

October 7, 2024

Matthew Dunham, P.E.
Division of Environmental Remediation, Region 4
1130 North Westcott Road
Schenectady, NY 12306-2014
Sent via email matthew.dunham@dec.ny.gov

Re: Interim Remedial Measure Work Plan and Design Report- Sub-Slab Depressurization System

Former Barnet Mills – C442065 20 Forbes Ave., Rensselaer, New York LaBella Project #2220630

Dear Mr. Dunham,

LaBella Associates, D.P.C. ("LaBella") is pleased to submit this Sub-Slab Depressurization System (SSDS) Interim Remedial Measure Work Plan and Design Report (IRMWP) associated with the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) Site (BCP ID No. C442065) located at 20 Forbes Avenue, Rensselaer, New York, hereinafter referred to as the "Site." The purpose of this IRMWP is to install sub-slab depressurization systems (SSDS) to mitigate impacts related to soil vapor intrusion.

PROJECT DESCRIPTION AND HISTORY

The Site is comprised of a 6.33-acre parcel that includes nine (9) vacant buildings numbered 1 and 4 through 11, former parking areas, a roadway, and an open grassed area. The Site is situated in an urban area with mixed commercial, residential, and utility land uses and is oriented parallel to the Hudson River by approximately 100 to 200 feet southeast.

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 the Site has been vacant with abandoned buildings. As part of the NYSDEC-approved December 15, 2023, BCP Remedial Investigation Work Plan, and April 29, 2024, Interim Remedial Measures Work Plan - Slab Demolitions for Buildings 1, 4, 5, 6, 7, 8, 10 and 11, and Former Buildings 2 and 3, BBL Barnett, LLC has begun building renovation activities. Slab removal work began on May 22,2024 in Building 4, and will include removal of slabs in Buildings 5, 6, 7, 9, 10, and 11. Slab work for Building 1 will be conducted later in the renovation process.

The Site was previously used for industrial and commercial purposes including but not limited to textile mill operations. The buildings vary in size and number of stories. The renovation project is rehabilitating existing abandoned textile mill buildings into 72 apartments for non-transient residential occupation and commercial space. Future plans for Building 1 are currently undetermined. As part of the



redevelopment, one of the current structures (Building 8) is proposed to be demolished. The project site is eligible to be listed in the National Register of Historic Places.

Several phases of environmental assessments/investigations have been previously performed. The results of Alpine Environmental Services, Inc.'s October 2021 Phase II Environmental Site Assessment (ESA) indicated the presence of VOCs in on-Site soil vapor. Given the conditions of buildings, a soil vapor intrusion investigation could not and cannot effectively be conducted. **Figure 1** presents the soil vapor results compared to the February 2024 revision to the New York State Department of Health's (NYSDOH's) Guidance for Evaluating Soil Vapor Intrusion matrices. Sub slab test results indicate compounds are present at concentrations greater than the lowest applicable sub-slab vapor matrix values in Buildings 4, 5, 6, 9, 10 and 11 (samples were not collected from Buildings 7 or 8). Vapor concentrations at Building 1 did not exceed lowest applicable sub-slab vapor concentrations; however, the presence of non-aqueous phase liquid (NAPL) petroleum adjacent and beneath Building 1 and gross impacts beneath Building 7 indicates a strong potential for vapor intrusion after the buildings are renovated.

To address the potential for soil vapor intrusion, LaBella presents the following design and installation plan for sub-slab depressurization systems (SSDs) for Buildings 1, 4, 5, 6, 7, 10 and 11. Building 9 is not included for a SSDS due the building being renovated with an open-air design for non-occupancy uses. Following installation of the systems, indoor air quality (IAQ) samples will be collected to evaluate whether a passive SSDS needs to be converted to an active SSDS and/or to confirm successful mitigation.

SSDS PILOT COMUNICATION TESTING: BUILDINGS 1 & 4

Prior to the removal of the slab(s) in Buildings 1 and 4, vacuum communication tests were performed on April 22, 2024, to aid in the SSDS design at these locations. This communication testing included the installation of one 3-inch diameter suction (vacuum) test point (SP) located near the center of the floor slab in each building. Several 3/8- inch vacuum measuring points were installed in varying directions from the SPs at 5-foot intervals. Each SP was temporarily connected to a vacuum pump with the pump exhaust directed outside of the building. Testing proceeded by applying approximately 5 to 20 inches water column (IWC) vacuum in approximately 5 IWC increments to the SPs and measuring vacuum response utilizing a micromanometer to determine the vacuum field. Soil gas flow rate and total volatile organic compound (VOC) discharge concentration was measured utilizing an anemometer and photoionization detector (PID) capable of detecting 1 part per billion. A minimum vacuum reading of 0.004 IWC is required to determine the maximum influence from the SP and a corresponding radial distance.

The SSDS Communication Pilot Test Results report is provided as Attachment 1. Refer to the attached report for details regarding vacuum versus estimated influence (radius of influence distance) utilized for the design details presented below. LaBella used the Pilot Test results to determine the necessary number of suction points to provide sufficient sub slab depressurization, which are summarized below.

Building 4 has shown that due to past foundation structures that are below grade, the
influence of the vacuum is limited to these areas as shown in Drawing B4, and that multiple
laterals will be required to provide sufficient coverage of Building 4. However, communication
pilot test results indicate that the planned plumbing trenches can be utilized to apply adequate



- depressurization over the entire footprint of Building 4.
- The test performed in Building 1 has shown it will require a minimum of 2 suction points to create sufficient vacuum throughout the sub slab area, should the slab be replaced. If the slab will not be replaced, then four suction points would provide sufficient coverage of Building 1.

If a passive system will need to be changed to an active system, the Pilot Test flow rate test data will be utilized to specify properly sized SSDS fans.

SSDS DESIGN AND INSTALLATION

This section presents the SSDS design and installation approach for the SSDS at each building, followed by subsections that are specific to buildings where the slabs will be removed (Buildings 5, 6, 7, 10 & 11), or where the slab will be trenched (Building 4). After a building occupant and use are identified for Building 1, the SSDS design will be confirmed, but it will be one of the two approaches used for the other Site buildings.

Design drawings and specifications for each SSDS are attached. If alterations to building plans result from permit approvals, etc. that warrant substantial changes to the SSDS, an amendment will be made to this document detailing necessary changes. SSDS construction will be completed by BBL Barnett, LLC (BBL) or their contractors. LaBella will provide construction inspections and post-installation IAQ sampling.

The SSDS will be installed consistent with the NYSDOH *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated October 2006 (and associated amendments). The majority of the system will be constructed of Schedule 40 polyvinyl chloride (PVC) piping and fittings which shall conform to ASTM D3034. Exposed interior piping will be Schedule 40 Chlorinated PVC (CPVC) which has higher heat resistance to protect the system in case of fire. Each SSDS is designed to be a passive system that can be converted to an active system, if IAQ data indicates that additional mitigation is warranted.

Following slab trenching or removal, subbase materials will be excavated to an elevation of 12 inches below the planned floor elevation. Excavated material will be field screened and segregated based on screening results into material that requires either 1) off-site disposal or 2) testing to determine if the material can be reused on-site as soil beneath a cover or be used as cover soil. Excavations will be conducted consistent with the Excavation Work Plan located within the Interim Site Management Plan (ISMP).

The excavations will be backfilled with washed #1a round peastone gravel. Horizontal vacuum laterals consisting of 3-inch diameter Schedule 40 PVC with machine cut slots will be placed within the peastone backfill, approximately 4 inches below the bottom of the slab. In Building 4 trenches, the laterals are expected to be co-located with other building utility lines. Vacuum laterals will be manifolded beneath the slab. Open ends of the horizontal slotted lateral piping will be capped with Schedule 40 PVC caps. Vertical suction piping will be plumbed to each lateral and extended above the floor grade. Suction piping will consist of 3-inch diameter Schedule 40 PVC. The SSDS layouts are depicted in Figures 2 through 8.

Prior to pouring concrete for floors, a vapor barrier consisting of 15-mil polyethylene or approved



equivalent flexible sheeting material (i.e., Stego® Vapor Barrier) will be placed on top of the peastone, directly beneath the concrete slab. Penetrations in the sheeting (i.e., suction lines, piping, utilities) will be sealed with Stego® Tape or equivalent. Cracks within the existing concrete slab will be sealed with urethane caulk. System monitoring points (MPs), into the subbase and away from SSDS piping, to provide a future sub-slab sampling point for the post-installation soil vapor intrusion (SVI) sampling. Should the SSDS need to be made into an active system, MPs could also be used to confirm the radius of influence. Proposed MP locations are depicted on the attached Figures. MPs will generally be installed a sufficient distance from vacuum points or vacuum laterals to demonstrate vacuum coverage over the entire floor slab. The MPs will be placed toward the edge of the estimated edge of the area of influence. MP locations may be altered due to field conditions.

Suction piping will be plumbed to the building roof through client specified pipe chases, typically through interior walls containing other piping. Piping will be adequately secured using pipe brackets. Labels will be attached to the vertical risers indicating the piping is for a SSDS. Each above grade vacuum leg will be outfitted with a vacuum indication manometer in an accessible location.

The SSDS will initially operate in a passive mode utilizing a turbine vent mounted on the building roof. Should indoor air analysis indicate vapor intrusion, the SSDS will be retrofitted with an adequate electrically powered fan, creating an active SSDS. Fans may be changed depending upon results of subsequent pressure field confirmation testing. Active SSDSs will be equipped with operation indicator lights and vacuum display.

SSDS effluent (passive or active) will be mounted on the building roof to comply with National Register of Historic Places requirements. The effluent will be discharged at least 10 feet from any air intakes, at least 12 inches above the roof surface and at least 10 feet from any opening that is less than 2 feet below the effluent point.

MPs will consist of Vapor Pin® sampling devices (https://www.vaporpin.com/pressure-field-extension-testing/). The MPs will be installed by initially drilling a 1.50-inch hole partially into the concrete floor slab to accommodate a flush-mount stainless steel secured cover. A 5/8-inch hole will then be drilled through the slab to install the sampling pin. The pin includes a silicon sealing sleeve. The flush-mount cover will be secured and sealed to the slab using hydraulic cement.

<u>Building 4 SSDS</u> – Partial slab removal and trenching for the installation of utilities is planned for Building 4 and began on May 22, 2024. Communication pilot test results indicate that the trenching locations can be utilized to apply adequate depressurization over the entire footprint of Building 4. Proposed trenching locations are depicted in **Figure 2**. **Figure 9** shows typical construction cross section and other details. Following installation, the floor will be sealed with urethane caulk.

<u>Buildings 5, 6, 7, 10 & 11 SSDSs:</u> – The existing concrete floor slabs in Buildings 5, 6, 7, 10 and 11 will be removed and replaced with new poured slabs (refer to the April 29, 2024, *Interim Remedial Measures Work Plan - Slab Demolitions for Buildings 1, 4, 5, 6, 7, 8, 10 and 11, and Former Buildings 2 and 3*). Vacuum laterals will be manifolded beneath the slab and be spaced on 25-foot centers. The SSDS layouts are depicted in **Figures 3, 4, 5, 6, & 7. Figure 9** shows typical construction cross section and other details. Following installation, the floor will be sealed with urethane caulk.

Building 1 SSDS - After a building occupant and use are identified for Building 1, the SSDS design will



be confirmed, but is expected to be one of the two approaches presented above, with more details presented below. Refer to **Figure 8** for Building 1 SSDS options, and **Figure 9** for typical construction cross section and other details.

- Slab Remains in Place Option Four suction points are proposed with locations either adjoining the building interior walls or adjoining to building columns. Vertical risers would extend up the wall/column and the piping would be manifolded together at one ceiling location, before penetrating near the center of the roof.
- Slab is Removed Option Two horizontal vacuum laterals would be installed and connected
 to horizontal laterals that are manifolded together beneath the slab into one lateral that
 extends to an interior building wall. One vertical riser would extend up the wall and either
 extend toward a central ceiling location before penetrating near the center of the roof, or
 penetrate the roof before extending towards a central location and rising up.

HEALTH AND SAFETY PLAN

LaBella's Health and Safety Plan (HASP) for this project is included in Attachment 2.

COMMUNITY AIR MONITORING PLAN

The NYSDOH Generic Community Air Monitoring Plan (CAMP) and Fugitive Dust and Particulate Monitoring will be utilized for soil disturbance during implementation of this IRM, and is included in **Attachment 3**. Based on the nature of the work some modifications/clarifications are warranted for the CAMP monitoring. These are provided below:

- Work beneath slabs will be completed within buildings and thus upwind/downwind monitoring
 will be modified. Specifically, a background reading for VOCs and fugitive dust will be
 established at each work area prior to conducting subsurface penetrations. Subsequent to
 completing work and sealing the floor penetrations, a reading for VOCs will be recorded to
 confirm background levels have been established.
- During SSDS installation work, one fugitive dust monitoring station will be set up outside the building where SSDS installation work is being performed. It should be noted that coring of the concrete floor will likely create some minimal dust for a short duration and wet techniques will be employed to minimize this issue.
- During SSDS installation work, one PID station will be established approximately 10 feet from the open slab area. For buildings where the complete slab is removed, the PID station may be co-located with the dust monitoring station just outside the building/work area.

HOUSEKEEPING AND INVESTIGATION DERIVED WASTE

Waste materials anticipated to be generated during the implementation of this IRM Work Plan include soil from the installation of the SSDS. Excavated material will be field screened and segregated based on screening results into material that requires either 1) off-site disposal or 2) testing to determine if the material can be reused on-site as soil beneath a cover or be used as cover soil. Excavations will be conducted consistent with the Excavation Work Plan located within the Interim Site Management Plan (ISMP). Good housekeeping practices will be followed to minimize impacted soil in contact with the floor and such soil will be promptly picked up and placed in an appropriate location.



POST ACTIVE SSDS STARTUP PRESSURE FIELD CONFIRMATION

Should indoor air analysis indicate the need for active SSDSs, the systems will be retrofitted with adequate electrically powered fans, creating an active SSDS. Fans may be changed depending upon results of subsequent pressure field confirmation testing.

Following active SSDS startup, the system components will be inspected to ensure proper operation. Vacuum point manometers will be checked, and smoke testing or equivalent will be performed at slab penetrations and cracks to identify openings that could affect pressure field measurements. Identified breaches in the slab will be sealed with urethane caulk.

Following approximately 30 days of SSDS operation, vacuum at each MP will be measured utilizing a micromanometer to confirm a minimum vacuum gradient of 0.004 IWC. Should measurements determine an inadequate vacuum gradient, SSDS adjustments will be made which may include fan retrofitting. The vacuum gradient will be retested following any SSDS changes to confirm adequate vacuum.

POST-INSTALLATION SVI SAMPLING

At least thirty (30) days after SSDS startup, confirmatory indoor air quality (IAQ) samples, including sub-slab vapor and indoor air, should be completed prior to occupancy, during heating season (November 15th – March 31th) and once the buildings HVAC systems are up and running. Fourteen pairs of sub-slab and indoor air samples are planned to be collected (28 samples) plus two duplicates and one outdoor air sample. The location of the outdoor air sample will be dependent on wind direction on the day of sampling.

The IAQ sampling will be completed consistent with the procedures provided in the Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York dated October 2006. Indoor air samples will be collected from a height of approximately three (3)-feet above the floor surface utilizing Summa® canisters with pre-set regulator set to 24-hours.

Subsequent to completing the indoor and outdoor air sampling, the samples will be sent under standard COC procedures to the laboratory for testing. The samples will be analyzed for VOCs by a New York State Environmental Laboratory Accreditation Program (ELAP) certified laboratory using USEPA Method TO-15 with a minimum detection limit of $1 \mu g/m^3$ with 0.25 $\mu g/m^3$ for TCE and vinyl chloride.

QUALITY ASSURANCE/QUALITY CONTROL PLAN AND DUSR

Activities completed at the Site will be managed under LaBella's Quality Control Program, which is included in the Remedial Investigation Work Plan. For the TO-15 samples, the laboratory will provide a data package using the ASP Category B format. A DUSR will be completed for the ASP-B format laboratory data packages per DER-10. The DUSR will include the laboratory data summary pages showing corrections made by the data validator and each page will be initialed by the data validator. The laboratory data summary pages will be included even if no changes were made.

REPORTING



The information and laboratory analytical data obtained during the IRM will be included in an IRM Construction Completion Report (CCR). The CCR will be completed consistent with DER-10 Section 5.8. Construction details for the system including the final system layout, and system components, as well as post-installation SVI sampling data will be documented in an IRM Construction Completion Report (CCR) and also in the NYSDEC-approved EDD format in EQuIS.

CERTIFICATION

I <u>Fil L. Fina III, PE</u> certify that I am currently a NYS registered professional engineer and that this IRM Work Plan and Design Report 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 that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

CLOSING

If you have any questions, or require additional information, please do not hesitate to contact me or Fil L. Fina III, PE at (518) 885-5383 x 203.

Respectfully submitted,

LABELLA ASSOCIATES, D.P.C.

Arlette St. Romain Brownfields Program Manager



Fil L. Fina III, PE Vice President, Principal

Attachments:

Figure 1 – 2021 Sub-Slab Data Sampling Results – LaBella summary of data collected by Alpine

Figure 2 - SSDS Layout Building 4

Figure 3 - SSDS Layout Building 5

Figure 4 - SSDS Layout Building 6

Figure 5 – SSDS Layout Building 7

Figure 6 - SSDS Layout Building 10

Figure 7 - SSDS Layout Building 11

Figure 8 – SSDS Layout Building 1

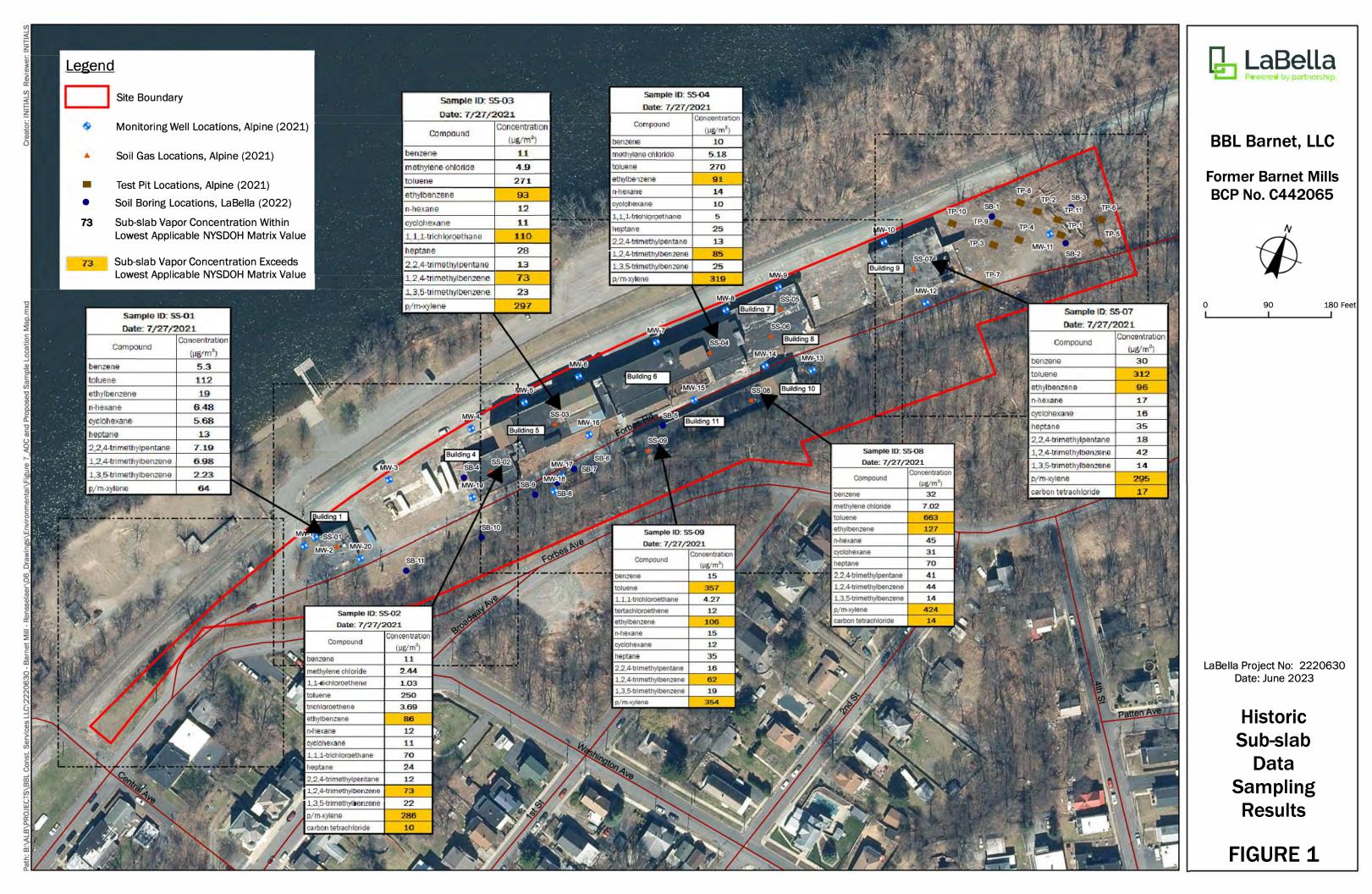
Figure 9 - Typical construction cross section and other details

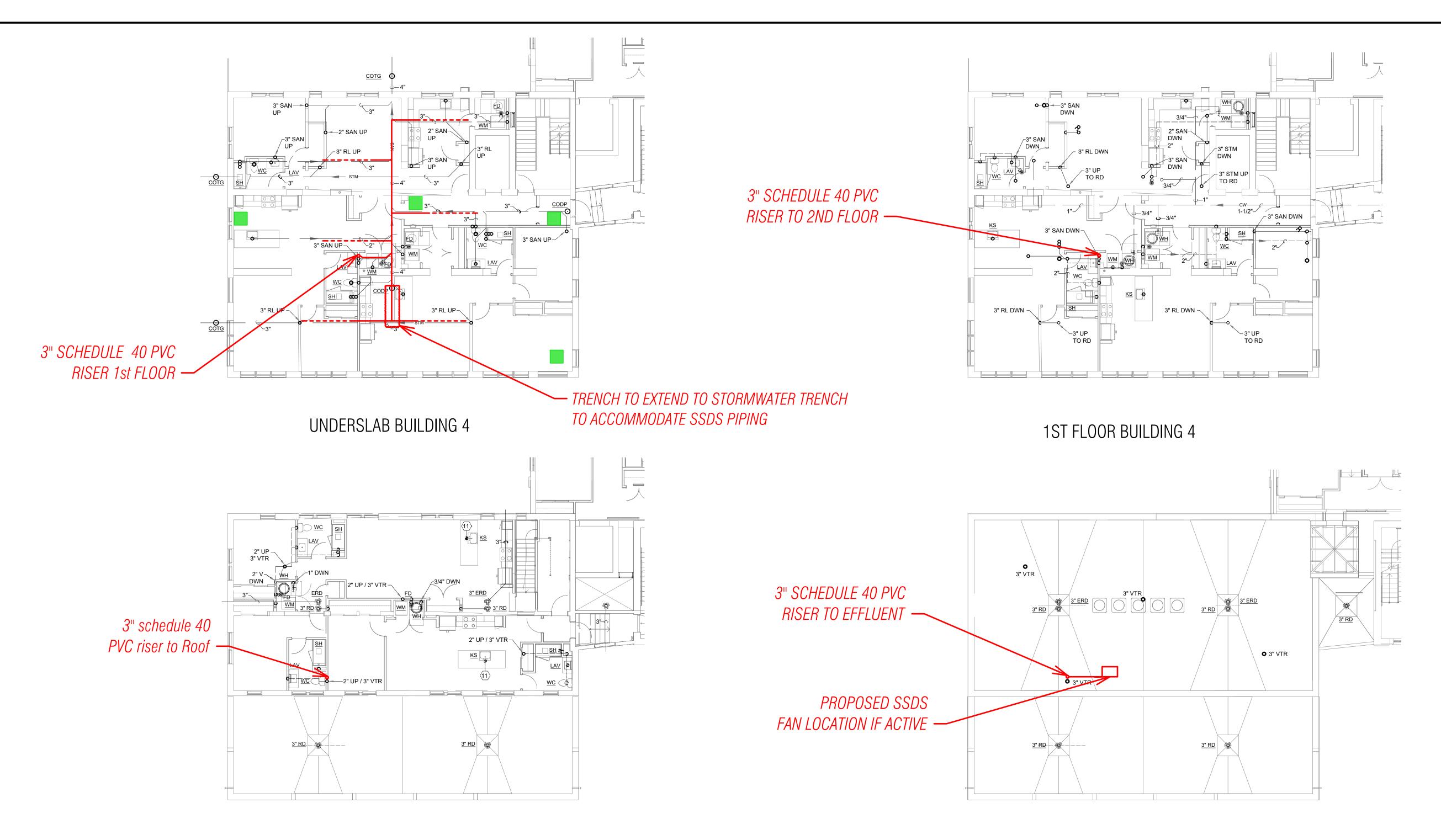
Attachment 1 - Sub Slab Depressurization System Communication Pilot Test Results letter, dated

April 23, 2024, prepared by LaBella

Attachment 2 - HASPAttachment 3 - CAMP







2ND FLOOR BUILDING 4

LEGEND:

SSDS Solid 3" Schedule 40 PVC

SSDS Slotted 3" Schedule 40 PVC

MONITORING POINT

Scale: 1 " = 10'-0"

TIE PENETRATIONS, IF APPLICABLE.

SSDS PIPING WILL BE PLACED IN SUB SLAB TRENCHES FOR BUILDING PLUMBING.

VAPOR BARRIER. STEGO WRAP 20-MIL CLASS A OR APPROVED EQUIVALENT FLEXIBLE SHEETING MATERIAL SHALL BE PLACED ABOVE (ON TOP OF) THE GAS PERMEABLE LAYER PRIOR TO POURING THE SLAB OR PLACING THE FLOOR ASSEMBLY TO SERVE AS A SOIL-VAPOR-BARRIER, BY BRIDGING ANY CRACKS THAT DEVELOP IN THE SLAB OR FLOOR ASSEMBLY. THE SHEETING SHOULD COVER THE ENTIRE FLOOR AREA, SEPARATE SECTIONS OF SHEETING SHOULD BE OVERLAPPED AT LEAST 12 INCHES. THE SHEETING SHALL BE SEALED AROUND ANY PIPE, WIRE OR OTHER PENETRATIONS OF THE MATERIAL, PER THE MANUFACTURER'S INSTRUCTIONS. ALL PUNCTURES OR TEARS IN THE MATERIAL REPAIRED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS. THE SHEETING SHALL MEET THE FOLLOWING REQUIREMENTS (E.G., STEGO WRAP 20-MIL CLASS A VAPOR BARRIER OR APPROVED

3. SEAMS IN THE VAPOR BARRIER SHALL BE SEALED WITH A PRODUCT DESIGNED TO BE COMPATIBLE WITH THE VAPOR BARRIER (E.G., STEGO TAPE FOR STEGO WRAP PRODUCTS).

4. PREVENTION OF SOIL VAPOR ENTRY: ALL CONCRETE FLOOR SLABS SHALL BE DESIGNED, MIXED, PLACED, REINFORCED, CONSOLIDATED, FINISHED, AND CURED TO MINIMIZE THE FORMATION OF CRACKS IN ACCORDANCE WITH STANDARDS SET FORTH IN THE MODEL BUILDING CODES.

5. LARGE OPENINGS, IF ANY, THROUGH THE CONCRETE FLOOR SLAB, GRADE BEAMS, OR OTHER FOUNDATION COMPONENTS IN CONTACT WITH THE SOIL (E.G., SPACES AROUND STORM SEWER PIPING, ETC.) SHALL BE FILLED OR CLOSED WITH MATERIALS THAT PROVIDE A PERMANENT AIRTIGHT SEAL SUCH AS NON-SHRINK MORTAR, GROUTS, EXPANDING FOAM, OR SIMILAR MATERIALS DESIGNED FOR SUCH APPLICATION.

6. SMALLER GAPS AROUND ALL PIPE, WIRE, OR OTHER OBJECTS, IF ANY, THAT PENETRATE CONCRETE FLOOR SLAB OR OTHER FLOOR ASSEMBLIES SHALL BE MADE AIR-TIGHT WITH AN ELASTOMERIC JOINT SEALANT, AS DEFINED IN ASTM C920-87. AND APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

7. ALL CONTROL JOINTS, ISOLATION JOINTS, CONSTRUCTION JOINTS, AND ANY OTHER JOINTS IN THE CONCRETE FLOOR SLAB OR BETWEEN THE FLOOR SLAB AND THE BUILDING'S WALLS SHALL BE SEALED. A CONTINUOUS FORMED GAP (FOR EXAMPLE, A "TOOLED EDGE") WHICH ALLOWS THE APPLICATION OF A SEALANT THAT WILL PROVIDE A CONTINUOUS, AIRTIGHT SEAL SHALL BE CREATED ALONG ALL JOINTS. WHEN THE SLAB HAS CURED, THE GAP SHALL BE CLEARED OF LOOSE MATERIAL AND FILLED WITH AN ELASTOMERIC JOINT SEALANT, AS DEFINED IN ASTM C920-97, AND APPLIED IN

ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. JOINTS, CRACKS, OR OTHER OPENINGS AROUND ALL PENETRATIONS OF BOTH EXTERIOR AND INTERIOR SURFACES OF MASONRY BLOCK OR POURED CONCRETE FOUNDATION COMPONENTS BELOW THE GROUND SURFACE SHALL BE SEALED WITH AN ELASTOMERIC SEALANT THAT PROVIDES AN AIR-TIGHT SEAL. PENETRATIONS OF POURED CONCRETE WALLS SHOULD ALSO BE SEALED ON THE EXTERIOR SURFACE. THIS INCLUDES SEALING OF WALL

9. VAPOR COLLECTION AND VENT SYSTEM: LENGTHS OF SUB-SLAB VAPOR COLLECTION PIPING SHALL BE INSTALLED BENEATH THE VAPOR BARRIER. SUB-SLAB VAPOR COLLECTION PIPING WILL BE 3-INCH DIAMETER, PERFORATED PVC PIPING OR SLOTTED (0.020 TO 0.040-INCH SLOT) PVC PIPING OR APPROVED EQUIVALENT.

ROOF BUILDING 4

10. INSTALL CAP AT EACH VAPOR COLLECTION PIPE TERMINATION.

11. SOLID BELOW GRADE PIPE SLOPED DOWN AT MINIMUM 1/16 INCH PER FOOT AWAY FROM RISER (I.E., DRAINED BACK TO PERFORATED PIPE).

12. SLOPE ANY ABOVE GRADE HORIZONTAL SOLID PIPE AT A MINIMUM OF 1/16 INCH PER FOOT TO ALLOW DRAINAGE BACK TO SUBSURFACE.

13. THE VAPOR COLLECTION PIPING SHALL BE CONNECTED VIA THE APPROPRIATE FITTINGS TO 3-INCH DIAMETER SOLID PVC PIPE. THE RISERS SHALL PENETRATE THE BUILDING ENVELOPE THROUGH THE CONCRETE FLOOR SLAB AS DEPICTED ON FIGURE 9.

14. THE HEADER PIPE SHALL DAYLIGHT ABOVE THE FLOOR SLAB, IN THE LOCATIONS DEPICTED ON DRAWING NUMBER 8. THE VERTICAL PIPES SHALL EXTEND THROUGH THE ROOF AND TERMINATE AT LEAST 12 INCHES ABOVE THE SURFACE OF THE ROOF, IN A LOCATION THAT IS: AT LEAST 10 FEET FROM ANY AIR IN-TAKES, ANY WINDOW, OR OTHER OPENING INTO THE CONDITIONED SPACES OF THE BUILDING THAT IS LESS THAN 4 FEET BELOW THE EXHAUST POINT; AND AT LEAST 10 FEET FROM ANY ADJOINING OR ADJACENT BUILDINGS. ALL ROOF PENETRATIONS MUST BE PROPERLY SEALED AND COMPLETED IN ACCORDANCE WITH OTHER RELATED SPECIFICATIONS.

15. ALL EXPOSED AND VISIBLE INTERIOR AND EXTERIOR VENT PIPES SHALL BE IDENTIFIED WITH LABELS PLACED AT LEAST EVERY 10 FEET, "SUB SLAB

DEPRESSURIZATION SYSTEM". MINIMUM ONE LABEL PER FLOOR. 16. VENT PIPES SHALL BE INSTALLED IN A CONFIGURATION AND SUPPORTED IN A MANNER THAT ENSURES THAT ANY RAINWATER OR CONDENSATION ACCUMULATING WITHIN THE PIPES DRAINS DOWNWARD INTO THE GROUND BENEATH THE VAPOR BARRIER.

17. THE CONTRACTOR SHALL PROVIDE PHOTO DOCUMENTATION FOR ALL PIPING PRIOR TO COVERING. 18. VENT STACK TERMINATION WILL BE A PROTECTIVE WOVEN WIRE MESH CAP BEFORE A WIND-ACTUATED TURBINE VENT. EMPIRE TV04G OR

EQUIVALENT IF PASSIVE 19. VENT STACK POST SSDS FAN WILL BE TERMINATED WITH A RAIN CAP FOR ACTIVE SYSTEM.

20. ELECTRICAL: AN ELECTRICAL CONTRACTOR WILL INSTALL JUNCTION BOX WITH 10/3 WIRE WITH GROUND IN THE VICINITY OF THE VENT STACKS TO

ALLOW FOR THE INSTALLATION OF AN IN-LINE RADON FAN AT A FUTURE POINT IN TIME IF NECESSARY. 21. GENERAL: HEATING, VENTILATING, AND AIR CONDITIONING (HVAC) SYSTEMS SHALL BE DESIGNED AND INSTALLED TO AVOID DEPRESSURIZATION

OF THE BUILDING RELATIVE TO UNDERLYING AND SURROUNDING SOIL. SPECIFICALLY, JOINTS IN AIR DUCTS AND PLENUMS PASSING THROUGH UNCONDITIONED SPACES SHALL BE SEALED.

22. THIS DRAWING IS NOT INTENDED TO PROVIDE STRUCTURAL INFORMATION. REFER TO STRUCTURAL DRAWINGS.

23. FIRE COLLARS INSTALLED BETWEEN FLOORS ON VERTICAL RISERS BASED ON MANUFACTURER'S INSTRUCTIONS. 24. INSTALL MONITORING POINTS TO MANUFACTURER'S SPECIFICATIONS.

25. FOLLOW ALL MANUFACTURER'S INSTRUCTIONS AND SPECIFICATIONS. 26. EXPOSED INTERIOR PIPING WILL BE SCHEDULE 40 CPVC.

5 Mc-Crea Hill Road Ballston Spa, NY 12020 518-885-5383

labellapc.com

EXP: ##/##/20##

CERTIFICATE OF AUTHORIZATION NUMBER: PROFESSIONAL ENGINEERING: 018281 LAND SURVEYING: 017976 GEOLOGICAL: 018750

It is a violation of New York Education Law Art. 145 Sec. 7209 & Art. 147 Sec. 7307, for any person, unless acting under the direction of a licensed architect, professional engineer, or land surveyor, to alter an item in any way. If an item bearing the seal of an architect, engineer, or land surveyor is altered; the altering architect, engineer, or land surveyor shall affix to the item their seal and notation "altered by" followed by their signature and date of such alteration, and a specific description of the alteration.

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BBL CONSTRCUTION Client Address

BARNET MILLS

FORBES AVE, RENNSELLAER

NO: DATE: DESCRIPTION:

PROJECT NUMBER 2220630.01

DRAWN BY: NS

REVIEWED BY: ISSUED FOR:

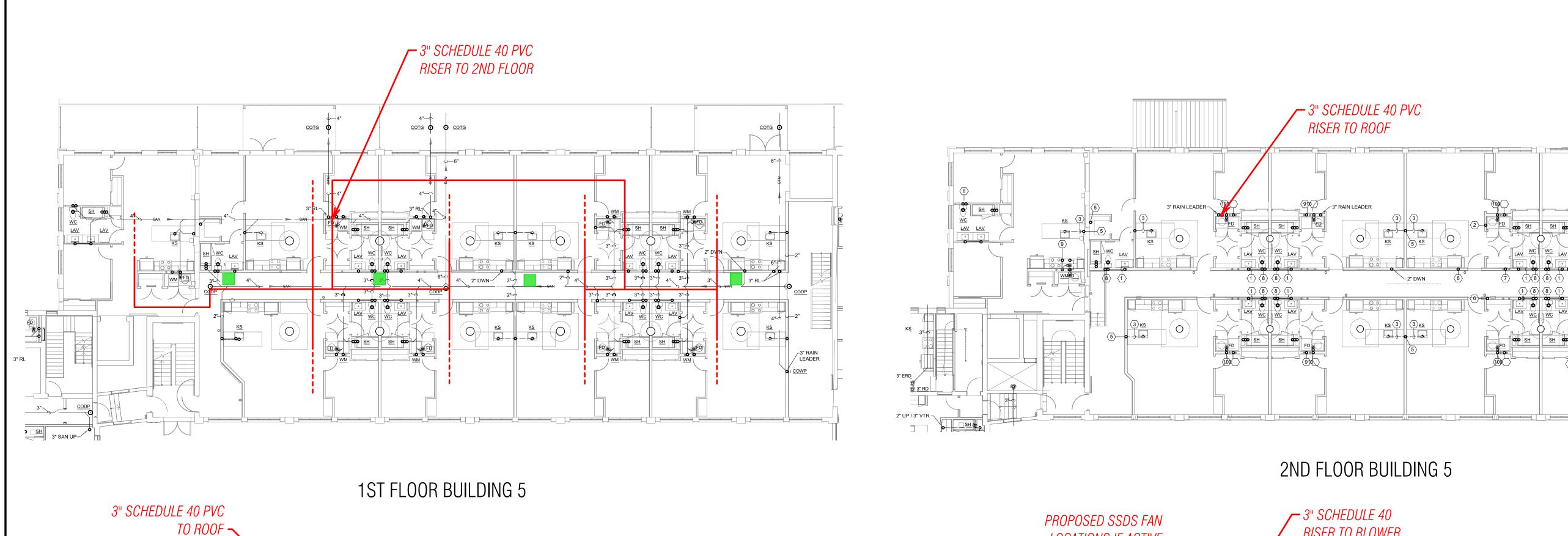
DATE:

BBL Construction 10/04/2024

DRAWING NAME:

BUILDING 4 SSDS LAYOUT

DRAWING NUMBER:



PROPOSED SSDS FAN RISER TO BLOWER LOCATIONS IF ACTIVE -• 4" VTR 4" VTR CONDUCTOR

3RD FLOOR BUILDING 5

3" UP / 4" VTR-/ 3" UP / 4" VTR-

SSDS Solid 3" Schedule 40 PVC

SSDS Slotted 3" Schedule 40 PVC

MONITORING POINT

Scale: 1 = 12 - 6

_3" UP / 4" VTR

KS ...

LEGEND:

3" VTR

2" UP / 3" VTR

1. VAPOR BARRIER. STEGO WRAP 20-MIL CLASS A OR APPROVED EQUIVALENT FLEXIBLE SHEETING MATERIAL SHALL BE PLACED ABOVE (ON TOP OF) THE GAS PERMEABLE LAYER PRIOR TO POURING THE SLAB OR PLACING THE FLOOR ASSEMBLY TO SERVE AS A SOIL-VAPOR-BARRIER, BY BRIDGING ANY CRACKS THAT DEVELOP IN THE SLAB OR FLOOR ASSEMBLY. THE SHEETING SHOULD COVER THE ENTIRE FLOOR AREA, SEPARATE SECTIONS OF SHEETING PER THE MANUFACTURER'S INSTRUCTIONS. ALL PUNCTURES OR TEARS IN THE MATERIAL REPAIRED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS. THE SHEETING SHALL MEET THE FOLLOWING REQUIREMENTS (E.G., STEGO WRAP 20-MIL CLASS A VAPOR BARRIER OR APPROVED EQUIVALENT):

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2. SEAMS IN THE VAPOR BARRIER SHALL BE SEALED WITH A PRODUCT DESIGNED TO BE COMPATIBLE WITH THE VAPOR BARRIER (E.G., STEGO TAPE FOR STEGO WRAP PRODUCTS).

3. PREVENTION OF SOIL VAPOR ENTRY: ALL CONCRETE FLOOR SLABS SHALL BE DESIGNED, MIXED, PLACED, REINFORCED, CONSOLIDATED, FINISHED, AND CURED TO MINIMIZE THE FORMATION OF CRACKS IN ACCORDANCE WITH STANDARDS SET FORTH IN THE MODEL BUILDING CODES.

4. LARGE OPENINGS, IF ANY, THROUGH THE CONCRETE FLOOR SLAB, GRADE BEAMS, OR OTHER FOUNDATION COMPONENTS IN CONTACT WITH THE SOIL (E.G., SPACES AROUND STORM SEWER PIPING, ETC.) SHALL BE FILLED OR CLOSED WITH MATERIALS THAT PROVIDE A PERMANENT AIRTIGHT SEAL SUCH AS NON-SHRINK MORTAR, GROUTS, EXPANDING FOAM, OR SIMILAR MATERIALS DESIGNED FOR SUCH APPLICATION

SMALLER GAPS AROUND ALL PIPE, WIRE, OR OTHER OBJECTS, IF ANY, THAT PENETRATE CONCRETE FLOOR SLAB OR OTHER FLOOR ASSEMBLIES SHALL BE MADE AIR-TIGHT WITH AN ELASTOMERIC JOINT SEALANT, AS DEFINED IN ASTM C920-87, AND APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

6. ALL CONTROL JOINTS, ISOLATION JOINTS, CONSTRUCTION JOINTS, AND ANY OTHER JOINTS IN THE CONCRETE FLOOR SLAB OR BETWEEN THE FLOOR SLAB AND THE BUILDING'S WALLS SHALL BE SEALED. A CONTINUOUS FORMED GAP (FOR EXAMPLE, A "TOOLED EDGE") WHICH ALLOWS THE APPLICATION OF A SEALANT THAT WILL PROVIDE A CONTINUOUS, AIRTIGHT SEAL SHALL BE CREATED ALONG ALL JOINTS. WHEN THE SLAB HAS CURED, THE GAP SHALL BE CLEARED OF LOOSE MATERIAL AND FILLED WITH AN ELASTOMERIC JOINT SEALANT, AS DEFINED IN ASTM C920-97, AND APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

7. JOINTS, CRACKS, OR OTHER OPENINGS AROUND ALL PENETRATIONS OF BOTH EXTERIOR AND INTERIOR SURFACES OF MASONRY BLOCK OR TIE PENETRATIONS, IF APPLICABLE.

8. VAPOR COLLECTION AND VENT SYSTEM: LENGTHS OF SUB-SLAB VAPOR COLLECTION PIPING SHALL BE INSTALLED BENEATH THE VAPOR BARRIER. SUB-SLAB VAPOR COLLECTION PIPING WILL BE 3-INCH DIAMETER, PERFORATED PVC PIPING OR SLOTTED (0.020 TO 0.040-INCH SLOT) PVC PIPING OR

ROOF BUILDING 5

APPROVED EQUIVALENT.

INSTALL CAP AT EACH VAPOR COLLECTION PIPE TERMINATION.

10. SOLID BELOW GRADE PIPE SLOPED DOWN AT MINIMUM 1/16 INCH PER FOOT AWAY FROM RISER (I.E., DRAINED BACK TO PERFORATED PIPE).

11. SLOPE ANY ABOVE GRADE HORIZONTAL SOLID PIPE AT A MINIMUM OF 1/16 INCH PER FOOT TO ALLOW DRAINAGE BACK TO SUBSURFACE. 12. THE VAPOR COLLECTION PIPING SHALL BE CONNECTED VIA THE APPROPRIATE FITTINGS TO 3-INCH DIAMETER SOLID PVC PIPE. THE RISERS SHALL

13. THE HEADER PIPE SHALL DAYLIGHT ABOVE THE FLOOR SLAB, IN THE LOCATIONS DEPICTED ON DRAWING NUMBER 8 . THE VERTICAL PIPES SHALL EXTEND THROUGH THE ROOF AND TERMINATE AT LEAST 12 INCHES ABOVE THE SURFACE OF THE ROOF, IN A LOCATION THAT IS: AT LEAST 10 FEET FROM ANY AIR IN-TAKES, ANY WINDOW, OR OTHER OPENING INTO THE CONDITIONED SPACES OF THE BUILDING THAT IS LESS THAN 4 FEET BELOW THE EXHAUST POINT; AND AT LEAST 10 FEET FROM ANY ADJOINING OR ADJACENT BUILDINGS. ALL ROOF PENETRATIONS MUST BE PROPERLY SEALED AND COMPLETED IN ACCORDANCE WITH OTHER RELATED SPECIFICATIONS

14. ALL EXPOSED AND VISIBLE INTERIOR AND EXTERIOR VENT PIPES SHALL BE IDENTIFIED WITH LABELS PLACED AT LEAST EVERY 10 FEET, "SUB SLAB

15. VENT PIPES SHALL BE INSTALLED IN A CONFIGURATION AND SUPPORTED IN A MANNER THAT ENSURES THAT ANY RAINWATER OR CONDENSATION

ACCUMULATING WITHIN THE PIPES DRAINS DOWNWARD INTO THE GROUND BENEATH THE VAPOR BARRIER 16. THE CONTRACTOR SHALL PROVIDE PHOTO DOCUMENTATION FOR ALL PIPING PRIOR TO COVERING.

17. VENT STACK TERMINATION WILL BE A PROTECTIVE WOVEN WIRE MESH CAP BEFORE A WIND-ACTUATED TURBINE VENT. EMPIRE TV04G OR EQUIVALENT IF PASSIVE.

18. VENT STACK POST SSDS FAN WILL BE TERMINATED WITH A RAIN CAP FOR ACTIVE SYSTEM.

19. ELECTRICAL: AN ELECTRICAL CONTRACTOR WILL INSTALL JUNCTION BOX WITH 10/3 WIRE WITH GROUND IN THE VICINITY OF THE VENT STACKS TO ALLOW FOR THE INSTALLATION OF AN IN-LINE RADON FAN AT A FUTURE POINT IN TIME IF NECESSARY

20. GENERAL: HEATING, VENTILATING, AND AIR CONDITIONING (HVAC) SYSTEMS SHALL BE DESIGNED AND INSTALLED TO AVOID DEPRESSURIZATION OF THE BUILDING RELATIVE TO UNDERLYING AND SURROUNDING SOIL. SPECIFICALLY, JOINTS IN AIR DUCTS AND PLENUMS PASSING THROUGH UNCONDITIONED SPACES SHALL BE SEALED.

21. THIS DRAWING IS NOT INTENDED TO PROVIDE STRUCTURAL INFORMATION. REFER TO STRUCTURAL DRAWINGS.

FIRE COLLARS INSTALLED BETWEEN FLOORS ON VERTICAL RISERS BASED ON MANUFACTURER'S INSTRUCTIONS. 23. INSTALL MONITORING POINTS TO MANUFACTURER'S SPECIFICATIONS.

24. FOLLOW ALL MANUFACTURER'S INSTRUCTIONS AND SPECIFICATIONS. 25. EXPOSED INTERIOR PIPING WILL BE SCHEDULE 40 CPVC.

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EXP: ##/##/20##

CERTIFICATE OF AUTHORIZATION NUMBER: PROFESSIONAL ENGINEERING: 018281 LAND SURVEYING: 017976 GEOLOGICAL: 018750

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BBL CONSTRCUTION

Client Address

BARNET MILLS

FORBES AVE, RENNSELLAER

NO: DATE: DESCRIPTION:

PROJECT NUMBER: 2220630.01

REVIEWED BY:

DRAWN BY: NS

ISSUED FOR:

BBL Construction

10/04/2024

DRAWING NAME:

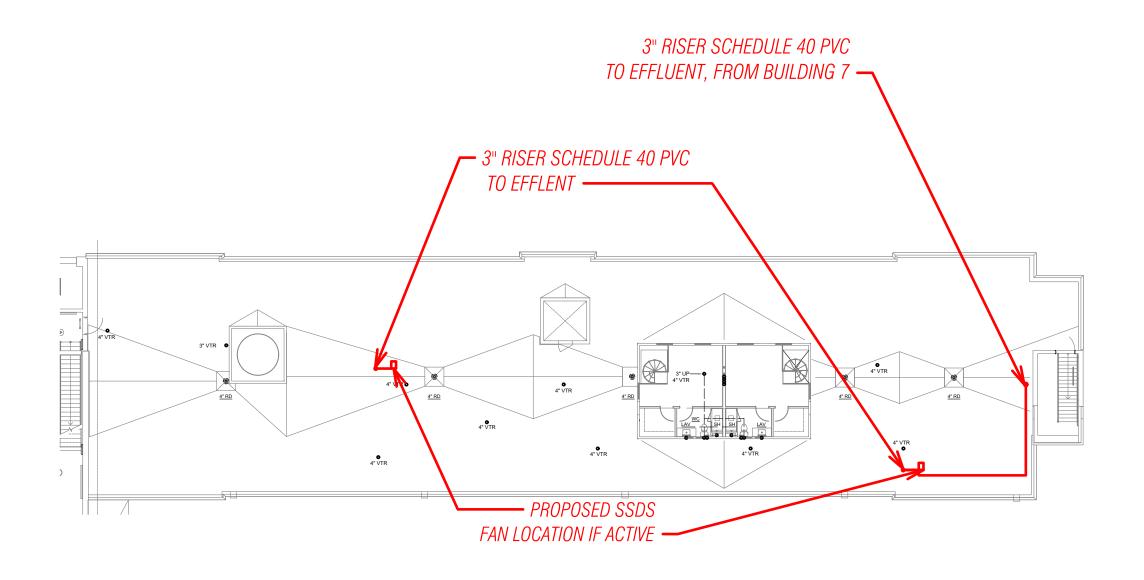
DATE:

BUILDING 5 SSDS LAYOUT

DRAWING NUMBER:

1ST FLOOR BUILDING 6

2ND FLOOR BUILDING 5



┌─ 3" RISER SCHEDULE 40 PVC

ROOF BUILDING 6

3" RISER SCHEDULE 40 PVC TO ROOF 3" RISER SCHEDULE 40 PVC TO ROOF 3" RISER SCHEDULE 40 PVC TO ROOF, FROM BUILDING 7

LEGEND:

SSDS Solid 3" Schedule 40 PVC

SSDS Slotted 3" Schedule 40 PVC

MONITORING POINT

Scale: 1 " = 20'-0"

NOTEC.

1. VAPOR BARRIER. STEGO WRAP 20-MIL CLASS A OR APPROVED EQUIVALENT FLEXIBLE SHEETING MATERIAL SHALL BE PLACED ABOVE (ON TOP OF) THE GAS PERMEABLE LAYER PRIOR TO POURING THE SLAB OR PLACING THE FLOOR ASSEMBLY TO SERVE AS A SOIL-VAPOR-BARRIER, BY BRIDGING ANY CRACKS THAT DEVELOP IN THE SLAB OR FLOOR ASSEMBLY. THE SHEETING SHOULD COVER THE ENTIRE FLOOR AREA, SEPARATE SECTIONS OF SHEETING SHOULD BE OVERLAPPED AT LEAST 12 INCHES. THE SHEETING SHALL BE SEALED AROUND ANY PIPE, WIRE OR OTHER PENETRATIONS OF THE MATERIAL, PER THE MANUFACTURER'S INSTRUCTIONS. ALL PUNCTURES OR TEARS IN THE MATERIAL REPAIRED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS. THE SHEETING SHALL MEET THE FOLLOWING REQUIREMENTS (E.G., STEGO WRAP 20-MIL CLASS A VAPOR BARRIER OR APPROVED EQUIVALENT):

2. SEAMS IN THE VAPOR BARRIER SHALL BE SEALED WITH A PRODUCT DESIGNED TO BE COMPATIBLE WITH THE VAPOR BARRIER (E.G., STEGO TAPE FOR STEGO WRAP PRODUCTS)

3. PREVENTION OF SOIL VAPOR ENTRY: ALL CONCRETE FLOOR SLABS SHALL BE DESIGNED, MIXED, PLACED, REINFORCED, CONSOLIDATED, FINISHED, AND CURED TO MINIMIZE THE FORMATION OF CRACKS IN ACCORDANCE WITH STANDARDS SET FORTH IN THE MODEL BUILDING CODES.

4. LARGE OPENINGS, IF ANY, THROUGH THE CONCRETE FLOOR SLAB, GRADE BEAMS, OR OTHER FOUNDATION COMPONENTS IN CONTACT WITH THE SOIL (E.G., SPACES AROUND STORM SEWER PIPING, ETC.) SHALL BE FILLED OR CLOSED WITH MATERIALS THAT PROVIDE A PERMANENT AIRTIGHT SEAL SUCH AS NON-SHRINK MORTAR, GROUTS, EXPANDING FOAM, OR SIMILAR MATERIALS DESIGNED FOR SUCH APPLICATION.

5. SMALLER GAPS AROUND ALL PIPE, WIRE, OR OTHER OBJECTS, IF ANY, THAT PENETRATE CONCRETE FLOOR SLAB OR OTHER FLOOR ASSEMBLIES SHALL BE MADE AIR-TIGHT WITH AN ELASTOMERIC JOINT SEALANT, AS DEFINED IN ASTM C920-87, AND APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

6. ALL CONTROL JOINTS, ISOLATION JOINTS, CONSTRUCTION JOINTS, AND ANY OTHER JOINTS IN THE CONCRETE FLOOR SLAB OR BETWEEN THE FLOOR SLAB AND THE BUILDING'S WALLS SHALL BE SEALED. A CONTINUOUS FORMED GAP (FOR EXAMPLE, A "TOOLED EDGE") WHICH ALLOWS THE APPLICATION OF A SEALANT THAT WILL PROVIDE A CONTINUOUS, AIRTIGHT SEAL SHALL BE CREATED ALONG ALL JOINTS. WHEN THE SLAB HAS CURED, THE GAP SHALL BE CLEARED OF LOOSE MATERIAL AND FILLED WITH AN ELASTOMERIC JOINT SEALANT, AS DEFINED IN ASTM C920-97, AND APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

7. JOINTS, CRACKS, OR OTHER OPENINGS AROUND ALL PENETRATIONS OF BOTH EXTERIOR AND INTERIOR SURFACES OF MASONRY BLOCK OR POURED CONCRETE FOUNDATION COMPONENTS BELOW THE GROUND SURFACE SHALL BE SEALED WITH AN ELASTOMERIC SEALANT THAT PROVIDES AN AIR-TIGHT SEAL. PENETRATIONS OF POURED CONCRETE WALLS SHOULD ALSO BE SEALED ON THE EXTERIOR SURFACE. THIS INCLUDES SEALING OF WALL TIE PENETRATIONS, IF APPLICABLE.

8. VAPOR COLLECTION AND VENT SYSTEM: LENGTHS OF SUB-SLAB VAPOR COLLECTION PIPING SHALL BE INSTALLED BENEATH THE VAPOR BARRIER.
SUB-SLAB VAPOR COLLECTION PIPING WILL BE 3-INCH DIAMETER, PERFORATED PVC PIPING OR SLOTTED (0.020 TO 0.040-INCH SLOT) PVC PIPING OR

APPROVED EQUIVALENT.

INSTALL CAP AT EACH VAPOR COLLECTION PIPE TERMINATION.

SOLID BELOW GRADE PIPE SLOPED DOWN AT MINIMUM 1/16 INCH PER FOOT AWAY FROM RISER (I.E., DRAINED BACK TO PERFORATED PIPE).

11. SLOPE ANY ABOVE GRADE HORIZONTAL SOLID PIPE AT A MINIMUM OF 1/16 INCH PER FOOT TO ALLOW DRAINAGE BACK TO SUBSURFACE.

12. THE VAPOR COLLECTION PIPING SHALL BE CONNECTED VIA THE APPROPRIATE FITTINGS TO 3-INCH DIAMETER SOLID PVC PIPE. THE RISERS SHALL

PENETRATE THE BUILDING ENVELOPE THROUGH THE CONCRETE FLOOR SLAB AS DEPICTED ON FIGURE 9.

13. THE HEADER PIPE SHALL DAYLIGHT ABOVE THE FLOOR SLAB, IN THE LOCATIONS DEPICTED ON DRAWING NUMBER 8. THE VERTICAL PIPES SHALL EXTEND THROUGH THE ROOF AND TERMINATE AT LEAST 12 INCHES ABOVE THE SURFACE OF THE ROOF, IN A LOCATION THAT IS: AT LEAST 10 FEET FROM ANY AIR IN-TAKES, ANY WINDOW, OR OTHER OPENING INTO THE CONDITIONED SPACES OF THE BUILDING THAT IS LESS THAN 4 FEET BELOW THE EXHAUST POINT; AND AT LEAST 10 FEET FROM ANY ADJOINING OR ADJACENT BUILDINGS. ALL ROOF PENETRATIONS MUST BE PROPERLY SEALED AND COMPLETED IN ACCORDANCE WITH OTHER RELATED SPECIFICATIONS.

14. ALL EXPOSED AND VISIBLE INTERIOR AND EXTERIOR VENT PIPES SHALL BE IDENTIFIED WITH LABELS PLACED AT LEAST EVERY 10 FEET, "SUB SLAB DEPRESSURIZATION SYSTEM". MINIMUM ONE LABEL PER FLOOR.

15. VENT PIPES SHALL BE INSTALLED IN A CONFIGURATION AND SUPPORTED IN A MANNER THAT ENSURES THAT ANY RAINWATER OR CONDENSATION ACCUMULATING WITHIN THE PIPES DRAINS DOWNWARD INTO THE GROUND BENEATH THE VAPOR BARRIER.

16. THE CONTRACTOR SHALL PROVIDE PHOTO DOCUMENTATION FOR ALL PIPING PRIOR TO COVERING.

17. VENT STACK TERMINATION WILL BE A PROTECTIVE WOVEN WIRE MESH CAP BEFORE A WIND-ACTUATED TURBINE VENT. EMPIRE TV04G OR

EQUIVALENT IF PASSIVE.

18 VENT STACK POST SSDS FAN WILL BE TERMINATED WITH A RAIN CAP FOR ACTIVE SYSTEM

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19. ELECTRICAL: AN ELECTRICAL CONTRACTOR WILL INSTALL JUNCTION BOX WITH 10/3 WIRE WITH GROUND IN THE VICINITY OF THE VENT STACKS TO

ALLOW FOR THE INSTALLATION OF AN IN-LINE RADON FAN AT A FUTURE POINT IN TIME IF NECESSARY.

20. GENERAL: HEATING, VENTILATING, AND AIR CONDITIONING (HVAC) SYSTEMS SHALL BE DESIGNED AND INSTALLED TO AVOID DEPRESSURIZATION OF THE BUILDING RELATIVE TO UNDERLYING AND SURROUNDING SOIL. SPECIFICALLY, JOINTS IN AIR DUCTS AND PLENUMS PASSING THROUGH UNCONDITIONED SPACES SHALL BE SEALED.

21. THIS DRAWING IS NOT INTENDED TO PROVIDE STRUCTURAL INFORMATION. REFER TO STRUCTURAL DRAWINGS.

22. FIRE COLLARS INSTALLED BETWEEN FLOORS ON VERTICAL RISERS BASED ON MANUFACTURER'S INSTRUCTIONS

23. INSTALL MONITORING POINTS TO MANUFACTURER'S SPECIFICATIONS.24. FOLLOW ALL MANUFACTURER'S INSTRUCTIONS AND SPECIFICATIONS.

24. FULLOW ALL MANUFACTURER'S INSTRUCTIONS AND SPEC 25. EXPOSED INTERIOR PIPING WILL BE SCHEDULE 80 CPVC. LaBella
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→ 3" RISER SCHEULDE 40 PVC

TO 3rd FLOOR, FROM BUILDING 7

CERTIFICATE OF AUTHORIZATION NUMBER: PROFESSIONAL ENGINEERING: 018281 LAND SURVEYING: 017976 GEOLOGICAL: 018750

EXP: ##/##/20##

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BBL CONSTRCUTION
Client Address

BARNET MILLS

FORBES AVE, RENNSELLAER

NO: DATE: DESCRIPTION:

Revisions

PROJECT NUMBER: 2220630.01

DRAWN BY: NS

ISSUED FOR:

DATE:

REVIEWED BY:

BBL Construction

10/04/2024

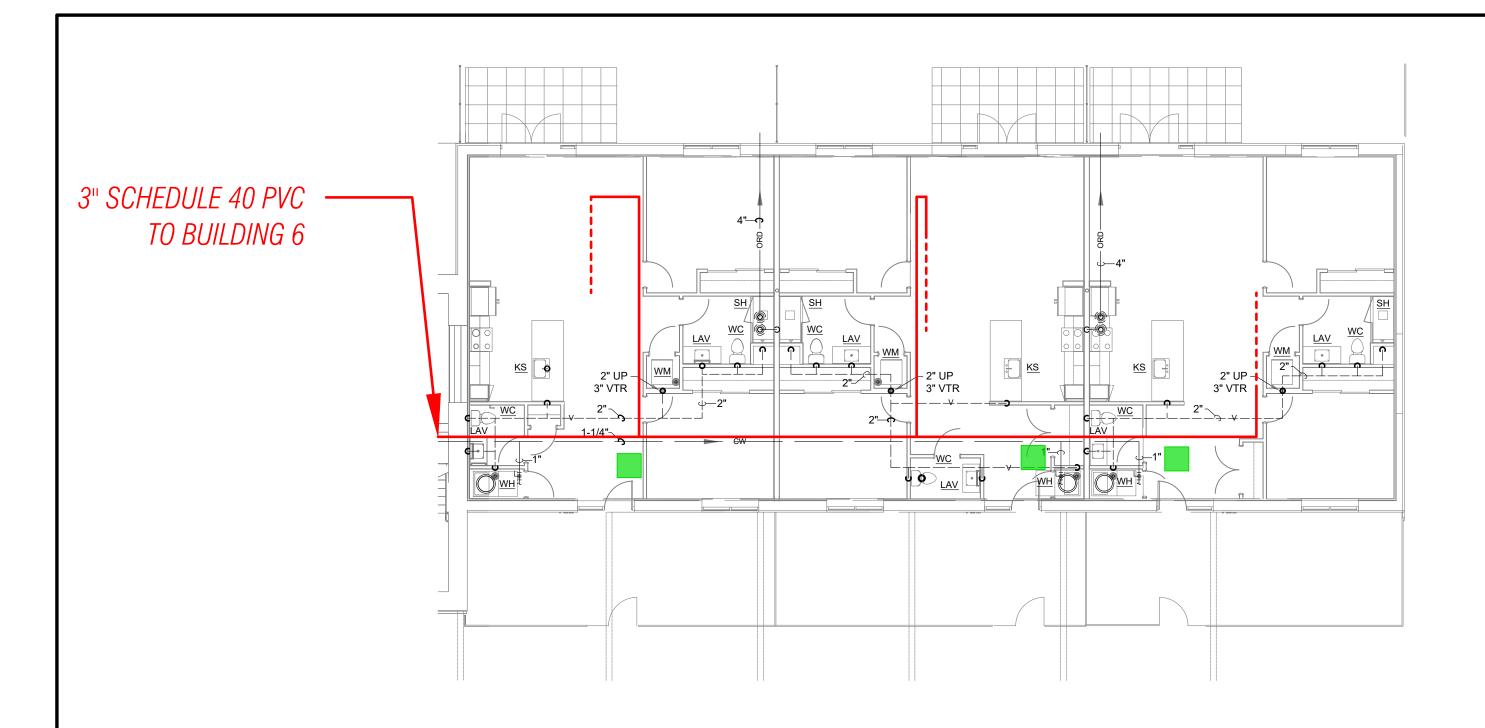
DRAWING NAME:

BUILDING 6 SSDS LAYOUT

DRAWING NUMBER:

1

10/4/2024 9:51:41 AM B:\GI OBAI \Proiects\BBI Construction Services\2220630 - Barnet Mill - Rensselaer\06 Drawings\Fnvironmenta\S



2ND FLOOR BUILDING 7

1ST FLOOR BUILDING 7

4" RD | /® 3" VTR---3" VTR—**→** 3" VTR—**►○**

ROOF BUILDING 7

LEGEND:

SSDS Solid 3" Schedule 40 PVC

SSDS Slotted 3" Schedule 40 PVC

MONITORING POINT

Scale: 1 = 20'-0"

SSDS PIPING WILL REMAIN BELOW THE SLAB AND PENETRATE THE FLOOR IN BUILDING 6 DUE TO LIMITED ROOF ACCESS

VAPOR BARRIER. STEGO WRAP 20-MIL CLASS A OR APPROVED EQUIVALENT FLEXIBLE SHEETING MATERIAL SHALL BE PLACED ABOVE (ON TOP OF) THE GAS PERMEABLE LAYER PRIOR TO POURING THE SLAB OR PLACING THE FLOOR ASSEMBLY TO SERVE AS A SOIL-VAPOR-BARRIER, BY BRIDGING ANY CRACKS THAT DEVELOP IN THE SLAB OR FLOOR ASSEMBLY. THE SHEETING SHOULD COVER THE ENTIRE FLOOR AREA, SEPARATE SECTIONS OF SHEETING SHOULD BE OVERLAPPED AT LEAST 12 INCHES. THE SHEETING SHALL BE SEALED AROUND ANY PIPE, WIRE OR OTHER PENETRATIONS OF THE MATERIAL, PER THE MANUFACTURER'S INSTRUCTIONS. ALL PUNCTURES OR TEARS IN THE MATERIAL REPAIRED ACCORDING TO THE MANUFACTURER'S

INSTRUCTIONS. THE SHEETING SHALL MEET THE FOLLOWING REQUIREMENTS (E.G., STEGO WRAP 20-MIL CLASS A VAPOR BARRIER OR APPROVED

SEAMS IN THE VAPOR BARRIER SHALL BE SEALED WITH A PRODUCT DESIGNED TO BE COMPATIBLE WITH THE VAPOR BARRIER (E.G., STEGO TAPE FOR STEGO WRAP PRODUCTS).

4. PREVENTION OF SOIL VAPOR ENTRY: ALL CONCRETE FLOOR SLABS SHALL BE DESIGNED, MIXED, PLACED, REINFORCED, CONSOLIDATED, FINISHED AND CURED TO MINIMIZE THE FORMATION OF CRACKS IN ACCORDANCE WITH STANDARDS SET FORTH IN THE MODEL BUILDING CODES.

LARGE OPENINGS, IF ANY, THROUGH THE CONCRETE FLOOR SLAB, GRADE BEAMS, OR OTHER FOUNDATION COMPONENTS IN CONTACT WITH THE SOIL (E.G., SPACES AROUND STORM SEWER PIPING, ETC.) SHALL BE FILLED OR CLOSED WITH MATERIALS THAT PROVIDE A PERMANENT AIRTIGHT SEAL SUCH AS NON-SHRINK MORTAR, GROUTS, EXPANDING FOAM, OR SIMILAR MATERIALS DESIGNED FOR SUCH APPLICATION.

SMALLER GAPS AROUND ALL PIPE, WIRE, OR OTHER OBJECTS, IF ANY, THAT PENETRATE CONCRETE FLOOR SLAB OR OTHER FLOOR ASSEMBLIES SHALL BE MADE AIR-TIGHT WITH AN ELASTOMERIC JOINT SEALANT, AS DEFINED IN ASTM C920-87, AND APPLIED IN ACCORDANCE WITH THE

MANUFACTURER'S RECOMMENDATIONS. 7. ALL CONTROL JOINTS, ISOLATION JOINTS, CONSTRUCTION JOINTS, AND ANY OTHER JOINTS IN THE CONCRETE FLOOR SLAB OR BETWEEN THE FLOOR SLAB AND THE BUILDING'S WALLS SHALL BE SEALED. A CONTINUOUS FORMED GAP (FOR EXAMPLE, A "TOOLED EDGE") WHICH ALLOWS THE APPLICATION OF A SEALANT THAT WILL PROVIDE A CONTINUOUS, AIRTIGHT SEAL SHALL BE CREATED ALONG ALL JOINTS. WHEN THE SLAB HAS CURED, THE GAP SHALL BE CLEARED OF LOOSE MATERIAL AND FILLED WITH AN ELASTOMERIC JOINT SEALANT, AS DEFINED IN ASTM C920-97, AND APPLIED IN

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9. VAPOR COLLECTION AND VENT SYSTEM: LENGTHS OF SUB-SLAB VAPOR COLLECTION PIPING SHALL BE INSTALLED BENEATH THE VAPOR BARRIER. SUB-SLAB VAPOR COLLECTION PIPING WILL BE 3-INCH DIAMETER, PERFORATED PVC PIPING OR SLOTTED (0.020 TO 0.040-INCH SLOT) PVC PIPING OR

10. INSTALL CAP AT EACH VAPOR COLLECTION PIPE TERMINATION.

11. SOLID BELOW GRADE PIPE SLOPED DOWN AT MINIMUM 1/16 INCH PER FOOT AWAY FROM RISER (I.E., DRAINED BACK TO PERFORATED PIPE).

12. SLOPE ANY ABOVE GRADE HORIZONTAL SOLID PIPE AT A MINIMUM OF 1/16 INCH PER FOOT TO ALLOW DRAINAGE BACK TO SUBSURFACE.

13. THE VAPOR COLLECTION PIPING SHALL BE CONNECTED VIA THE APPROPRIATE FITTINGS TO 3-INCH DIAMETER SOLID PVC PIPE. THE RISERS SHALL PENETRATE THE BUILDING ENVELOPE THROUGH THE CONCRETE FLOOR SLAB AS DEPICTED ON FIGURE 9.

14. THE HEADER PIPE SHALL DAYLIGHT ABOVE THE FLOOR SLAB, IN THE LOCATIONS DEPICTED ON DRAWING NUMBER 8. THE VERTICAL PIPES SHALL EXTEND THROUGH THE ROOF AND TERMINATE AT LEAST 12 INCHES ABOVE THE SURFACE OF THE ROOF, IN A LOCATION THAT IS: AT LEAST 10 FEET FROM ANY AIR IN-TAKES, ANY WINDOW, OR OTHER OPENING INTO THE CONDITIONED SPACES OF THE BUILDING THAT IS LESS THAN 4 FEET BELOW THE EXHAUST POINT; AND AT LEAST 10 FEET FROM ANY ADJOINING OR ADJACENT BUILDINGS. ALL ROOF PENETRATIONS MUST BE PROPERLY SEALED AND COMPLETED IN ACCORDANCE WITH OTHER RELATED SPECIFICATIONS.

15. ALL EXPOSED AND VISIBLE INTERIOR AND EXTERIOR VENT PIPES SHALL BE IDENTIFIED WITH LABELS PLACED AT LEAST EVERY 10 FEET, "SUB SLAB DEPRESSURIZATION SYSTEM". MINIMUM ONE LABEL PER FLOOR.

16. VENT PIPES SHALL BE INSTALLED IN A CONFIGURATION AND SUPPORTED IN A MANNER THAT ENSURES THAT ANY RAINWATER OR CONDENSATION

ACCUMULATING WITHIN THE PIPES DRAINS DOWNWARD INTO THE GROUND BENEATH THE VAPOR BARRIER.

17. THE CONTRACTOR SHALL PROVIDE PHOTO DOCUMENTATION FOR ALL PIPING PRIOR TO COVERING. 18. VENT STACK TERMINATION WILL BE A PROTECTIVE WOVEN WIRE MESH CAP BEFORE A WIND-ACTUATED TURBINE VENT. EMPIRE TV04G OR

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20. ELECTRICAL: AN ELECTRICAL CONTRACTOR WILL INSTALL JUNCTION BOX WITH 10/3 WIRE WITH GROUND IN THE VICINITY OF THE VENT STACKS TO ALLOW FOR THE INSTALLATION OF AN IN-LINE RADON FAN AT A FUTURE POINT IN TIME IF NECESSARY.

21. GENERAL: HEATING, VENTILATING, AND AIR CONDITIONING (HVAC) SYSTEMS SHALL BE DESIGNED AND INSTALLED TO AVOID DEPRESSURIZATION OF THE BUILDING RELATIVE TO UNDERLYING AND SURROUNDING SOIL. SPECIFICALLY, JOINTS IN AIR DUCTS AND PLENUMS PASSING THROUGH

UNCONDITIONED SPACES SHALL BE SEALED. 22. THIS DRAWING IS NOT INTENDED TO PROVIDE STRUCTURAL INFORMATION. REFER TO STRUCTURAL DRAWINGS.

23. FIRE COLLARS INSTALLED BETWEEN FLOORS ON VERTICAL RISERS BASED ON MANUFACTURER'S INSTRUCTIONS.

24. INSTALL MONITORING POINTS TO MANUFACTURER'S SPECIFICATIONS. 25. FOLLOW ALL MANUFACTURER'S INSTRUCTIONS AND SPECIFICATIONS.

26. EXPOSED INTERIOR PIPING WILL BE SCHEDULE 40 CPVC.

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EXP: ##/##/20##

CERTIFICATE OF AUTHORIZATION NUMBER: PROFESSIONAL ENGINEERING: 018281 LAND SURVEYING: 017976 GEOLOGICAL: 018750

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BBL CONSTRCUTION

Client Address

BARNET MILLS

FORBES AVE, RENNSELLAER

NO: DATE: DESCRIPTION:

2220630.01 DRAWN BY: NS

REVIEWED BY:

PROJECT NUMBER:

ISSUED FOR: BBL Construction

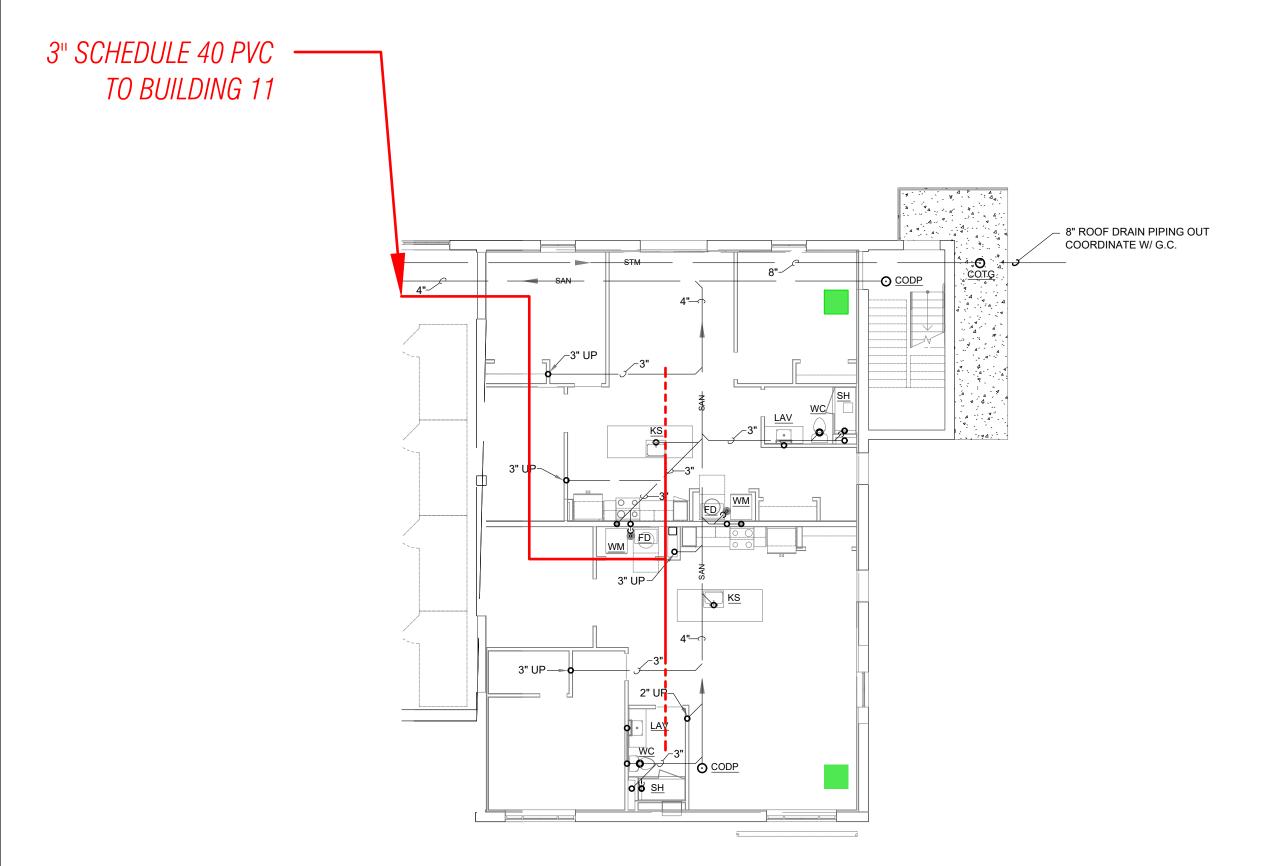
10/04/2024

DRAWING NAME:

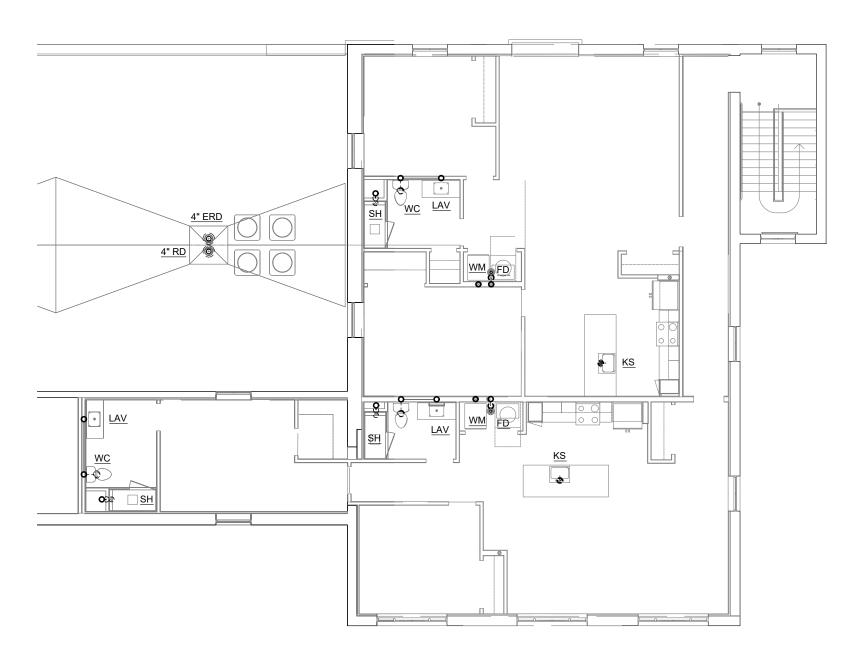
DATE:

BUILDING 7 SSDS LAYOUT

DRAWING NUMBER:



1ST FLOOR BUILDING 10



2ND FLOOR/ROOF BUILDING 10

LEGEND:

SSDS Solid 3" Schedule 40 PVC

SSDS Slotted 3" Schedule 40 PVC

MONITORING POINT

Scale: 1 " = 10'-0"

NOTES

1. SSDS PIPING WILL STAY BELOW SLAB AND PENETRATE THE FLOOR IN BUILDING 11 DUE TO LIMITED ROOF ACCESS.

2. VAPOR BARRIER. STEGO WRAP 20-MIL CLASS A OR APPROVED EQUIVALENT FLEXIBLE SHEETING MATERIAL SHALL BE PLACED ABOVE (ON TOP OF) THE GAS PERMEABLE LAYER PRIOR TO POURING THE SLAB OR PLACING THE FLOOR ASSEMBLY TO SERVE AS A SOIL-VAPOR-BARRIER, BY BRIDGING ANY CRACKS THAT DEVELOP IN THE SLAB OR FLOOR ASSEMBLY. THE SHEETING SHOULD COVER THE ENTIRE FLOOR AREA, SEPARATE SECTIONS OF SHEETING SHOULD BE OVERLAPPED AT LEAST 12 INCHES. THE SHEETING SHALL BE SEALED AROUND ANY PIPE, WIRE OR OTHER PENETRATIONS OF THE MATERIAL, PER THE MANUFACTURER'S INSTRUCTIONS. ALL PUNCTURES OR TEARS IN THE MATERIAL REPAIRED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS. THE SHEETING SHALL MEET THE FOLLOWING REQUIREMENTS (E.G., STEGO WRAP 20-MIL CLASS A VAPOR BARRIER OR APPROVED EQUIVALENT):

3. SEAMS IN THE VAPOR BARRIER SHALL BE SEALED WITH A PRODUCT DESIGNED TO BE COMPATIBLE WITH THE VAPOR BARRIER (E.G., STEGO TAPE FOR STEGO WRAP PRODUCTS).

4. PREVENTION OF SOIL VAPOR ENTRY: ALL CONCRETE FLOOR SLABS SHALL BE DESIGNED, MIXED, PLACED, REINFORCED, CONSOLIDATED, FINISHED, AND CURED TO MINIMIZE THE FORMATION OF CRACKS IN ACCORDANCE WITH STANDARDS SET FORTH IN THE MODEL BUILDING CODES.

5. LARGE OPENINGS, IF ANY, THROUGH THE CONCRETE FLOOR SLAB, GRADE BEAMS, OR OTHER FOUNDATION COMPONENTS IN CONTACT WITH THE SOIL (E.G., SPACES AROUND STORM SEWER PIPING, ETC.) SHALL BE FILLED OR CLOSED WITH MATERIALS THAT PROVIDE A PERMANENT AIRTIGHT SEAL SUCH AS NON-SHRINK MORTAR, GROUTS, EXPANDING FOAM, OR SIMILAR MATERIALS DESIGNED FOR SUCH APPLICATION.

6. SMALLER GAPS AROUND ALL PIPE, WIRE, OR OTHER OBJECTS, IF ANY, THAT PENETRATE CONCRETE FLOOR SLAB OR OTHER FLOOR ASSEMBLIES SHALL BE MADE AIR-TIGHT WITH AN ELASTOMERIC JOINT SEALANT, AS DEFINED IN ASTM C920-87, AND APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

7. ALL CONTROL JOINTS, ISOLATION JOINTS, CONSTRUCTION JOINTS, AND ANY OTHER JOINTS IN THE CONCRETE FLOOR SLAB OR BETWEEN THE FLOOR SLAB AND THE BUILDING'S WALLS SHALL BE SEALED. A CONTINUOUS FORMED GAP (FOR EXAMPLE, A "TOOLED EDGE") WHICH ALLOWS THE APPLICATION OF A SEALANT THAT WILL PROVIDE A CONTINUOUS, AIRTIGHT SEAL SHALL BE CREATED ALONG ALL JOINTS. WHEN THE SLAB HAS CURED, THE GAP SHALL BE CLEARED OF LOOSE MATERIAL AND FILLED WITH AN ELASTOMERIC JOINT SEALANT, AS DEFINED IN ASTM C920-97, AND APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

8. JOINTS, CRACKS, OR OTHER OPENINGS AROUND ALL PENETRATIONS OF BOTH EXTERIOR AND INTERIOR SURFACES OF MASONRY BLOCK OR POURED CONCRETE FOUNDATION COMPONENTS BELOW THE GROUND SURFACE SHALL BE SEALED WITH AN ELASTOMERIC SEALANT THAT PROVIDES AN AIR-TIGHT SEAL. PENETRATIONS OF POURED CONCRETE WALLS SHOULD ALSO BE SEALED ON THE EXTERIOR SURFACE. THIS INCLUDES SEALING OF WALL TIE PENETRATIONS, IF APPLICABLE.

9. VAPOR COLLECTION AND VENT SYSTEM: LENGTHS OF SUB-SLAB VAPOR COLLECTION PIPING SHALL BE INSTALLED BENEATH THE VAPOR BARRIER. SUB-SLAB VAPOR COLLECTION PIPING WILL BE 3-INCH DIAMETER, PERFORATED PVC PIPING OR SLOTTED (0.020 TO 0.040-INCH SLOT) PVC PIPING OR APPROVED EQUIVALENT.

10. INSTALL CAP AT EACH VAPOR COLLECTION PIPE TERMINATION.

11. SOLID BELOW GRADE PIPE SLOPED DOWN AT MINIMUM 1/16 INCH PER FOOT AWAY FROM RISER (I.E., DRAINED BACK TO PERFORATED PIPE).

12. SLOPE ANY ABOVE GRADE HORIZONTAL SOLID PIPE AT A MINIMUM OF 1/16 INCH PER FOOT TO ALLOW DRAINAGE BACK TO SUBSURFACE.

13. THE VAPOR COLLECTION PIPING SHALL BE CONNECTED VIA THE APPROPRIATE FITTINGS TO 3-INCH DIAMETER SOLID PVC PIPE. THE RISERS SHALL

PENETRATE THE BUILDING ENVELOPE THROUGH THE CONCRETE FLOOR SLAB AS DEPICTED ON FIGURE 9.

14. THE HEADER PIPE SHALL DAYLIGHT ABOVE THE FLOOR SLAB, IN THE LOCATIONS DEPICTED ON DRAWING NUMBER 8. THE VERTICAL PIPES SHALL EXTEND THROUGH THE ROOF AND TERMINATE AT LEAST 12 INCHES ABOVE THE SURFACE OF THE ROOF, IN A LOCATION THAT IS: AT LEAST 10 FEET FROM ANY AIR IN-TAKES, ANY WINDOW, OR OTHER OPENING INTO THE CONDITIONED SPACES OF THE BUILDING THAT IS LESS THAN 4 FEET BELOW THE EXHAUST

POINT; AND AT LEAST 10 FEET FROM ANY ADJOINING OR ADJACENT BUILDINGS. ALL ROOF PENETRATIONS MUST BE PROPERLY SEALED AND COMPLETED IN ACCORDANCE WITH OTHER RELATED SPECIFICATIONS.

15. ALL EXPOSED AND VISIBLE INTERIOR AND EXTERIOR VENT PIPES SHALL BE IDENTIFIED WITH LABELS PLACED AT LEAST EVERY 10 FEET, "SUB SLAB

DEPRESSURIZATION SYSTEM". MINIMUM ONE LABEL PER FLOOR.

16. VENT PIPES SHALL BE INSTALLED IN A CONFIGURATION AND SUPPORTED IN A MANNER THAT ENSURES THAT ANY RAINWATER OR CONDENSATION ACCUMULATING WITHIN THE PIPES DRAINS DOWNWARD INTO THE GROUND BENEATH THE VAPOR BARRIER.

17. THE CONTRACTOR SHALL PROVIDE PHOTO DOCUMENTATION FOR ALL PIPING PRIOR TO COVERING.
18. VENT STACK TERMINATION WILL BE A PROTECTIVE WOVEN WIRE MESH CAP BEFORE A WIND-ACTUATED TURBINE VENT. EMPIRE TV04G OR

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19. VENT STACK POST SSDS FAN WILL BE TERMINATED WITH A RAIN CAP FOR ACTIVE SYSTEM. 20. ELECTRICAL: AN ELECTRICAL CONTRACTOR WILL INSTALL JUNCTION BOX WITH 10/3 WIRE WITH GROUND IN THE VICINITY OF THE VENT STACKS TO

ALLOW FOR THE INSTALLATION OF AN IN-LINE RADON FAN AT A FUTURE POINT IN TIME IF NECESSARY.

21. GENERAL: HEATING, VENTILATING, AND AIR CONDITIONING (HVAC) SYSTEMS SHALL BE DESIGNED AND INSTALLED TO AVOID DEPRESSURIZATION OF THE BUILDING RELATIVE TO UNDERLYING AND SURROUNDING SOIL. SPECIFICALLY, JOINTS IN AIR DUCTS AND PLENUMS PASSING THROUGH

UNCONDITIONED SPACES SHALL BE SEALED. 22. THIS DRAWING IS NOT INTENDED TO PROVIDE STRUCTURAL INFORMATION. REFER TO STRUCTURAL DRAWINGS.

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23. FIRE COLLARS INSTALLED BETWEEN FLOORS ON VERTICAL RISERS BASED ON MANUFACTURER'S INSTRUCTIONS.

24. INSTALL MONITORING POINTS TO MANUFACTURER'S SPECIFICATIONS.

25. FOLLOW ALL MANUFACTURER'S INSTRUCTIONS AND SPECIFICATIONS. 26. EXPOSED INTERIOR PIPING WILL BE SCHEDULE 40 CPVC. LaBella
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EXP: ##/##/20##

GEOLOGICAL: 018750

1

CERTIFICATE OF AUTHORIZATION NUMBER: PROFESSIONAL ENGINEERING: 018281 LAND SURVEYING: 017976

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BBL CONSTRCUTION

Client Address

BARNET MILLS

FORBES AVE, RENNSELLAER

NO: DATE: DESCRIPTION:

nevisions

PROJECT NUMBER: 2220630.01

DRAWN BY: NS

REVIEWED BY:

ISSUED FOR:

BBL Construction

10/04/2024

DRAWING NAME:

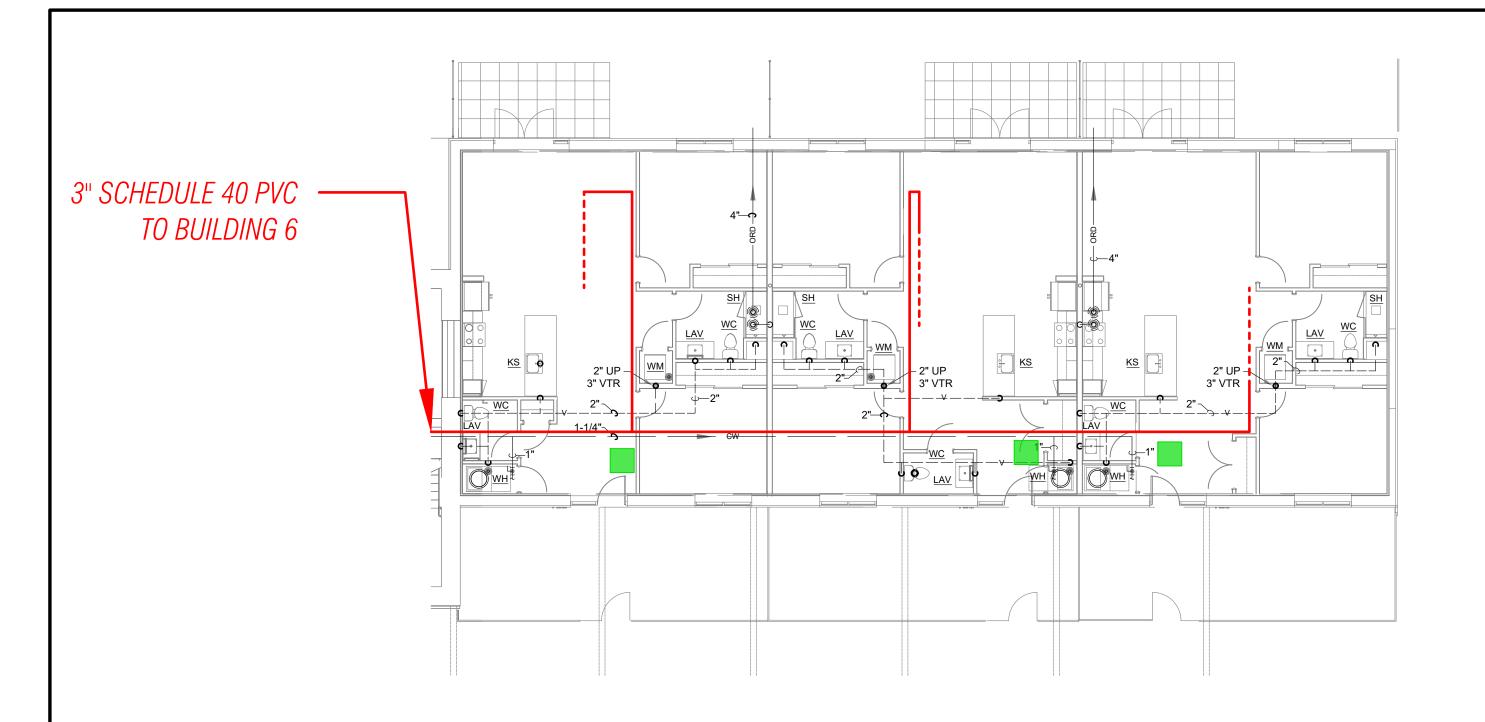
DATE:

BUILDING 10 SSDS LAYOUT

DRAWING NUMBER:

10/4/2024 9:49:51 AM

6



1ST FLOOR BUILDING 7

2ND FLOOR BUILDING 7

4" RD | /® 3" VTR---3" VTR—**→** 3" VTR—**►○**

ROOF BUILDING 7

LEGEND:

SSDS Solid 3" Schedule 40 PVC

SSDS Slotted 3" Schedule 40 PVC

MONITORING POINT

Scale: 1 = 20'-0"

SSDS PIPING WILL REMAIN BELOW THE SLAB AND PENETRATE THE FLOOR IN BUILDING 6 DUE TO LIMITED ROOF ACCESS

VAPOR BARRIER. STEGO WRAP 20-MIL CLASS A OR APPROVED EQUIVALENT FLEXIBLE SHEETING MATERIAL SHALL BE PLACED ABOVE (ON TOP OF) THE GAS PERMEABLE LAYER PRIOR TO POURING THE SLAB OR PLACING THE FLOOR ASSEMBLY TO SERVE AS A SOIL-VAPOR-BARRIER, BY BRIDGING ANY CRACKS THAT DEVELOP IN THE SLAB OR FLOOR ASSEMBLY. THE SHEETING SHOULD COVER THE ENTIRE FLOOR AREA, SEPARATE SECTIONS OF SHEETING SHOULD BE OVERLAPPED AT LEAST 12 INCHES. THE SHEETING SHALL BE SEALED AROUND ANY PIPE, WIRE OR OTHER PENETRATIONS OF THE MATERIAL, PER THE MANUFACTURER'S INSTRUCTIONS. ALL PUNCTURES OR TEARS IN THE MATERIAL REPAIRED ACCORDING TO THE MANUFACTURER'S

INSTRUCTIONS. THE SHEETING SHALL MEET THE FOLLOWING REQUIREMENTS (E.G., STEGO WRAP 20-MIL CLASS A VAPOR BARRIER OR APPROVED

3. SEAMS IN THE VAPOR BARRIER SHALL BE SEALED WITH A PRODUCT DESIGNED TO BE COMPATIBLE WITH THE VAPOR BARRIER (E.G., STEGO TAPE

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17. THE CONTRACTOR SHALL PROVIDE PHOTO DOCUMENTATION FOR ALL PIPING PRIOR TO COVERING.

18. VENT STACK TERMINATION WILL BE A PROTECTIVE WOVEN WIRE MESH CAP BEFORE A WIND-ACTUATED TURBINE VENT. EMPIRE TV04G OR EQUIVALENT IF PASSIVE.

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22. THIS DRAWING IS NOT INTENDED TO PROVIDE STRUCTURAL INFORMATION. REFER TO STRUCTURAL DRAWINGS.

23. FIRE COLLARS INSTALLED BETWEEN FLOORS ON VERTICAL RISERS BASED ON MANUFACTURER'S INSTRUCTIONS.

24. INSTALL MONITORING POINTS TO MANUFACTURER'S SPECIFICATIONS. 25. FOLLOW ALL MANUFACTURER'S INSTRUCTIONS AND SPECIFICATIONS.

26. EXPOSED INTERIOR PIPING WILL BE SCHEDULE 40 CPVC.

5 Mc-Crea Hill Road Ballston Spa, NY 12020 518-885-5383

labellapc.com

EXP: ##/##/20##

CERTIFICATE OF AUTHORIZATION NUMBER: PROFESSIONAL ENGINEERING: 018281 LAND SURVEYING: 017976 GEOLOGICAL: 018750

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BBL CONSTRCUTION

Client Address

BARNET MILLS

FORBES AVE, RENNSELLAER

NO: DATE: DESCRIPTION:

PROJECT NUMBER: 2220630.01

DRAWN BY: NS REVIEWED BY:

ISSUED FOR: BBL Construction

10/04/2024

DRAWING NAME:

DATE:

BUILDING 7 SSDS LAYOUT

DRAWING NUMBER:

Layout With Slab Removal Layout Without Slab Removal 3" SUCTION POINT - 3" SUCTION POINT -----4" OVERFLOW NOZZLE 4" OVERFLOW NOZZLE COORDINATE W/ G.C. COORDINATE W/ G.C. 4" ERD 4" ERD -ORD----ORD--4" RD 🔘 4" RD 🔘 3" SUCTION POINT 4" ROOF DRAIN PIPING OUT 4" ROOF DRAIN PIPING OUT COORDINATE W/ G.C. COORDINATE W/ G.C. 3" SCHEDULE 40 PVC RISER TO ROOF —— **∠** 3" SUCTION POINT - 3" SCHEDULE 40 PVC RISER TO ROOF 1ST FLOOR BUILDING 1 1ST FLOOR BUILDING 1

LEGEND:

SSDS Solid 3" Schedule 40 PVC

SSDS Slotted 3" Schedule 40 PVC

MONITORING POINT

Scale: 1 " = 20'-0"

1. SSDS RISERS IN BUILDING 1, IF SLAB STAYS IN PLACE WILL FOLLOW COLUMNS TO CEILING AND MANIFOLD BEFORE MAKING SINGLE PENETRATION THROUGH THE ROOF.

2. SSDS PIPING IN BUILDING 1 WILL MANIFOLD SUB SLAB IF THE SLAB IS REMOVED, MAKING A SINGLE PENETRATION THROUGH THE SLAB AND THEN THE RISER WILL FOLLOW THE COLUMN UP TO THE ROOF.

3. VAPOR BARRIER. STEGO WRAP 20-MIL CLASS A OR APPROVED EQUIVALENT FLEXIBLE SHEETING MATERIAL SHALL BE PLACED ABOVE (ON TOP OF) THE GAS PERMEABLE LAYER PRIOR TO POURING THE SLAB OR PLACING THE FLOOR ASSEMBLY TO SERVE AS A SOIL-VAPOR-BARRIER, BY BRIDGING ANY CRACKS THAT DEVELOP IN THE SLAB OR FLOOR ASSEMBLY. THE SHEETING SHOULD COVER THE ENTIRE FLOOR AREA, SEPARATE SECTIONS OF SHEETING

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SUCH AS NON-SHRINK MORTAR, GROUTS, EXPANDING FOAM, OR SIMILAR MATERIALS DESIGNED FOR SUCH APPLICATION.

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LaBella
Powered by partnership.

5 Mc-Crea Hill Road Ballston Spa, NY 12020 518-885-5383

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_____ EXP: ##/##/20## EXP: ##/##/20##

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BBL CONSTRCUTION
Client Address

BARNET MILLS

FORBES AVE, RENNSELLAER

NO: DATE: DESCRIPTION:

2220630.01

DRAWN BY: NS
REVIEWED BY:

ISSUED FOR: BBL Construction

10/04/0004

10/04/2024

DRAWING NAME:

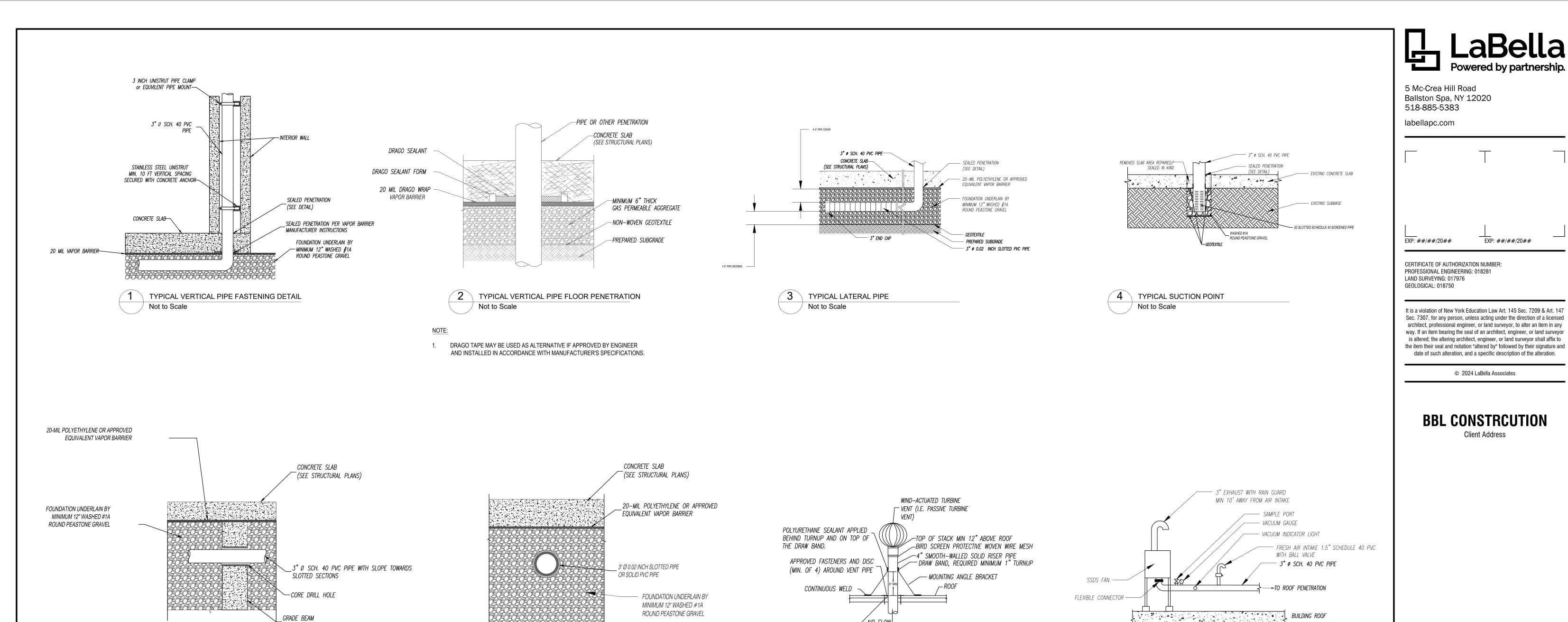
DATE:

BUILDING 1 SSDS LAYOUT

DRAWING NUMBER:

0

10/4/2024 10:26:00 AM B:\GLOBAL\Projects\BBL Construction Services\22220630 - Barnet Mill - Rensselaer\06_Drawings\



TYPICAL PASSIVE ROOF VENT

Not to Scale

OR FOOTER

CONCRETE SLAB

—VAPOR PIN SAMPLE PORT

— SILICONE VAPOR PIN SLEEVE

__(SEE STRUCTURAL PLANS)

_20-MIL POLYETHYLENE OR APPROVED

#1A ROUND PEASTONE GRAVEL

FOUNDATION UNDERLAIN BY MINIMUM 12" WASHED

___EQUIVALENT VAPOR BARRIER

6 TYPICAL TRENCH DETAIL

Not to Scale

5 TYPICAL FOUNDATION PIPE PENETRATION

9 TYPICAL VAPOR PIN MONITORING POINT

Not to Scale

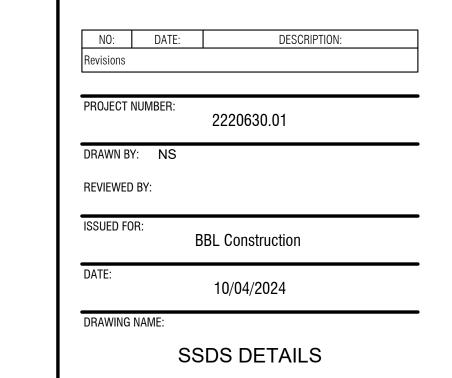
STAINLESS STEEL

FLUSH MOUNT COVER

Not to Scale



Not to Scale



EXP: ##/##/20##

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Client Address

BARNET MILLS

FORBES AVE, RENNSELLAER

DRAWING NUMBER:

Attachment 1: Sub Slab Depressurization System Communication Pilot Test Results Report



June 17, 2024

Mr. Jonathan H. deForest LEED AP President/Principal BBL Companies 302 Washington Avenue Extension Albany, New York 12203

Re: Former Barnet Mills Property – C442065
Sub Slab Depressurization System Communication Pilot Test Results
20 Forbes Avenue, Rensselaer, NY
LaBella Project 2220630

Dear Mr. deforest,

The purpose of this letter is to present the results of sub-slab depressurization system (SSDS) communication pilot test results performed on April 22, 2024. The results of pilot testing will be utilized to design the sub-slab piping layouts in Buildings 1 and 4. Results may also be utilized for general SSDS assumptions regarding potential vacuum influence when considering design parameters in buildings 5, 6, 7, 10 and 11.

BACKGROUND

Several phases of environmental assessments/investigations have been previously performed and reported. The results of soil vapor sampling performed to date indicate the presence of several VOCs. The data indicate that these vapors may have become trapped beneath the slabs in many of the buildings. Refer to the October 1, 2021 Phase II Environmental Site Assessment Report by Alpine Environmental Services, Inc. for further details.

Seven Buildings located on the Barent Mills property are currently undergoing renovation construction. Buildings 5, 6, 7, 10 and 11 will have their slabs removed and replaced with new subbase and slabs. The slabs in Buildings 1 and 4 will not be removed.

To determine the potential effectiveness and to aid in the design of SSDSs in Buildings 1 and 4 a vacuum communication pilot test was performed on April 22nd, 2024. The purpose of pilot testing is to determine if a vacuum field can be established beneath the slabs, the approximate areal influence of a vacuum point beneath the slab and the potential operating parameters (vacuum, flow rate) of a vacuum point. A minimum vacuum of 0.004 inches of water column (IWC) at any point beneath a slab is considered adequate to prevent vapor intrusion into buildings from the subsurface. Communication pilot testing procedures and results are presented below.



SSDS COMMUNICATION PILOT TESTING METHODS AND RESULTS

Communication pilot tests consisted of installing a single 4-inch diameter suction (vacuum) point in each building (1 & 4) near the center of the slab. and installing vacuum measuring points in at certain distances away from the suction point to determine the radius of influence under different vacuum magnitudes.

Communication testing at each Building (1 & 4) included the installation of one 4-inch diameter suction (vacuum) test point (SP) located near the center of the floor slab. Several 3/8- inch vacuum measuring points (MPs) were installed from the SP at 5-foot intervals. SP and MP testing locations for Buildings 1 and 4 are depicted on Drawing Number B1 and B4 (attached), respectively.

Each SP was temporarily connected to a vacuum pump with the pump exhaust directed outside of the building. Testing proceeded by applying vacuum incrementally at 3, 5, 10 and 20 inches of water column (IWC) to the SPs and measuring vacuum response at the MPs utilizing a Dwyer Micro-Monometer Series 475 Mark III micromanometer to determine the vacuum field and corresponding inferred radius of influence from a single SP.

Soil gas flow rate at each vacuum increment and total volatile organic compound (VOC) discharge concentration was measured utilizing an anemometer and photoionization detector (PID) capable of detections to 1 part per billion, respectively. Pilot testing results for Buildings 1 and 4 are present below.

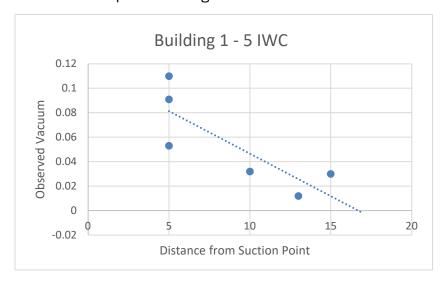
Building 1 Pilot Test Data:

Table 1: Building 1-5 IWC Test Data

5 IWC @ Suction Point				
Measuring Point	Observed Vacuum (inches of water)	Distance From Suction Point (ft)		
1NW5	0.11			
1SE5	0.091	5		
1SW5	0.053			
1NE10	0.032	10 13		
1SE13	0.012			
1NW15	0.030	15		
1SW15	0			
1 NE17	0	17		
1S20	0	20		
1N25	0	25		



Graph 1: Building 1-5 IWC vs. Distance



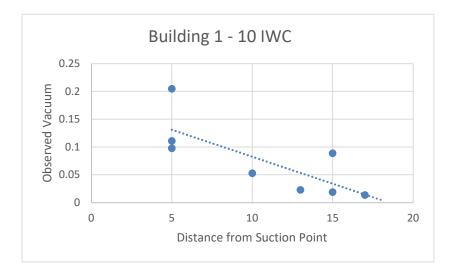
The maximum Radius of Influence (ROI) was determined to be approximately 16 feet at 5 inches of water column (IWC) at the suction point.

Table 2: Building 1- 10 IWC Test Data

10 IWC @ Suction Point				
MeasuringObserved VacuumDistance FromPoint(inches of water)Suction Point (f				
1NW5	0.205			
1SE5	0.111	5		
1SW5	0.098			
1NE10	0.053	10 13		
1SE13	0.023			
1NW15	0.089	15		
1SW15	0.019			
1 NE17	0.014	17		
1S20	0	20		
1N25	0	25		



Graph 2: Building 1- 10 IWC vs. Distance



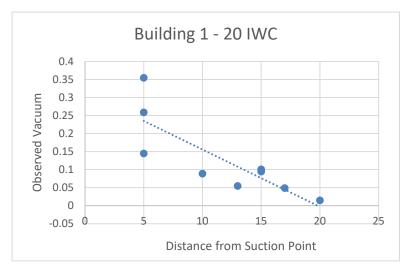
The maximum ROI was determined to be approximately 17 feet at 10 IWC at the suction point.

Table 3: Building 1- 20 IWC Test Data

20 IWC @ Suction Point				
Measuring Observed Vacuum Distance From Point (inches of water) Suction Point (f				
1NW5	0.355			
1SE5	0.259	5		
1SW5	0.145			
1NE10	0.089	10 13		
1SE13	0.055			
1NW15	0.101	15		
1SW15	0.095	10		
1 NE17	0.049	17		
1S20	0.015	20		
1N25	0.002	25		



Graph 3: Building 1-20 IWC vs. Distance



The maximum ROI was determined to be approximately 20 feet at 5 IWC at the suction point.

Vacuum vs. Flow Rate – Table 4 presents the calculated flow rate from the SP under varying vacuums.

Table 4: Building 1- Vacuum vs. Flow Rate

Building 1				
Vacuum at SP (IWC) Flow Rate (cfm)				
5	96			
10	80			
20	104			

VOC Discharge Concentration – No measurable concentration of VOCs (>1 part per billion) were recorded in the discharge utilizing a PPB Rae 3000.



Building 4 Pilot Test Data:

Table 5: Building 4-3 IWC Test Data

3 IWC @ Suction Point			
Observed Vacuum	Distance From		
(inches of water)	Suction Point (ft)		
0.033			
0.03	5		
0.03			
0.045			
0	9		
0			
0	10		
0			
0	15		
0			
0	20		
0	22		
	Observed Vacuum (inches of water) 0.033 0.03 0.03 0.045 0 0 0 0 0 0		

The maximum ROI was determined to be approximately 5 ft at 3 IWC at the suction point.

Graph 5: Building 4- 3 IWC vs. Distance

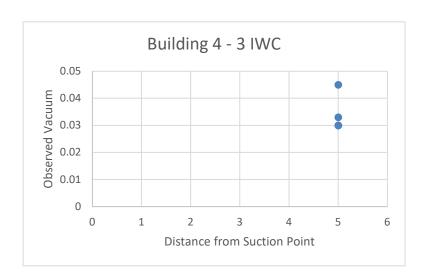




Table 6: Building 4-5 IWC Test Data

5 IWC @ Suction Point				
Measuring Point	Observed Vacuum (inches of water)	Distance From Suction Point (ft)		
4NW5	0.065			
4NE5	0.022	5		
4SE5	0.115	3		
4SW5	0.123			
4NE9	0.012	9		
4SE10	0			
4SW10	0.061	10		
4NW10	0			
4NE15	0	15		
4SW15	0.009	. 13		
4SW20	0	20		
4SW22	0	22		

Graph 6: Building 4-5 IWC vs. Distance



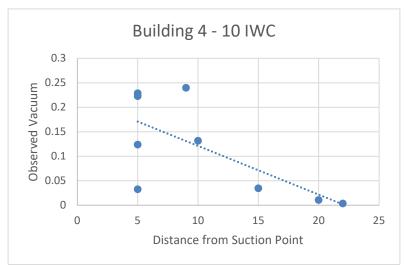
The maximum ROI was determined to be approximately 16 feet at 5 IWC at the suction point. This ROI was determined solely from the southwest measuring points due to the interference of the foundation as measuring points 4NW10, 4NE15, 4SE10 are located on the outside of the foundation barrier.



Table 7: Building 4- 10 IWC Test Data

10 IWC @ Suction Point			
Measuring	Observed Vacuum	Distance From	
Point	(inches of water)	Suction Point (ft)	
4NW5	0.124		
4NE5	0.033	5	
4SE5	0.223		
4SW5	0.229		
4NE9	0.240	9	
4SE10	0		
4SW10	0.132	10	
4NW10	0		
4NE15	0	15	
4SW15	0.035		
4SW20	0.011	20	
4SW22	0.0040	22	

Graph 7: Building 4- 10 IWC vs. Distance



The maximum ROI was determined to be approximately 22 ft at 10 IWC at the suction point. This ROI was determined solely from the southwest measuring points due to the

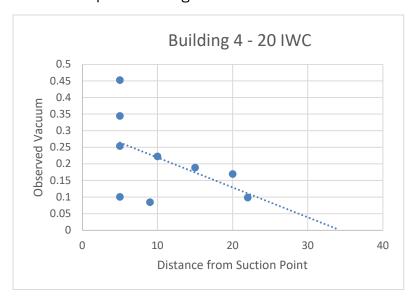


interference of the foundation as measuring points 4NW10, 4NE15, 4SE10 are located on the outside of the foundation barrier.

Table 8: Building 4- 20 IWC Test Data

20 IWC @ Suction Point				
Measuring	Observed Vacuum	Distance From		
Point	(inches of water)	Suction Point (ft)		
4NW5	0.254			
4NE5	0.101	5		
4SE5	0.453	J		
4SW5	0.345			
4NE9	0.085	9		
4SE10	0			
4SW10	0.223	10		
4NW10	0			
4NE15	0	15		
4SW15	0.189			
4SW20	0.17	20		
4SW22	0.099	22		

Graph 8: Building 4- 20 IWC vs. Distance





The maximum ROI was determined to be approximately 34 ft at 20 IWC at the suction point. This ROI was determined solely from the southwest measuring points due to the interference of the foundation as measuring points 4NW10, 4NE15, 4SE10 are located on the outside of the foundation barrier.

Vacuum vs. Flow Rate – Table 9 presents the calculated flow rate from the SP under varying vacuums.

Table 9: Building 4- Vacuum vs. Flow Rate

Building 4				
Vacuum at SP (IWC) Flow Rate (cf				
3	64			
5	128			
10	126			
20	96			

VOC Discharge Concentration – No measurable concentration of VOCs (>1 part per billion) were recorded in the discharge utilizing a PPB Rae 3000.

CONCLUSIONS

Based on the results from the pilot test, we can determine the necessary number of suction points to provide sufficient sub slab depressurization. Building 4 has shown that due to past foundation structures that are below grade, the influence of the vacuum is limited to these areas as shown in Drawing B4, and that multiple laterals will be required to provide sufficient coverage of Building 4. However, communication pilot test results indicate that the planned plumbing trenches can be utilized to apply adequate depressurization over the entire footprint of Building 4.

The test performed in Building 1 has shown it will require a minimum of 2 suction points to create sufficient vacuum throughout the sub slab area, should the slab be replaced. If the slab will not be replaced, then four suction points would provide sufficient coverage of Building 1.



If you have any questions, or require additional information, please do not hesitate to contact Nate Shaw or Fil Fina at (518)885-5383.

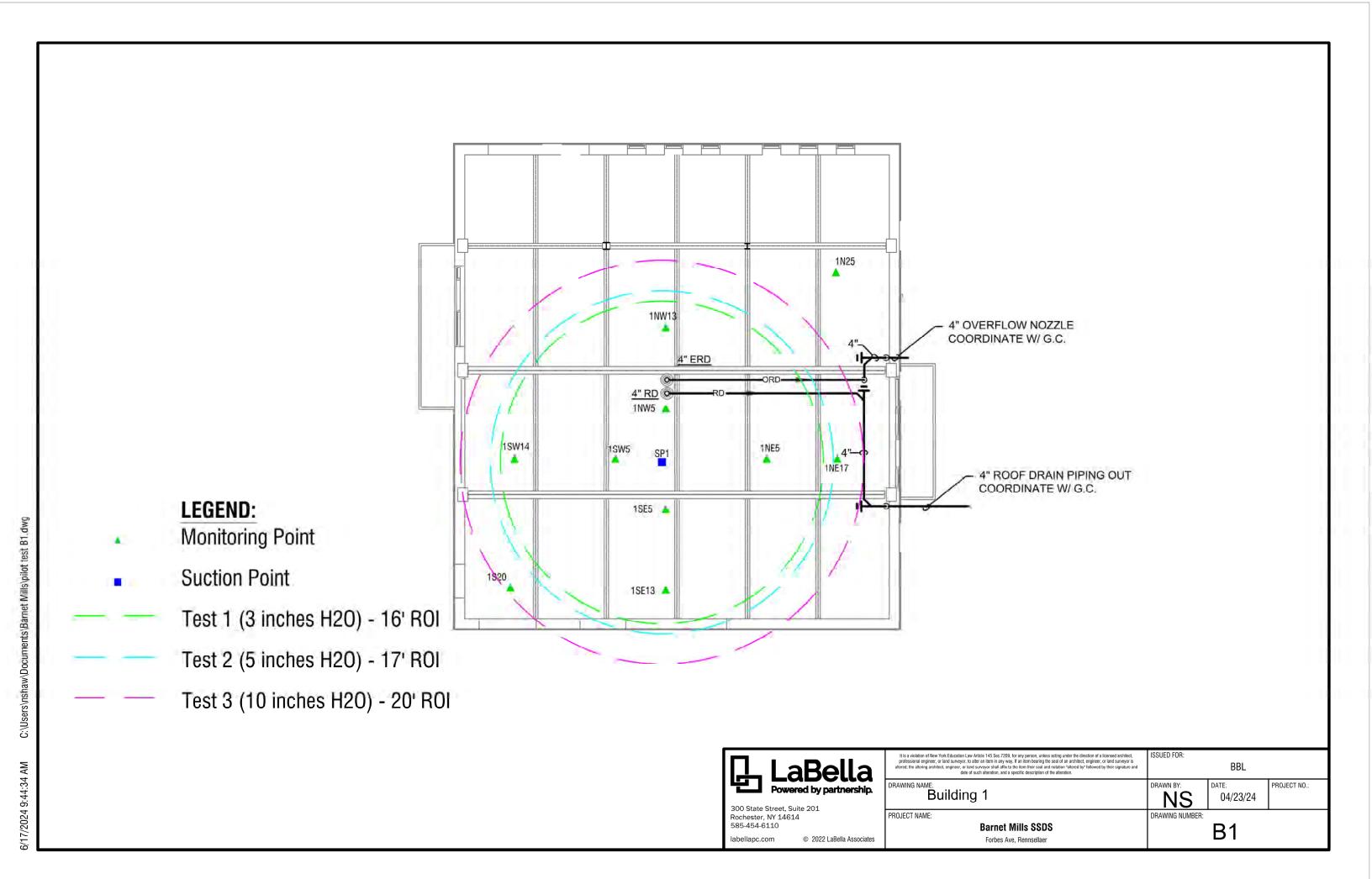
Respectfully submitted, LaBella Associates, D.P.C.

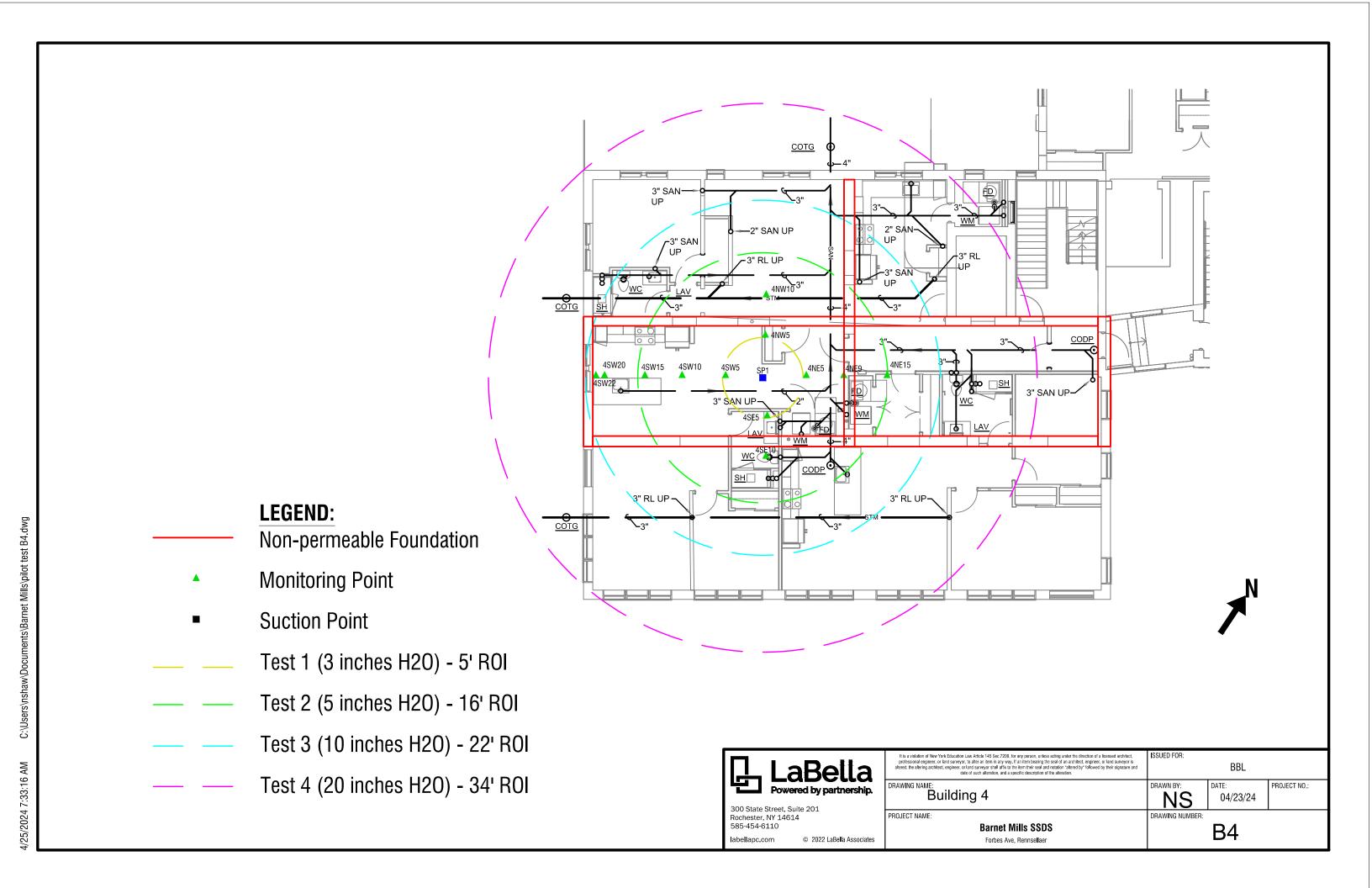
nate Shaw

Nate Shaw Environmental Engineer



Fil L. Fina III, PE Vice President, Principal





Attachment 2: HASP

Site Health and Safety Plan

Location:

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

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

LaBella Project No. 2220630

May 2023

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Appendix A: Safety Data Sheets

Appendix B: Task Hazard Analysis Form Appendix C: Expousure Monitoring Plan Appendix D: Daily Tailgate Safety Form Appendix E: Incident Report Form

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 implementation of a Remedial Investigation Work Plan being 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 implementation of the Remedial Investigation Work Plan (RIWP) activities taking place at the Fomer 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 remedial investigation work plan. The primary investigation activities may include the following:

- Site Mobilization/Demobilization;
- 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 F	Personnel	
Program Manager	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 selfexamination 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	НН	SG	STB	WG	WC	None
Drilling Activities	нн	SG	STB	WG	wc	EM or EP
Environmental sampling	НН	SG	STB	Sur as	WC, Tyvek® as needed	None
Decontamination	НН	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 Minitoring 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 placementof 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

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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.

13.1.4Site 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.

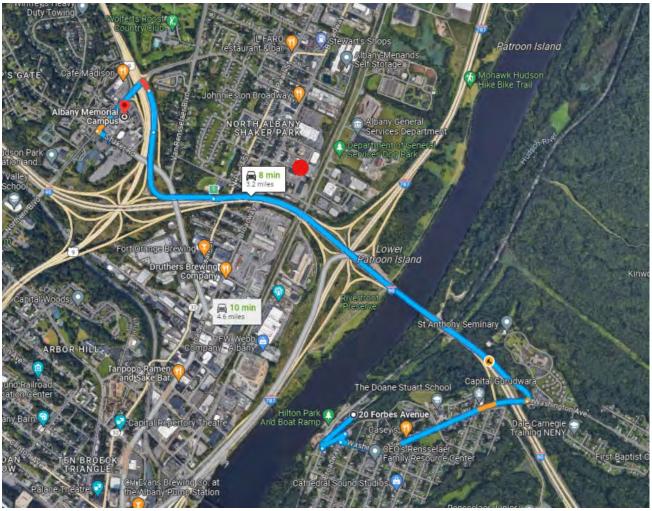
13.7 Hospital Route

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	0.2 miles
	Broadway	
2.	Turn right onto Broadway	0.1 miles
3.	Turn left onto Washington Ave.	0.7 miles
4.	Turn left to merge onton I-90W	1.4 miles
5.	Take Exit 6 for US-9N toward Loudonville,	0.5 miles
	keep right fort Northern Blvd.	
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;

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- 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 <u>start</u> of each shift, project personnel and visitors will be given onsite 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 <u>end</u> 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 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



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.

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	<= 100 %
	Acute 3; Ozone 1; H332,	
	H402, H420	

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

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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	Basis
			parameters	
1,1,1- Trichloroethane	71-55-6	TWA	350 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Not classifi	able as a humar	carcinogen
		STEL	450 ppm	USA. ACGIH Threshold Limit
				Values (TLV)
			able as a humar	
		С	350 ppm 1,900 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	350 ppm 1,900 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		PEL	350 ppm 1,900 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		STEL	450 ppm 2,450 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		С	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)
		humans	animal carcinoge cutaneous absor	en with unknown relevance to
		TWA	25 ppm 90 mg/m3	USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)
		Skin notati	on	,
		TWA	100 ppm 360 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin desigr	nation	
		С	1 ppm 3.6 mg/m3	USA. NIOSH Recommended Exposure Limits
	+	Potential O	ccupational Card	
		PEL	0.28 ppm 1 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin	1	1 /

Biological occupational exposure limits

ziologican occupationan exposano inimo						
Component	CAS-No.	Parameters	Value	Biological	Basis	
				snecimen		

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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 s	shift of wor	kweek	
		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) Odorc) Odor Thresholdd) pHNo data availableNo data available

e) Melting point: -30.4 °C (-22.7 °F)

point/freezing point

f) Initial boiling point 74 °C 165 °F at 1,013 hPa and boiling range

g) Flash point ()No data availableh) Evaporation rate No data availablei) Flammability (solid, No data available

gas)

j) Upper/lower flammability or explosive limits Upper explosion limit: 15.5 %(V) Lower explosion limit: 8.0 %(V)

k) Vapor pressure No data availablel) 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 $^{\circ}$ C (68 $^{\circ}$ F)

o) Partition coefficient: log Pow: 2.49 at 20 °C (68 °F) - Bioaccumulation is not n-octanol/water expected., (ECHA)

p) Autoignition No data available temperature

q) Decomposition No data available temperature

r) Viscosity No data availables) 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.

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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

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 (US-EPA)

Toxicity to daphnia and other aquatic invertebrates

static test EC50 - Daphnia magna (Water flea) - > 530 mg/l - 48 h

(US-EPA)

Toxicity to algae static test EC50 - Pseudokirchneriella subcapitata (algae) - 41 mg/l -

72 h

(OECD Test Guideline 201)

static test NOEC - Pseudokirchneriella subcapitata (green algae) - 7.8

mg/I - 72 h

(OECD Test Guideline 201)

IC50 - Scenedesmus capricornutum (fresh water algae) - > 670 mg/l

- 96 h

Remarks: (Lit.)

(OECD Test Guideline 209)

12.2 Persistence and degradability

Biodegradability Result: 0 % - Not readily biodegradable.

(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:

1,1,1-Trichloroethane CAS-No. Revision Date 2020-07-14

123-91-1 2007-07-01

1,4-Dioxane

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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1,1,1-Trichloroethane	CAS-No. 71-55-6	Revision Date 2020-07-14
1,4-Dioxane	123-91-1	2007-07-01
Pennsylvania Right To Know Components 1,1,1-Trichloroethane	CAS-No. 71-55-6	Revision Date 2020-07-14
1,4-Dioxane	123-91-1	2007-07-01
California Prop. 65 Components , which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.1,4-Dioxane	CAS-No. 123-91-1	Revision Date 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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The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

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

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

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 **Acros Organics** One Reagent Lane One Reagent Lane Fair Lawn, NJ 07410 Fair Lawn, NJ 07410

Tel: (201) 796-7100

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

Notes to Physician

. Causes central nervous system depression: Inhalation of high vapor concentrations may

cause symptoms like headache, dizziness, tiredness, nausea and vomiting

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 (CO2).

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

HealthFlammabilityInstabilityPhysical hazards330N/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 Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. **Up**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	IDLH: 500 ppm	TWA: 20 ppm
		(Vacated) TWA: 375 mg/m ³	TWA: 100 ppm	
		Ceiling: 300 ppm	TWA: 375 mg/m ³	
		(Vacated) STEL: 150 ppm	STEL: 150 ppm	
		(Vacated) STEL: 560 mg/m ³	STEL: 560 mg/m ³	
		TWA: 200 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 protectionWear 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 StateLiquidAppearanceColorlessOdoraromaticOdor Threshold1.74 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

SolubilityInsoluble in waterPartition coefficient; n-octanol/waterNo data availableAutoignition Temperature535 °C / 995 °FDecomposition TemperatureNo information availableViscosity0.6 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 (CO2)

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 No information available

Products

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.

Revision Date 25-Dec-2021 **Toluene**

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Toluene	108-88-3	Not listed				

Mutagenic Effects Not mutagenic in AMES Test

Experiments have shown reproductive toxicity effects on laboratory animals. **Reproductive Effects**

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) Kidney Liver spleen Blood Neurological effects Eyes Ears STOT - repeated exposure

No information available **Aspiration hazard**

delayed

Symptoms / effects,both acute and 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) EC50: > 433 mg/L, 96h	50-70 mg/L LC50 96 h 5-7 mg/L LC50 96 h 15-19 mg/L LC50 96 h 28 mg/L LC50 96 h	EC50 = 19.7 mg/L 30 min	EC50: = 11.5 mg/L, 48h (Daphnia magna) EC50: 5.46 - 9.83 mg/L, 48h Static (Daphnia magna)
	(Pseudokirchneriella subcapitata)	12 mg/L LC50 96 h		

Persistence and Degradability Persistence is unlikely

Bioaccumulation/ Accumulation No information available.

Is not likely mobile in the environment due its low water solubility. **Mobility**

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

UN1294 **UN-No TOLUENE Proper Shipping Name**

Hazard Class 3 **Packing Group** Ш

TDG

UN-No UN1294
Proper Shipping Name TOLUENE

Hazard Class 3
Packing Group ||

<u>IATA</u>

UN-No UN1294
Proper Shipping Name TOLUENE

Hazard Class 3
Packing Group ||

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	Χ	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	Χ	1	203-625-9	Χ	Χ	Χ	Х	Х	KE-33936

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313

DAILY 010									
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	Х	Х	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

Component

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	• • •
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

CAS No

			Pollutant	Potential	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

Restriction of

OECD HPV

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.

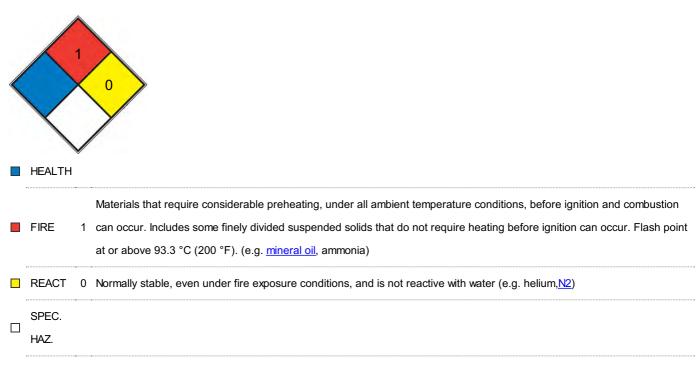
Advice for firefighters

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



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-

Chemical Book

3

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
рН	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	Lower explosion limit: 0,3 %(V)
limits	
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 LD50 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

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.

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/

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] ChemlDplus, 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

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.

Revision Date 20-Feb-2020 Arsenic powder

Most important symptoms and

effects

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media approved class D extinguishers. Do not use water or foam.

None reasonably foreseeable.

Unsuitable Extinguishing Media No information available

Flash Point No information available Method -No information available

Autoignition Temperature

Explosion Limits

No information available

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

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 Sweep up and shovel into suitable containers for disposal. Avoid dust formation. Up

	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/m ³	(Vacated) TWA: 0.5 mg/m ³	IDLH: 5 mg/m ³	TWA: 0.01 mg/m ³
			Ceiling: 0.002 mg/m ³	_

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 protectionWear 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

pH

No information available
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 FormulaAsMolecular Weight74.92

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) LD50 = 763 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic

No information available

Products

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
Ī	Arsenic	7440-38-2	Group 1	Known	A1	Х	A1

IARC (International Agency for Research on Cancer)

NTP: (National Toxicity Program)

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

ACGIH: (American Conference of Governmental Industrial

Mexico - Occupational Exposure Limits - Carcinogens

Hygienists)

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 EffectsNo 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 No information available

delayed

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/ AccumulationNo 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

<u>IATA</u>

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 -	TSCA - EPA Regulatory
			Active/Inactive	Flags
Arsenic	7440-38-2	Χ	ACTIVE	-

Legend:

TSCA - Toxic Substances Control Act, (40 CFR Part 710)

X - Listed

'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

Revision Date 20-Feb-2020

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	Х	-	231-148-6	Х	X	Х	Х	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 s

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	-
	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	Carcinogen
			10 μg/day	

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

Email: tech@alfa.com

www.alfa.com

Revision Date20-Feb-2020Print Date20-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

1

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

4

GHS Label elements, including precautionary statements

Symbol(GHS)



Signal word Dange

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

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



SECTION 6: Accidental release measures

4

Personal precautions, protective equipment and emergency procedures

SPEC. HAZ.

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

4

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/m³ (for soluble compounds) (ACGIH and MSHA); IDLH (for soluble compounds) 250 mg/m³ (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.

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.

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

1

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/

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 ETHYLSULFATE SDS

Chemicalbook



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

No information available

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point Method -No information available

No information available

Autoignition Temperature

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

HealthFlammabilityInstabilityPhysical hazards410N/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 PrecautionsDo 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 Sweep up and shovel into suitable containers for disposal. Avoid dust formation. **Up**

T. Handling and storage

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.

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/m ³ TWA: 0.002 mg/m ³	Ceiling: 0.3 mg/m³ Ceiling: 0.6 mg/m³ (Vacated) STEL: 0.3 ppm TWA: 0.1 mg/m³ TWA: 0.2 mg/m³ TWA: 5 µg/m³	IDLH: 9 mg/m ³	TWA: 0.01 mg/m ³ TWA: 0.002 mg/m ³

<u>Legend</u>

Storage.

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

Engineering MeasuresUse 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 protectionWear 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.

exposure limits are exceeded of it initiation of 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.

Physical and chemical properties

Physical State Solid

Revision Date 24-Dec-2021 Cadmium

Appearance Silver Odor Odorless

No information available **Odor Threshold** No information available Melting Point/Range 321 °C / 609.8 °F

765 °C / 1409 °F @ 760 mmHg **Boiling Point/Range**

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

Not applicable

Viscosity

Molecular Formula Cd 112.40 **Molecular Weight**

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.

Strong oxidizing agents, Strong acids, Sulfur oxides **Incompatible Materials**

Hazardous Decomposition Products Toxic fumes

Hazardous Polymerization Hazardous polymerization does not occur.

None under normal processing. **Hazardous Reactions**

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation		
Cadmium	LD50 = 2330 mg/kg (Rat)	Not listed	$LC50 = 25 \text{ mg/m}^3 \text{ (Rat) } 30 \text{ min}$		

Toxicologically Synergistic No information available

Products

Delayed and immediate effects as well as chronic effects from short and long-term exposure

No information available Irritation 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
Ī	Cadmium	7440-43-9	Group 1	Known	A2	X	A2

Revision Date 24-Dec-2021 Cadmium

IARC (International Agency for Research on Cancer) 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) NTP: (National Toxicity Program) Known - Known Carcinogen

Reasonably Anticipated - Reasonably Anticipated to be a Human

Carcinogen

ACGIH: (American Conference of Governmental Industrial

Hygienists)

A1 - Known Human Carcinogen A2 - Suspected Human Carcinogen

A3 - Animal Carcinogen

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.

No information available. **Developmental Effects Teratogenicity** No information available.

STOT - single exposure Respiratory system STOT - repeated exposure Kidney Blood

No information available **Aspiration hazard**

Symptoms / effects, both acute and Kidney disorders: May cause harm to the unborn child: Blood disorders

delayed

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information



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,	Not listed	EC50: = 0.0244 mg/L, 48h
		96h (Pimephales promelas)		Static (Daphnia magna)
		LC50: = 0.016 mg/L, 96h		
		(Oryzias latipes)		
		LC50: = 21.1 mg/L, 96h		
		flow-through (Lepomis		
		macrochirus)		
		LC50: = 0.24 mg/L, 96h		
		static (Cyprinus carpio)		
		LC50: = 4.26 mg/L, 96h		
		semi-static (Cyprinus carpio)		
		LC50: = 0.002 mg/L, 96h		

(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

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

Revision Date 24-Dec-2021

Cadmium

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	Х	-	231-152-8	Χ	Χ		Х	Х	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)

STITE (SISAII TRAISE FISE)				
Component	CWA - Hazardous CWA - Reportable Substances 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	-
	2.5 ug/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	0.05 μg/day	Developmental
		Developmental		Carcinogen
		Male Reproductive		

U.S. State Right-to-Know Regulations

	Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Γ	Cadmium	X	X	Χ	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) -	Seveso III Directive (2012/18/EC) -	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
		Qualifying Quantities			
		for Major Accident	for Safety Report		
		Notification	Requirements		
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

1

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

4

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

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/m³ (ACGIH and MSHA), 1 mg/m³ (OSHA); Cr(II) and Cr(III) compounds 0.5 mg/m³ (ACGIH); Cr(VI) compounds, water soluble and certain water insoluble, 0.05 mg/m³ (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
рН	<1 (H2O, 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)

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

1

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

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

1

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 chromate SDS Chromium SDS Chromium (III) oxide SDS Ammonium dichromate SDS

Chemicalbook

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

1

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

4

GHS Label elements, including precautionary statements

Symbol(GHS)



Signal word Dange

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

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

	0		\Diamond	HEALTH	2	Intense or continued but not chronic exposure could cause temporary incapacitation or possible residual injury (e.g. <u>diethyl ether</u> , ammonium phosphate, iodine)
2		0	\Diamond	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)
			\Diamond	REACT	0	Normally stable, even under fire exposure conditions, and is not reactive with water (e.g. helium, N2)
			\Diamond	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.

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/m³ as Pb (ACGIH and MSHA), 0.05 mg (Pb)/m³ (OSHA); 10-h TWA 0.1 mg(inorganic lead)/m³ (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)

SECTION 12: Ecological information

4

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

SECTION 15: Regulatory information

4

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(2,2,6,6-1)

 TETRAMETHYL-3,5-HEPTANEDIONATO)LEAD(II) SDS
 LEAD(II) TETRAKIS(4-CUMYLPHENOXY)-SDS
 Chromium(III) oxide SDS
 Lead dioxide SDS

Chemicalbook

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

1

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

4

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

1

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

Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

NFPA 704

	1		\Diamond	HEALTH	2	Intense or continued but not chronic exposure could cause temporary incapacitation or possible residual injury (e.g. <u>diethyl ether</u> , ammonium phosphate, iodine)
2		0	\Diamond	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)
			\Diamond	REACT	0	Normally stable, even under fire exposure conditions, and is not reactive with water (e.g. helium, $\underline{\text{N2}}$)
			\Diamond	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,	,1'-Biphenyl, chloro derivs.							
CAS No.	1336-36-3	1336-36-3							
	Limit value - E	Eight hours	Limit value	- Short term					
	ppm	mg/m ³	ppm	mg/m ³					

Component	1,1'-Biphe	1,1'-Biphenyl, chloro derivs.				
CAS No.	1336-36-3	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	Remarks				
Canada - Ontario	(1) as sun	(1) as sum of components assayed by chromatographic procedure with reference of the bulk sample				
Finland	(1) Total F	(1) Total PCB = 5*([PCB 28] + [PCB 52] + [PCB 101] + [PCB 138] + [PCB 153] + [PCB 180])				
Germany (AGS)	(1) 42% C	(1) 42% Chlorine (CAS-No. 53469-21-9) (2) 54% Chlorine (CAS-No. 11097-69-1)				
Germany (DFG)	(1) Only fo	(1) Only for chlorinated biphenyls with Cl				
Hungary	POP Pers	POP Persistent Organic Pollutant				
Sweden	(1) Short-	(1) Short-term value, 15 minutes average value				
Dialogical limit 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

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	340 ~ 375
range	
Flammability	no data available
Lower and upper explosion limit/flammability	no data available
limit	
Flash point	195(O.C)
Auto-ignition temperature	no data available

Decomposition temperature	no data available
рН	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

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

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

1

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

sageib carequest_locale cir

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

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

> Echemi.com Company 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

Classification of the substance or mixture

Carcinogenicity, Category 1A

2.2 GHS label elements, including precautionary statements

Pictogram(s)

Hazard statement(s) Precautionary statement(s)

H350 May cause cancer

Prevention P203 Obtain, read and follow all safety instructions before use.

P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/... P318 IF exposed or concerned, get medical advice. Response

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 which do not result in classification

SECTION 3: Composition/information on ingredients

Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentr
[Name confidential or not available]	[Name confidential or not available]	1332-21-4	603-721-4	7%

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 contac

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 Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

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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 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
Flammability no data available
no data available
no data available
no data available

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

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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

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, feet 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 actinolite, anthophyllite, crocidolite) (For reference only, please actinolite, anthophyllite, crocidolite) please check.)

IATA: ASBESTOS, AMPHIBOLE (amosite, tremolita 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					
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)			\overline{t}		

SECTION 16: Other information



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

C50: Lethal Concentration 50%

LD50: Lethal Dose 50%

EC50: Effective Concentration 50%

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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•Cellulose Ether Market Analysis: Pharmaceu...

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More Safety Data Sheets

Arginyl-arginyl-prolyl-tyrosyl-isoleucyl-leuci...

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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China's Top 100 Industrial Digitalization Enterprises List The Drafting Unit of the "Specification for Operation and Management of Self-build Cross-border E-commerce Website" of the CCPIT

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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		ed Controls Measures / E/ Training
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

	Likelihood & Severity (Classification			
Likelihood of Harm Severity of Harm/Consequences					
(People, Environment, Facility)	(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	5			
<u>Likelihood of Harm Categories:</u>	Severity of Harm Cat	egories:			
-Very Unlikely: Will not occur except in rare	-Slight harm: Only firs	t aid required			
instances under certain conditions			y to work for a short period of time		
-Unlikely: Typically would not occur					
-Likely: May occur on a regular basis	indefinitely				
Very Likely: Will occur in most instances					

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						
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	d 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 <u>ground intrusive</u> 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 <u>non-intrusive</u> 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

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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/m³) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the

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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/m³ 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/m³ 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/m³ 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

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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:

- Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.
- 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.
- 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;
- 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° C (14 to 122° 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.
- 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.
 - The action level will be established at 150 ug/m3 (15 minutes average). While conservative, 5.

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 potentialsuch as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.
- 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.

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.

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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/m³, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m³ 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

Dat	е			Time	
	ation or			Temperature	
	dress				
	ject Number			Humidity	
Cor	nducted by			Conditions	
We me	re all workers r asures should l	eminded that COVID be taking to prevent) is still prevalent and that appinfection of themselves and c	propriate others?	Yes No
9	11 If 911 is	unavailable at this lo	ocation, please state the proc	edure for report	ing emergencies
List	: Safety Topic c	f Discussion and/or	Any Specific Hazards for the	Work Beina Per	formed Today
1			, -	g	
2					
3					
4					
5					
6					
7					
List	: Control Measu	res for Each Specific	c 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



PART A - INCIDENT/LOSS MANAGEMENT REPORTING SCHEDULE

<u>Event</u>	Form(s) Required	<u>Action</u>	
Property damage to company property (including Fleet vehicles) OR 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. Losses greater than \$5,000: Online Reporting Form or Part B: Employee Rpt. Part C: Supervisor Invest/Analysis Report Part D: Witness Statement Form Photos, Diagrams, Maps, etc. **In addition to insurance forms	Immediate verbal notification to Supervisor and Online Reporting Form within 24 hours Send Parts B, C and D to Safety Manager as soon as possible but within 2-4 business days.	
Near Miss Incidents:	All cases: Online Reporting Form or Part B: Employee Report	Same-day verbal notification to Supervisor	
Low* potential for significant injury or property damage	Online Reporting Form or Part B: Employee Rpt.	Send to Safety Manager and HR within 24 hours.	
Moderate* or High* potential for significant injury or property damage	Online Reporting Form/Part B: Employee Rpt. Part C: Supervisor Invest. & Analysis Report Part D: Witness Statement Form Photos, Diagrams, Maps, etc.	Send Parts C and D to Safety Manager as soon as possible but within 2-4 business days.	
*Category to be determined by Safety Manager			
Employee Injury or Illness:	All cases: Online Reporting Form or Part B – Employee Report	Immediate verbal notification to Supervisor and/or Field Supervisor (in all cases).	
Minor injury (first aid treatment/non-OSHA recordable)	Online Reporting Form or Part B: Employee Rpt.	Send to Safety Manager and HR within 24 hours.	
Serious Injury (employee received medical treatment/lost days away from work, or required job restriction or transfer)	Online Reporting Form or Part B: Employee Rpt. Part C: Supervisor Invest. & Analysis Report Part D: Witness Statement Form Photos, Diagrams, Maps, etc.	Send Parts C and D to Safety Manager as soon as possible but within 2-4 business days.	
Catastrophes (examples: fatality, multiple persons injured)	Above documentation plus additional documentation as requested Health and Safety Manager or Senior Management **In addition to insurance forms	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 Part D: Witness Statement Form 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 Employ	ree:	Employee's Supervisor:			
Employee's Division Director:	Employee's Home Office I	_ocation:	Date of Hire:			
environment. -A near-miss is an incident in whitime or position, damage or iniurv -A hazard is an object or situation	ch no property was damaged easily could have occurred. that has the potential to harr been stolen or damaged, yo	to the body and/or involves damage and no personal injury was sustained no people or cause damage to property unmust complete the IT Incident Reports	, but where given a slight shift in y or the environment.			
Date of Event	Time of Event:	Type of Incident: Incident Near Miss Hazard	Project Number:			
Address of Incident:	Additional information Re	garding Incident Location:				
How did the incident happen? (De immediate action taken to protect inter		t led up to the event and site conditions, wed	ither and tools. Document any			
Incident involved the following (c Machines Equipment E	• • •	nicles If Yes, list license Plate Number				
<u> </u>	☐ 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	ge occur: 🔲 Yes 🔲 No	Approximate estimated value of dar	nage:			
Names of all involved persons:		Witness Statements Attached (1 for each witness)(see Safety Manual 1.22): ☐ Yes ☐ No				
Did this Incident involve an injur Injured Employee Name:	y?	- sign at bottom and provide to Supe Date of Birth:	rvisor, Safety Manager and HR. Gender:			
Job Title.	nployee type: Full time Part Time 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 Was medicine prescribed? Ye Describe treatment:		A A A	Part of body affected: Shade all that apply or list:			
Has employee returned to work? Yes No	employee still being eated? Yes No as employee assigned: Restricted duty Job transfer Days away from work					
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: Incident Near Miss	łazard	Date of this Report:			
Event Location:	Project Number:	Supervisor:		Title:			
Description of Incident:							
Description of melacit.							
Incident involved the following (che	eck all that apply):	es If Yes, list licens	e Plate Num	bers:			
☐ Machines ☐ Equipment ☐		ment 🚨 Chemica	ls 🗖 Electr	ronic Equipment 🔲 Wildlife			
EMPLOYEE & INJURY INFORMATION							
Involved Employee:	Employee Age:	Employee Gende	C.	Date of Hire:			
Was employee injured:	If Yes, describe injury:						
☐ Yes ☐ No							
Date last worked:	Date returned to work:	Was employee as	ssigned:				
		☐ Restricted duty	Job trar	nsfer 🗖 Days away from work			
Hospital/Clinic Name:	Doctor name:	Type of Injury:		· ·			
INVOLVED PARTIES and WITN		information)					
Names of all involved persons:	Witnesses (name and contact	: information): W	itness State	ments Attached? Yes No			
PROPERTY DAMAGE		•					
Did property damage occur?	If Yes, what is nature of dama	ge and what inflicte	d the dama	ge:			
☐ Yes ☐ No							
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 ti	me of the event and was it appr	opriate?	□ No				
Is there a task that applies to the task being performed when the injury or incident occurred?							
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.							
Were hazards sufficiently identified							
Were identified controls adequate and implemented? If not, please explain.							
Were the identified controls not im	plemented? If not, please expla	in.	□ 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					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	ating Without Authorization 📮 Hazardous Substances				☐ PPE Unavailable			
		☐ Inadequate Ventilation			☐ Insufficient Worker Training			
		☐ Improper Material Storage			☐ Insufficient Supervisor Training			
		Improper Tool or Equipn			r Maintenance			
☐ Guards Not Used		☐ Insufficient Job Knowledge			☐ Inadequate Supervision			
☐ Improper Loading or Placement		Slippery Conditions				ent Job Planning		
☐ Improper Lifting		Poor Housekeeping			ate Hiring Practices			
Servicing or Adjusting Machinery in		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				
	Jnnecessary Haste 🔲 Inadequate Fall Protec		on		Unrealistic Scheduling			
Other:		l 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			duled tion Date	Actual Completion Date	Follow-up Date	
INVESTIGATOR SIGNATURES:								
Signature: Name;			Title; Date;					
Signature: Name;			Title;			Date;	Date;	
Signature: Name;			Title;		Date;	Date;		
Signature: Name;			Title;		Date;	Date;		
Signature: Name;			Title;			Date;	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 If the interviewer writes the statement for the wit completely before signing this form. Deletions r changes must be initialed by the witness.	based and when possible written by the witness. tness, the witness must review the statement nust be lined out and initialed by the witness. All
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.



Attachment 3: Community Air Monitoring Plan (CAMP)

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 <u>ground intrusive</u> 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 <u>non-intrusive</u> 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

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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/m³) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the

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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/m³ 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/m³ 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/m³ 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.

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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:

- Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.
- 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.
- 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;
- 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° C (14 to 122° 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.
- 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.
 - The action level will be established at 150 ug/m3 (15 minutes average). While conservative, 5.

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 potentialsuch as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.
- 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.

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.

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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/m³, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m³ 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.