks from identified hazards. | | | |
|---|---|---|---|
| Name | Signature | Company | Date |
| | | | |
| | | | |
| | | | |

**New York State Department of Health**
**Generic Community Air Monitoring Plan**

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 activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is 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 generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with 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 and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with 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.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

**Continuous monitoring** will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

**Periodic monitoring** for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should 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 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 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.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with 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. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

## Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50$^{o}$ C (14 to 122$^{o}$ F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see Paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

# Special Requirements CAMP

1. When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

2. If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

3. If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/$m_3$, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/$m_3$ or less at the monitoring point.

4. Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Especially if machinery with internal combustion engines are utilized for indoor work. Response levels and actions should be pre-determined, as necessary, for each site.

5. Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under "Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures" except that in this instance "nearby/occupied structures" would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g. weekends or evenings) when building occupancy is at a minimum.

# 6.08 PRE-JOB SAFETY TAILGATE/TOOLBOX MEETING FORM

| | | | |
|---|---|---|---|
| Date | | Time | |
| Location or Address | | Temperature | |
| Project Number | | Humidity | |
| Conducted by | | Conditions | |
| Were all workers reminded that COVID is still prevalent and that appropriate measures should be taking to prevent infection of themselves and others? | | | Yes ☐ No ☐ |

| | |
|---|---|
| **911** | **If 911 is unavailable at this location, please state the procedure for reporting emergencies** _____ |

| List Safety Topic of Discussion and/or Any Specific Hazards for the Work Being Performed Today | |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| **List Control Measures for Each Specific Hazard Listed Above** | |
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |

## PLEASE SIGN THE BACK OF THIS SHEET

The presenter and all attendees shall print and sign in the appropriate areas on the back of this sheet

**By signing, you declare that you understand the information presented in today's meeting, and that you have had the opportunity to ask questions and to clarify any uncertainty regarding such information.**

**All Visitors and Contractors Must Print Their Company Name**

| Name | Signature | Company |
|---|---|---|
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# PART A – INCIDENT/LOSS MANAGEMENT REPORTING SCHEDULE

| Event | Form(s) Required | Action |
|---|---|---|
| **Property damage** to company property (including Fleet vehicles)<br>**OR**<br>Damage to non-company property by company employee | All cases: LaBella's Online Incident/Near-Miss/ Hazard Reporting Form ("Online Reporting Form") **or** Part B- Incident/Near-Miss Hazard Report ("Part B: Employee Rpt.") from the Safety Manual 6.01 Incident/Near Miss/Hazard Report Package. Include photos.<br><br>Losses greater than $5,000:<br>Online Reporting Form or Part B: Employee Rpt.<br>Part C: Supervisor Invest/Analysis Report<br>Part D: Witness Statement Form<br>Photos, Diagrams, Maps, etc.<br>**In addition to insurance forms | Immediate verbal notification to Supervisor and Online Reporting Form within 24 hours<br><br>Send Parts B, C and D to Safety Manager as soon as possible but within 2-4 business days. |
| **Near Miss Incidents:**<br><br>Low* potential for significant injury or property damage<br><br>Moderate* or High* potential for significant injury or property damage<br><br>*Category to be determined by Safety Manager | All cases: Online Reporting Form or Part B: Employee Report<br><br>Online Reporting Form or Part B: Employee Rpt.<br><br>Online Reporting Form/Part B: Employee Rpt.<br>Part C: Supervisor Invest. & Analysis Report<br>Part D: Witness Statement Form<br>Photos, Diagrams, Maps, etc. | Same-day verbal notification to Supervisor<br><br>Send to Safety Manager and HR within 24 hours.<br><br>Send Parts C and D to Safety Manager as soon as possible but within 2-4 business days. |
| **Employee Injury or Illness:**<br><br>Minor injury (first aid treatment/non-OSHA recordable)<br><br>Serious Injury (employee received medical treatment/lost days away from work, or required job restriction or transfer)<br><br>Catastrophes (examples: fatality, multiple persons injured) | All cases: Online Reporting Form or Part B – Employee Report<br><br>Online Reporting Form or Part B: Employee Rpt.<br><br>Online Reporting Form or Part B: Employee Rpt.<br>Part C: Supervisor Invest. & Analysis Report<br>Part D: Witness Statement Form<br>Photos, Diagrams, Maps, etc.<br><br>Above documentation plus additional documentation as requested Health and Safety Manager or Senior Management<br>**In addition to insurance forms | Immediate verbal notification to Supervisor and/or Field Supervisor (in all cases).<br><br>Send to Safety Manager and HR within 24 hours.<br><br>Send Parts C and D to Safety Manager as soon as possible but within 2-4 business days.<br><br>IMMEDIATELY call Safety Manager and Vice President of Operations (24/7). |
| **Incidents Involving Personnel Other than LaBella** (example: subcontractors) | Part C: Supervisor Invest. & Analysis Report<br>Part D: Witness Statement Form<br>Photos, Diagrams, Maps, etc. | Same verbal reporting requirements as employees. |

# PART B - INCIDENT/ NEAR MISS / HAZARD REPORT

**Completed by Employee with Supervisor**

**Complete all fields. Be as specific as possible and include drawings, photos, additional narrative, as needed.**

| Person Submitting Form: | Name of Affected Employee: | Employee's Supervisor: |
|---|---|---|
| Employee's Division Director: | Employee's Home Office Location: | Date of Hire: |

**-An incident** is an unwanted event that causes injury or illness to the body and/or involves damage to property, equipment, or the environment.
**-A near-miss** is an incident in which no property was damaged and no personal injury was sustained, but where given a slight shift in time or position, damage or injury easily could have occurred.
**-A hazard** is an object or situation that has the potential to harm people or cause damage to property or the environment.

If you have IT equipment that has been stolen or damaged, you must complete the **IT Incident Report** located on the Information Technology page of the intranet immediately for security purposes.

| Date of Event | Time of Event: | Type of Incident:<br>❑ Incident ❑ Near Miss ❑ Hazard | Project Number: |
|---|---|---|---|
| Address of Incident: | Additional information Regarding Incident Location: | | |

How did the incident happen? *(Describe step by step the events that led up to the event and site conditions, weather and tools. Document any immediate action taken to protect internal/internal staff)*

Incident involved the following (check all that apply): ❑ Vehicles If Yes, list license Plate Numbers: _____

❑ Machines ❑ Equipment ❑ Tools ❑ Property ❑ Environment ❑ Chemicals ❑ Electronic Equipment ❑ Wildlife

Describe how items above played a part in the incident and if they contributed to/resulted in injury:

| Did property or equipment damage occur: ❑ Yes ❑ No | Approximate estimated value of damage: |
|---|---|
| Names of all involved persons: | Witness Statements Attached (1 for each witness)(see Safety Manual 1.22):<br>❑ Yes ❑ No |

**Did this Incident involve an injury? ❑ Yes ❑ No If No – sign at bottom and provide to Supervisor, Safety Manager and HR.**

| Injured Employee Name: | SSN: (last 4 digits) | Date of Birth: | Gender: |
|---|---|---|---|

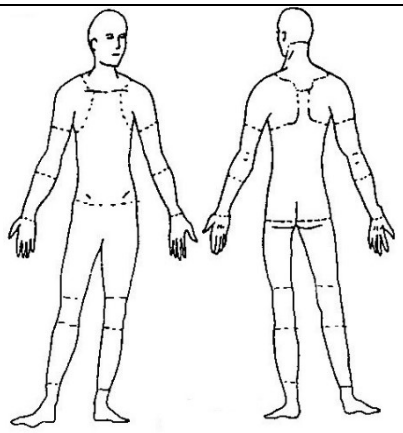
| Job Title: | Employee type:<br>❑ Full time ❑ Part Time<br>❑ On-Call/temporary | Time Employee Began Work & Time of Injury: | Phone Number: |
|---|---|---|---|
| Type of Injury (e.g. abrasion, bruise, burn, sprain, cut, etc): | | Was PPE being used & what type: | |

Was medical treatment provided? ❑ Yes ❑ No

Was medicine prescribed? ❑ Yes ❑ No Type:

Describe treatment:

| Hospital/Clinic & Dr Name: | Is employee still being treated?<br>❑ Yes ❑ No |
|---|---|
| Has employee returned to work?<br>❑ Yes ❑ No | Was employee assigned:<br>❑ Restricted duty<br>❑ Job transfer<br>❑ Days away from work |



Part of body affected:
Shade all that apply or list:

| Employee Name (print): | Signature: | Date: |
|---|---|---|
| Supervisor Name (print): | Signature: | Date: |

# PART C - SUPERVISOR INVESTIGATION & ANALYSIS REPORT

**Completed by Supervisor with Input by Safety Manager and Others as Needed**

| Date of Event | Time of Event: | Type of Event:<br>❑ Incident<br>❑ Near Miss ❑ Hazard | Date of this Report: |
|---|---|---|---|
| Event Location: | Project Number: | Supervisor: | Title: |

Description of Incident:

Incident involved the following (check all that apply): ❑ Vehicles If Yes, list license Plate Numbers: _____

❑ Machines ❑ Equipment ❑ Tools ❑ Property ❑ Environment ❑ Chemicals ❑ Electronic Equipment ❑ Wildlife

**EMPLOYEE & INJURY INFORMATION**

| Involved Employee: | Employee Age: | Employee Gender: | Date of Hire: |
|---|---|---|---|
| Was employee injured:<br>❑ Yes ❑ No | If Yes, describe injury: | | |
| Date last worked: | Date returned to work: | Was employee assigned:<br>❑ Restricted duty ❑ Job transfer ❑ Days away from work | |
| Hospital/Clinic Name: | Doctor name: | Type of Injury: | |

**INVOLVED PARTIES and WITNESSES**

| Names of all involved persons: | Witnesses (name and contact information): | Witness Statements Attached? ❑ Yes ❑ No |
|---|---|---|

**PROPERTY DAMAGE**

| Did property damage occur?<br>❑ Yes ❑ No | If Yes, what is nature of damage and what inflicted the damage: |
|---|---|
| Cost to repair damage: | Repercussions from damage: |

**INCIDENT DESCRIPTION**

Describe what happened. (Investigate scene of incident or conditions. Describe who was involved, when and where the incident happened, what happened, and how.) Attach photographs, maps, drawings.

| | |
|---|---|
| What PPE was being used at the time of the event and was it appropriate? | ❑ Yes ❑ No |
| Is there a task that applies to the **task** being performed when the injury or incident occurred?<br>*If Yes, review the THA, answer the following questions, and attach a copy to this report. If no, please explain why the THA was not required for the task.* | ❑ Yes ❑ No |
| Were hazards sufficiently identified? If not, please explain. | ❑ Yes ❑ No |
| Were identified controls adequate and implemented? If not, please explain. | ❑ Yes ❑ No |
| Were the identified controls not implemented? If not, please explain. | ❑ Yes ❑ No |

# PART C - SUPERVISOR INVESTIGATION & ANALYSIS REPORT

**Root Cause** (What was the root cause of the incident, i.e., actually caused the illness, injury, or incident?)

| **Unsafe Acts** | **Unsafe Conditions** | **Management System Deficiencies** |
|---|---|---|
| ❑ Improper Work Technique | ❑ Poor Workstation Design or Layout | ❑ Lack of Written Procedures or Safety Rules |
| ❑ Improper PPE, Not Used or Used Incorrectly | ❑ Fire or Explosion Hazard | ❑ Safety Rules Not Enforced |
| ❑ Safety Rule Violation | ❑ Congested Work Area | ❑ Hazards Not Identified |
| ❑ Operating Without Authorization | ❑ Hazardous Substances | ❑ PPE Unavailable |
| ❑ Failure to Warn or Secure | ❑ Inadequate Ventilation | ❑ Insufficient Worker Training |
| ❑ Operating at Improper Speeds | ❑ Improper Material Storage | ❑ Insufficient Supervisor Training |
| ❑ By-Passing Safety Devices | ❑ Improper Tool or Equipment | ❑ Improper Maintenance |
| ❑ Guards Not Used | ❑ Insufficient Job Knowledge | ❑ Inadequate Supervision |
| ❑ Improper Loading or Placement | ❑ Slippery Conditions | ❑ Insufficient Job Planning |
| ❑ Improper Lifting | ❑ Poor Housekeeping | ❑ Inadequate Hiring Practices |
| ❑ Servicing or Adjusting Machinery in Motion | ❑ Excessive Noise | ❑ Poor Process Design |
| ❑ Horseplay | ❑ Inadequate Guarding of Hazards | ❑ Inadequate Workplace Inspections |
| ❑ Drug or Alcohol Use | ❑ Defective Tools/Equipment | ❑ Inadequate Equipment |
| ❑ Unsafe Act(s) of Others | ❑ Insufficient Lighting | ❑ Unsafe Design or Construction |
| ❑ Unnecessary Haste | ❑ Inadequate Fall Protection | ❑ Unrealistic Scheduling |
| ❑ Other: | ❑ Other: | ❑ Other: |

**Contributing Cause(s)** (Conditions that made the incident more likely)

**Immediate Actions Taken**

**Actions to Prevent Recurrence** (Be specific as to what would prevent injury, incident or damage from recurrence) (use extra page if needed)

**CORRECTIVE ACTION TRACKING (All Blocks Must be Filled In and Information Verifiable)**

| List action(s) that have or will be taken to prevent a recurrence. | Assigned To Whom | Scheduled Completion Date | Actual Completion Date | Follow-up Date |
|---|---|---|---|---|
| | | | | |
| | | | | |
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| | | | | |
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**INVESTIGATOR SIGNATURES:**

| | | | |
|---|---|---|---|
| Signature: | Name; | Title; | Date; |
| Signature: | Name; | Title; | Date; |
| Signature: | Name; | Title; | Date; |
| Signature: | Name; | Title; | Date; |
| Signature: | Name; | Title; | Date; |

# PART D – WITNESS STATEMENT FORM

Date of Incident: _____Date of this Statement:_____

Name of Witness: _____

Name of Interviewer: _____

**Instructions:** Witness statements should be fact based and when possible written by the witness. If the interviewer writes the statement for the witness, the witness must review the statement completely before signing this form. Deletions must be lined out and initialed by the witness. All changes must be initialed by the witness.

**Statement:**

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Witness Signature & Date: _____

Interviewer Signature & Date: _____

*Note. If the Witness refuses to sign this form, the interviewer should print "refused to sign" and the date on the Witness Signature line.

# APPENDIX 5
# FIELD LOGS

| Project: **20 Forbes Avenue**<br>Project Location: **Rensselaer, NY**<br>Project Number: **21-26694-E** | Log of Boring B-1<br>**Sheet 1 of 1** |
|---|---|

| | | |
|---|---|---|
| Date(s) Drilled **8/9/12 - 8/12/12** | Logged By **Baines** | Checked By **MS** |
| Drilling Method **Direct Push** | Drill Bit Size/Type **2" Dual Tube** | Total Depth of Borehole **30 ft** |
| Drill Rig Type **Geoprobe** | Drilling Contractor **CoreDown** | Approximate Surface Elevation **Approx 24 ft AMSL** |
| Groundwater Level and Date Measured **est. 15'** | Sampling Method(s) | Hammer Data **NA** |
| Borehole Backfill **Well Materials** | Location **South Bldng #1** | |

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 0 | | | | Gravel Surface | | |
| | | | | Fine sand and gravel | | |
| 5 | | | | Fine sand, silt and fine gravel - dry | | |
| 10 | | | | Same, moist - dark staining and petroleum odor in soil | | Dark staining and oily with petroleum odor |
| | | | | Est GW Depth ▼ | | |
| 15 | | | | Fine sand and gravel, coarse sand, black stained and petroleum odor, moist | | Black staining an oily with petroleum odor |
| 20 | | | | Same, saturated, black staining and petroleum odor | | Black oily staining and oily residue |
| 25 | | | | Medium-coarse sand and med gravel, saturated and black oily contamination | | Saturated with black oily deposits |
| | | | | | | Set Monitoring Well @ 22-ft with 10 ft of 0,020 slotted screen and solid riser to grade,Bentonite seal above screen and flush mount curb box at surface |
| 30 | | | | EOB | | |

/Users/Earth/Documents/Alpine-Projects/2021/20-Forbes-Ave-Rensselaer/Ph2-ESA/Borings/20-Forbes-Ave080921.bg4l(master field).tpl

| Project: **20 Forbes Avenue**<br>Project Location: **Rensselaer, NY**<br>Project Number: **21-266-94E** | Log of Boring B-2<br>**Sheet 1 of 1** |
|---|---|

| | | |
|---|---|---|
| Date(s) Drilled **8/9/12 - 8/12/12** | Logged By **Baines** | Checked By **MS** |
| Drilling Method **Direct Push** | Drill Bit Size/Type **2" Dual Tube** | Total Depth of Borehole **30 ft** |
| Drill Rig Type **Geoprobe** | Drilling Contractor **CoreDown** | Approximate Surface Elevation **Approx 23 ft AMSL** |
| Groundwater Level and Date Measured **est. 15'** | Sampling Method(s) **Dual Tube** | Hammer Data **NA** |
| Borehole Backfill **Well Materials** | Location **SW of Building #1** | |

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 0 | | | | Gravel Surface | | |
| | | | | Fine sand and gravel | | |
| 5 | | | | Fine sand, silt and fine gravel - dry | | |
| 10 | | | | Same, moist - dark staining and petroleum odor in soil starting @ 14-15 ft | | Dark staining and oily with petroleum odor |
| | | | | Est GW Depth ▼ | | |
| 15 | | | | Fine sand and gravel, coarse sand, black stained and petroleum odor, moist | | Black staining an oily with petroleum odor |
| 20 | | | | Fine brown sand, fine-med gravel, saturated, black staining and oily petroleum in soil | | Black oily staining and oily residue |
| 25 | | | | Coarse sand, silt and med gravel, saturated | | Saturated with black oily deposits |
| | | | | | | Set Monitoring Well @ 22-ft with 10 ft of 0,020 slotted screen and solid riser to grade,Bentonite seal above screen and flush mount curb box at surface |
| 30 | | | | EOB | | |

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Project: **20 Forbes Avenue**
Project Location: **Rensselaer, NY**
Project Number: **321-266-94E**

# Log of Boring B-3
**Sheet 1 of 1**

| | | |
|---|---|---|
| Date(s) Drilled **8/9/12 - 8/12/12** | Logged By **Baines** | Checked By **MS** |
| Drilling Method **Direct Push** | Drill Bit Size/Type **2" Dual Tube** | Total Depth of Borehole **20 ft** |
| Drill Rig Type **Geoprobe** | Drilling Contractor **CoreDown** | Approximate Surface Elevation **Approx 21' AMSL** |
| Groundwater Level and Date Measured **est. 12'** | Sampling Method(s) **Dual Tube** | Hammer Data **NA** |
| Borehole Backfill **Well Materials** | Location **West of Bldng #2 Area** | |

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 0 | | | | Gravel Surface | | |
| | | | | Sand, gravel and brick fill with fine sand and silt at 3-5 | | |
| 5 | | | | Fine sand, silt and fine gravel - dry | | |
| 10 | | | | Fine sand, silt and fine gravel - dry | | |
| | | | | Est GW Depth ▼ | | |
| 15 | | | | Fine and medium sand, silt and fine gravel - Saturated | | |
| 20 | | | | EOB | | Set Monitoring Well @ 20-ft with 10 ft of 0,020 slotted screen and solid riser to grade,Bentonite seal above screen and flush mount curb box at surface |
| 25 | | | | | | |
| 30 | | | | | | |

/Users/Earth/Documents/Alpine-Projects/2021/20-Forbes-Ave-Rensselaer/Ph2-ESA/Borings/20-Forbes-Ave080921.bg4l(master field).tpl

Project: **20 Forbes Avenue**
Project Location: **Rensselaer, NY**
Project Number: **21-266-94E**

# Log of Boring B-4
**Sheet 1 of 1**

| | | |
|---|---|---|
| Date(s) Drilled **8/9/12 - 8/12/12** | Logged By **Baines** | Checked By **MS** |
| Drilling Method **Direct Push** | Drill Bit Size/Type **2" Dual Tube** | Total Depth of Borehole **20 ft** |
| Drill Rig Type **Geoprobe** | Drilling Contractor **CoreDown** | Approximate Surface Elevation **Approx 20' AMSL** |
| Groundwater Level and Date Measured **est. 14'** | Sampling Method(s) **Dual Tube** | Hammer Data **NA** |
| Borehole Backfill **Well Materials** | Location **West of Building #3 Area** | |

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 0 | | | | Gravel Surface | | |
| | | | | Sand, gravel and silt | | |
| 5 | | | | Fine sand & silt then gray clay @ 6-10 ft. - dry | | |
| 10 | | | | Gray clay to 12-ft, then fine sand, silt and fine gravel - moist | | |
| | | | | Est GW Depth ▼ | | |
| 15 | | | | Fine sand, silt and fine gravel - Saturated | | |
| 20 | | | | EOB | | Set Monitoring Well @ 20-ft with 10 ft of 0,020 slotted screen and solid riser to grade,Bentonite seal above screen and flush mount curb box at surface |
| 25 | | | | | | |
| 30 | | | | | | |

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| Project: **20 Forbes Avenue**<br>Project Location: **Rensselaer, NY**<br>Project Number: **21-266-94E** | Log of Boring B-5<br>**Sheet 1 of 1** |
|---|---|

| | | |
|---|---|---|
| Date(s) Drilled **8/9/12 - 8/12/12** | Logged By **Baines** | Checked By **MS** |
| Drilling Method **Direct Push** | Drill Bit Size/Type **2" Dual Tube** | Total Depth of Borehole **20 ft** |
| Drill Rig Type **Geoprobe** | Drilling Contractor **CoreDown** | Approximate Surface Elevation **Approx 20' AMSL** |
| Groundwater Level and Date Measured **est. 10'** | Sampling Method(s) **Dual Tube** | Hammer Data **NA** |
| Borehole Backfill **Well Materials** | Location **West of Building #4** | |

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 0 | | | | Gravel Surface | | |
| | | | | Sand, silt, brick and gravel - dry | | |
| 5 | | | | Silt, clay and fine gravel - saturated | | |
| | | | | Est GW Depth ▼ | | |
| 10 | | | | Same | | |
| | | | | Coarse sand and fine gravel - Saturated | | |
| 15 | | | | Coarse sand, silt and fine gravel | | |
| 20 | | | | EOB | | Set Monitoring Well @ 20-ft with 10 ft of 0,020 slotted screen and solid riser to grade,Bentonite seal above screen and flush mount curb box at surface |
| 25 | | | | | | |
| 30 | | | | | | |

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Project: **20 Forbes Avenue**
Project Location: **Rensselaer, NY**
Project Number: **21-266-94E**

# Log of Boring B-6
**Sheet 1 of 1**

| | | |
|---|---|---|
| Date(s) Drilled **8/9/12 - 8/12/12** | Logged By **Baines** | Checked By **MS** |
| Drilling Method **Direct Push** | Drill Bit Size/Type **2" Dual Tube** | Total Depth of Borehole **20 Ft** |
| Drill Rig Type **Geoprobe** | Drilling Contractor **CoreDown** | Approximate Surface Elevation **Approx 20" AMSL** |
| Groundwater Level and Date Measured **est. 10'** | Sampling Method(s) **Dual Tube** | Hammer Data **NA** |
| Borehole Backfill **Well Materials** | Location **West of Building #5** | |

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 0 | | | | Gravel Surface | | |
| | | | | Sand, silt and gravel - dry | | |
| 5 | | | | Silt, clay and fine gravel, wood @ 5-6 ft - saturated | | |
| | | | | Est GW Depth ▼ | | |
| 10 | | | | Same, some black staining in soil, saturated | | |
| 15 | | | | Same, some black staining in soil, saturated | | |
| | | | | Fine sand, silt and medium gravel - saturated | | |
| 20 | | | | EOB | | Set Monitoring Well @ 20-ft with 10 ft of 0,020 slotted screen and solid riser to grade,Bentonite seal above screen and flush mount curb box at surface |
| 25 | | | | | | |
| 30 | | | | | | |

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| Project: **20 Forbes Avenue**<br>Project Location: **Rensselaer, NY**<br>Project Number: **21-266-94E** | Log of Boring B-7<br>**Sheet 1 of 1** |
|---|---|

| | | |
|---|---|---|
| Date(s) Drilled **8/9/12 - 8/12/12** | Logged By **Baines** | Checked By **MS** |
| Drilling Method **Direct Push** | Drill Bit Size/Type **2" Dual Tube** | Total Depth of Borehole **20 ft** |
| Drill Rig Type **Geoprobe** | Drilling Contractor **CoreDown** | Approximate Surface Elevation **Approx 20' AMSL** |
| Groundwater Level and Date Measured **est. 10'** | Sampling Method(s) **Dual Tube** | Hammer Data **NA** |
| Borehole Backfill **Well Materials** | Location **West of Building #6** | |

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 0 | | | | Gravel Surface | | PID elevated at 4-5 ft |
| | | | | Sand, silt and gravel - moist, black oily stained soil @ 4-5 ft | | |
| 5 | | | | Coarse sand and gravel- moist, black oily staining | | |
| | | | | Gray Clay - moist | | |
| 10 | | | | Est GW Depth ▼<br>Gray clay - moist | | |
| | | | | Sand, silting coarse gravel - saturated | | |
| 15 | | | | Fine brown silt, sand and coarse gravel - saturated | | |
| 20 | | | | EOB | | Set Monitoring Well @ 20-ft with 10 ft of 0,020 slotted screen and solid riser to grade,Bentonite seal above screen and flush mount curb box at surface |
| 25 | | | | | | |
| 30 | | | | | | |

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| Project: **20 Forbes Avenue**<br>Project Location: **Rensselaer, NY**<br>Project Number: **21-266-94E** | Log of Boring B-8<br>**Sheet 1 of 1** |
|---|---|

| | | |
|---|---|---|
| Date(s) Drilled **8/9/12 - 8/12/12** | Logged By **Baines** | Checked By **MS** |
| Drilling Method **Direct Push** | Drill Bit Size/Type **2" Dual Tube** | Total Depth of Borehole **20 ft** |
| Drill Rig Type **Geoprobe** | Drilling Contractor **CoreDown** | Approximate Surface Elevation **Approx 20' AMSL** |
| Groundwater Level and Date Measured **est. 3'** | Sampling Method(s) **Dual Tube** | Hammer Data **NA** |
| Borehole Backfill **Well Materials** | Location **SW of Building #7** | |

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 0 | | | | Gravel Surface | | |
| | | | | Sand, silt and gravel - moist, black oily stained soil @ 4-5 ft | | |
| | | | | Est GW Depth ▼ | | |
| 5 | | | | same, black oily staining | | PID 0.0 PPM at 7-10 ft |
| | | | | Fine sand silt and coarse gravel - saturated | | |
| 10 | | | | same at 10-13 ft, saturated | | |
| | | | | Dense silt and fine sand - dry | | |
| 15 | | | | Fine brown silt, sand and fine gravel - saturated | | |
| 20 | | | | EOB | | Set Monitoring Well @ 20-ft with 10 ft of 0,020 slotted screen and solid riser to grade,Bentonite seal above screen and flush mount curb box at surface Later adjusted screen to 2-Foot Depth and finished |
| 25 | | | | | | |
| 30 | | | | | | |

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| Project: **20 Forbes Avenue**<br>Project Location: **Rensselaer, NY**<br>Project Number: **21-266-94E** | Log of Boring B-9<br>**Sheet 1 of 1** |
|---|---|

| | | |
|---|---|---|
| Date(s) Drilled **8/9/12 - 8/12/12** | Logged By **Baines** | Checked By **MS** |
| Drilling Method **Direct Push** | Drill Bit Size/Type **2" Dual Tube** | Total Depth of Borehole **20 ft** |
| Drill Rig Type **Geoprobe** | Drilling Contractor **CoreDown** | Approximate Surface Elevation **Approx 20' AMSL** |
| Groundwater Level and Date Measured **est. 2'** | Sampling Method(s) **Dual Core** | Hammer Data **NA** |
| Borehole Backfill **Well Materials** | Location **West of Bldng#7** | |

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 0 | | | | Gravel Surface | | |
| | | | | Fine brown sand and fine gravel - dry | | |
| | | | | Est GW Depth ▼ | | |
| | | | | Black stained fine sand and fine gravel - moist | | |
| 5 | | | | same, black oily staining | | |
| | | | | Gray silt and clay and fine gravel - moist | | |
| 10 | | | | Fine sand, silt and coarse gravel - moist | | |
| 15 | | | | Fine brown sand, silt and fine gravel - saturated | | |
| 20 | | | | EOB | | Set Monitoring Well @ 20-ft with 10 ft of 0,020 slotted screen and solid riser to grade,Bentonite seal above screen and flush mount curb box at surface Later adjusted screen to 2-Foot Depth and finished |
| 25 | | | | | | |
| 30 | | | | | | |

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| Project: **20 Forbes Avenue**<br>Project Location: **Rensselaer, NY**<br>Project Number: **21-266-94E** | Log of Boring B-10<br>**Sheet 1 of 1** |
|---|---|

| | | |
|---|---|---|
| Date(s) Drilled **8/9/12 - 8/12/12** | Logged By **Baines** | Checked By |
| Drilling Method **Direct Push** | Drill Bit Size/Type **2" Dual Tube** | Total Depth of Borehole |
| Drill Rig Type **Geoprobe** | Drilling Contractor **CoreDown** | Approximate Surface Elevation |
| Groundwater Level and Date Measured **est. 3'** | Sampling Method(s) **Dual Tube** | Hammer Data |
| Borehole Backfill **Well Materials** | Location **West of Building #9** | |

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 0 | | | | Gravel Surface | | |
| | | | | Fine sand, silt and fine gravel - dry | | |
| | | | | Est GW Depth ▼ | | |
| 5 | | | | Fine sand, silt and fine gravel - saturated | | |
| 10 | | | | Fine sand, silt and coarse gravel - saturated | | |
| 15 | | | | Dense silt, sand and coarse gravel - saturated | | |
| 20 | | | | EOB | | Set Monitoring Well @ 12-ft with 10 ft of 0,020 slotted screen and solid riser to grade, bentonite seal above screen and flush mount curb box at surface |
| 25 | | | | | | |
| 30 | | | | | | |

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| Project: **20 Forbes Avenue**<br>Project Location: **Rensselaer, NY**<br>Project Number: **21-266-94E** | Log of Boring B-11<br>**Sheet 1 of 1** |
|---|---|

| | | |
|---|---|---|
| Date(s) Drilled **8/9/12 - 8/12/12** | Logged By **Baines** | Checked By |
| Drilling Method **Direct Push** | Drill Bit Size/Type **2" Dual Tube** | Total Depth of Borehole |
| Drill Rig Type **Geoprobe** | Drilling Contractor **CoreDown** | Approximate Surface Elevation |
| Groundwater Level and Date Measured **est. 15'** | Sampling Method(s) **Dual Tube** | Hammer Data |
| Borehole Backfill **Well Materials** | Location **North end of SP** | |

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 0 | | | | Gravel Surface | | |
| | | | | Fine sand, silt and fine gravel - dry | | |
| 5 | | | | Fine sand and silt and med gravel - dry | | |
| 10 | | | | Same - dry | | Odorous soil |
| 15 | | | | Est GW Depth ▼<br>Fine brown sand, some silt and fine gravel - saturated | | |
| 20 | | | | Fine brown sand and fine gravel - saturated | | Set Monitoring Well @ 25-ft with 10 ft of 0,020 slotted screen and solid riser to grade, bentonite seal above screen and flush mount curb box at surface |
| 25 | | | | EOB | | |
| 30 | | | | | | |

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| Project: **20 Forbes Avenue**<br>Project Location: **Rensselaer, NY**<br>Project Number: **21-266-94E** | Log of Boring B-12<br>**Sheet 1 of 1** |
|---|---|

| | | |
|---|---|---|
| Date(s) Drilled **8/9/12 - 8/12/12** | Logged By **Baines** | Checked By |
| Drilling Method **Direct Push** | Drill Bit Size/Type **2" Dual Tube** | Total Depth of Borehole |
| Drill Rig Type **Geoprobe** | Drilling Contractor **CoreDown** | Approximate Surface Elevation |
| Groundwater Level and Date Measured **est. 16'** | Sampling Method(s) **Dual Tube** | Hammer Data |
| Borehole Backfill **Well Materials** | Location **East of Building #9** | |

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 0 | | | | Gravel Surface | | |
| | | | | Fine sand, and fine gravel - dry | | |
| 5 | | | | Fine sand and silt and fine gravel - dry | | |
| 10 | | | | Same - dry | | |
| 15 | | | | Fine brown sand, some silt and med gravel - saturated<br>Est GW Depth ▼ | | |
| 20 | | | | Fine brown sand and fine gravel - saturated | | Set Monitoring Well @ 25-ft with 10 ft of 0,020 slotted screen and solid riser to grade, bentonite seal above screen and flush mount curb box at surface |
| 25 | | | | EOB | | Set Monitoring Well @ 25-ft with 10 ft of 0,020 slotted screen and solid riser to grade, bentonite seal above screen and flush mount curb box at surface |
| 30 | | | | | | |

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| Project: **20 Forbes Avenue**<br>Project Location: **Rensselaer, NY**<br>Project Number: **21-266-94E** | Log of Boring B-13<br>**Sheet 1 of 1** |
|---|---|

| | | |
|---|---|---|
| Date(s) Drilled **8/9/12 - 8/12/12** | Logged By **Baines** | Checked By **MS** |
| Drilling Method **Direct Push** | Drill Bit Size/Type **2" Dual Tube** | Total Depth of Borehole **25 ft** |
| Drill Rig Type **Geoprobe** | Drilling Contractor **CoreDown** | Approximate Surface Elevation **Approx 34' AMSL** |
| Groundwater Level and Date Measured **est. 15'** | Sampling Method(s) **Dual Tube** | Hammer Data **NA** |
| Borehole Backfill **Well Materials** | Location **North of Building #10** | |

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 0 | | | | Gravel Surface | | |
| | | | | Fine brown sand, and coarse gravel - dry | | |
| 5 | | | | Same - dry | | |
| 10 | | | | Fine brown sand and silt, coarse gravel - damp | | |
| | | | | Est GW Depth ▼ | | |
| 15 | | | | Fine brown sand, some silt and coarse gravel - saturated | | Set Monitoring Well @ 25-ft with 10 ft of 0,020 slotted screen and solid riser to grade, bentonite seal above screen and flush mount curb box at surface |
| 20 | | | | Fine brown sand and fine gravel - saturated | | Set Monitoring Well @ 25-ft with 10 ft of 0,020 slotted screen and solid riser to grade, bentonite seal above screen and flush mount curb box at surface |
| 25 | | | | EOB | | |
| 30 | | | | | | |

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| Project: **20 Forbes Avenue**<br>Project Location: **Rensselaer, NY**<br>Project Number: **21-26694-E** | Log of Boring B-14<br>**Sheet 1 of 1** |
|---|---|

| | | |
|---|---|---|
| Date(s) Drilled **8/9/12 - 8/12/12** | Logged By **Baines** | Checked By **MS** |
| Drilling Method **Direct Push** | Drill Bit Size/Type **2" Dual Tube** | Total Depth of Borehole **25 ft** |
| Drill Rig Type **Geoprobe** | Drilling Contractor **CoreDown** | Approximate Surface Elevation **Approx 35' AMSL** |
| Groundwater Level and Date Measured **est. 15'** | Sampling Method(s) **Dual Tube** | Hammer Data **NA** |
| Borehole Backfill **Well Materials** | Location **East of Building #8** | |

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 0 | | | | Gravel Surface<br>Fine brown sand, and med-coarse gravel - dry | | |
| 5 | | | | Same - dry<br>Black coal ash staining at 8-10 ft. | | |
| 10 | | | | No Recovery due to pushed cobble | | |
| 15 | | | | Est GW Depth ▼<br>Fine brown sand, some silt and coarse gravel - saturated | | Set Monitoring Well @ 25-ft with 10 ft of 0,020 slotted screen and solid riser to grade, bentonite seal above screen and flush mount curb box at surface |
| 20 | | | | Same - saturated | | |
| 25 | | | | EOB | | Set Monitoring Well @ 25-ft with 10 ft of 0,020 slotted screen and solid riser to grade, bentonite seal above screen and flush mount curb box at surface |
| 30 | | | | | | |

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| Project: **20 Forbes Avenue**<br>Project Location: **Rensselaer, NY**<br>Project Number: **21-266-94E** | Log of Boring B-15<br>**Sheet 1 of 1** |
|---|---|

| | | |
|---|---|---|
| Date(s) Drilled **8/9/12 - 8/12/12** | Logged By **Baines** | Checked By **MS** |
| Drilling Method **Direct Push** | Drill Bit Size/Type **2" Dual Tube** | Total Depth of Borehole **25 ft** |
| Drill Rig Type **Geoprobe** | Drilling Contractor **CoreDown** | Approximate Surface Elevation **Approx 36' AMSL** |
| Groundwater Level and Date Measured **est. 15'** | Sampling Method(s) **Dual Tube** | Hammer Data **NA** |
| Borehole Backfill **Well Materials** | Location **East of Building #6 next to road** | |

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 0 | | | | Gravel Surface<br>Fine brown sand, and fine gravel - dry | | |
| 5 | | | | Same - moist | | |
| 10 | | | | Same | | |
| 15 | | | | Est GW Depth ▼<br>No Recovery | | |
| 20 | | | | No Recovery - saturated sampler | | Set Monitoring Well @ 25-ft with 10 ft of 0,020 slotted screen and solid riser to grade, bentonite seal above screen and flush mount curb box at surface |
| 25 | | | | EOB | | Set Monitoring Well @ 25-ft with 10 ft of 0,020 slotted screen and solid riser to grade, bentonite seal above screen and flush mount curb box at surface |
| 30 | | | | | | |

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| Project: **20 Forbes Avenue**<br>Project Location: **Rensselaer, NY**<br>Project Number: **21-266-94E** | Log of Boring B-16<br>**Sheet 1 of 1** |
|---|---|

| | | |
|---|---|---|
| Date(s) Drilled **8/9/12 - 8/12/12** | Logged By **Baines** | Checked By **MS** |
| Drilling Method **Direct Push** | Drill Bit Size/Type **2" Dual Tube** | Total Depth of Borehole **25 ft** |
| Drill Rig Type **Geoprobe** | Drilling Contractor **CoreDown** | Approximate Surface Elevation **Approx 28' AMSL** |
| Groundwater Level and Date Measured **est. 12'** | Sampling Method(s) **Dual Tube** | Hammer Data **NA** |
| Borehole Backfill **Well Materials** | Location **East of Building #5 ctr** | |

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 0 | | | | Gravel Surface<br>Fine brown sand - dry | | |
| 5 | | | | Same then coal ash fill at 8 9 feet then coarse gravel and concrete fill - dry | | |
| 10 | | | | Fine brown sand and silt - saturate at 14 Ft.<br>Est GW Depth ▼ | | |
| 15 | | | | Dense gray silt, some fine gravel - saturated at bottom of sample | | Set Monitoring Well @ 20-ft with 10 ft of 0,020 slotted screen and solid riser to grade, bentonite seal above screen and flush mount curb box at surface |
| 20 | | | | Fine sand, silt and coarse gravel - saturated | | Set Monitoring Well @ 20-ft with 10 ft of 0,020 slotted screen and solid riser to grade, bentonite seal above screen and flush mount curb box at surface |
| 25 | | | | EOB | | |
| 30 | | | | | | |

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| Project: **20 Forbes Avenue**<br>Project Location: **Rensselaer, NY**<br>Project Number: **21-266-94E** | Log of Boring B-17<br>**Sheet 1 of 1** |
|---|---|

| | | |
|---|---|---|
| Date(s) Drilled **8/9/12 - 8/12/12** | Logged By **Baines** | Checked By **MS** |
| Drilling Method **Direct Push** | Drill Bit Size/Type **2" Dual Tube** | Total Depth of Borehole **20 ft** |
| Drill Rig Type **Geoprobe** | Drilling Contractor **CoreDown** | Approximate Surface Elevation **Approx 27' AMSL** |
| Groundwater Level and Date Measured **est. 10'** | Sampling Method(s) **Dual Tube** | Hammer Data **NA** |
| Borehole Backfill **Well Materials** | Location **West of Sub Station in Road** | |

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 0 | | | | Gravel Surface | | |
| | | | | Fine brown sand and fine gravel - dry | | |
| 5 | | | | Same, some silt - dry | | |
| | | | | Est GW Depth ▼ | | |
| 10 | | | | Same, saturated at 14-Ft. | | |
| 15 | | | | Fine sand and silt and fine gravel - saturated | | |
| 20 | | | | EOB | | Set Monitoring Well @ 18-ft with 10 ft of 0,020 slotted screen and solid riser to grade, bentonite seal above screen and flush mount curb box at surface |
| 25 | | | | | | |
| 30 | | | | | | |

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| Project: **20 Forbes Avenue**<br>Project Location: **Rensselaer, NY**<br>Project Number: **91-266-94E** | Log of Boring B-18<br>**Sheet 1 of 1** |
|---|---|

| | | |
|---|---|---|
| Date(s) Drilled **8/9/12 - 8/12/12** | Logged By **Baines** | Checked By **MS** |
| Drilling Method **Direct Push** | Drill Bit Size/Type **2" Dual Tube** | Total Depth of Borehole **20 ft** |
| Drill Rig Type **Geoprobe** | Drilling Contractor **CoreDown** | Approximate Surface Elevation **Approx 27' AMSL** |
| Groundwater Level and Date Measured **est. 10'** | Sampling Method(s) **Dual Tube** | Hammer Data **NA** |
| Borehole Backfill **Well Materials** | Location **South of Sub Station** | |

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 0 | | | | Gravel Surface | | |
| | | | | Fine brown sand and fine gravel - dry | | |
| 5 | | | | Fine brown sand, silt and coarse gravel - dry | | |
| | | | | Est GW Depth ▼ | | |
| 10 | | | | Same - dry | | |
| 15 | | | | Same with some clay - saturated | | |
| 20 | | | | EOB | | Set Monitoring Well @ 18-ft with 10 ft of 0,020 slotted screen and solid riser to grade, bentonite seal above screen and flush mount curb box at surface |
| 25 | | | | | | |
| 30 | | | | | | |

/Users/Earth/Documents/Alpine-Projects/2021/20-Forbes-Ave-Rensselaer/Ph2-ESA/Borings/20-Forbes-Ave080921.bg4l(master field).tpl

| Project: **20 Forbes Avenue**<br>Project Location: **Rensselaer, NY**<br>Project Number: **91-266-94E** | Log of Boring B-19<br>**Sheet 1 of 1** |
|---|---|

| | | |
|---|---|---|
| Date(s) Drilled **8/9/12 - 8/12/12** | Logged By **Baines** | Checked By **MS** |
| Drilling Method **Direct Push** | Drill Bit Size/Type **2" Dual Tube** | Total Depth of Borehole **20 ft** |
| Drill Rig Type **Geoprobe** | Drilling Contractor **CoreDown** | Approximate Surface Elevation **Approx 22 ft AMSL** |
| Groundwater Level and Date Measured **est. 12'** | Sampling Method(s) **Dual Tube** | Hammer Data **NA** |
| Borehole Backfill **Well Materials** | Location **South side of Building #4** | |

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 0 | | | | Gravel Surface | | |
| | | | | Brick, sand, stone and gravel - dry | | |
| 5 | | | | Fine brown sand, silt and fine gravel - dry | | |
| 10 | | | | Same - moist | | |
| | | | | Est GW Depth ▼ | | |
| 15 | | | | Fine sand and fine gravel, dark gray stained with slight odor - saturated | | |
| 20 | | | | EOB | | Set Monitoring Well @ 20-ft with 10 ft of 0,020 slotted screen and solid riser to grade, bentonite seal above screen and flush mount curb box at surface |
| 25 | | | | | | |
| 30 | | | | | | |

/Users/Earth/Documents/Alpine-Projects/2021/20-Forbes-Ave-Rensselaer/Ph2-ESA/Borings/20-Forbes-Ave080921.bg4l(master field).tpl

| Project: **20 Forbes Avenue**<br>Project Location: **Rensselaer, NY**<br>Project Number: **90-266-94E** | Log of Boring B-20<br>**Sheet 1 of 1** |
|---|---|

| | | |
|---|---|---|
| Date(s) Drilled **8/9/12 - 8/12/12** | Logged By **Baines** | Checked By **MS** |
| Drilling Method **Direct Push** | Drill Bit Size/Type **2" Dual Tube** | Total Depth of Borehole **25 ft** |
| Drill Rig Type **Geoprobe** | Drilling Contractor **CoreDown** | Approximate Surface Elevation **Approx 24' AMSL** |
| Groundwater Level and Date Measured **est. 12'** | Sampling Method(s) **Dual Tube** | Hammer Data **NA** |
| Borehole Backfill **Well Materials** | Location **NE Corner of Building #1** | |

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 0 | | | | Gravel Surface | | |
| | | | | Fine sand and coarse gravel - dry | | |
| 5 | | | | Fine sand, silt and coarse gravel - dry | | |
| 10 | | | | Same - dry, saturated at 14.5 Ft. | | |
| | | | | Est GW Depth ▼ | | |
| 15 | | | | Same with seam of black oily gravel at 16-19 Ft. - saturated | | Black oily stained gravel at 6-18 ft. |
| 20 | | | | Medium Brown sand - saturated | | Set Monitoring Well @ 22-ft with 10 ft of 0,020 slotted screen and solid riser to grade, bentonite seal above screen and flush mount curb box at surface |
| 25 | | | | EOB | | |
| 30 | | | | | | |

/Users/Earth/Documents/Alpine-Projects/2021/20-Forbes-Ave-Rensselaer/Ph2-ESA/Borings/20-Forbes-Ave080921.bg4l(master field).tpl

Project: **20 Forbes Avenue**
Project Location: **Rensselaer, NY**
Project Number: **21-26694-E**

# Key to Log of Boring
**Sheet 1 of 1**

| Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | MATERIAL DESCRIPTION | Water Content, % | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

## COLUMN DESCRIPTIONS

1. Depth (feet): Depth in feet below the ground surface.
2. Sample Type: Type of soil sample collected at the depth interval shown.
3. Sample Number: Sample identification number.
4. Sampling Resistance, blows/ft: Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval using the hammer identified on the boring log.
5. MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive text.
6. Water Content, %: Water content of the soil sample, expressed as percentage of dry weight of sample.
7. REMARKS AND OTHER TESTS: Comments and observations regarding drilling or sampling made by driller or field personnel.

## FIELD AND LABORATORY TEST ABBREVIATIONS

CHEM: Chemical tests to assess corrosivity
COMP: Compaction test
CONS: One-dimensional consolidation test
LL: Liquid Limit, percent
PI: Plasticity Index, percent
SA: Sieve analysis (percent passing No. 200 Sieve)
UC: Unconfined compressive strength test, Qu, in ksf
WA: Wash sieve (percent passing No. 200 Sieve)

## MATERIAL GRAPHIC SYMBOLS

### TYPICAL SAMPLER GRAPHIC SYMBOLS

- Auger sampler
- Bulk Sample
- 3-inch-OD California w/ brass rings
- CME Sampler
- Grab Sample
- 2.5-inch-OD Modified California w/ brass liners
- Pitcher Sample
- 2-inch-OD unlined split spoon (SPT)
- Shelby Tube (Thin-walled, fixed head)

### OTHER GRAPHIC SYMBOLS

- Water level (at time of drilling, ATD)
- Water level (after waiting)
- Minor change in material properties within a stratum
- Inferred/gradational contact between strata
- Queried contact between strata

## GENERAL NOTES

1: Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2: Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

/Users/Earth/Documents/Alpine-Projects/2021/20-Forbes-Ave-Rensselaer/Ph2-ESA/Borings/20-Forbes-Ave080921.bg4((master field).tpl

**Figure B-1**

# APPENDIX 6

# REQUEST TO IMPORT/REUSE FILL MATERIAL FORM

**NEW YORK STATE**
**DEPARTMENT OF ENVIRONMENTAL CONSERVATION**

***Request to Import/Reuse Fill or Soil***

*This form is based on the information required by DER-10, Section 5.4(e) and 6NYCRR Part 360.13. Use of this form is not a substitute for reading the applicable regulations and Technical Guidance document.*

## SECTION 1 – SITE BACKGROUND

The allowable site use is: Choose an item

Have Ecological Resources been identified? Choose an item

Is this soil originating from the site? Choose an item

How many cubic yards of soil will be imported/reused? Choose an item

If greater than 1000 cubic yards will be imported, enter volume to be imported:

## SECTION 2 – MATERIAL OTHER THAN SOIL

Is the material to be imported gravel, rock or stone? Choose an item

Does it contain less than 10%, by weight, material that passes a size 100 sieve? Choose an item

Is this virgin material from a permitted mine or quarry? Choose an item

Is this material recycled concrete or brick from a DEC registered processing facility? Choose an item

## SECTION 3 - SAMPLING

Provide a brief description of the number and type of samples collected in the space below:

---

*Example Text: 5 discrete samples were collected and analyzed for VOCs. 2 composite samples were collected and analyzed for SVOCs, Inorganics & PCBs/Pesticides.*

*If the material meets requirements of DER-10 section 5.4(e)5 (other material), no chemical testing needed.*

## SECTION 3 CONT'D - SAMPLING

Provide a brief written summary of the sampling results or attach evaluation tables (compare to DER-10, Appendix 5):

---

*Example Text: Arsenic was detected up to 17 ppm in 1 (of 5) samples; the allowable level is 16 ppm.*

*If Ecological Resources have been identified use the "If Ecological Resources are Present" column in Appendix 5.*

## SECTION 4 – SOURCE OF FILL

Name of person providing fill and relationship to the source:

Location where fill was obtained:

Identification of any state or local approvals as a fill source:

If no approvals are available, provide a brief history of the use of the property that is the fill source:

Provide a list of supporting documentation included with this request:

The information provided on this form is accurate and complete.

| | |
|---|---|
| Signature | Date |
| Print Name | |
| Firm | |

# APPENDIX 7

# SOIL QUALITY STANDARDS FOR IMPORTED MATERIALS

# Appendix 5
# Allowable Constituent Levels for Imported Fill or Soil
# Subdivision 5.4(e)

Source: This table is derived from soil cleanup objective (SCO) tables in 6 NYCRR 375. Table 375-6.8(a) is the source for unrestricted use and Table 375-6.8(b) is the source for restricted use.

Note: For constituents not included in this table, refer to the contaminant for supplemental soil cleanup objectives (SSCOs) in the Commissioner Policy on *Soil Cleanup Guidance*. If an SSCO is not provided for a constituent, contact the DER PM to determine a site-specific level.

| Constituent | Unrestricted Use | Residential Use | Restricted Residential Use | Commercial or Industrial Use | If Ecological Resources are Present |
|---|---|---|---|---|---|
| **Metals** | | | | | |
| Arsenic | 13 | 16 | 16 | 16 | 13 |
| Barium | 350 | 350 | 400 | 400 | 433 |
| Beryllium | 7.2 | 14 | 47 | 47 | 10 |
| Cadmium | 2.5 | 2.5 | 4.3 | 7.5 | 4 |
| Chromium, Hexavalent[1] | 1 [3] | 19 | 19 | 19 | 1 [3] |
| Chromium, Trivalent[1] | 30 | 36 | 180 | 1500 | 41 |
| Copper | 50 | 270 | 270 | 270 | 50 |
| Cyanide | 27 | 27 | 27 | 27 | NS |
| Lead | 63 | 400 | 400 | 450 | 63 |
| Manganese | 1600 | 2000 | 2000 | 2000 | 1600 |
| Mercury (total) | 0.18 | 0.73 | 0.73 | 0.73 | 0.18 |
| Nickel | 30 | 130 | 130 | 130 | 30 |
| Selenium | 3.9 | 4 | 4 | 4 | 3.9 |
| Silver | 2 | 8.3 | 8.3 | 8.3 | 2 |
| Zinc | 109 | 2200 | 2480 | 2480 | 109 |
| **PCBs/Pesticides** | | | | | |
| 2,4,5-TP Acid (Silvex) | 3.8 | 3.8 | 3.8 | 3.8 | NS |
| 4,4'-DDE | 0.0033 [3] | 1.8 | 8.9 | 17 | 0.0033 [3] |
| 4,4'-DDT | 0.0033 [3] | 1.7 | 7.9 | 47 | 0.0033 [3] |
| 4,4'-DDD | 0.0033 [3] | 2.6 | 13 | 14 | 0.0033 [3] |
| Aldrin | 0.005 | 0.019 | 0.097 | 0.19 | 0.14 |
| Alpha-BHC | 0.02 | 0.02 | 0.02 | 0.02 | 0.04 [4] |
| Beta-BHC | 0.036 | 0.072 | 0.09 | 0.09 | 0.6 |
| Chlordane (alpha) | 0.094 | 0.91 | 2.9 | 2.9 | 1.3 |
| Delta-BHC | 0.04 | 0.25 | 0.25 | 0.25 | 0.04 [4] |
| Dibenzofuran | 7 | 14 | 59 | 210 | NS |
| Dieldrin | 0.005 | 0.039 | 0.1 | 0.1 | 0.006 |
| Endosulfan I | 2.4[2] | 4.8 | 24 | 102 | NS |
| Endosulfan II | 2.4[2] | 4.8 | 24 | 102 | NS |
| Endosulfan sulfate | 2.4[2] | 4.8 | 24 | 200 | NS |
| Endrin | 0.014 | 0.06 | 0.06 | 0.06 | 0.014 |
| Heptachlor | 0.042 | 0.38 | 0.38 | 0.38 | 0.14 |
| Lindane | 0.1 | 0.1 | 0.1 | 0.1 | 6 |
| Polychlorinated biphenyls | 0.1 | 1 | 1 | 1 | 1 |

| Constituent | Unrestricted Use | Residential Use | Restricted Residential Use | Commercial or Industrial Use | If Ecological Resources are Present |
|---|---|---|---|---|---|
| **Semi-volatile Organic Compounds** | | | | | |
| Acenaphthene | 20 | 98 | 98 | 98 | 20 |
| Acenaphthylene | 100 | 100 | 100 | 107 | NS |
| Anthracene | 100 | 100 | 100 | 500 | NS |
| Benzo(a)anthracene | 1 | 1 | 1 | 1 | NS |
| Benzo(a)pyrene | 1 | 1 | 1 | 1 | 2.6 |
| Benzo(b)fluoranthene | 1 | 1 | 1 | 1.7 | NS |
| Benzo(g,h,i)perylene | 100 | 100 | 100 | 500 | NS |
| Benzo(k)fluoranthene | 0.8 | 1 | 1.7 | 1.7 | NS |
| Chrysene | 1 | 1 | 1 | 1 | NS |
| Dibenz(a,h)anthracene | 0.33 [3] | 0.33 [3] | 0.33 [3] | 0.56 | NS |
| Fluoranthene | 100 | 100 | 100 | 500 | NS |
| Fluorene | 30 | 100 | 100 | 386 | 30 |
| Indeno(1,2,3-cd)pyrene | 0.5 | 0.5 | 0.5 | 5.6 | NS |
| m-Cresol(s) | 0.33 [3] | 0.33 [3] | 0.33 [3] | 0.33 [3] | NS |
| Naphthalene | 12 | 12 | 12 | 12 | NS |
| o-Cresol(s) | 0.33 [3] | 0.33 [3] | 0.33 [3] | 0.33 [3] | NS |
| p-Cresol(s) | 0.33 | 0.33 | 0.33 | 0.33 | NS |
| Pentachlorophenol | 0.8 [3] | 0.8 [3] | 0.8 [3] | 0.8 [3] | 0.8 [3] |
| Phenanthrene | 100 | 100 | 100 | 500 | NS |
| Phenol | 0.33 [3] | 0.33 [3] | 0.33 [3] | 0.33 [3] | 30 |
| Pyrene | 100 | 100 | 100 | 500 | NS |
| **Volatile Organic Compounds** | | | | | |
| 1,1,1-Trichloroethane | 0.68 | 0.68 | 0.68 | 0.68 | NS |
| 1,1-Dichloroethane | 0.27 | 0.27 | 0.27 | 0.27 | NS |
| 1,1-Dichloroethene | 0.33 | 0.33 | 0.33 | 0.33 | NS |
| 1,2-Dichlorobenzene | 1.1 | 1.1 | 1.1 | 1.1 | NS |
| 1,2-Dichloroethane | 0.02 | 0.02 | 0.02 | 0.02 | 10 |
| 1,2-Dichloroethene(cis) | 0.25 | 0.25 | 0.25 | 0.25 | NS |
| 1,2-Dichloroethene(trans) | 0.19 | 0.19 | 0.19 | 0.19 | NS |
| 1,3-Dichlorobenzene | 2.4 | 2.4 | 2.4 | 2.4 | NS |
| 1,4-Dichlorobenzene | 1.8 | 1.8 | 1.8 | 1.8 | 20 |
| 1,4-Dioxane | 0.1 [3] | 0.1 [3] | 0.1 [3] | 0.1 [3] | 0.1 |
| Acetone | 0.05 | 0.05 | 0.05 | 0.05 | 2.2 |
| Benzene | 0.06 | 0.06 | 0.06 | 0.06 | 70 |
| Butylbenzene | 12 | 12 | 12 | 12 | NS |
| Carbon tetrachloride | 0.76 | 0.76 | 0.76 | 0.76 | NS |
| Chlorobenzene | 1.1 | 1.1 | 1.1 | 1.1 | 40 |
| Chloroform | 0.37 | 0.37 | 0.37 | 0.37 | 12 |
| Ethylbenzene | 1 | 1 | 1 | 1 | NS |
| Hexachlorobenzene | 0.33 [3] | 0.33 [3] | 1.2 | 3.2 | NS |
| Methyl ethyl ketone | 0.12 | 0.12 | 0.12 | 0.12 | 100 |
| Methyl tert-butyl ether | 0.93 | 0.93 | 0.93 | 0.93 | NS |
| Methylene chloride | 0.05 | 0.05 | 0.05 | 0.05 | 12 |

| **Volatile Organic Compounds** (continued) | | | | | |
|---|---|---|---|---|---|
| Propylbenzene-n | 3.9 | 3.9 | 3.9 | 3.9 | NS |
| Sec-Butylbenzene | 11 | 11 | 11 | 11 | NS |
| Tert-Butylbenzene | 5.9 | 5.9 | 5.9 | 5.9 | NS |
| Tetrachloroethene | 1.3 | 1.3 | 1.3 | 1.3 | 2 |
| Toluene | 0.7 | 0.7 | 0.7 | 0.7 | 36 |
| Trichloroethene | 0.47 | 0.47 | 0.47 | 0.47 | 2 |
| Trimethylbenzene-1,2,4 | 3.6 | 3.6 | 3.6 | 3.6 | NS |
| Trimethylbenzene-1,3,5 | 8.4 | 8.4 | 8.4 | 8.4 | NS |
| Vinyl chloride | 0.02 | 0.02 | 0.02 | 0.02 | NS |
| Xylene (mixed) | 0.26 | 1.6 | 1.6 | 1.6 | 0.26 |

All concentrations are in parts per million (ppm)
NS = Not Specified

Footnotes:
[1] The SCO for Hexavalent or Trivalent Chromium is considered to be met if the analysis for the total species of this contaminant is below the specific SCO for Hexavalent Chromium.
[2] The SCO is the sum of endosulfan I, endosulfan II and endosulfan sulfate.
[3] For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the Track 1 SCO value.
[4] This SCO is derived from data on mixed isomers of BHC.

# APPENDIX 8

# COMMUNITY AIR MONITORING PLAN

**New York State Department of Health**
**Generic Community Air Monitoring Plan**

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 activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is 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 generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with 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 and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with 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.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

**Continuous monitoring** will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

**Periodic monitoring** for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should 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 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 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.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with 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. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

## Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50$^{o}$ C (14 to 122$^{o}$ F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see Paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

# Special Requirements CAMP

1. When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

2. If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

3. If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/$m_3$, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/$m_3$ or less at the monitoring point.

4. Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Especially if machinery with internal combustion engines are utilized for indoor work. Response levels and actions should be pre-determined, as necessary, for each site.

5. Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under "Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures" except that in this instance "nearby/occupied structures" would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g. weekends or evenings) when building occupancy is at a minimum.