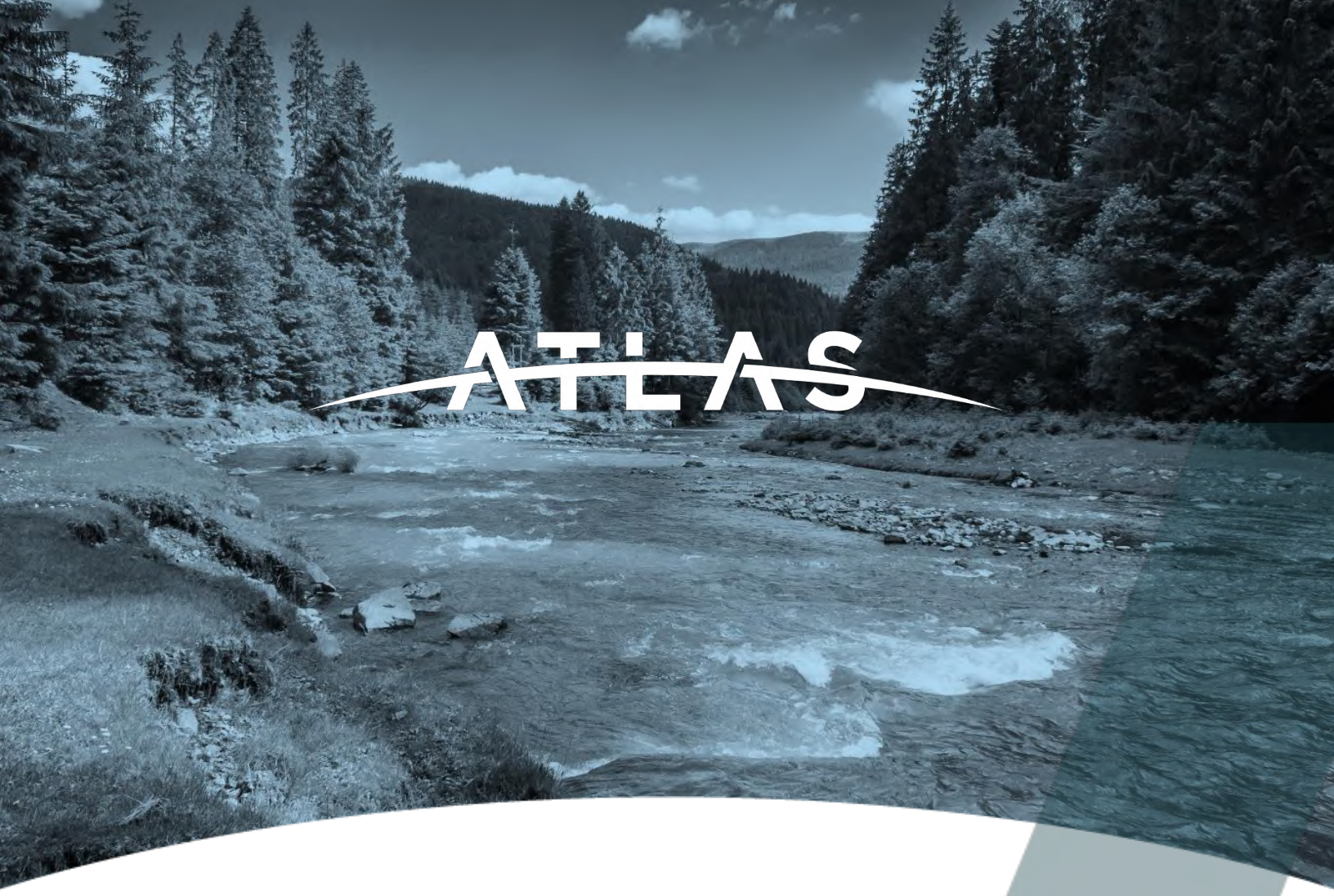

CORRECTIVE ACTION PLAN

FORMER ST. JOHNSBURY ARMORY

1249 Main Street
St. Johnsbury, VT 05819
VTDEC Site #2012-4326

PREPARED FOR:

Joseph Kasprzak
Town of St. Johnsbury Vermont
51 Depot Square, Suite 3
St. Johnsbury, VT 05819

PREPARED BY:

Atlas Technical Consultants LLC
51 Knight Lane
Williston, VT 05495

October 18, 2022

51 Knight Lane
Williston, VT 05495
(802) 862-1980 | oneatlas.com

October 18, 2022

Joseph Kasprzak
Town of St. Johnsbury Vermont
51 Depot Square, Suite 3
St. Johnsbury, VT 05819

SUBJECT: Former St. Johnsbury Armory
1249 Main Street
St. Johnsbury, VT 05819
VTDEC Site #2012-4326

Dear Mr. Kasprzak,

Atlas Technical Consultants, LLC (formerly ATC Group Services, LLC) is pleased to provide the Town of St. Johnsbury (St.J) this *Corrective Action Plan* for the Former St. Johnsbury Armory building located at 1249 Main Street, St. Johnsbury, Vermont (site).

This report has been prepared by the employees of Atlas Technical Consultants, LLC whose signatures appear below. Requests for information on the contents of this report should be directed to these individuals. I certify under penalty of perjury that I am an environmental professional and that all content contained within this deliverable is to the best of my knowledge true and correct.

Prepared by:

Daniel P. White
Senior Project Manager

Joseph J. Hayes, CPG, PG
Vermont Operations Manager

Nate Berube, P.E.
Professional Engineer
VT License #74152

STATE OF VERMONT
NATHAN BERUBE
No. 74152
ENVIRONMENTAL
LICENSED
PROFESSIONAL ENGINEER

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Appendix C Public Notice Form, Abutters List
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ADDENDA

Addendum 1 Building Materials Abatement Remediation Specifications & Planning Cost Estimate

EXECUTIVE SUMMARY

On behalf of the Town of St. Johnsbury Atlas Technical Consultants, LLC (formerly ATC Group Services, LLC), has prepared this Corrective Action Plan (CAP) for the site located at 1249 Main Street in St. Johnsbury, Vermont in accordance with the Vermont Department of Environmental Conservation (VTDEC) Investigation and Remediation of Contaminated Properties Rule (IRule, 2019). The owner plans to redevelop the property as a municipal police station and has entered into the VTDEC Brownfields Reuse and Environmental Liability Limitation Act (BRELLA) Program.

The objective of this CAP is to properly manage contaminated soils that have been impacted by urban fills through excavation, offsite disposal and capping. Two regulated soil areas of shallow impacted soils have been identified through prior investigations, including an area to the east of the building which is contaminated with polycyclic aromatic hydrocarbons (PAHs), and an area to the south of the building which is contaminated with PAHs and lead. Regulated building materials (RBM) have also been identified at the site. A description of proposed corrective action activities associated with RBMs, including polychlorinated biphenyls (PCBs), lead, and Asbestos Containing Materials (ACM) along with a remediation planning cost estimate is provided as Addendum 1 of this CAP.

Removal and replacement of the contaminated soil with delivered clean fill (i.e., caps) will remove the direct contact exposure risk to regulated areas within greenspaces while the existing pavement will remove the direct contact exposure risk within regulated areas outside the greenspaces. Also, abatement of the RBMs will remove exposure risks. Annual inspections will be performed by the facility under operational conditions to verify the integrity of the caps. Following successful completion of the corrective actions, a Corrective Action Construction Completion Report (CACCR) will be prepared and submitted with the expectation that the Site will receive a Certificate of Completion (COC) in accordance with BRELLA requirements upon final determination by VTDEC.

1. INTRODUCTION

On behalf of the Town of St. Johnsbury, Atlas Technical Consultants, LLC (formerly ATC Group Services, LLC) and Stantec have prepared this Corrective Action Plan (CAP) for a portion site located at 1249 Main Street, in St. Johnsbury, Vermont in accordance with the Vermont Department of Environmental Conservation (VTDEC) Investigation and Remediation of Contaminated Properties Rule (IRule, 2019)(**Figure 1**). The Site includes a two-story historic brick building and surrounding grounds as well as paved parking areas and driveways **(Figure 2)**. The Town of St. Johnsbury purchased the property from the Vermont Military Department with plans to revitalize the downtown area and use the building for municipal purposes. The property has entered into the VTDEC Brownfields Reuse and Environmental Liability Limitation Act (BRELLA) Program. A redevelopment site plan is provided in Appendix A.

Prior site investigations determined that areas of impacted soil are present at the site, along with regulated building materials (RBMs). These areas require corrective action that should be performed prior to redevelopment site work. The objective of the proposed corrective action is to mitigate the impact of hazardous materials on sensitive receptors to the maximum extent practicable by implementing removal and/or abatement, and proper disposal of contaminated media, by use of engineered controls to contain hazardous materials, if needed, and by use of institutional controls, if needed.

2. CONCEPTUAL SITE MODEL

2.1 Site Infrastructure, Historical Land Uses, and Adjacent Properties

The Site is approximately 0.44 acres in area and is developed with one (1) currently unoccupied building originally constructed in 1916. Exterior areas consist of limited greenspace with some sidewalks, parking lots and driveways. Site topography is generally flat with a slight slope toward the east. The property was formerly used as a military armory. The property has a historic hazardous waste site designation due to a prior release from an on-site petroleum underground storage tank (UST). One hazardous site abuts the Site to the east across Main Street (assumed down gradient).

2.2 Source(s), Release(s) & Prior Investigations

The Johnson Company completed a Phase I ESA, dated May 2012, which identified a number of *recognized environmental conditions (RECs).* These included the following with response actions taken:

- Two USTs previously containing gasoline (1,000 gallon) and fuel oil (6,000 gallon) were removed from the Site along with 22 tons of petroleum-impacted soils (SMS site *#2010-4075)*. VTDEC issued a Sites Management Activity Complete (SMAC) designation and the Site was removed from the Site Management Section (SMS) hazardous waste site list. No further actions were recommended as part of this REC.
- Three pits/floor drains were observed during the Site inspection. One of these drains exhibited staining and previous use of the building suggests that vehicles were stored in the basement of the structure and may have leaked petroleum or other contaminants to

the pits. The report recommended further investigation of the floor drains including dye testing to determine their outlet and sediment sampling for total petroleum hydrocarbons (TPH) and volatile organic compounds (VOCs). In 2013, ATC conducted dye tracing tests of these identified floor drains. This testing confirmed that the drains were connected to the municipal sewer on Main Street and that the potential for contamination beneath these drains was minimal.

- Multiple partially empty and empty one- to five-gallon containers of paint were encountered under the roof access ramp. No evidence of spills or leaks were noted during the inspection, but the report recommended disposal of this potentially hazardous waste stream at a permitted facility. Buckets were removed by the Town of St. Johnsbury from the facility for disposal.
- The potential PCB contents of a transformer at the northwest corner of the site could not be confirmed. No evidence of spills or leaks were noted during the inspection, but the report recommended contacting the local utility to either replace the oil within the transformer with non-PCB oil or replace the transformer all together.
- Older electrical components were noted in multiple areas of the building during the inspection. The age of these components suggests that they may contain PCBs, such as in light ballasts. Also, due to the age of the building, there exists a potential for PCB-containing construction materials such as caulks, paints, and sealants. The report recommended a full survey of potential PCB-containing material at the Site.
- There exists a potential for heavy metal contamination (particularly lead) based on the buildings past use as an armory which also generally contained an indoor firing range. The report recommended a full survey of potential lead-containing material at the Site including LBP. In 2013, ATC conducted a full survey of building materials for lead content. The survey revealed numerous components containing identifiable levels of lead. These materials have the potential to be removed as part of potential renovation work at the site.
- Due to the age of the building, asbestos containing materials (ACM) is likely present. The report references the 2008 Asbestos Survey Memo by Crothers Environmental Group, LLC; however, it recommends further investigation to close data gaps and in preparation for solicitation of formal ACM abatement quotes from qualified contractors. Additional investigation completed by ATC and others have identified numerous ACMs at the site. ACM to be impacted by renovation work at the site are scheduled for abatement prior to renovation work at the site.

Numerous investigations and reports have been generated for the site between 2008 and the present pertaining to the presence of hazardous building materials at the site. These reports have identified the presence of asbestos, lead, PCB's, and mold at the site. Each report recommended the proper handling and removal of these hazardous material from the site. Additionally, hazardous materials have been detected in surface soils in some areas, including lead from exterior building materials, and PAHs from urban soils. This is further discussed in Section 2.4.

2.3 Site Geology and Hydrogeology

According to the Vermont Natural Resources Atlas, the surficial geology at the site consists of lake sands. The bedrock geology consists of phyllite and metalimestone. The site is located within an Urban Soil Background Area. Groundwater in the site vicinity reportedly flows in an easterly direction and has been encountered between 10 and 55 feet below ground surface (bgs). Groundwater was not encountered at the site at a depth of 20 bgs.

2.4 Contaminant Fate and Transport

Contaminants of concern that have been evaluated at the Site include volatile organic compounds (VOCs) from offsite tanks, PAHs and metals associated with development soils, and asbestos, PCBs, and lead associated with building materials. No VOCs related to the off-site USTs were identified in soil vapor at the site. PAHs were detected above the applicable Vermont Soil Standard (VSS) for Urban Background (UB) in one boring (SB-6) and above VSS for Non-Resident (VSS-NR) in two borings (SB-4 and SB-9). Lead was detected in one boring (SB-9) above the applicable VSS for Resident (VSS-R). All of these exceedances were within what VTDEC defines as surface soils (0-1.5 fbgs). Subsequent deeper sampling at these locations from 2-3.5 fbgs indicated the vertical limit of these contaminated areas does not exceed 2.5 fbgs. These data were utilized to calculate regulated soil volumes slated for removal and replacement as the applicable corrective action, as outlined in Section 6.4.

No known source of PAHs has been identified on-site and the depth of exceedance indicates urban fills. In general, PAHs are hydrophobic and will tend to adsorb to shallow soil particles under typical site conditions. PCBs originating from exterior building materials have not been detected in surficial soils. Lead has been detected in exterior building materials and have impacted surface soils adjacent to the buildings in one location along the south side of the building, as outlined above. PCBs and lead are also generally hydrophobic and will tend to adsorb to shallow soil particles under typical site conditions. See **Appendix B** for Site Investigation data.

2.5 Sensitive Receptors and Exposure Pathways

Media evaluated during the site investigation include soil and soil vapor. There is currently a direct contact exposure risk to workers/pedestrians traversing the site or workers that disturb shallow soils due to impacted development soils in areas that exceed the UB concentration. These soils require corrective actions to reduce the risk. Although VOCs were detected in soil vapor, no detections were above Resident Vapor Intrusion Standards (VIS) and therefore, there is no known risk of vapor intrusion and inhalation based on the current dataset. However, vapor intrusion is a dynamic phenomenon as atmospheric parameters (barometric pressure, solar heating, etc.) and building conditions (insulation, heating, cooling processes, etc.) can cause fluctuations in air movement, resulting in dynamic conditions over time. RBM also present a risk and will needed to be properly managed and/or abated.

3. PUBLIC NOTICE

A list of the persons who will receive notice for this corrective action, including contact names, addresses, email addresses, where available, and phone numbers are tabulated in **Appendix C**. The public notice form that will be filled out and submitted to these recipients following VTDEC request to do so is also included.

4. PERFORMANCE STANDARDS

The objective of the corrective action is to remove the direct contact exposure risk to contaminated soils and to appropriately manage contaminated soils slated for excavation to accommodate the redevelopment project as well as exposure to RBMs. The risk from contaminated soils will be mitigated through the excavation, offsite disposal, and capping of contaminated soils. The cleanup goal is to achieve Site closure by obtaining a Certificate of Completion (COC) designation from VTDEC following completion of the corrective action measures outlined herein. Land use restrictions (LUR) would be required in the event residual contamination is left in the ground.

Areas of soil impact based on the results of site investigations are depicted on **Figures 3 and 4**. These are conservative estimates based on limited datasets relating to the PAH- and lead-impacted areas. Additional delineation would be required in an attempt to reduce the regulated soil volumes. As an alternative, proposed corrective actions will address greenspaces only within the regulated areas whereas the existing asphalt caps outside the greenspace areas already serve the purpose of mitigating exposure risk via direct contact assuming there are no disturbances to these areas. The risk from RBMs will be mitigated through abatement.

5. PERMITS

A list of all local, state and federal permits required for the project and current status is provided below:

- Town of St. Johnsbury Building Permit – Pending
- Vermont Department of Health Lead and Asbestos Department Asbestos Abatement Permit - Pending

6. REMEDIAL CONSTRUCTION PLAN

The corrective actions are designed to remove impacted soil volumes by excavating contaminated soils for offsite disposal and replacing those soils with clean fill. This shall be completed following any exterior building materials abatement to avoid potential cross-contamination. This will also allow the overall site work to move forward unhindered following the correction action as all hazardous materials will be removed from contaminated media.

This CAP including attached **Addendum 1** "Asbestos Abatement & PCB Remediation Specifications" prepared by Atlas for addressing RBMs will be provided in the project bidding and construction documents to ensure the selected General Contractor (GC) is notified of the details of the required corrective action and includes these provisions into their project.

All corrective action construction activities will be overseen by an Environmental Professional (EP) to confirm strict adherence to this plan.

6.1 Health and Safety Requirements

All workers handling contaminated soils shall possess OSHA Hazardous Waste Operations (HAZWOPER) certifications. Different levels of training are required, based on the tasks to be performed, and thus the potential exposure to hazardous materials at the job site. A Site-Specific Health and Safety Plan (HASP) as required by 29 CFR1910.120 is provided as **Appendix D**. The

GC will be responsible for the implementation of the HASP and for ensuring all subcontractors and other personnel working at the Site are OSHA-compliant.

The GC and other site workers are responsible for full compliance with the Vermont Occupational Safety & Health Agency (VOSHA) on the Project, evaluations and personal protective equipment (PPE) for its employees as required for this project, including but not limited to Job Safety Analysis, personal exposure monitoring, written health and safety program, medical monitoring and issuing of personal protective equipment. The Site Superintendent for the GC, as well as equipment operators and any workers entering the excavation, will need to be current on the 40-hour HAZWOPER training regardless of the OSHA requirements.

6.2 Existing Soil Vapor Point Decommissioning

The EP shall oversee the removal of 3 existing exterior soil vapor points by removing the road box and pulling the tubing and vapor implant from the ground. Any remaining annulus shall be filled with granular bentonite and the surface shall be replaced to match the surrounding material with topsoil and seeded as applicable.

6.3 Traffic Control

The GC shall ensure that any traffic control that may be required to facilitate the corrective actions comply with specifications set forth in the construction documents.

6.4 Contaminated Soil Excavations

Under the direction of the EP, the GC shall perform contaminated soil excavations and handling as outlined below:

- Excavate materials in a manner that minimizes fugitive dust and particulate emissions. If visible particulate emissions are generated during soils and materials excavation, utilize various and appropriate methods (including wetting or appropriate tarps or covers) to ensure that visible dust and particulate emissions are contained within the excavation itself, and that such emissions do not migrate outside the immediate excavation.

- Inspect all excavations for the presence of unforeseen subsurface conditions. Such unforeseen conditions might include the presence of concrete vaults, USTs, dry wells, or large diameter concrete or steel piping. Should the presence of unforeseen conditions be identified by the EP, such conditions shall be immediately brought to the attention of VTDEC for further inspection, documentation, and a determination as to additional work, if any, as required.

- If solid waste is encountered during the course of excavation activities, coordinate a staging area for the segregation of soils and solid waste. Solid waste shall be removed from the excavated soils and stockpiled separately at the temporary staging area pending offsite disposal. Following the segregation of any solid waste, the remaining soil shall be returned to the excavation or added to the contaminated soil waste stream as appropriate and under the direction of the EP.

- Load and dump soils and fill materials onsite in a manner that minimizes the generation of visible emissions. This will likely require that excavated materials are sufficiently moist such that visible emissions, if any, are present only within the dump body or loader bucket.

- If visible particulate emissions are generated during the loading, handling or transportation of soils, the GC shall utilize various and appropriate methods (including wetting and/or appropriate tarps or covers) to ensure that visible dust and particulate emissions are contained within the dump body or excavation bucket.

- Closely monitor and maintain dust and erosion control measures to ensure that site soils and fill are not tracked off the property and that such materials do not migrate off the property through water or wind erosion. Monitoring will be accomplished through visual observation and/or handheld real time metering.

- Minimize truck idling time.

- Inspect all site work equipment, including all excavators, loaders, dump trucks and other mobile or stationary equipment on a daily basis and the equipment shall be maintained in such a manner as to minimize the potential for a release of petroleum fuels or oils on the Site. In addition, use other construction-related fluids including glues, epoxy, and concrete form oil, for their intended purpose only and these materials shall be stored in such a manner as to minimize the potential for a release to the environment.

- Report any release of motor fuels, oils, or construction-related fluids to the Site to the EP immediately. Maintain a spill clean-up kit onsite and shall be prepared to respond with its own resources or subcontracted services to clean-up a spill/release of petroleum products and/or chemicals.

- Instruct transporters, all of which will be appropriately permitted to haul non-hazardous solid waste, of the best management practices (BMPs) for the transportation of such materials, including proper tarping of dump bodies or recycling/roll-off containers. Any entity hauling soils offsite shall be compliant with any applicable local, State, and Federal permits or other regulatory requirements. All loose materials shall be removed from truck bodies, earth moving equipment and roll-off containers prior to such equipment leaving the Site.

- If the materials are wet, appropriate measures should be taken to prevent leakage to the ground surface. Install appropriate anti-tracking measures (e.g. anti-tracking pads, coarse gravel, etc.) at the offsite staging area to ensure that all vehicles and mobile equipment that have entered the storage area do not track soils and fill materials from the storage area out onto adjacent public roadways at any time.

- Any equipment or tools that come in contact with contaminated materials shall be decontaminated prior to leaving the Site. Decontamination shall consist of scraping loose any contaminated materials from the equipment and pressure washing. The water used for pressure washing shall be allowed to seep back into the ground at the excavation. Additional details are provided in the HASP.

- Dewatering is not anticipated to complete the corrective actions due to the expected depth of excavations (~1.5 fbgs) relative to depth to groundwater at the Site (over 20 fbgs). Due to the limited volume of excavations, it is anticipated that all open excavations in contaminated areas will be backfilled or covered on a daily basis, thereby mitigating any potential ponding of surface waters from potential precipitation events.

- Contact the EP who will notify the VTDEC if odorous and/or discolored soils are encountered which may indicate the presence of previously unknown contamination. Under the direction of the EP and VTDEC, the soils will be segregated and polyencapsulated onsite, sampled, waste profiled and managed onsite or offsite as required in accordance with Section 7 based on sampling and profiling results.

- In the event any relic USTs are discovered during the excavations, notify the EP immediately. The EP will arrange proper closure of the UST in accordance with VTDEC's *UST Closure and Site Assessment Requirements* dated June 2010.

The GC under the direction of the EP will excavate two soil areas previously determined during site investigations and depicted on **Figures 3 and 4.** Refer to **Table T1** for excavation details provided below:

TABLE T1:
SOIL EXCAVATION DETAILS

Excavation Area	Area (SF)	Depth (FT)	Volume (CY)	Corrected Volume (CY) w/15% "Fluff"
Proposed Excavation Area A	1,096	2.5	101	116
Proposed Excavation Area B	931	2.0	69	79
			Total:	195

The GC shall "live-load" the pre-characterized contaminated soils into dump trucks and haul them directly to the offsite disposal location under bill of lading (see Section 7 for additional details).

6.5 Decontamination Procedures

Any equipment or tools that comes in contact with contaminated soil will need to be decontaminated if they leave the regulated soil areas or at the end of site work. Decontamination procedures will consist of pressure washing. The water used for pressure washing will be allowed to seep back into the ground within the contaminated areas.

7. WASTE MANAGEMENT

Composite soil samples will be required by the disposal facility for waste characterization profiling purposes prior to their acceptance of the waste. This can be completed by collecting in-situ samples for compositing in the regulated areas, or by removing the soils and collecting ex-situ samples from soil stockpiles. Due to space restrictions at the Site, the latter would likely require an offsite staging area that would require compliance with VTDEC sensitive receptor setbacks and security requirements set forth in IRule. Additionally, the staging area would require approval from both the owner and VTDEC via VTDEC's offsite storage form. This form and typical waste

profiling analytical requirements as required by Casella for their NEWSVT Landfill in Coventry, VT is included in **Appendix E**.

This CAP assumes the soils will be non-hazardous. Additional sampling and coordination would be required if any of the soils turn out to be hazardous. Following facility acceptance the soils shall be loaded by the GC and hauled to the disposal facility under bill of lading by permitted and licensed waste haulers. Any disposal receipts and/or waste manifests for all waste transported for offsite disposal shall be provided to the EP for inclusion in the final report.

8. IMPLEMENTATION SCHEDULE

The CAP approval process typically includes 30 days for VTDEC to review the draft CAP and then a 30 day public comment period following VTDEC's approval of the draft CAP. Once the 30 day public comment period has been met, through the State's Environmental Notice Bulletin (ENB), the CAP will be final and implementation can commence. The schedule for the implementation of the CAP will be determined following completion of the EP/GC bidding and selection process, although a preliminary schedule that may be subject to change is outlined below.

- October 2022: Approval of remediation specification by EPA/VTDOH
- September-November 2022: CAP review, comment, and approval
- TBD: Remediation Bidding process
- TBD: Abatement/corrective action implementation

The timeline for completion of abatement and construction is to be determined. The EP shall submit the CACCR within 90 days of completion of CAP activities.

9. CORRECTIVE ACTION OPERATION & MAINTENANCE PLAN

Annual inspections of the soil caps shall be performed by the facility owner to confirm the integrity of the barrier is not compromised due to storms, burrowing beasts, utility work, etc. An inspection form is provided in **Appendix F**. This is further outlined in conjunction with institutional controls in the next section.

10. INSTITUTIONAL CONTROL PLAN

Since all existing soil vapor points will be removed as part of the corrective action, no long-term soil vapor monitoring activities will be completed following construction. Any residual soil contaminants beneath potential engineered soil caps following construction will be clearly documented in the COC and annual inspections will be performed by the facility owner in accordance with details outlined in the previous section.

11. REDEVELOPMENT & REUSE PLAN

The redevelopment project will include the renovation (and partial removal) of the one existing building for municipal use, and will include surface infrastructure, underground utility and stormwater management upgrades.

12. QUALITY ASSURANCE/QUALITY CONTROL PLAN

The collection of environmental media samples for waste characterization will be performed in accordance with the EP's Standard Operating Procedures (SOPs), which can be provided upon request. The analyses of environmental media samples will be completed in accordance with the certified environmental laboratory's SOPs and EPA methodology, which can be provided upon request. Since the sampling will be conducted for waste characterization and not site characterization, quality assurance/quality control (QA/QC) samples (trip blanks, duplicates, field blanks, etc.) are not applicable.

13. COST ESTIMATE

A “Remediation Planning Cost Estimate” letter prepared by Atlas pertaining to RBMs addressed to Joe Kasperzak, Town of St. Johnsbury, dated October 18, 2022 is included in **Addendum 1** of this CAP. This letter provides planning cost estimates for PCB, Lead, and Asbestos remediation/abatement and associated consulting costs. Additional costs associated with EPA work plan approvals, annual air quality sampling, and General Contractor VOSHA Lead in Construction compliance area are also included. The cost estimates are based on previous site investigation work conducted by ATC Group Services and KGSNE, LLC.

14. CONTRACTORS & SUBCONTRACTORS

The contractors and subcontractors that will be implementing the CAP are unknown at this time. An administrative addendum to the CAP documenting this information will be provided following completion of the project bidding and selection process.

FIGURES

Figure 1 - Vicinity Map

Vermont Agency of Natural Resources

vermont.gov

LEGEND

Rare Threatened Endangered
- Threatened or Endangered
- Rare

Wetland - VSWI
- Class 1 Wetland
- Class 2 Wetland
- Buffer

- Wetlands Advisory Layer
- Hazardous Site
- Hazardous Waste Generators
- Brownfields
- Salvage Yard
- Aboveground Storage Tank
- Underground Storage Tank (w
- Dry Cleaner

Private Wells
- GPS Located
- Screen Digitized
- E911 Address Matched
- Welldriller/Clarion
- Unknown Location Method
- Incorrectly Located

Public Water Sources
- Active
- Proposed
- Inactive

Ground Water SPA
- Active/Shared SPA: SHADED

NOTES

Former St. Johnsbury Armory
1249 Main St, St Johnsbury, VT
VTDEC Site #2012-4326

247.0 0 124.00 247.0 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 406 Ft. 1cm = 49 Meters

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THIS MAP IS NOT TO BE USED FOR NAVIGATION

DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.

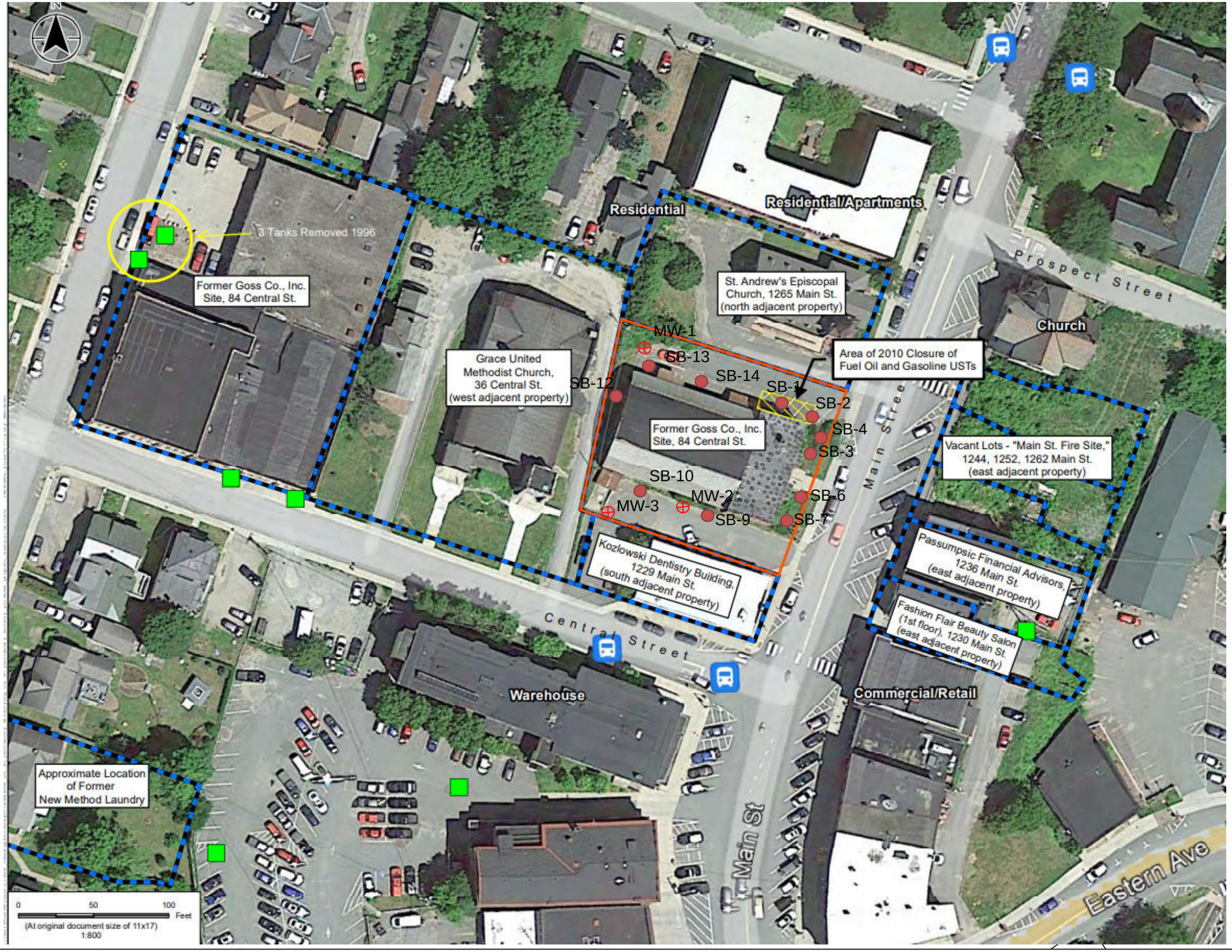

Figure 2

Proj No.	280BS00860
Drawn By: EL	Checked By: / Approved By:
Sample Date:	N/A
Drawing Date:	6/7/2022
Scale:	Not To Scale

Site Plan
Former St. Johnsbury Armory
1249 Main Street
St. Johnsbury, Vermont

ATLAS
51 Knight Lane, P.O Box 1486
Williston, VT 05495
Ph. (802)862-1980

LEGEND

- MONITORING WELLS INSTALLED AS SOIL VAPOR POINTS
- SOIL BORING
- PROPERTY LINE
- PROPERTY LINE
- 24 PAH CONCENTRATION IN SOIL (0-1.5 FBGS) (MG/KG)
- * EXCEEDS VERMONT SOIL STANDARD OF RESIDENT VALUES
- ESTIMATED EXTENT OF PAH-CONTAMINATED SOILS

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51 Knight Lane, P.O Box 1486
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PROJECT:

St. Johnsbury Armory
1249 Main Street, ST. JOHNSBURY, VERMONT

CONTAMINATION MAP
PAHS IN SOIL
Sample Date: June 15, 2022

CLIENT: Stantec, Inc.

COMPUTER CADFILE : 280BS00860.CADD: /STANTEC.DWG

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
EL		EU	JH
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
NOT TO SCALE	8-4-2022	280BS00860	3

LEGEND

- MONITORING WELLS INSTALLED AS SOIL VAPOR POINTS
- SOIL BORING
- PROPERTY LINE
- GRASS AREAS
- 730 LEAD CONCENTRATION IN SOIL (0 - 1.5 fbgs) (mg/kg)
- * EXCEEDS VERMONT SOIL STANDARD OF RESIDENT VALUES
- ESTIMATED EXTENT OF LEAD-CONTAMINATED SOILS

ATLAS
51 Knight Lane, P.O Box 1486
Williston, VT 05495
Ph. (802)862-1980

PROJECT:

St. Johnsbury Armory
1249 Main Street, ST. JOHNSBURY, VERMONT

CONTAMINATION DISTRIBUTION MAP
LEAD IN SOIL
Sample Date: June 15, 2022

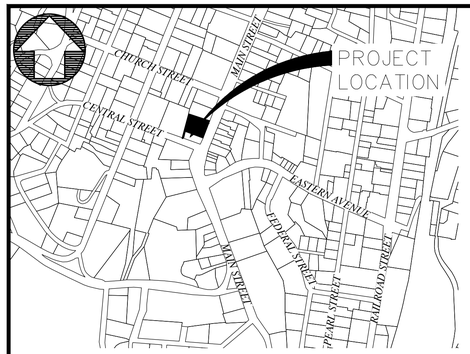
CLIENT: Stantec, Inc.

COMPUTER CADFILE : 280BS00860.CADD: /STANTEC.DWG

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
EL		EU	JH
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
NOT TO SCALE	8-4-2022	280BS00860	4

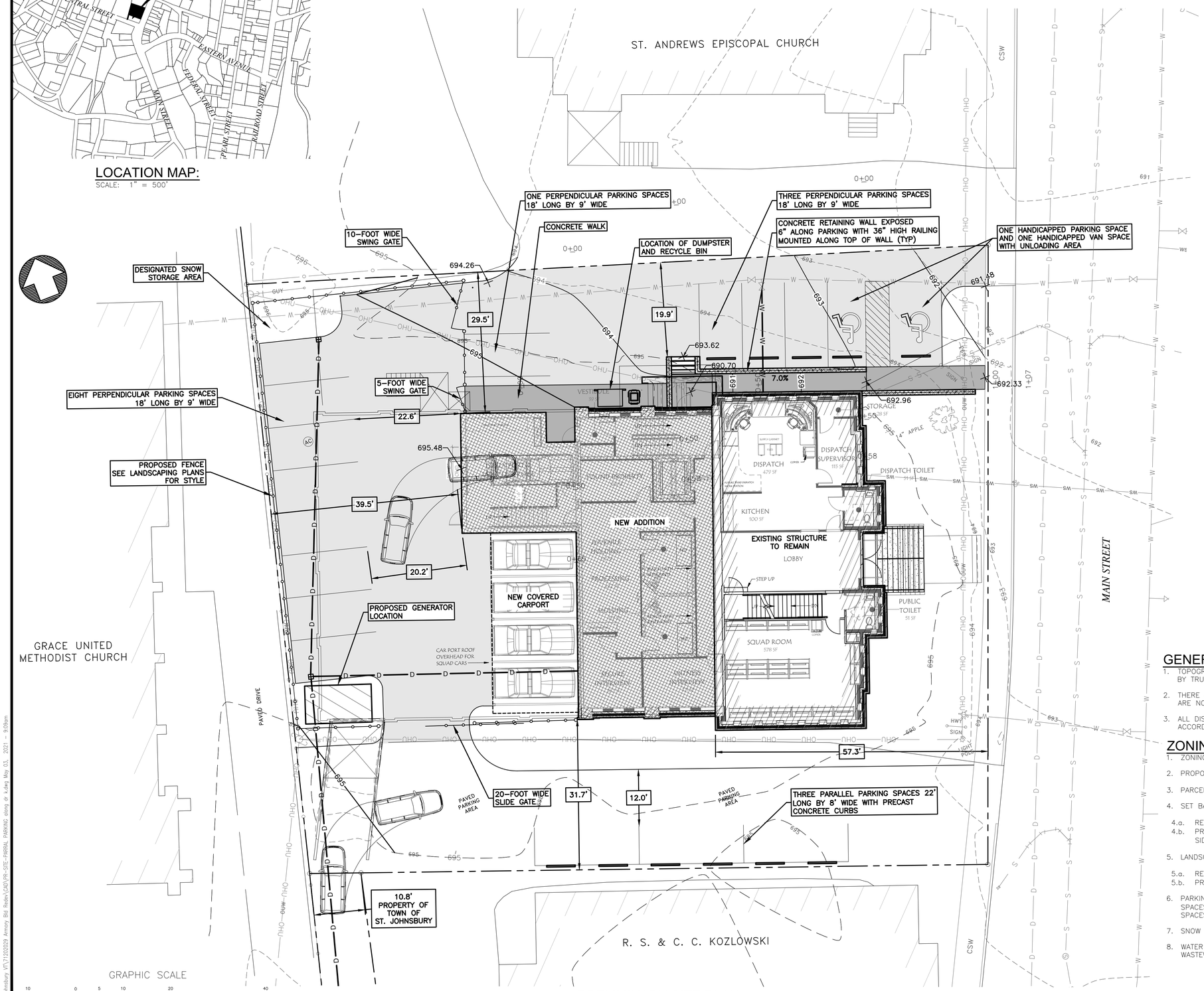
APPENDIX A

Redevelopment Site Plan



LOCATION MAP:

SCALE: 1" = 500'



PRELIMINARY SITE PLAN:

SCALE: 1" = 10'

LEGEND

EXISTING:

- WATER MAIN PIPE
- SEWER MAIN PIPE
- STORM DRAIN PIPE
- OVERHEAD WIRE
- BUILDING/STRUCTURE OUTLINE
- PAVED ROAD OUTLINE
- GRAVEL ROAD OUTLINE
- PROPERTY LINE
- BARB WIRE FENCE
- STONE WALL
- GUARD RAIL
- WOOD FENCE
- MAJOR CONTOUR
- MINOR CONTOUR
- CLEAN OUT
- TREE LINE
- SIGNS
- FIRE HYDRANT
- WATER SHUTOFF VALVE
- WATER VALVE
- SEWER MANHOLE
- CATCH BASIN
- IRON PIPE/REBAR
- UTILITY POLE/GUY WIRE
- DECIDUOUS TREE
- CONIFEROUS TREE
- MAIL BOX
- TRAVERSE POINT

PROPOSED:

- SEWER MAIN PIPE
- SEWER SERVICE
- STORM DRAIN PIPE
- 6" PERFORATED UNDERDRAIN
- WATER MAIN PIPE
- WATER SERVICE
- MAJOR CONTOUR
- MINOR CONTOUR
- SECURITY FENCE
- RAILING
- BUILDING/STRUCTURE OUTLINE
- PAVED AREA
- CONCRETE WALKWAY
- PAINTED PARKING LINE
- CATCH BASIN

GENERAL NOTES:

1. TOPOGRAPHIC SURVEY AND BOUNDARY LINES BASED ON INFORMATION PROVIDED BY TRULINE LANDSURVERYORS, THIS IS NOT A BOUNDARY SURVEY.
2. THERE ARE BURIED UTILITIES ON THIS SITE. THE LOCATION OF BURIED UTILITIES ARE NOT WARRANTED TO BE EXACT.
3. ALL DISTURBED AREAS OUTSIDE OF PAVED AREAS SHALL BE RESTORED IN ACCORDANCE WITH LANDSCAPE PLANS.

ZONING NOTES:

1. ZONING DISTRICT: MIXED USE
2. PROPOSED USE: POLICE STATION AND DISPATCH CETNER
3. PARCEL SIZE: 1249 MAIN STREET: 19,040 SQUARE FEET (0.44 ACRES)
4. SET BACKS:
   - 4.a. REQUIRED: FRONT = 15-FEET SIDE/REAR = 15-FEET
   - 4.b. PROPOSED: FRONT = 57.3-FEET SIDE (NORTH) = 29.5-FEET/ SIDE (SOUTH) = 31.7-FEET/REAR = 39.5-FEET
5. LANDSCAPED/GREEN STRIP:
   - 5.a. REQUIRED: FRONT = 10-FEET SIDE/REAR = 5-FEET
   - 5.b. PROPOSED: FRONT = N/A SIDE/REAR = 0-FEET
6. PARKING SPACES PROVIDED: 8 EMPLOYEE SPACES, 4 COVERED PATROL CAR SPACES, 1 SALLY PORT/GARAGE SPACE, 4 PUBLIC SPACES AND 2 HANDICAPPED SPACES. 19 SPACES TOTAL
7. SNOW SHALL BE STORED IN DESIGNATED AREAS AND REMOVED AS NECESSARY.
8. WATER AND WASTEWATER USAGE ESTIMATED AT 950 GPD BASED ON THE VERMONT WASTEWATER SYSTEM AND POTABLE WATER SUPPLY RULE.

DUFRESNE GROUP
CONSULTING ENGINEERS
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Manchester, VT • Tel: (802) 768-8291
• • •
Dufresne Group is owned by Dufresne & Associates, PC

REVISIONS

DATE	COMMENTS	BY

THE DRAWING SHALL NOT BE REUSED OR ALTERED IN ANY WAY WITHOUT THE WRITTEN APPROVAL AND AUTHORITY OF DUFRESNE GROUP. ANY REVISIONS SHALL BE MADE BY DUFRESNE GROUP©

ARMORY BUILDING REDEVELOPMENT

PRELIMINARY SITE PLAN

ST JOHNSBURY, VERMONT

Project #	
Project Mgr.	EAE
Design by	EAE
Drawn by	EAE
Reviewed by	REVIEWED BY
Approved by	NAME
Date	MAY 3, 2021
Scale	AS SHOWN

C1

SHEET 1 OF 1

FILE: J:\St. Johnsbury VT\71202029 Armory Bld Redev\CAD\PR-SITE-PARKIN. PARKING.dwg by k.dwg May 03, 2021 - 9:09am

APPENDIX B

Site Investigation Tables

TABLE 1
SOIL QUALITY RESULTS - POLYCYCLIC AROMATIC HYDROCARBONS
FORMER ST JOHNSBURY ARMORY, ST JOHNSBURY, VT

		Compound	BaP TEQ	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene (BaP)	Benzo(b) fluor anthene	Benzo(g,h,i) perylene	Benzo(k) fluor anthene	Chrysene	Dibenzo(a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	2-Methyl naphthalene	Naphthalene	Phenanthrene	Pyrene
		VSS Resident	0.07	NS	NS	NS	NS	TEQ	NS	NS	NS	NS	NS	2,301	2,301	NS	NS	2.7	NS	NS
		Urban Background	0.58	NS	NS	NS	NS	TEQ	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		VSS Non-Resident	1.54	NS	NS	NS	NS	TEQ	NS	NS	NS	NS	NS	26,371	26,371	NS	NS	16	NS	NS
		BaP TEF	--	--	--	--	0.1	1	0.1	--	0.01	0.01	1	--	--	0.1	--	--	--	--
Sample ID:	**Sample Depth (fbgs):**	**Sample Date:**																		
SB-1	0-1.5	04/25/22	ND<0.21	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18
SB-2	0-1.5	04/25/22	ND<0.21	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18
SB-3	0-1.5	04/25/22	**0.40**	ND<0.18	ND<0.18	ND<0.18	**0.19**	**0.24**	**0.31**	ND<0.18	ND<0.18	**0.23**	ND<0.18	**0.37**	ND<0.18	ND<0.18	ND<0.18	ND<0.18	**0.20**	**0.38**
SB-4	0-1.5	04/25/22	**3.3**	ND<0.19	ND<0.19	**0.64**	**2.4**	**2.3**	**2.8**	**1.0**	**1.1**	**2.3**	**0.36**	**4.8**	ND<0.19	**1.3**	ND<0.19	ND<0.19	**2.8**	**3.6**
SB-4a	2-3.5	09/20/22	**0.138**	#######	#######	ND<0.022	**0.075**	**0.0737**	**0.0854**	**0.0387**	**0.0339 J**	**0.0756**	**0.0393**	**0.149**	#######	**0.077**	NA	ND<0.010	**0.0758**	**0.123**
SB-6	0-1.5	04/25/22	**0.60**	ND<0.20	ND<0.20	ND<0.20	**0.34**	**0.38**	**0.49**	**0.23**	ND<0.20	**0.38**	ND<0.20	**0.77**	ND<0.20	**0.34**	ND<0.20	ND<0.20	**0.53**	**0.63**
SB-6a	2.5-3.5	09/20/22	**0.061**	#######	#######	ND<0.022	**0.0342 J**	**0.039**	**0.0506**	**0.0289 J**	**0.0169 J**	**0.0356**	ND<0.015	**0.0621**	#######	**0.0598**	NA	ND<0.0098	**0.0247 J**	**0.0539**
SB-7	0-1.5	04/25/22	**0.23**	ND<0.18	ND<0.18	ND<0.18	ND<0.18	ND<0.18	**0.21**	ND<0.18	ND<0.18	ND<0.18	ND<0.18	**0.28**	ND<0.18	**0.20**	ND<0.18	ND<0.18	ND<0.18	**0.23**
SB-9	0-1.5	04/25/22	**24**	**6.8**	**0.21**	**15**	**19**	**16**	**19**	**7.2**	**7.0**	**17**	**2.7**	**49**	**7.1**	**9.9**	**2.9**	**4.4**	**58**	**38**
SB-9a	2.5-3.5	09/20/22	**0.023**	#######	#######	ND<0.021	**0.0126 J**	#######	**0.0150 J**	ND<0.017	#######	**0.0127 J**	ND<0.015	**0.0208 J**	#######	**0.0416**	NA	ND<0.0098	ND<0.012	**0.0177 J**
SB-10	0-1.5	04/25/22	ND<0.24	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21
SB-12	0-1.5	04/25/22	ND<0.24	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21	ND<0.21
SB-13	0-1.5	04/25/22	ND<0.23	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20
SB-14	0-1.5	04/25/22	ND<0.23	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20	ND<0.20

QA/QC Samples:

Duplicate (SB-9)	2.5-3.5	09/20/22	**0.024**	#######	#######	ND<0.025	**0.0200 J**	#######	**0.0244 J**	ND<0.020	#######	**0.0183 J**	ND<0.018	**0.0353 J**	#######	#######	ND<0.018	ND<0.011	**0.0286 J**	**0.0306 J**
		RPD	4%	--	--	--	45%	--	48%	--	--	36%	--	52%	--	--		--	--	53%

NOTES:
All results provided in micrograms per kilogram (mg/kg) or parts per million (ppm), analyzed by EPA Method 8270
Bold values indicate detections
NE = not encountered
VSS = Vermont Soil Standards (IRULE, July 2019)
TEF = Toxicity Equivalency Factor, TEQ = Toxicity Equivalency Quotient
BaP TEQ values were calculated from select PAH analyical concentrations as shown multiplied by the corresponding TEF and summed
TEF compounds that are non-detect were estimated based on half of the provided laboratory limit
BaP TEQ values are compared to VSS for Resident Soils, Non-Resident Soils and Urban Background Values
Green shaded values are below Resident Values
Blue shaded values indicate exceedance of Resident Values
Orange shaded values indicate exceedance of Urban Background Values
Red shaded values indicate exceedance of Non-Resident Values
ND = not detected above stated method detection limit (MDL)
NS = no standard available
NA = not analyzed
J = estimated value below laboratory reporting limit (RL)
fbgs = feet below ground surface
RPD = relative percent difference

TABLE 2
SOIL QUALITY RESULTS - PCBs
FORMER ST JOHNSBURY ARMORY, ST JOHNSBURY, VT

		Analyte	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	Arochlor 1262	Arochlor 1268
Sample ID:	**Depth (fbgs):**	**Date:**									
SB-1	0-1.5	04/25/22	ND<0.081	ND<0.081	ND<0.081	ND<0.081	ND<0.081	ND<0.081	ND<0.081	ND<0.081	ND<0.081
SB-2	0-1.5	04/25/22	ND<0.082	ND<0.082	ND<0.082	ND<0.082	ND<0.082	ND<0.082	ND<0.082	ND<0.082	ND<0.082
SB-3	0-1.5	04/25/22	ND<0.084	ND<0.084	ND<0.084	ND<0.084	ND<0.084	ND<0.084	ND<0.084	ND<0.084	ND<0.084
SB-4	0-1.5	04/25/22	ND<0.092	ND<0.092	ND<0.092	ND<0.092	ND<0.092	ND<0.092	ND<0.092	ND<0.092	ND<0.092
SB-6	0-1.5	04/25/22	ND<0.094	ND<0.094	ND<0.094	ND<0.094	ND<0.094	ND<0.094	ND<0.094	ND<0.094	ND<0.094
SB-7	0-1.5	04/25/22	ND<0.083	ND<0.083	ND<0.083	ND<0.083	ND<0.083	ND<0.083	ND<0.083	ND<0.083	ND<0.083
SB-9	0-1.5	04/25/22	ND<0.087	ND<0.087	ND<0.087	ND<0.087	ND<0.087	ND<0.087	ND<0.087	ND<0.087	ND<0.087
SB-10	0-1.5	04/25/22	ND<0.095	ND<0.095	ND<0.095	ND<0.095	ND<0.095	ND<0.095	ND<0.095	ND<0.095	ND<0.095
SB-12	0-1.5	04/25/22	ND<0.096	ND<0.096	ND<0.096	ND<0.096	ND<0.096	ND<0.096	ND<0.096	ND<0.096	ND<0.096
SB-13	0-1.5	04/25/22	ND<0.092	ND<0.092	ND<0.092	ND<0.092	ND<0.092	ND<0.092	ND<0.092	ND<0.092	ND<0.092
SB-14	0-1.5	04/25/22	ND<0.090	ND<0.090	ND<0.090	ND<0.090	ND<0.090	ND<0.090	ND<0.090	ND<0.090	ND<0.090

NOTES:
Polychlorinated biphenyls (PCBs) soil quality results, provided in mg/kg = milligrams per kilogram, analyzed by EPA Method 8082 w/soxhlet extracti
Bold values indicate detections
VSS = Vermont Soil Standards (IRULE, July 2019)
Blue shaded values indicate exceedance of VSS Resident Values (VSS-R) = 0.144 mg/kg
Orange shaded values indicate exceedance of VSS Non-Resident Values (VSS-NR) = 0.68 mg/kg
Red shaded values indicate exceedance of EPA High Occupancy Cleanup Standards (EPA-HOCS) = 1.0 mg/kg
ND = not detected above provided detection limit
fbgs = feet below ground surface

TABLE 3
SOIL QUALITY RESULTS - METALS
FORMER ST JOHNSBURY ARMORY, ST JOHNSBURY, VT

		Analyte	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
		VSS Resident	**16**	**11,247**	**6.9**	**40,223**	**400**	**3.1**	**366**	**237**
		VSS Non-Resident	**16**	**127,382**	**87**	**360,223**	**800**	**3.1**	**4,900**	**2,483**
Sample ID:	**Depth (fbgs):**	**Date:**								
SB-1	0-1.5	04/25/22	ND<3.3	**45**	ND<0.33	**15**	**20**	**0.043**	ND<3.3	ND<0.33
SB-2	0-1.5	04/25/22	ND<3.3	**39**	ND<0.33	**17**	**26**	**0.079**	ND<3.3	ND<0.33
SB-3	0-1.5	04/25/22	ND<3.6	**24**	ND<0.36	**17**	**24**	**0.097**	ND<3.6	ND<0.36
SB-4	0-1.5	04/25/22	ND<3.7	**64**	ND<0.37	**12**	**160**	**0.54**	ND<3.7	ND<0.37
SB-6	0-1.5	04/25/22	ND<3.8	**60**	ND<0.38	**17**	**110**	**0.18**	ND<3.8	ND<0.38
SB-7	0-1.5	04/25/22	ND<3.4	**30**	ND<0.34	**13**	**28**	ND<0.027	ND<3.4	ND<0.34
SB-9	0-1.5	04/25/22	**4.7**	**35**	ND<0.36	**13**	**730**	**0.36**	ND<3.6	ND<0.36
SB-9a	2.5-3.5	09/20/22	NA	NA	NA	NA	**20.5**	NA	NA	NA
SB-10	0-1.5	04/25/22	ND<4.0	**58**	**1.0**	**11**	**23**	**0.099**	ND<4.0	ND<0.40
SB-12	0-1.5	04/25/22	ND<3.9	**48**	ND<0.39	**12**	**260**	**0.33**	ND<3.9	ND<0.39
SB-13	0-1.5	04/25/22	ND<3.9	**38**	ND<0.39	**21**	**9.3**	**0.048**	ND<3.9	ND<0.39
SB-14	0-1.5	04/25/22	ND<3.7	**120**	**0.50**	**14**	**290**	**0.98**	ND<3.7	**0.93**

NOTES:
All results provided in milligrams per kilogram (mg/kg) or parts per million (ppm)
All samples analyzed by EPA Methods 6010/7470
Bold values indicate detections
VSS = Vermont Soil Standards (IRULE, July 2019)
Blue shaded values indicate exceedance of Resident Values
Red shaded values indicate exceedance of Non-Resident Values
ND = not detected above provided detection limit
NA = not analyzed
fbgs = feet below ground surface
RPD = relative percent difference

Table 4
Soil Vapor Analytical Results
Former St Johnsbury Armory

		Sample Location	MW-1	MW-2	MW-3
		Sample date:	5/4/2022	5/4/2022	5/4/2022
		Sample method:	Vapor Implant	Vapor Implant	Vapor Implant
		PID:	0.1	0.2	0.6
		Sample elevation:	198	201.5	192.6
Compound	**VISV Residential**	**VISV Industrial**			
Tetrachloroethene (PCE)	**21**	**170**	1.40	6.6	10
Trichloroethene (TCE)	**6.7**	**23**	ND	ND	ND
cis-1,2-Dichloroethene	**NS**	**NS**	D	ND	ND
trans-1,2-Dichloroethene	**NS**	**NS**	ND	ND	ND
Vinyl chloride	**3.7**	**62**	ND	ND	ND
Carbon tetrachloride	**6**	**45**	ND	ND	ND
Chloroform	**1.3**	**12**	ND	ND	ND
1,2-Dichloroethane (EDC)	**3.6**	**16**	*BRL<5.0*	BRL<0.81	*BRL<5.0*
1,2-Dibromoethane (EDB)	**0.16**	**0.68**	*BRL<9.4*	*BRL<1.5*	*BRL<9.4*
Acetone	**1,100,000**	**4,500,000**	29.0	ND	38.0
Benzene	**4.3**	**35**	1.0	1.9	1.5
Bromoform	**85**	**370**	ND	ND	ND
Bromoethene	**NS**	**NS**	ND	ND	ND
Carbon disulfide	**24,000**	**100,000**	ND	ND	ND
Chloromethane	**3,100**	**13,000**	ND	ND	ND
Chloroethane	**330,000**	**1,200,000**	ND	ND	ND
Dichlorodifluoromethane (Freon12)	**3,500**	**15,000**	5.9	40.0	21.0
Ethanol	**NS**	**NS**	16.0	ND	ND
Ethyl acetate	**2,400**	**10,000**	ND	ND	16.0
Heptane	**NS**	**NS**	1.3	2.3	2.0
Hexane	**24,000**	**100,000**	ND	ND	ND
Isopropyl alcohol/isopropanol	**7,000**	**29,000**	210.0	290.0	200.0
Methylene chloride	**3,400**	**41,000**	2.1	ND	ND
Methyl ethyl ketone (MEK)	**170,000**	**730,000**	ND	ND	ND
Methyl isobutyl ketone	**100,000**	**440,000**	ND	ND	ND
Propylene	**100,000**	**440,000**	ND	ND	ND
1,2,4-Trichlorobenzene	**2,000**	**7000**	0.4	ND	1.9
Tertiary Butyl Alcohol	**NS**	**NS**	ND	ND	ND
Tetrahydrofuran	**70,000**	**290,000**	ND	ND	ND
Toluene	**170,000**	**730,000**	4.5	16.0	23.0
Trichlorofluoromethane	**NS**	**NS**	ND	ND	ND
Xylenes (total)	**3,500**	**15,000**	2.2	10.2	10.7

Notes:

All samples analyzed by EPA method TO-15

2017 Vermont Vapor Intrusion Screening Values (VISV) are from Appendix A of

the Investigation and Remediation of Contaminated Properties Rule, July 2017; residential and industrial subslab soil gas

Green shaded values exceed VISV residential and red shaded values exceed VISV industrial

BRL = Not detect at or above stated laboratory reporting limit samples in ug/m3

Italicized values indicate report limit exceeds VISV

J = Indicates estimated value below laboratory reporting limit

NA = not analyzed or not applicable

E = Indicates value exceeds calibration range

Appendix C

Public Notice Form, Abutters List

State of Vermont
Department of Environmental Conservation
Waste Management & Prevention Division
Davis Building - 1st Floor, One National Life Drive
Montpelier, VT 05620-3704

OFFICIAL NOTICE

Dear _____,

This is an official notice that a draft Corrective Action Plan (CAP) has been prepared by _____ on behalf of _____ for the _____ site. Vermont law requires that adjoining and/or impacted property owners receive notice of this CAP, as well as being provided a 30 day public comment period. The public comment period will start on _____ and end on _____.

The CAP approval process includes a public comment period and an opportunity to request a public meeting. Note that in order to appeal a final CAP approval, comments must be submitted during the public comment period.

To view the draft CAP, please visit the Environmental Notice Bulletin (ENB) at ENB.VERMONT.GOV, and enter the site number: _____ in the "Permit #" space. Do not include spaces or dashes.

For further information, please visit the following website:
DEC.VERMONT.GOV/PERMITS/ENB/GENERAL.

FOR QUESTIONS CONTACT:
Waste Management & Prevention Division, Sites Management Section (SMS)
SMS Site Manager: _____
SMS Site Manager email address: _____
(802) 828-1138

SITE NUMBER

_____

NAME OF POTENTIALLY RESPONSIBLE PARTY

_____

LOCATION OF CORRECTIVE ACTION STREET ADDRESS/ROUTE

_____

TOWN(S) WHERE PROPOSED CORRECTIVE ACTION WILL TAKE PLACE

_____

Former Armory - 1249 Main Street St. Johnsbury Abuters

Name	Address	Phone
Grace United Methodist Church	36 Central Street, ST. Johnsbury, Vermont	802-748-2895
St. Anderws Episcopal Church	1256 Main Street, ST. Johnsbury, Vermont	802-748-2121
Pussumski Saving Bank	1236 Main Street, St. Johnsbury, Vermont	802-748-5017
Fashion Flair	1222 Main Street, ST. Johnsbury, Vermont	802-748-3056
Dr. Richard S. Kozoloski DDS	1229 Main Street, ST. Johnsbury, Vermont	802-748-3906

APPENDIX D

Health & Safety Plan

Health and Safety Plan

Prepared For:

Town of St. Johnsbury

Former Armory Building

1249 Main Street,

St. Johnsbury Vermont

Atlas Project #: 280EM00860

Prepared By:

Atlas Technical Consultants

51 Knight Lane

Williston, VT 05495

REVIEW AND APPROVAL

CLIENT: Town of St. Johnsbury **PROJECT NUMBER:** 280EM00860

SITE NAME: Former Armory Building **SITE LOCATION:** 1249 Main Street, St. Johnsbury, Vermont

PROJECT DESCRIPTION: Contaminated soil excavations and handling for corrective action and post excavation sampling

PREPARED BY: Jesse Stratton **TITLE:** Sr. Project Manager **DATE:** 7/20/2022

Jesse Stratton		
Project Manager	**Signature**	**Date**
Joseph Hayes		
Reviewer's Name	**Signature**	**Date**

This Health and Safety Plan (HASP) has been written for the use of Atlas and its employees. It may also be used as a guidance document by properly trained and experienced Atlas subcontractors. However, Atlas does not guarantee the health or safety of any person working on this project site.

Due to the potential hazardous nature of this site and the activity occurring thereon, it is not possible to discover, evaluate, and provide protection for all possible hazards which may be encountered. Strict adherence to the health and safety guidelines set forth herein will reduce, but not eliminate, the potential for injury at this site. The health and safety guidelines in this Plan were prepared specifically for this site and should not be used on any other site without prior research by trained health and safety specialists. All site personnel have the authority to "Stop Work" if unsafe conditions are present or discovered during site activities.

Atlas claims no responsibility for use of this plan by others. The plan is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if these conditions change.

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EMERGENCY INFORMATION

Site Emergency Numbers	
Police, Fire and Ambulance Emergencies	**911**
CORE Health Networks *(24 hour Injury/Illness Case Management)*	**(855) 282-6331**
Poison Control Center	**(800) 222-1222**
Nationwide Call Before You Dig	**811 (888-DIG-SAFE)**
National Response Center	**(800) 424-8802**
EPA Region # Main Office (enter region #)	**(800) 887-6063**
State Environmental Agency	**(802) 828-1556**

HOSPITAL AND ROUTE INFORMATION

Northeastern Vermont Regional Hospital
1315 Hospital Drive
St. Johnsbury, Vermont 05819
802-748-8141

Approximate travel time is 6-7 minutes.

Directions from Main Street

1. North on Main Street
2. Left on to Mt. Pleasant Street (0.1 mi)
3. Right onto Hastings Street (0.3 mi)
4. Straight on Memorial Drive (1.2 mi)
5. Right onto Hospital Drive (0.2 mi)

OCCUPATIONAL MEDICAL CLINIC AND ROUTE INFORMATION

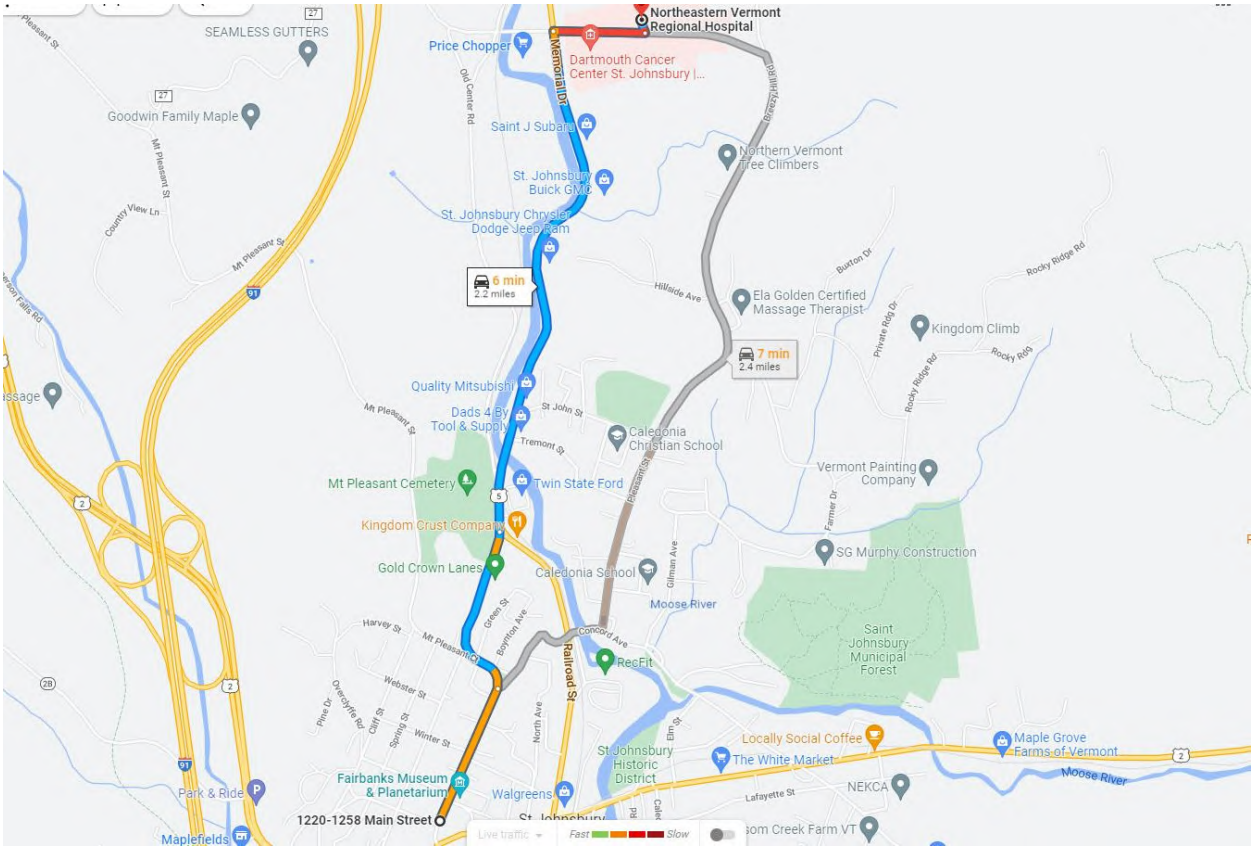
Northeastern Vermont Regional Hospital
1315 Hospital Drive
St. Johnsbury, Vermont 05819
802-748-8141

Approximate travel time is 6-7 minutes.

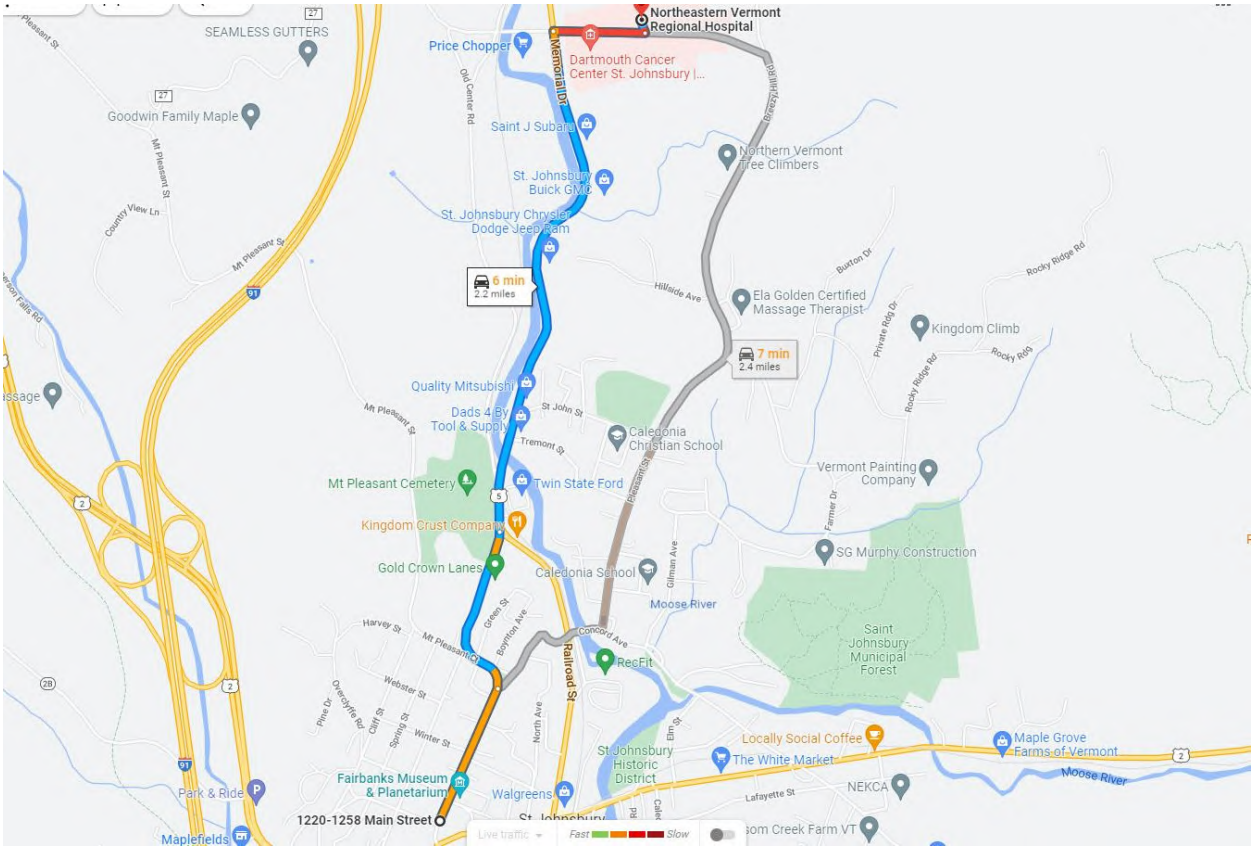
Directions from Main Street

1. North on Main Street
2. Left on to Mt. Pleasant Street (0.1 mi)
3. Right onto Hastings Street (0.3 mi)
4. Straight on Memorial Drive (1.2 mi)
5. Right onto Hospital Drive (0.2 mi)

EMERGENCY MEDICAL ROUTE TO HOSPITAL



ROUTE TO OCCUPATIONAL CLINIC



EMERGENCY ASSEMBLY LOCATION

The Grace United Church parking lot located to the west of the site. Dependent on the site's hazards and work location, the exact location of the emergency assembly location will be communicated during the daily tailgate safety meeting.

FIRST-AID MEASURES

In the event that an employee exhibits symptoms of exposure, contact **CORE Health Networks** immediately for phone assessment of injury/illness. The following procedures will be used:

Class of contaminant: Soils contaminated with PAHs and lead

Eye Contact: Flush eye immediately with copious amount of water for a minimum of 15 minutes. Repeat until irritation is eliminated and seek medical attention.

Skin Contact: Wash exposed area with soap and water for at least 15 minutes. If dermatitis or severe reddening occurs, seek medical attention.

Inhalation: Move the person into fresh air. If symptoms persist, seek medical attention.

Ingestion: Do not induce vomiting. Seek immediate medical attention.

IMPORTANT NUMBERS:

Title	Name	Phone Number
Project Manager:	Jesse Stratton	802-881-8685
Site Safety and Health Officer:	Haleigh Marshall	802-318-7638
Site Supervisor:	TBD	TBD
Regional Safety Coordinator:	Greg Fiedorowicz	401-302-2822
State Utility Locate Service:	National Call Before You Dig	811

1.0 INTRODUCTION

All personnel and visitors who may enter work areas on this site must comply with the requirements of this Health and Safety Plan (HASP). All site personnel have the authority to "Stop Work" if unsafe conditions are present.

1.1. Scope and Applicability of the Site Health and Safety Plan

This HASP has been prepared by Atlas for the activities associated with Direct Push Drilling, Installation of Monitoring Wells and Sampling of soil/water to identify contamination.

The principal hazardous chemical contaminants in the soil/water at the site are expected to be Petroleum. Appendix B contains Safety Data Sheets (SDS) for the potential onsite contaminates.

The health and safety protocols established in this HASP are based on the Atlas Health and Safety Policy Manual, the Occupational Safety and Health Administration (OSHA) Regulations, past field experiences, specific site conditions, and chemical hazards known or anticipated to be present from available site data. The following HASP is intended solely for use during the proposed activities described in the project documents and technical specifications. Specifications herein are subject to review and revision based on actual conditions encountered in the field during site characterization activities. Such changes must be listed on the HASP List of Approved Amendments and/or Changes (see Appendix C).

Before site operations begin, all employees, including subcontractors for Atlas working on this project site will have read this HASP and all revisions. Such changes must be listed on the HASP List of Approved Amendments and/or Changes (see Appendix C). By signing this form all individuals recognize the requirements of the HASP, known or suspected hazards, and will adhere to the protocols required for the project site.

Before site operations begin, all employees, including subcontractors for Atlas working on this project site will have read this HASP and all revisions. Before work begins, all affected workers will sign the HASP Acknowledgement Form (see Appendix C). By signing this form, all individuals recognize the requirements of the HASP, known or suspected hazards, and will adhere to the protocols required for the project site.

1.2. Historical Overview

The facility is located at 1249 Main Street in St. Johnsbury, VT. The Town of St. Johnsbury plans to redevelop the property into municipal space. The property has previously been listed as a Hazardous Site by the VTDEC. Site soils are contaminated with PAHs from urban fills and lead from exterior building materials. Building materials are contaminated with PCBs, lead and asbestos.

1.3. Visitors

All visitors to the site must participate in a site H&S discussion that informs them of the hazards at the site and the potential activities that Atlas or its subcontractors are performing. All visitors must sign the Atlas Visitors Log (see Appendix C).

Visitors are not allowed in the work area while work is being performed unless properly trained and are wearing the required PPE.

1.4. Subcontractor Activities

All subcontractors used at the Site require pre-approval in the Atlas Subcontractor Prequalification System or through Atlas' manual subcontractor approval process. Subcontractors are TBD following results of the bidding and selection process.

Subcontractor Details	
Name of Subcontractor:	
Contact Name:	
Contact Phone Number:	
Anticipated Dates Onsite:	
Activities to be Performed:	

2.0 PROJECT ORGANIZATION

The following are specific roles and responsibilities for key site personnel.

2.1. Project Manager (PM)

The Project Manager (PM) has the primary responsibility for the fulfillment of the terms of the contract and overseeing operations for the purpose that includes meeting company legal and safety requirements. It is the PM's responsibility to manage the scope of the project, provide for the H&S of all employees working and communicate with the Client regarding the progress toward project goals. The PM will inform the Regional Safety Coordinator (RSC) of all HASP modifications, violations and incidents. The PM responsibilities include:

- Provide personnel time to read and understand the HASP and complete any training required to work on the project site.
- Conduct project start-up health and safety briefing for onsite personnel and subcontractors.
- Check that each subcontractor is approved in Atlas' subcontractor system and that each subcontractor's site workers have appropriate training.
- Verify Atlas employees are medically cleared and have completed all necessary training.
- That hazards identified during any site audits or while working are corrected. If necessary for immediate hazards, shut down field operations if hazards cannot be corrected or the hazards present an immediate threat to life and health.
- Develop HASP.
- Determine and provide all necessary safety systems and PPE.

2.2. Site Supervisor

The Site Supervisor is responsible for field operations and reports to the Project Manager and is the onsite coordinator and overseer of operations. It is their duty to supervise the site personnel, coordinate the activities of the subcontractor personnel and verify that the scope of work is followed and modified, when necessary. The Site Supervisor's specific responsibilities include:

- Executing the work plan and schedule as detailed by the Project Manager
- Coordination with the SSHO on health and safety issues
- Ensuring site work compliance with the requirements of the HASP

2.3. Site Safety and Health Officer (SSHO)

The site Safety and Health Officer (SSHO) has the responsibility and authority to implement this HASP and to verify compliance. The SSHO reports to the Project Manager. The SSHO is on-site during all work operations and has the responsibility to halt site work if unsafe conditions are detected or if deviations in the work plan occur. The responsibilities of the SSHO at the site include the following:

- Managing the H&S functions on the site;
- Ensuring compliance with the HASP and use of PPE;
- Conducting daily Tailgate Safety Meetings for site personnel and subcontractors. The following topics should be covered:

  - Hazard Communication (i.e., SDS location, proper PPE to be used, chemical hazards of non-routine tasks).
  - Work zone setup and equipment movement
  - Review of all applicable JSA(s).
  - Discuss tasks to be performed, associated hazards and procedures to protect employees from those hazards.
  - Review site safety requirements.
  - Review site emergency procedures
- Conducting daily safety inspections of the site looking for unsafe acts or conditions and providing corrective action as appropriate.

2.4. Regional Safety Coordinator (RSC)

The Regional Safety Coordinator (RSC) is responsible for providing professional health and safety advice to the project. The RSC will review and provide support for concerns regarding the health and safety of field personnel assigned to this project, including:

- If requested by the Project Manager, review and approval of HASP;
- Review of incident reports, inspections and air monitoring results;
- When required, the RSC will conduct a field audit of the site to evaluate the adequacy of the protective measures and work with the PM to implement any necessary changes.

2.5. Field Personnel

The field personnel include technicians, engineers, scientists, geologists and subcontractors who perform work on this site. Each individual team member will be responsible for understanding and personally complying with the requirements of this HASP. Field personnel will report health and safety violations to either the site Supervisor or the SSHO. H&S responsibilities, as discussed in this HASP that are shared by all site personnel include:

- Complying with the requirements of the HASP
- Reporting unsafe acts or conditions
- Wearing correct PPE for the task
- Stopping any unsafe work
- Following the JSA and/or correct steps for a task.
- Assist other field personnel with being safe and meeting the requirements of this HASP.

3.0 TASK/OPERATION HEALTH AND SAFETY RISK ANALYSIS SUMMARY

This chapter describes the identified and anticipated hazards associated with this site based on the environmental conditions, tasks to be performed and the control measures necessary to protect workers from these hazards. The assessment looked at the general, chemical, physical and biological hazards that may be encountered while working on this site. Using this information, appropriate control methods are selected to eliminate the identified risks or effectively control them.

3.1. Job Safety Analysis (JSA)

The purpose of the JSA is to identify the routine health and safety hazards associated with the routine site tasks and operations. JSAs for the anticipated tasks that will be performed onsite are maintained in Appendix A. A single JSA may be used for a task/operation performed in multiple locations if the hazards, potential exposures and controls are the same at each location. Field personnel are expected to modify JSAs for the site as new hazards are identified and create JSAs if one is not available for a task that will be performed.

3.2. Chemical Exposure Assessment

Hazardous chemicals may be used on the site to support site operations. The Atlas H&S Policy No. 08 – Hazard Communication Program requires Atlas to provide employees, contractors, subcontractors and visitors with information on the health effects of these chemicals and necessary actions to protect against exposure. This information is transmitted through Safety Data Sheets (SDS), container labels, training and a written Hazard Communication Program.

Site activities will adhere to the Program as described in the Atlas Policy. All site personnel, including subcontractors, will be briefed on the Program as part of the site orientation training before starting work. In accordance with this Program, the PM and/or SSHO will check that each chemical brought to the site is accompanied by its SDS. A copy of each SDS will be maintained and be made available to each site personnel who may be potentially exposed to the chemical. In addition, the SSHO will check that all subcontractors bring at least one copy of SDS for each chemical they bring onto the site. The SSHO will also check that all chemical containers brought to the site are labeled as to its contents and appropriate hazard warnings according to the Program. The location of all SDSs will be identified during the daily tailgate safety meeting and may be included in Appendix B of this HASP or maintained in a separate area.

3.3. Potential Chemical Hazards Associated with the Project Site

The following chemical hazard evaluation for the project site is based on historical and previous investigations of the site. The evaluation has been conducted to identify hazardous substances that potentially may be present at the site and to ensure that work activities, PPE and emergency response are consistent with the specific contaminants that could be encountered.

Chemical impacted material has been identified on the site. The potential contaminants that might be encountered during the field activities and exposure limits are listed below.

3.3.1. Table 3-1 Chemical Time Weighted Averages, PEL's and STEL's (if applicable).

Name (Constituent)	PEL	TWA (8hr)	STEL
Arochlor-1254 (PCBs)	none	0.5 mg/m^3	none
Naphthalene	none	10 ppm 50 mg/m^3	**N/E
Lead	50 µg/m^3	30 µg/m^3	**N/E
Commonly Used Chemicals			
Alconox (cleaning/detergent)	**N/E	5 mg/m^3	**N/E

**N/E – Not Established by OSHA or NIOSH.

3.4. Chemical Hazard Exposure Routes

Exposure routes for chemical impacted material:

- Inhalation of dust, vapor, particulates or due to the presence of hazardous materials from soil or ground water.
- Ingestion of soil/water via hand to mouth contact.
- Absorption through the skin from contact with contaminated soil/water.

To protect field personnel, the following procedures will be used as needed:

- Establishment of work zones
- Use of PPE
- Decontamination procedures
- Atmospheric monitoring

3.5. Noise Hazards and Controls

Exposure to high levels of noise may occur when working near heavy equipment, tools and remediation systems. Depending upon the environment surrounding the project site airports, factory machines, etc. may produce high levels of noise. Employees exposed to noise levels in excess of the action level of 85 decibels (A-weighted, Slow Response) will be included in a Hearing Conservation Program according to Atlas H&S Policy No. 47 – Hearing Conservation. The SSHO may evaluate employee noise exposures using a noise survey meter or a noise dosimeter. The RSC may conduct additional noise monitoring to determine the appropriate response to be taken. Employees will be provided with ear plugs and/or earmuffs when exposed to noise levels in excess of the 8-hour Permissible Exposure Limit (PEL) of 90 decibel (A-weighted, Slow Response). This hearing protection must have a Noise Reduction Rating (NRR) to protect hearing in accordance with Policy No. 34 and reduce the exposure level to below 90 dba.

3.6. Biological Hazards

Site activities may expose workers to other hazards such as poisonous plants, insects, animals, and indigenous pathogens. Protective clothing and respiratory protection equipment and training on how to identify poisonous plants, animals and insects, can greatly reduce the chances of exposure. Thoroughly washing any exposed body parts, clothing, and equipment will also protect against infections. If working in wooded/grassy areas, use appropriate insect repellants (containing DEET and/or Permethrin) and apply per the manufacturers' directions.

3.6.1. Poison Oak, Poison Sumac, Poison Ivy

- Avoid contact with plants.
- Use barrier products such as IvyX Pre-contact, IvyBlock, or other products on exposed skin where potential direct contact or contact through clothing is possible. Re-apply periodically throughout the day to exposed skin.
- Cover as much skin as practical; wear long sleeves, long pants, socks, boots, gloves, neckerchiefs, hats and other clothing articles. Wear impermeable gloves over cotton/leather gloves.
- Remove gloves before eating or taking bathroom breaks. Clean hands thoroughly with Tecnu, IvyX post-contact, or other product before eating or bathroom breaks. Ensure you do not touch your face or hands with a contaminated glove or other article of clothing.
- Separate contaminated field clothing and wash in hot water. Heavy contaminations may not be able to be removed and the clothing will need to be discarded.
- Clean all objects that may have urushiol on its surface. Besides clothing, urushiol can stick to many surfaces, including tools and equipment.
- Protect your vehicle interior by placing a large towel or bedsheet over the seats. Wash hands with Tecnu before and after removing contaminated clothes.
- Wash contaminated skin with Tecnu, IvyX Post-contact, or other product immediately. Do not delay since urushiol takes only a few minutes to affect your skin.
- Shower (do not take a bath) and thoroughly wash your entire body with warm, soapy water as soon as possible.
- Dermatitis can present in many forms which include itchy skin, redness or streaks, hives, swelling, small or large blisters or scabs after bursting after urushiol exposure.

3.6.2. Ants

- Look at your surroundings during site setup. If present in large numbers move the work area. If unable to move the work area stop work and contact the PM.
- Workers should take the following steps to prevent fire ant stings and bites:
- Do not disturb or stand on or near ant mounds.
- Be careful when lifting items (including animal carcasses) off the ground, as they may be covered in ants.
- Fire ants may also be found on trees or in water, so always look over the area before starting to work.

3.6.3. Bee/Hornets/Wasp

- Look at your surroundings during site setup. If present in large numbers move the work area. If unable to move the work area stop work and contact the PM.

- Bees, wasps, and hornets are most abundant in the warmer months. Nests and hives may be found in trees, under roof eaves, in attics or on equipment such as ladders.
- Avoid perfumed soaps, shampoos, and deodorants.
- Wear clothing to cover as much of the body as possible.
- Remain calm and still if a single stinging insect is flying around. (Swatting at an insect may cause it to sting.)
- If you are attacked by several stinging insects at once, run to get away from them. (Bees release a chemical when they sting, which may attract other bees.)
- If a bee comes inside your vehicle, stop the car slowly, and open all the windows.
- Workers with a history of severe allergic reactions to insect bites or stings should consider carrying an epinephrine auto injector (EpiPen) and should wear a medical identification bracelet or necklace stating their allergy.

3.6.4. Ticks

- Avoid vegetation when possible. Stay to the center on trails where the vegetation is the shortest.
- Be especially vigilant if vegetation contacts your body above your knee. Remember that ticks find a place on vegetation to lie in wait until a host comes along and brushes across them.
- Apply CDC-recommended insect repellents: DEET or permethrin according to label directions up to, and above, parts of body and clothing where contact with vegetation occurs.
- DEET is most effective in higher concentrations from 20-30% (Deep Woods OFF! & Cutter Backwoods). Spray directly onto your exposed skin. Apply to face by spraying hands and then wiping on skin avoiding eyes and mouth.
- Reapplication throughout the day is needed since it only works while volatilizing.
- Do not apply DEET to skin underneath clothing.
- Permethrin is more effective at repelling ticks than DEET and is applied to clothing only.
- Re-application each day is not needed since it is effective on clothes for several consecutive days and after laundering. Launder separately from other clothes. Do not apply permethrin to your skin.
- For best protection apply permethrin to clothing, including footwear, socks and hats, and DEET to exposed skin.
- Always tuck shirt into pants and tuck pants into tightly woven socks. Small ticks can crawl through the fabric of some socks. Wear a hat to cover your exposed head.
- Check for ticks on clothing during field work and at every rest break.
- At the end of the day, before entering your vehicle, do a thorough tick check with your field partner.
- Reapply permethrin to clothing to knock down ticks and prevent them from entering the vehicle with you.
- As soon as possible after field work, remove clothing and check yourself before conducting office work. Check again while bathing and changing. Be sure to look closely and feel carefully for small, nymph “seed” ticks on waistline, neck, hairline, behind ears, under arms, and groin.

- Keep field gear and clothing out of living spaces and bag soiled field clothes until washing (separately in hot water).
- If you discover an embedded tick, call Core Health. Nurses there can help you with first aid and remind you of the symptoms to be alert for afterward.

3.6.5. Snakes

- Walk only as fast as you can watch the path ahead. If you see a snake, back away slowly. Most snakes avoid people if possible and bite only when threatened or surprised.
- When working in known snake habitats, snake gaiters must be worn by all site employees.
- Do not place your hands or feet in locations where you cannot see the surrounding area.
- When possible, avoid areas of tall vegetation.
- Tap or poke the ground ahead of you with a walking stick before entering an area where you can't see your feet. Snakes will try to avoid you if given enough warning.
- When in an area known to have snakes, wear long pants and boots. If work must be conducted in areas with tall grass or other cover where snakes may be present, also wear snake gaiters.
- Never handle a snake. Even non-venomous snakes can bite and cause serious injury.

3.6.6. Dogs

- If an unsecured dog is seen on or near the project site, stop work and all employees are to take shelter in a building or vehicle until the dog leaves the area or the dog is secured by authorities or its owner. Contact animal control if the dog does not leave on its own.

3.7. Lightning

Weather conditions can change quickly when working. In the event lightning is seen, thunder is heard, or storm notifications in the area are issued, all outdoor work must stop and all onsite employees are to take shelter inside a building or vehicle. Work can resume 30 minutes after the last observed sign of lightning, sound of thunder and the threat of subsequent storm activity is deemed safe. Before resuming work, onsite employees should contact the Project Manager to determine if additional storm activity will be occurring. The use of online weather activity maps (webpages), weather applications, and public safety notification services, can be very helpful when assessing approaching storms in the area. If storm activity will continue, onsite employees should secure the site and either reschedule work or wait in a building or vehicle until the storm activity (see above) is no longer a threat.

3.8. General Public

When working in unsecured locations onsite employees must setup a work zone that keeps the general public away from or provides a barrier to any hazards created by the work performed onsite.

All employees are expected to treat the general public respectfully and to limit our engagement and interaction. In the event an employee feels threatened by the general public; work must stop, and the employee should seek protection in a building, withdraw from the area and/or contact local authorities. Work should only resume when the threat has been eliminated.

3.9. Hand and Power Tools

In order to complete the various tasks for the project, personnel will utilize hand and power tools. The use of hand and power tools introduce a variety of hazards including injury from being struck

by flying objects, cut or struck by the tool, fire and electrocution. Proper PPE must be worn while using these tools. Ground Fault Circuit Interrupters (GFCIs) are required for all portable corded electric tools.

For specific PPE and procedures associated with a tool see the JSA for the task in which the tool is being used and the manufacturer's instruction manual.

3.10. Slip, Trip and Falls

Working in and around the project site will pose slip, trip and fall hazards due to equipment, tools/supplies and slippery surfaces from weather and from activities performed onsite. Good housekeeping must be maintained at all times. Tools and equipment no longer in use must be removed from the work area and secured. Traction control devices must be worn when working on slippery surfaces. A general site walk should be conducted prior to the start of work to identify trip hazards. These identified trip hazards should be correct or visibly marked to warn onsite employees.

3.11. Material Handling

Proper manual lifting of material will be required by site personnel and if not done correctly could result in injury. No one is to lift any object greater than 50 pounds or any object that is large or awkward by themselves. If possible, the use of equipment and tools to help lift and move the material is required.

Employees must be trained on proper lifting techniques prior to arriving at the project site.

3.12. Fire and Explosion

All equipment used to transfer flammable material, including contaminated soil or water must be grounded and bonded to prevent static buildup. An appropriately rated fire extinguisher must be maintained and available for use on site.

3.13. Moving Equipment

Field personnel working in the immediate vicinity of heavy equipment may encounter injuries from contact from the equipment.

Spotters must be used when heavy equipment is used onsite or moving from one location to another and the route and designation discussed with all site personnel prior to movement. Equipment must be equipped with back up alarms.

All site employees must wear at least an ANSI class 2 reflective vest or shirt.

3.14. Vehicular Traffic

Work zones will be established out of local traffic patterns whenever possible and clearly marked. All site personnel must wear high visibility PPE based on the amount and speed of the traffic.

3.15. Heat Stress

All employees and visitors, must adhere to the following procedures when heat stress conditions exist.

The SSHO will have training in first-aid and Cardiopulmonary Resuscitation (CPR), including training in heat-related illnesses. The SSHO must also be trained on the requirements of the Atlas Policy for Industrial Hygiene (Policy No. 31), which contains the requirement for heat stress

monitoring. All workers should be capable of recognizing and treating the signs and symptoms of heat stress conditions. During potential heat stress conditions, ice should be readily available to rapidly cool victims.

Water will be made available at the site for employee fluid replacement. When heat stress is a hazard, employees will be provided with balanced, electrolyte solutions to replace fluid and electrolyte loss. Employees will be provided with replacement fluids at a minimum rate of 8 ounces every 15 to 20 minutes per person.

Acclimatization is a gradual physiological adaptation that improves an individual's ability to tolerate heat stress. Full-heat acclimatization requires up to 3 weeks of continued physical activity under heat-stress conditions similar to those anticipated for the work. Acclimatization loss begins when the work activity in heat stress conditions is discontinued. A noticeable loss usually occurs within 3 – 4 days.

3.16. Rest Breaks

All rest breaks will be taken out of the zone of exclusion in a cooler, shaded, rest area. The frequency of rest breaks will be based on the level of physical activity, temperature and humidity and will be discussed during the daily tailgate meeting. At any time, the frequency of rest breaks can be increased if the SSHO or other site employees determine it to be necessary.

Heat stress and heat strain are conditions resulting from environmental factors including temperature, relative humidity, radiant heat transfer, and air movement, as they are affected by clothing. The primary objective of the heat stress management program is to prevent heat stroke which is life threatening and the most serious of the heat-induced disabilities. Extra caution should be taken for workers who are not acclimated to working in the heat.

The following Heat Stress Index should be used as a guide to evaluate heat stress situations.

3.16.1. Table 3-2: Heat Stress Index

Heat Stress Index									
Temp. °F	Relative Humidity								
	10%	20%	30%	40%	50%	60%	70%	80%	90%
105°	98°	104°	110°	120°	132°				
102°	97°	101°	108°	117°	125°				
100°	95°	99°	105°	110°	120°	132°			
98°	93°	97°	101°	106°	110°	125°			
96°	91°	95°	98°	104°	108°	120°	128°		
94°	89°	93°	95°	100°	105°	111°	122°		
92°	87°	90°	92°	96°	100°	106°	114°	122°	
90°	85°	88°	90°	92°	96°	100°	106°	114°	122°
88°	82°	86°	87°	89°	93°	95°	100°	106°	115°
86°	80°	84°	85°	87°	90°	92°	96°	100°	109°
84°	78°	81°	83°	85°	86°	89°	91°	95°	99°
82°	77°	79°	80°	81°	84°	86°	89°	91°	95°
80°	75°	77°	78°	79°	81°	83°	85°	86°	89°
78°	72°	75°	77°	78°	79°	80°	81°	83°	85°
76°	70°	72°	75°	76°	77°	77°	77°	78°	79°
74°	68°	70°	73°	74°	75°	75°	75°	76°	77°
NOTES: Add 10° F when protective clothing (use of a respirator and/or chemical protective clothing such as Tyvek, arch flash or flame resistant) is being used; Add 10° F when in direct sunlight.									

HSI Temp	Category	Injury Threat
> 130° F	Extreme Danger	No work unless emergency exists. Contact Atlas RSC and Corporate H&S Group prior to proceeding. Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
105°-130° F	Danger	Contact RSC prior to proceeding. Requires strict adherence to ACGIH Heat Stress Guidelines, including use of on-site WBGT equipment. Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
90°-105° F	Extreme Caution	Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
80°-90° F	Caution	Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
< 80° F	Normal Range	Typical conditions for time of year. Little or no danger under normal circumstances. As always, anticipate problems and work safely.

3.17. Cold Stress

This procedure applies to all employees who perform field work in cold environments at risk of cold stress injury and intended to protect workers from the most severe effects of cold stress.

Atlas site employees have been trained in cold stress as part of their HAZWOPER 40-hour initial training, site workers will receive refresher training by the SSHO in cold stress safety and health procedures. The training program will include, as a minimum, instruction in the following areas:

- Proper first-aid treatment
- Proper clothing practices
- Proper eating and drinking habits
- Recognition of impending frostbite
- Recognition of the signs and symptoms of impending hypothermia or excessive cooling of the body when shivering does not occur
- Safe working practices

The SSHO will be trained in first aid, CPR and cold stress conditions.

Frostbite and hypothermia are two types of cold injury that personnel must be protected against during the performance of field duties. The objective is to prevent the deep body temperature from falling below 96.8° F and to prevent cold injury to body extremities. Two factors influence the development of a cold injury; the ambient temperature, and wind velocity.

The SSHO will monitor environmental conditions by recording ambient temperature and estimated wind-speed. Information contained in Tables 3-3 will be used to evaluate the possibility of hypothermia among workers on-site. No work will be conducted when the temperature and wind speed combine for a temperature of less than -20° F.

Use appropriate cold weather clothing when temperatures are at or below 40°F as exposed skin surfaces must be protected. These protective items can include facemask, hand wear, and foot wear. Workers handling evaporative solvents during cold stress conditions will take special precautions to avoid soaking gloves and clothing because of the added danger of prolonged skin contact and evaporative cooling. Personnel will wear protective clothing appropriate for the level of cold and planned physical activity. The objective is to protect all parts of the body, with emphasis on the hands and feet. Eye protection against glare and ultraviolet light should be worn in snowy and icy conditions.

The work rate should not be so great as to cause heavy sweating that could result in wet clothing. If heavy work must be done, opportunities for rest breaks will be provided where workers have the opportunity to change into dry clothing. Conversely, plan work activities to minimize time spent sitting or standing still. Rest breaks should be taken in a warm, dry area. Windbreaks can also be used to shield the work area from the cooling effects of wind.

When frostbite, hypothermia, or other cold stress symptoms are suspected, treat the patient to relieve symptoms or transport them to the medical facility identified in this HASP.

3.17.1. Table 3-3: Hypothermia Evaluation

Estimated Wind Speed (mph)	Actual Temperature Reading (˚F)											
	50˚	**40˚**	**30˚**	**20˚**	**10˚**	**0˚**	**-10˚**	**-20˚**	**-30˚**	**-40˚**	**-50˚**	**-60˚**
	Equivalent chill Temperature (˚ F)											
Calm	50˚	40˚	30˚	20˚	10˚	0˚	-10˚	-20˚	-30˚	-40˚	-50˚	-60˚
5 mph	48˚	37˚	27˚	16˚	6˚	-5˚	-15˚	-26˚	-36˚	-47˚	-57˚	-68˚
10 mph	40˚	28˚	16˚	4˚	-9˚	-24˚	-33˚	-46˚	-58˚	-70˚	-83˚	-95˚
15 mph	36˚	22˚	9˚	-5˚	-18˚	-32˚	-45˚	-58˚	-72˚	-85˚	-99˚	-112˚
20 mph	32˚	18˚	4˚	-10˚	-25˚	-39˚	-53˚	-67˚	-82˚	-96˚	-110˚	-121˚
25 mph	30˚	16˚	0˚	-15˚	-29˚	-44˚	-59˚	-74˚	-88˚	-104˚	-118˚	-133˚
30 mph	28˚	13˚	-2˚	-18˚	-33˚	-48˚	-63˚	-79˚	-94˚	-109˚	-125˚	-140˚
35 mph	27˚	11˚	-4˚	-20˚	-35˚	-51˚	-67˚	-82˚	-98˚	-113˚	-129˚	-145˚
40 mph	26˚	10˚	-6˚	-21˚	-37˚	-53˚	-69˚	-85˚	-100˚	-116˚	-132˚	-148˚
(Wind speeds > 40 mph have little additional effect)	**LITTLE DANGER** If < hour with dry skin. Maximum danger of false sense of security				**INCREASING DANGER** Danger from freezing of exposed flesh within one minute.			**GREAT DANGER** Flesh may freeze within 30 seconds.				
	Trench foot and immersion foot may occur at any point on this chart.											

* Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA

4.0 AIR MONITORING AND PERSONAL PROTECTIVE EQUIPMENT

4.1. Site Air Monitoring Requirements

To prevent exposure to hazardous atmospheres and aid in the selection of respiratory protection, monitoring for the presence of airborne contaminants will occur when knowledge of the site indicates their potential presence. One or more of the following direct-reading instruments may be used to aid in this determination;

- Photoionization Detectors (PID) and
- Flame Ionization Detectors (FID) will measure non-specific organic gases and vapors.
- Combustible Gas Indicators (CGI) will detect explosive atmospheres.
- Oxygen (O_2) meters will detect fluctuations in oxygen concentrations.

These instruments should be calibrated or bump tested daily and whenever the readings may be erratic. All readings should be recorded in the field log books according to the monitoring program. All employees responsible for using these devices must be shown how to properly calibrate and configure the equipment. A manual on how to use the equipment must always be maintained with the equipment.

All direct-reading instruments or equipment that are needed to monitor for hazardous atmospheres on this project site are listed in Tables 4-1, 4-2 and 4-3.

The breathing zone of the employee(s) anticipated to have the highest potential for exposure for each task will be monitored using an appropriate combination of some or all of these direct-reading instruments. Air monitoring will occur every 15 minutes during non-intrusive activities, or every 5 feet of penetration during intrusive activities. Site tasks and air monitoring requirements are shown in Table 4-1. Additional site monitoring may occur at the discretion of the SSHO, site supervisor, or RSC.

All air monitoring equipment must be calibrated as per manufacturer's instructions.

If any of the action levels listed in Tables 4-2 or 4-3 are met, work must immediately stop. No employee is authorized to work in conditions that require respiratory protection without first contacting your RSC. If any of the action levels listed in Table 4-2 or 4-3 are met, work must immediately stop. Contact must be made with the PM informing them that the Respiratory Protection Plan, Appendix H will be followed.

4.1.1. Table 4-1: Site Air Monitoring Requirements

Site Activity	Instrument	Frequency	Location	Caution
Direct Push Drilling (if required)	PID	Every 15 minutes or 5 feet of penetration	In breathing zone of person nearest activity	Communicate with equipment operator before sampling
Site Excavation and Construction Activities	CGI	Every 15 minutes or 5 feet of penetration /Ongoing, during soil excavation	In work area near activity	Communicate with equipment operator before sampling

Air monitoring results obtained from the breathing zone during field activities will be recorded in field logbooks on an ongoing basis as part of the standard data that is recorded. The Air Quality Monitoring Record will be completed if a PID reading >10 ppm is measured, see Appendix A.

The action levels were developed using the following assumptions.

- Atlas assumed the primary substance of gasoline is Naphtha with a TWA of 300 ppm.
- The remaining chemical components of gasoline were assumed to each account for 15% of the gasoline mixture.
    - Assumed benzene is one of the components of gasoline.
- The exposure levels to the individual chemicals averaged 50 ppm (TWA).
- The chemical makeup of gasoline used to calculate the action level is based on the current mixture of gasoline prior to release into soil or water.

Air monitoring information will be utilized to evaluate personnel exposure and assess the need for respiratory protection. PID readings measured in the employees breathing zone will be used to determine the level of protection required. PID readings refer to readings above background, which are sustained for at least 5 minutes and are measured during the performance of field tasks.

4.2. Action Levels for Respiratory Protection

The first and foremost means of protecting employees from injuries or exposures is to eliminate the exposure. The general hierarchy for controlling potential exposures is: (1) engineering controls; (2) administrative controls; and (3) the use of PPE. PPE is a means of preventing injury or exposure when exposure elimination and/or other control means are not feasible.

The initial level of protection and the upgrading to respiratory protection action levels at which the PPE will be upgraded are determined based on the identification of specific chemicals expected to be present at a site and the established OSHA Permissible Exposure Levels (PEL) or ACGIH Threshold Limit Values (TLVs), whichever is lower. In the event more than one chemical is expected or exists at a site, the most hazardous chemical will dictate the level of personal protection required. Table 4-2 and -3 shows the action levels for levels of personal protection equipment.

4.2.1. Table 4-2: Action Levels for Petroleum Contaminate Soil/Water

Monitoring Equipment	Hazard	Action Level Above Background	Action
PID/FID	Organic gas/vapor	< 10 ppm	Level D.
		10 to 50 ppm	Level C. Move upwind and continue air monitoring, cease operations, or use detector tube(s) for (contaminant) and reference Table 4-3 below.
		> 50 ppm	Immediate Withdrawal. Contact the PM and RSC for further instructions to proceed.
CGI	Explosive Atmosphere	< 10 % LEL	Level D.
		> 10 % LEL	Immediate Withdrawal. Explosive hazard. Contact the SSHO and RSC for further instructions.

Monitoring Equipment	Hazard	Action Level Above Background	Action
Oxygen Conc. Meter	O_2 Conc.	< 19.5 %	Immediate Withdraw. Combustible gas readings are not accurate below this concentration! Notify SSHO.

4.3. Levels of Protection

The protection levels may include all or some of the following, based on work scope.

4.3.1. Level D:

- See Section 8.0 of this HASP for minimum PPE requirements.

4.3.2. Level C:

- Half-face or full-face, air purifying respirator (NIOSH approved) with organic vapor cartridge. Refer to the Respiratory Protection Plan.
- Disposable, hooded, chemical-resistant clothing*
- Disposable, chemical-resistant outer gloves
- Disposable, inner nitrile gloves (8 mil minimum)
- Chemical-resistant boots with steel toe
- Disposable boot covers*
- Hard hat*
- Goggle
- Face Shield*
- Coveralls*
- Hearing protection*

4.4. Respiratory Protection

Respiratory protection requirements for employees are described in detail within Appendix H - Respiratory Protection Plan. Basic rules of respiratory usage are listed below:

- Facial hair that contacts or interferes with the seal of the mask-to-face is not allowed on personnel required to wear respirators.
- Respirator cartridges should be replaced after approximately 8-hours of continuous or intermittent usage, unless otherwise noted. Cartridges should also be replaced if they become damaged, after the expiration date is exceeded, if breakthrough (smell and/or taste) occurs or if filters become clogged causing resistance to breathing.
- Contact lenses may be worn when respiratory protection is required, in conjunction with additional eye protection to protect against particles or splashes, provided there is no interference with the respirator seal and the chemical in the atmosphere does not prevent their use.
- Respirators must be cleaned and disinfected after each day's use or more often, if necessary.
- Prior to donning, respirators will be inspected for worn or deteriorated parts. Emergency respirators or self-contained devices will be inspected at least once a month and after each use.
- After donning, personnel should perform a positive and negative user fit-check to determine if a good seal has been achieved.
- Any employee assigned a respirator or required to wear a respirator will receive an annual medical evaluation, annual respirator fit test and receive respiratory protection training.

5.0 HEALTH SURVEILLANCE PROGRAM

5.1. Employee Medical Examinations

All Atlas employees involved in work at this site will participate in Atlas' Medical Surveillance Program administered by Atlas' medical management provider. Atlas has worked with its medical

provider to develop a medical exam that evaluates employees for potential chemical exposure. The medical examinations provided to Atlas employees meet the requirements in 29 CFR 1910.120(f).

Any subcontractors or visitors that will work in an area where there is potential for exposure to onsite contaminates must also undergo a medical exam that meets 29 CFR 1910.120(f) and be cleared by a physician to work.

When respirators are required as determined by section 4.0 of this HASP, each employee will also have current respirator clearance.

The PM for this project site is responsible for checking on the medical clearance for any Atlas employee working on this site.

A post-project, follow-up exam may be required if an exposure incident is reported or an employee shows specific symptoms associated with the known or suspected hazardous chemicals. The RSC and the Project Manager will determine when post-project exams are required.

6.0 SITE SECURITY AND CONTROL

6.1. Work Zones

Restricted site areas will include, but not necessarily be limited to, the following zones:

- Exclusion Zone or Hot Zone - any area where contamination is either known or likely to be present in concentrations that could pose a threat to human health and safety or that potential for harm to personnel exists because of the type of work activities being conducted. Appropriate PPE and warning signs should be utilized in this area.
- Contamination Reduction Zone - any area where workers conduct personal and equipment decontamination.
- Support Zone - areas where access is controlled, but the chance to encounter hazardous materials or conditions are minimal.

Access to the work zones will be controlled by work zone delineators (e.g. traffic cones, flags, vehicles, DOT approved devices, temporary or permanent fencing, and/or safety barrier tape). Additionally, Atlas employees should follow the requirements of Atlas Policy No. 49, Work Zones in Traffic Areas for additional information. The delineation of the work zone will be discussed during the tailgate safety meeting.

In the event on-site personnel must upgrade their personal protective equipment, the work zones may require substantial modification in order to provide for the safety of nearby personnel not associated with this work. Any upgrade level will be communicated by the site supervisor to the PM. The PM will then inform the RSC of this occurrence.

6.2. Buddy System

The buddy system is preferred when working on this project site. The Buddy System means that personnel work in pairs and stay in close visual contact to be able to observe one another and summon rapid assistance in case of emergency.

6.3. Site Communication

Site communication may be in the form of hand signals, voice, or other communication devices. All forms of communication should be understood by all workers and discussed during the daily tailgate meeting prior to starting work.

7.0 DECONTAMINATION PROCEDURES

All personnel and equipment must undergo appropriate decontaminated prior to leaving the project site. The decontamination of personnel and equipment will be performed within the exclusion and contamination reduction zones. The SSHO will visually watch the decontamination process and verify it is completed. The decontamination solution to be used onsite:

- Alconox/Liquinox and water for removal of low-molecular weight hydrocarbons, inorganic compounds, salts, some organic acids, and other polar compounds.
- Dilute acids (vinegar) for removal of basic (caustic) compounds, amines, and hydrazines.
- Dilute bases (soaps and detergents) for removal of acidic compounds, phenols, thiols, and some nitro and sulfonic compounds.
- Organic solvents for removal of nonpolar compounds (organic).

The hands and face of each employee must be thoroughly washed upon leaving the work area. Trash receptacles will be provided for all disposable PPE.

Field equipment will be decontaminated according to the work plan. This may include manual removal of gross contamination with shovels or other tools, followed by a high-pressure, hot water sprayer. Decontamination with high-pressure and hot water poses the possibility of a splash and/or mist inhalation hazard, the task should be performed using Level D personal protective equipment with a face shield at a minimum.

Field tool including split-barrel soil samplers, brass liners, and sample knives and trowels will be decontaminated. The field tools may be scrubbed visually clean using the decontamination solution with a stiff, long-bristled scrub brush. Following scrubbing with the decontamination solution, the tools may be rinsed with distilled water or isopropyl alcohol.

All materials and equipment used for decontamination should be disposed of in accordance with local, State, and/or Federal Regulations. Clothing, tools, buckets, brushes, and all other equipment that is contaminated must be properly packaged and stored on the site until disposal arrangements are finalized. Clothing not completely decontaminated on-site should be secured in plastic bags before being removed from the site and taken to an appropriate cleaning facility.

8.0 STANDARD OPERATING PROCEDURES (SOPS)

As tasks are performed, the JSA must be reviewed by all onsite workers to identify additional precautions that must be taken. Any changes to the SOPs must be approved by the PM and RSC.

At a minimum, the following PPE must be worn at all times by all workers and visitors to this project site:

- Hard hat
- Long pants
- Shirt with sleeves
- Safety glasses

- Safety toed boots with ankle support
- Work gloves – the type of gloves worn may change based on task being performed.
- ANSI Class 2 safety vest (other garments, jackets, and shirts that meet the class 2 requirements may be worn in place of the safety vest).
- See JSA for task to be performed for specifics on type of PPE and any additional PPE.

The following SOPs will apply when working on this project site:

- Eating, drinking, chewing gum, tobacco products or any item that could facilitate hand-to-mouth transfer of contaminates are prohibited in the exclusion and contamination reduction zone or in any area known to be contaminated. Personnel must wash their hands and face and remove any contaminated PPE before handling these items.
- When decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.
- Contact with contaminated or suspected contaminated surfaces should be avoided. When possible, do not walk through puddles, leachate or discolored surfaces; kneel on the ground; lean, sit, or place equipment on drums, containers, or the ground.
- All personnel and visitors must be familiar with SOPs and any additional instructions and information contained in this HASP. All employees, visitors and subcontractors will read and sign an acknowledgement of the HASP before entering the site.
- All personnel must be or will be made aware of symptoms for heat or cold related illnesses.
- All personnel will be made aware of the location of the SDSs for the chemicals on-site.
- All loose clothing, jewelry, hair, or other items that could be caught in moving parts or snagged on equipment must be secured.
- All personnel going to the site must be trained on all tasks they are expected to perform and thoroughly briefed on anticipated hazards, equipment, safety practices, emergency procedures, and communications needed for this project site.
- Personnel on the site must use the buddy system when engaged in Level C, B or A work tasks. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.
- Personnel unfamiliar with a task must stop work and verify how to perform the task safely.
- All personnel have the responsibility to stop anyone from performing an unsafe act or stop work if they see a safety hazard.
- Warning signals for site evacuation must be established by the SSHO and discussed during the tailgate safety meeting. A clear unobstructed entrance and exit must be maintained.
- Personnel and equipment in any contaminated area should be minimized.
- Work areas for various operational activities will be established, defined and discussed during the tailgate safety meeting.
- Procedures for leaving a contaminated area will be planned and implemented during the daily tailgate safety meeting. Work areas and decontamination procedures will be established based on expected tasks to be performed.
- Daily and ongoing inspections of site operations will be conducted by the SSHO to check compliance with this HASP. If changes in operations are necessary, the HASP must be modified to reflect these changes.

- All hand and power tools will be inspected prior to use and removed from the work area when no longer needed.
- Fire prevention and protection (appropriate signs for flammable liquids, smoking areas, storage areas of combustible or flammable materials, etc.) will be according to Atlas H&S Policy No. 19 – Fire Protection.
- Site tailgate safety meetings will be held daily to discuss anticipated site conditions and daily activities. This meeting will be summarized on the Tailgate Safety Meeting Form, see Appendix C.
- A GFCI will be used on any extension cord or plugged in item.

9.0 CONTINGENCY PLAN

There are numerous potential emergency situations that may occur while working on this project site. If an emergency does occur, it is important that employees stop work and as soon as reasonably possible contact the PM. All emergency procedures including location of stop switches, emergency equipment and muster location must be discussed during the tailgate safety meeting and with all visitors.

9.1. Medical Emergencies

The name, address, telephone number, travel distance, and travel time to the nearest medical treatment facility are found in the Emergency Information section of this HASP. A map and direction for locating the facility is also available in the Emergency Information section.

An emergency first-aid kit will be readily accessible and identified on the site, and personnel will have CPR and first-aid training. Location of the first aid kit will be identified and discussed during the daily tailgate meeting. The first-aid kit will contain equipment necessary to protect employees against exposure to bloodborne pathogens. All employees must receive bloodborne pathogens training and if requested could receive Hepatitis B vaccinations according to the Atlas H&S Policy No. 15 – Bloodborne Pathogens if exposed to bodily fluids.

Any person who becomes ill or injured in the exclusion zone must be decontaminated as well as possible with consideration to which risk will be greater, the spread of contamination or the health of the individual. If the injury or illness is minor, full decontamination should be completed and first-aid administered before transport. If the patient's condition is serious, at least partial decontamination should be completed.

The following steps should be followed if an injury or illness case occurs regardless of severity of the injury:

- Check the area to make sure the scene is safe.
- Assess the employee's condition and if life threatening or if your training dictates call 911.
  - If 911 is called, Core Health should be contacted after talking with 911.
  - Emergency personnel must be informed if potential chemical contamination is suspected. If possible, initiate decontamination procedures to prevent contamination of responding personnel.
- Call Core Health, if the injury is not life threatening for first aid guidance.
  - A fellow employee may call for the injured employee.
  - Provide your name, Office and phone number.

  - If provided with first aid advice from Core Health, employees are authorized to secure (go to Walgreens, CVS, etc.) the items recommended by the nurse to treat the injury.
  - It is important for the injured employee to follow the advice of the nurse even when not at work (evenings, weekends).
- Begin providing first-aid using universal precautions while using proper PPE.
- If Core Health directs the injured employee to an occupational clinic for evaluation have a fellow employee drive them.
  - If someone is not available to transport the injured employee to the clinic, please let Core Health know. Based on the injury the injured employee may be able to drive themselves, but only after speaking with Core Health.
- Contact the PM as soon as it can be done safely or once the situation is stable.
  - If you cannot reach your manager, call the Office Manager or Branch Safety Officer.
  - Provide a detailed description of what and how the injury occurred. A fellow employee may make this call also.
- Complete and submit a written account of the injury within 24 hours to the Atlas incident reporting system.

9.2. Emergency Equipment

1. Eyewash containers or equipment will be available onsite.
2. First Aid Kit
3. A multipurpose dry chemical (Class A, B, and C) fire extinguisher, rated not less than 2A:10B:C, will be maintained on the site. Atlas employees are not trained in firefighting techniques and use of a fire extinguisher should be limited to cases of small or incipient stage fires. Always ensure you have an exit before attempting to fight a fire, notification has been completed and help is on the way.

9.3. Site Evacuation Conditions

The following conditions will necessitate the cessation of field work in the area of concern, withdrawal from the work area and revisions to this HASP:

- Fires and/or explosions
- The atmospheric conditions listed in Table 4-2 of this HASP are met.
- Flammable atmosphere readings above 10 percent LEL
- Oxygen readings above 23.5 percent oxygen concentration
- Oxygen readings at or below 19.5 percent oxygen concentration
- PID readings over 50 ppm sustained for more than 5 minutes

9.4. Gas Line, Electrical Line or Chemical Line Strike

In the event of a strike or potential strike all operations must stop and equipment turned off if safe to do so.

Onsite employees must immediately contact 911 or onsite emergency response and begin evacuation of the surrounding areas if there is no area alarm.

Once emergency services have been notified and all site personnel evacuated including the surround areas, contact the PM.

9.5. Non-Atlas Emergencies

In the event that an emergency occurs onsite that was not caused by project work, but may affect the safety of onsite staff all work must stop. If safe to do so, the site should be secured and employees moved to a safe location.

These events may include but are not limited to:

- General public medical emergency
- Vehicle incident
- Police activity – violence/theft

9.6. Emergency Communication System

Emergency contacts and telephone numbers are provided at the beginning of this HASP. Employees will be provided with a communication device for onsite and offsite communications. These devices may include radios or mobile telephones. If an emergency occurs on-site, the site supervisor is responsible for checking that the appropriate emergency contact has been notified. At the time of the emergency response, the site supervisor or designee will brief the emergency personnel on the status of the emergency, including site conditions.

Field personnel may need to use hand signals if there are noisy working conditions on the site. Any use of hand signals should be discussed during the tailgate safety meeting.

9.7. Emergency Response Follow-Up

If there is an incident or emergency response, the SSHO will notify the PM and RSC. The PM or BSO must complete an Incident Report through the company's Incident Management System. Prior to resuming work, a site safety meeting will be held to discuss the circumstances surrounding the incident and what should be done to prevent a re-occurrence.

10.0 TRAINING

It is the responsibility of the PM and each subcontractor's supervising manager to determine if Atlas and subcontractor employees meet these training requirements.

10.1. General Training Requirements

All Atlas and subcontractor employees working on this project site will have received, at a minimum, the following training prior to arrival.

- PPE use
- All tools and equipment to be used by the employee
- Hazard Communication
- Proper housekeeping
- Slip, trip and fall prevention
- Fire extinguisher training
- Temperature – Heat and Cold injuries/illnesses
- Safe lifting
- Noise
- CPR/First Aid

10.2. Hazwoper

All Atlas and subcontractor employees that work in the project exclusion zone, decontamination area or may be exposed to onsite contaminates must have completed the 40-hour training requirement of 29 CFR 1910.120(e) (Hazwoper) and maintain that training by completing an annual 8 hour Hazwoper refresher training.

10.3. Site Supervisor's Training

Onsite supervisors on this project who are directly responsible for or who supervise workers must complete, in addition to the initial 40-hour Hazwoper training, 8 additional hours of specialized supervisory training in compliance with the OSHA regulations.

10.4. Site Safety Training and Briefing Topics

The SSHO will conduct site-specific health and safety briefing (tailgate safety meeting) for field personnel before the start of all field work. All site workers including the site supervisor, Atlas employees and subcontractor personnel must attend. At the conclusion of the meeting, personnel are to sign the HASP Agreement and Acknowledgement Form and Tailgate Safety Meeting Form found in Appendix C.

As additional people are assigned to the site, it is the responsibility of the SSHO to ensure that new personnel are briefed on health and safety protocols and ensure that they have reviewed and signed the HASP Agreement and Acknowledgement Form.

The Tailgate Safety Meeting will cover:

- Site-specific health and safety procedures
- Client-specific health and safety policies and procedures
- Incidents and reporting
- JSA for tasks to be performed
- Health effects of various chemicals used on the site
- Emergency response actions pertaining to operations on-site
- Contents of this HASP

Additionally, daily site tailgate safety meetings will review past activities, plan the day's tasks, understand any near-miss and "lessons learned", establish safe working procedures for anticipated hazards and provide pertinent safety and health training and motivation.

10.5. Visitors

All visitors entering the designated work zones will be subject to all applicable health and safety requirements during field operations at this site. All visitors to a work site will be given the opportunity to review the HASP, will be escorted at all times, and will be required to stay a safe distance from site activities. The site supervisor and/or the SSHO will be responsible for briefing all visitors on the site hazards, site safety precautions, and the site emergency response plan.

APPENDIX A

Job Safety Analyses (JSA)

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
Dust Suppression	8/12/2020	04/15/2020	1 of 3

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT			
☒ REFLECTIVE VEST	☒ LONG PANTS	☐ AIR PURIFYING RESPIRATOR:	☐ OTHER:
☒ HARD HAT	☒ CUT RESISTANT GLOVE LEVEL: 3	☐ SUPPLIED AIR RESPIRATOR	☐ OTHER:
☒ SAFETY TOED BOOTS	☐ IMPACT RESISTANT GLOVE LEVEL:	☐ CHEMICAL RESISTANT CLOTHING:	☐ OTHER:
☒ SAFETY GLASSES	☐ CHEMICAL RESISTANT GLOVE:		☐ OTHER:
☐ FACE SHIELD	☒ HEARING PROTECTION	☒ GOGGLES:	☐ OTHER:

REQUIRED TOOLS / EQUIPMENT / SUPPLIES			
☐ DRINKING WATER	☐ RATCHET WITH EXTENSION	☐ OTHER:	☐ OTHER:
☐ BUG REPELLENT	☐ WELL MAGNET	☐ OTHER:	☐ OTHER:
☒ TRAFFIC CONTROL DEVICES	☐ AIR MONITORING: **Choose an item.**	☐ OTHER:	☐ OTHER:
☐ LADDER	☐ LOCKOUT/TAGOUT EQUIPMENT	☐ OTHER:	☐ OTHER:

STOP WORK

Atlas and Subcontractor employees must stop work and contact off-site senior personnel when a change in condition, process, or job phase develops on the project site that is not addressed by this JSA or within the project specific HASP. The JSA should be modified with new steps, hazards, and safe procedures agreed upon by all Atlas and Subcontractor employees at the project site and approved by off-site senior personnel. Documentation of the modification and review by all affected personnel must take place.

1) JOB STEPS	2) POTENTIAL HAZARDOUS CONDITIONS / UNSAFE PRACTICES	3) SAFE PROCEDURES and PREVENTATIVE MEASURES
Enter/Exit Truck	• Falls	• Face Truck. • Set park brake and lock controls before leaving machine. • Use three point of contact while mounting and dismounting the truck by holding handles provide and using wheel step. • Never jump from truck.
Drive Truck to Water Tank.	• Vehicles	• Stay alert & use defensive driving techniques. • Use mirrors or a spotter if backing into filling area. • Do not travel more than the posted speed limit or 5mph.
	• Pedestrians	• Use mirrors to watch for pedestrians. • Stay alert. • Yield to all pedestrians.
Fill Tank on Truck	• Falls	• Face Truck • Set park brake and lock controls before leaving machine • Use three point of contact while mounting and dismounting the truck by holding handles provide and using wheel step. • Never jump from truck • Use established manufactured hand holds and foot holds.

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
Dust Suppression	8/12/2020	04/15/2020	2 of 3

	• Hand Injuries – Cuts and Pinches	• Wear work gloves. • Never place hands in between areas where they can become pinched or stuck. • Do not place hand between objects on tank.
Fill Tank on Truck	• Hose Whipping • Overfilling the tank	• Make sure water is off and secure both ends of hose before turning on water. • Pay attention while filling the tank and do not overfill the tank causing a tip over.
Spray Water on Roads	• Pedestrians	• Use mirrors to watch for pedestrians • Stay alert and maintain distance from pedestrians. • Yield to all pedestrians. • Turn water off when pedestrians approach.
	• Vehicles	• Use mirrors to watch for pedestrians • Stay alert and keep distance from pedestrians.
Spray Water on Soil Piles	• Hand Injuries – Cuts and pinches	• Wear cut resistant gloves. • Watch hand and finger placement. • Do not place hand between objects where they can become stuck or pinched.
	• Hose Whipping	• Make sure water is off and secure both ends of hose before turning on water. • Pay attention while filling the tank and do not overfill the tank causing a tip over. • Brace yourself securely while holding hose.
	• Slip, Trips, Falls	• Wear steel toed boots with ankle support. • Watch foot placement. • Do not walk while spraying

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
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STOP WORK

Atlas and Subcontractor employees must stop work and contact off-site senior personnel when a change in condition, process, or job phase develops on the project site that is not addressed by this JSA or within the project specific HASP. The JSA should be modified with new steps, hazards, and safe procedures agreed upon by all Atlas and Subcontractor employees at the project site and approved by off-site senior personnel. Documentation of the modification and review by all affected personnel must take place.

Please explain additional steps, changes or amendments to this JSA in the provided space below. Prior to starting work ensure that all employees understand and agree with the changes in this JSA.

By signing this JSA form, you are acknowledging that you have read, reviewed and understand the job steps, potential hazardous conditions and unsafe conditions and the safe procedures, preventative measures required to perform the task safely and the requirement to Stop Work when a change in condition, process, or job phase develops on the project site that is not addressed by this JSA or within the project specific HASP.

Print Name	Signature	Company	Date

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
Direct Push Drilling	08/03/2020	04/15/2020	1 of 8

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT			
☒ REFLECTIVE VEST	☒ LONG PANTS	☐ AIR PURIFYING RESPIRATOR:	☐ OTHER:
☒ HARD HAT	☒ CUT RESISTANT GLOVE LEVEL: 3	☐ SUPPLIED AIR RESPIRATOR	☐ OTHER:
☒ SAFETY TOED BOOTS	☐ IMPACT RESISTANT GLOVE LEVEL:	☐ CHEMICAL RESISTANT CLOTHING:	☐ OTHER:
☒ SAFETY GLASSES	☒ CHEMICAL RESISTANT GLOVE: Nitrile		☐ OTHER:
☐ FACE SHIELD	☒ HEARING PROTECTION	☐ GOGGLES:	☐ OTHER:

REQUIRED TOOLS / EQUIPMENT / SUPPLIES			
☐ DRINKING WATER	☐ RATCHET WITH EXTENSION	☐ OTHER:	☐ OTHER:
☐ BUG REPELLENT	☐ WELL MAGNET	☐ OTHER:	☐ OTHER:
☒ TRAFFIC CONTROL DEVICES	☒ AIR MONITORING: PID	☐ OTHER:	☐ OTHER:
☐ LADDER	☐ LOCKOUT/TAGOUT EQUIPMENT	☐ OTHER:	☐ OTHER:

STOP WORK

Atlas and Subcontractor employees must stop work and contact off-site senior personnel when a change in condition, process, or job phase develops on the project site that is not addressed by this JSA or within the project specific HASP. The JSA should be modified with new steps, hazards, and safe procedures agreed upon by all Atlas and Subcontractor employees at the project site and approved by off-site senior personnel. Documentation of the modification and review by all affected personnel must take place.

1) JOB STEPS	2) POTENTIAL HAZARDOUS CONDITIONS / UNSAFE PRACTICES	3) SAFE PROCEDURES and PREVENTATIVE MEASURES
Site Setup	x See JSA Site Setup	x See JSA Site Setup
Move Equipment into Place on Project Site	x Pedestrians x Other Vehicles x Overhead Obstacles x Damage to Private Property	x Don PPE x Back-up alarm must be operational on equipment. x All employees/workers in the area should wear a traffic reflective vest. x When backing equipment into place a spotter must be used. x Spotter must have on traffic safety vest. x Equipment driver should yield to other vehicles. x Driver and spotter should walk the travel path and discuss the movement of the equipment.
Concrete/Asphalt Cutting	x See JSA Cutting Concrete or Asphalt	x See JSA Cutting Concrete or Asphalt
Clearing Five Feet Below Ground	x See JSA Air Knifing or Hand Augering	x See JSA Air Knifing or Hand Augering

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
Direct Push Drilling	08/03/2020	04/15/2020	2 of 8

Raising and Lowering of the Mast	x Equipment Failure x Overhead Utilities x Overhead Obstacles x Falling Objects x Rig Tipping Over	x Perform and document daily inspection of all cabling, hydraulics, motors, fluid levels and hoses. x A spotter will be used as the driller raises the mast to ensure that the path of the mast does not come in contact with overhead lines. x Setup drill rig at least 10 feet from overhead power lines. x Position the rig to avoid overhead power lines as defined by the voltage and local zoning requirements. x A spotter will be used as the driller raises the mast to ensure that overhangs, tree branches or canopies are not in the path of the mast. x Have everyone stand clear of the mast. x Set up work zone with enough room for staging of equipment and supplies such that there are aisle ways for walking and working. x Do not allow employees on the deck of the drill rig when the mast is being raised. x Only the driller should be next to the drill rig when raising the mast. x Inform all personnel before raising the mast. x Do not drive with mast in the raised position. x If the ground appears unstable, a qualified individual should determine if it is safe to place the drill rig at that site. x Set all brakes, put gearboxes in neutral, and disengage all hoist levers. x Set riggers/stabilizers prior to raising the mast. x Level and stabilized the drill rig before raising.

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
Direct Push Drilling	08/03/2020	04/15/2020	3 of 8

Connecting and Disconnecting Drill Piping	x Back Injuries from Lifting Drill piping and other Heavy Objects x Contact with Contaminated Soil x Rolling/Moving Drill Rod in the Stack x Hand Injuries ±Cuts, Pinches, Fractures or Crushed x Noise x Slips, Trips, Falls	x Use proper lifting procedures ±avoid lifting with the back and twisting. x If over 50 pounds or awkward ask for assistance. x Use a cart or wheelbarrow to move material into place. x Always take the drill rod on top of the others. x Move slowly and watch the other rods to see if they will shift. x Use the right tool for the job. x Be aware of hand placement ±do not place hands in the path of hammers, knifes or between objects. x Communicate your intentions to others involved. Make sure they understand where and what you will be doing before you do it. x Never put hands under hammer while it is moving towards the drill rod. Lock the lifting mechanism in place and lower the hammer towards the drill rod. Once in position remove hands from the controls and release lifting mechanism and secure to top of drill rod. x Keep hands off of hamm H U Z K L O H L W L V P R Y L the hammer as it is going up by holding onto it with your hand(s). x Maintain housekeeping. x Set up work zone with enough room for staging of equipment and supplies such that there are aisle ways for walking and working. x If on pavement or concrete sweep up loose sand, dirt or rock before lifting or moving equipment. x Continue to clean and remove cuttings from drilling area. x Pickup tools that are not needed and place out of the way. x Walk your pathway before carrying an item. x Maintain three points of contact when climbing up and down. Always face the climbing surface.

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
Direct Push Drilling	08/03/2020	04/15/2020	4 of 8

Connecting and Disconnecting Drill Piping	x Equipment Failure x Dropping Drill Rod x Hydraulic Hose Breaking x Moving Hammer/Mast	x Perform and document daily inspection of all cabling, hydraulics, motors, fluid levels and hoses. x Keep all unnecessary employees away from the area. x Keep gloves clean and dry. Replace if needed. x Use two hands while handling the drill rod. x Do not use your foot to hold the drill rod in the ground while removing the drill rod. Use a clamp to secure the down hole rod while removing sections. x Check all lines and connections for cracks, tears or weakness prior to start of operations. x Maintain lines in a manner that would prevent deterioration. x Remove and replace all lines that show wear and tear. x A safe zone should be established around the mast that represents an area the no one should be in while the hammer/mast is in motion. x When walking around the hammer/mast, watch for movement and potential contact with your head and shoulders. x Set up work area with enough area so that there is room to walk around the hammer/mast while it is in motion.
Hammering Drill Rod into Ground	x Back Injuries from Lifting Pipe Casing and Other Heavy Objects x Contact with Contaminated Soil x Hammer/Mast Footer x Contact with Underground Utilities x Hand Injuries ±Cuts, Pinches, Fractures or Crushed x Noise x Slips, Trips, Falls x Equipment Failure x Hazardous Atmosphere x Moving Hammer x Hydraulic Hose Breaking	x Use proper lifting procedures ±avoid lifting with the back and twisting. x If over 50 pounds or awkward ask for assistance. x Use a cart or wheelbarrow to move material into place. x Do not place your feet on the mast footer while in operation. x Keep mast footer on the ground. If the footer raises up, stop hammering and lower footer back to the ground. x Wear safety toed boots. x Keep feet away from footer area and be aware of feet placement. x &RQWDFW WKH VWDWH ¶V 48 hours prior to digging. x Use private locator company. x Look at existing site plans prior to beginning work to determine potential location of underground utilities. x Watch for pea gravel or fill material. x Stay at least 5 feet away from all marked utility lines. x Ensure all affected utilities are marked or have no conflict.

		x Never put hands under hammer while it is moving towards the drill rod. Lock the lifting mechanism in place and lower the hammer towards the drill rod. Once in position remove hands from the controls and release lifting mechanism and secure to top of drill rod. x Set up work zone with enough room for staging of equipment and supplies such that there are aisle ways for walking and working. x Continue to clean and remove cuttings from drilling area. x Maintain three points of contact when climbing up and down. Always face the climbing surface. x Perform and document daily inspection of all cabling, hydraulics, motors, fluid levels and hoses. x Keep all unnecessary employees away from the area. x Monitor the environment using a PID. x Use a respirator if levels of contaminates exceed the action level. x A safe zone should be established around the mast that represents an area the no one should be in while the hammer/mast is in motion. x When walking around the hammer/mast, watch for movement and potential contact with your head and shoulders. x Setup work area with enough area so that there is room to walk around the hammer/mast while it is in motion. x Check all lines and connections for cracks, tears or weakness prior to start of operations. x Maintain lines in a manner that would prevent deterioration. x Remove and replace all lines that show wear and tear.

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
Direct Push Drilling	08/03/2020	04/15/2020	6 of 8

Soil Sampling	x Hot Tools x Stuck Acetate Sleeve x Chemical Contact x Soil Sample Under Pressure ±Flying Debris	x Keep all metal tools and sampling equipment out of direct contact with the sun. Keep in shade. x Use the hydraulic ram to extrude the stuck sleeve. If there is not a ram, replace the sampling rod. x Keep the ball check free of debris to ensure proper operation. Check the operation of the ball check prior to connecting to the drill for sampling. x When removing the drive tip from the sample rod do not stand directly in front, stand to the side, and remove slowly. x Listen for a hissing sound coming from the sample rod. x Expanding clay may cause this to occur. Prior to drilling, the potential for expanding clay should be determined and the need for adjust sampling protocols with the driller discussed.
Soil Sampling	x Hand Injuries x Back Injuries x Tripping Hazards	x Seek assistance if the sampler is difficult to open or remove. x Secure drill rod sampler in a vise grip while removing sample tube. x Use the sample tube liner cutter while secure in sample tray to cut the liner and expose the soil sample. x Sample liner is sharp when cut. Only handle the liner with cotton, leather or craftsman gloves. Nitriles alone will not provide protection. x Avoid setting tools and other equipment on the ground. Set at waist level. Setup sample prep area on the back of tailgate or on a portable table. x Do not twist your body while using the liner cutter. Face one end of the liner and pull the liner cutter towards you. Step back and pull again until sample is exposed. x Maintain a clear path between the sample location and the preparation area.

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
Direct Push Drilling	08/03/2020	04/15/2020	7 of 8

Debris Removal	x Moving Hammer x Equipment Failure	x A safe zone should be established around the mast that represents an area the no one should be in while the hammer/mast is in motion. x When walking around the hammer/mast, watch for movement and potential contact with your head and shoulders. x Wear hard hat. x Setup work area with enough area so that there is room to walk around the hammer/mast while it is in motion. x Perform and document daily inspection of all cabling, hydraulics, motors, fluid levels and hoses. x Keep all unnecessary employees away from the area.
Debris Removal	x Hazardous Atmosphere x Back Injuries x Slips, Trips, Falls x Hand Injuries x Noise	x Monitor the environment using a PID. x Use a respirator if levels of contaminates exceed the action level. x Prior to work starting identify potential hazardous air contaminates. x Follow safe lifting procedures of lifting with the legs not the back. x Use a cart or wheelbarrow to move materials around the project site. x Set up work zone with enough room for staging of equipment and supplies such that there are aisle ways for walking and working. x Continue to clean and remove cuttings from drilling area. x Pickup tools that are not needed and place out of the way. x Always face where you are walking. x Always watch hand placement ±do not place your hand in direct path of a tool. x Communicate your intentions to others involved. Make sure they understand where and what you will be doing before you do it.
Drum Handling	x See JSA Drum Handling	x See JSA Drum Handling
Decon	x See JSA Decon	x See JSA Decon

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
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STOP WORK

Atlas and Subcontractor employees must stop work and contact off-site senior personnel when a change in condition, process, or job phase develops on the project site that is not addressed by this JSA or within the project specific HASP. The JSA should be modified with new steps, hazards, and safe procedures agreed upon by all Atlas and Subcontractor employees at the project site and approved by off-site senior personnel. Documentation of the modification and review by all affected personnel must take place.

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By signing this JSA form, you are acknowledging that you have read, reviewed and understand the job steps, potential hazardous conditions and unsafe conditions and the safe procedures, preventative measures required to perform the task safely and the requirement to Stop Work when a change in condition, process, or job phase develops on the project site that is not addressed by this JSA or within the project specific HASP.

Print Name	Signature	Company	Date

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
Dust Suppression	8/12/2020	04/15/2020	1 of 3

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT			
☒ REFLECTIVE VEST	☒ LONG PANTS	☐ AIR PURIFYING RESPIRATOR:	☐ OTHER:
☒ HARD HAT	☒ CUT RESISTANT GLOVE LEVEL: 3	☐ SUPPLIED AIR RESPIRATOR	☐ OTHER:
☒ SAFETY TOED BOOTS	☐ IMPACT RESISTANT GLOVE LEVEL:	☐ CHEMICAL RESISTANT CLOTHING:	☐ OTHER:
☒ SAFETY GLASSES	☐ CHEMICAL RESISTANT GLOVE:		☐ OTHER:
☐ FACE SHIELD	☒ HEARING PROTECTION	☒ GOGGLES:	☐ OTHER:

REQUIRED TOOLS / EQUIPMENT / SUPPLIES			
☐ DRINKING WATER	☐ RATCHET WITH EXTENSION	☐ OTHER:	☐ OTHER:
☐ BUG REPELLENT	☐ WELL MAGNET	☐ OTHER:	☐ OTHER:
☒ TRAFFIC CONTROL DEVICES	☐ AIR MONITORING: **Choose an item.**	☐ OTHER:	☐ OTHER:
☐ LADDER	☐ LOCKOUT/TAGOUT EQUIPMENT	☐ OTHER:	☐ OTHER:

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1) JOB STEPS	2) POTENTIAL HAZARDOUS CONDITIONS / UNSAFE PRACTICES	3) SAFE PROCEDURES and PREVENTATIVE MEASURES
Enter/Exit Truck	• Falls	• Face Truck. • Set park brake and lock controls before leaving machine. • Use three point of contact while mounting and dismounting the truck by holding handles provide and using wheel step. • Never jump from truck.
Drive Truck to Water Tank.	• Vehicles	• Stay alert & use defensive driving techniques. • Use mirrors or a spotter if backing into filling area. • Do not travel more than the posted speed limit or 5mph.
	• Pedestrians	• Use mirrors to watch for pedestrians. • Stay alert. • Yield to all pedestrians.
Fill Tank on Truck	• Falls	• Face Truck • Set park brake and lock controls before leaving machine • Use three point of contact while mounting and dismounting the truck by holding handles provide and using wheel step. • Never jump from truck • Use established manufactured hand holds and foot holds.

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
Dust Suppression	8/12/2020	04/15/2020	2 of 3

	• Hand Injuries – Cuts and Pinches	• Wear work gloves. • Never place hands in between areas where they can become pinched or stuck. • Do not place hand between objects on tank.
Fill Tank on Truck	• Hose Whipping • Overfilling the tank	• Make sure water is off and secure both ends of hose before turning on water. • Pay attention while filling the tank and do not overfill the tank causing a tip over.
Spray Water on Roads	• Pedestrians	• Use mirrors to watch for pedestrians • Stay alert and maintain distance from pedestrians. • Yield to all pedestrians. • Turn water off when pedestrians approach.
	• Vehicles	• Use mirrors to watch for pedestrians • Stay alert and keep distance from pedestrians.
Spray Water on Soil Piles	• Hand Injuries – Cuts and pinches	• Wear cut resistant gloves. • Watch hand and finger placement. • Do not place hand between objects where they can become stuck or pinched.
	• Hose Whipping	• Make sure water is off and secure both ends of hose before turning on water. • Pay attention while filling the tank and do not overfill the tank causing a tip over. • Brace yourself securely while holding hose.
	• Slip, Trips, Falls	• Wear steel toed boots with ankle support. • Watch foot placement. • Do not walk while spraying

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
Dust Suppression	8/12/2020	04/15/2020	3 of 3

STOP WORK

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Please explain additional steps, changes or amendments to this JSA in the provided space below. Prior to starting work ensure that all employees understand and agree with the changes in this JSA.

By signing this JSA form, you are acknowledging that you have read, reviewed and understand the job steps, potential hazardous conditions and unsafe conditions and the safe procedures, preventative measures required to perform the task safely and the requirement to Stop Work when a change in condition, process, or job phase develops on the project site that is not addressed by this JSA or within the project specific HASP.

Print Name	Signature	Company	Date

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
Excavating contaminated soil	11/3/2020	2/10/2005	1 of 5

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT			
☒ REFLECTIVE VEST	☐ LONG PANTS	☐ AIR PURIFYING RESPIRATOR:	☐ OTHER:
☒ HARD HAT	☒ CUT RESISTANT GLOVE LEVEL: 3	☐ SUPPLIED AIR RESPIRATOR	☐ OTHER:
☒ SAFETY TOED BOOTS	☒ IMPACT RESISTANT GLOVE LEVEL: 3	☐ CHEMICAL RESISTANT CLOTHING:	☐ OTHER:
☒ SAFETY GLASSES	☐ CHEMICAL RESISTANT GLOVE:		☐ OTHER:
☐ FACE SHIELD	☐ HEARING PROTECTION	☐ GOGGLES:	☐ OTHER:

REQUIRED TOOLS / EQUIPMENT / SUPPLIES			
☐ DRINKING WATER	☐ RATCHET WITH EXTENSION	☐ OTHER:	☐ OTHER:
☐ BUG REPELLENT	☐ WELL MAGNET	☐ OTHER:	☐ OTHER:
☒ TRAFFIC CONTROL DEVICES	☒ AIR MONITORING: PID	☐ OTHER:	☐ OTHER:
☐ LADDER	☐ LOCKOUT/TAGOUT EQUIPMENT	☐ OTHER:	☐ OTHER:

STOP WORK

Atlas and Subcontractor employees must stop work and contact off-site senior personnel when a change in condition, process, or job phase develops on the project site that is not addressed by this JSA or within the project specific HASP. The JSA should be modified with new steps, hazards, and safe procedures agreed upon by all Atlas and Subcontractor employees at the project site and approved by off-site senior personnel. Documentation of the modification and review by all affected personnel must take place.

1) JOB STEPS	2) POTENTIAL HAZARDOUS CONDITIONS / UNSAFE PRACTICES	3) SAFE PROCEDURES and PREVENTATIVE MEASURES
Entering/Exiting excavator	• Falls	• Face the surface of the equipment and use the manufacturer's designed hand and foot holds to climb in and out of the cab of the equipment using three points of contact. • Set park brake, turn equipment off, and lock controls before leaving the equipment • Always maintain three points of contacting when climbing in or out of the equipment. • Never jump off the equipment.
Moving excavator	• Co-workers, contact with pedestrian	• Use mirrors to watch for people. • Only approach the equipment after the operator has removed their hand from the control and indicated that it is safe to approach. • Do not operate the machine while pedestrians or employees are in the swing radius of the excavation arm. • Stay alert and use a spotter. • All employees must wear a high visibility traffic vest.
	• Non-Essential (unauthorized personnel)	• Establish an adequate work zone. • Minimize entry of all non-essential (unauthorized personnel) into the work zone.

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
Excavating contaminated soil	11/3/2020	2/10/2005	2 of 5

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT		
	• Vehicles	• Use mirrors to watch for traffic. • Do not operate machine while traffic is passing. • Use a spotter.
Remove contaminated soil	• Striking under ground utilities • Unidentified utilities	• Prior to digging the State's one call service must be contacted at least 48 hours before start of operations. • A private locating company should be used to identify any on-site underground utilities. • A valid ticket must be obtained and within dates. • Review as built drawings of the area. • Use a spotter to help identify any areas that appear to have back fill. • Stop if pea gravel or back fill is encountered! • Use a scrapping motion by digging 3 – 4 inches at a time for the first 5 feet.
	• Overhead hazards	• Spotter must be used when the equipment is operating or moved. Identify all overhead utilities or structures before moving equipment into position. • Must maintain a minimum of 10 feet from all overhead utility lines.
	• Contact with hazardous material	• Wear nitrile gloves under leather, cotton, or craftsman gloves. • Wear safety glasses
	• Hazardous atmosphere	• Monitor the environment for hazardous and explosive environments with a PID, FID or 4 gas monitor. • Stop work if 10 PPM is reached in the breathing zone and sustained for 5 minutes.
	• Falls into excavation	• All personnel should maintain a distance of 2 feet from the edge of the excavation. • Setup an exclusion zone around the excavation 3 feet from the edge.
	• Excavation collapse	• Competent Person for excavations must be on site to evaluate soil type. No one can enter the excavation until the Competent Person approves and performs a documented inspection. • Sloping, benching, or shoring must be used if the

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
Excavating contaminated soil	11/3/2020	2/10/2005	3 of 5

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT		
		Competent Person directs it or if the excavation exceeds 5 feet or more. • There should be no standing water in the excavation. • Limit the amount of time someone must be in an excavation. • Ladders or a means of safely climbing in and out of the excavation must used if the excavation is greater than 4 feet and place every 25 feet. The competent person may require ladders or another means of ingress and egress at depths less than 4 feet. • Spoil piles should be kept at least 2 feet from the edge of the excavation. • Daily inspections of the excavation must be conducted by the Competent Person. • Heavy equipment is not allowed any closer than 2 feet from the edge of the excavation.
Remove contaminated soil.	• Equipment tipping over	• Only qualified operators are allowed to operate the equipment. • The operator should always check the of operation before moving the equipment grade, elevation change, and weak ground conditions. • Operate the equipment from operator seat only. • Seat belt must be worn at all times when ever in the cab of the equipment. • The operator should know and respect the safe limits of the equipment. Use caution when operating on inclines. • Do not undermine machine • Move machine slowly over rough terrain. • Stay back from steep slopes and soft shoulders. • The equipment should remain at least two feet from the edge of the excavation. • A spotter should be used at all times while the equipment is in operation.
	Equipment Failure	• Perform and document daily inspection of all cabling, hydraulics, motors, fluid levels and hoses. • Replace any hoses or connections that appear to be

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
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MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT		
		weak or leaking.
	Blowing dust	• Water should be used to wet the soil and keep dust down. • The site safety officer should evaluate the weather conditions to determine if the windy conditions warrant stopping work. • Wear goggles during windy, dusty conditions.

STOP WORK

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Print Name	Signature	Company	Date

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
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Excavation or Trenching Activity	8/31/2020	04/16/2020	1 of 4

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT			
☒ REFLECTIVE VEST	☒ LONG PANTS	☐ AIR PURIFYING RESPIRATOR:	☐ OTHER:
☒ HARD HAT	☒ CUT RESISTANT GLOVE LEVEL: 3	☐ SUPPLIED AIR RESPIRATOR	☐ OTHER:
☒ SAFETY TOED BOOTS	☐ IMPACT RESISTANT GLOVE LEVEL:	☐ CHEMICAL RESISTANT CLOTHING:	☐ OTHER:
☒ SAFETY GLASSES	☐ CHEMICAL RESISTANT GLOVE:		☐ OTHER:
☐ FACE SHIELD	☒ HEARING PROTECTION	☐ GOGGLES:	☐ OTHER:

REQUIRED TOOLS / EQUIPMENT / SUPPLIES			
☐ DRINKING WATER	☐ RATCHET WITH EXTENSION	☐ OTHER:	☐ OTHER:
☐ BUG REPELLENT	☐ WELL MAGNET	☐ OTHER:	☐ OTHER:
☒ TRAFFIC CONTROL DEVICES	☐ AIR MONITORING: **Choose an item.**	☐ OTHER:	☐ OTHER:
☐ LADDER	☐ LOCKOUT/TAGOUT EQUIPMENT	☐ OTHER:	☐ OTHER:

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1) JOB STEPS	2) POTENTIAL HAZARDOUS CONDITIONS / UNSAFE PRACTICES	3) SAFE PROCEDURES and PREVENTATIVE MEASURES
Transportation of Heavy Equipment to and from the project Site	• See JSA Driving	• See JSA Driving
Unload Heavy Equipment	• See JSA Unloading Heavy Equipment	• See JSA Unloading Heavy Equipment
Moving Heavy Equipment at the Project Site	• Pedestrians/Vehicles	• Onsite personnel should wear traffic reflective vest. • Spotters must be used whenever the equipment is being operated. • Backup alarm is required on heavy equipment.
	• Tipping Over	• Only qualified operators on equipment. • Check area of operation before moving machine. • No riders on equipment or in bucket. • Lower bucket and lock controls before leaving machine. • Operate machine from operator seat only. • Know safe limits of machine. • Wear seat belt. • Use caution when operating on inclines. • Do not undermine machine.

JOB SAFETY ANALYSIS (JSA)

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		• Move machine slowly over rough terrain • Do not move heavy loads to outer limits of machine • Stay back from steep slopes and soft shoulders
	• Overhead Hazards	• Spotter must be used whenever moving heavy equipment onsite. • Driver and spotter should walk the travel path and discuss the movement of the equipment.
Moving Heavy Equipment at the Project Site.	• Heavy Equipment	• Spotters must be used at all times when heavy equipment is being operated. • All onsite personnel must wear safety reflective vest. • Operator must follow spotters hand signals and remove hands from controls when not working. • Site personnel should only approach the spotter • Backup alarm is required on heavy equipment.
Remove Soil	• Slips, Trips, Falls	• Maintain housekeeping. • Set up work zone with enough room for staging of equipment and supplies such that there are aisle ways for walking and working. • If on pavement or concrete sweep up loose sand, dirt or rock • Wear slip resistant steel toed boots. • Keep foot wear clean of mud and other debris. • Setup areas away from snow and ice. • If ice is present wear yak-traks on boots.
Remove Soil	• Pedestrians	• Caution tape or snow fence should be used to surround the entire site. • Onsite personnel must wear traffic reflective vest. • Never lift, swing, or move load over anyone or equipment • Keep windows clean • Keep ground personnel in view
	• Entrapment	• Competent Person must be on site to evaluate soil type and document inspection (daily) of safe entry. • No one can enter the trench until the competent person approves. • Sloping, benching or shoring must be used if the Competent Person directs it or if the trench exceeds 5 feet or more.

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		• There should be no standing water in the trench. • Limit the amount of time someone must be in a trench. • Ladders or a means of safely climbing in and out of the trench must used if the trench is greater than 4 feet and place every 25 feet. The competent person may require ladders or another means at depths less than 4 feet. • Spoil piles should be kept at least 2 feet from the edge of the trench. • Heavy equipment not allowed any closer than 2 feet from the edge of the trench.
Remove Soil	• Noise	• Hearing protection is required in the exclusion zone when heavy equipment is in use.
	• Underground Utilities	• The State's One Call Service should be contacted at least 2 days prior to the start of the project. • A private locator is required and Atlas staff should be onsite while private locator is working. • For the first five (5) feet the equipment operator shall use a technique of scraping the ground to a depth of not more than 3 inches at a time. This technique allows the equipment operator to "feel" the presence of an unmarked utility line. • A spotter must be used to help visually identify utility lines. • If pea gravel, fill material, or refusal is encountered stop operations and report the incident to the Project Manager and Branch Safety Officer. • Hand digging within 18 inches of marked utility lines is required.
Remove Soil	• Overhead Utilities	• All over head utilities must be identified before work begins. • There should be at least 10 feet distance between the heavy equipment and the utility line. • See HASP for more information on clearance.
	• See JSA Loading Soil with End Loader	• See JSA Loading Soil with End Loader
Loading Soil for Removal	• See JSA for Soil Removal	• See JSA for Soil Removal.

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Print Name	Signature	Company	Date

APPENDIX B

Chemical Hazard Information

Safety Data Sheets (SDS)

Polycyclic Aromatic Hydrocarbons Standard Mixture

High-Purity Standards

Chemwatch Hazard Alert Code: **4**

Catalogue number: **PAH-HM16C**
Version No: **1.1**
Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Issue Date: **06/05/2017**
Print Date: **06/05/2017**
S.GHS.USA.EN

SECTION 1 IDENTIFICATION

Product Identifier

Product name	Polycyclic Aromatic Hydrocarbons Standard Mixture
Synonyms	PAH-HM16C
Proper shipping name	Dichloromethane
Other means of identification	PAH-HM16C

Recommended use of the chemical and restrictions on use

Relevant identified uses	Use according to manufacturer's directions.

Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Registered company name	High-Purity Standards
Address	PO Box 41727 SC 29423 United States
Telephone	843-767-7900
Fax	843-767-7906
Website	highpuritystandards.com
Email	Not Available

Emergency phone number

Association / Organisation	INFOTRAC
Emergency telephone numbers	1-800-535-5053
Other emergency telephone numbers	1-352-323-3500

SECTION 2 HAZARD(S) IDENTIFICATION

Classification of the substance or mixture

Classification	Carcinogenicity Category 1B, Skin Sensitizer Category 1, Germ cell mutagenicity Category 1B, Reproductive Toxicity Category 1B, Acute Aquatic Hazard Category 1, Chronic Aquatic Hazard Category 1

Label elements

Hazard pictogram(s)	
SIGNAL WORD	DANGER

Hazard statement(s)

H350	May cause cancer.
H317	May cause an allergic skin reaction.
H340	May cause genetic defects.
H360	May damage fertility or the unborn child.
H410	Very toxic to aquatic life with long lasting effects.

Continued...

Hazard(s) not otherwise specified

Not Applicable

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.

Precautionary statement(s) Response

P308+P313	IF exposed or concerned: Get medical advice/attention.

Precautionary statement(s) Storage

P405	Store locked up.

Precautionary statement(s) Disposal

P501	Dispose of contents/container in accordance with local regulations.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
75-09-2	balance	methylene chloride
83-32-9	0.2	acenaphthene
208-96-8	0.2	acenaphthylene
120-12-7	0.2	anthracene
56-55-3	0.2	benz[a]anthracene
50-32-8	0.2	benz[a]pyrene
205-99-2	0.2	benzo[b]fluoranthene
191-24-2	0.2	benzo[ghi]perylene
207-08-9	0.2	benzo[k]fluoranthene
218-01-9	0.2	chrysene
53-70-3	0.2	dibenz[a,h]anthracene
206-44-0	0.2	fluoranthene
86-73-7	0.2	fluorene
193-39-5	0.2	indeno[1,2,3-cd]pyrene
91-20-3	0.2	naphthalene
85-01-8	0.2	phenanthrene
129-00-0	0.2	pyrene

SECTION 4 FIRST-AID MEASURES

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor.
Ingestion	▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice.

Most important symptoms and effects, both acute and delayed

Continued...

See Section 11

Indication of any immediate medical attention and special treatment needed

for naphthalene intoxication: Naphthalene requires hepatic and microsomal activation prior to the production of toxic effects. Liver microsomes catalyse the initial synthesis of the reactive 1,2-epoxide intermediate which is subsequently oxidised to naphthalene dihydrodiol and alpha-naphthol. The 2-naphthoquinones are thought to produce haemolysis, the 1,2-naphthoquinones are thought to be responsible for producing cataracts in rabbits, and the glutathione-adducts of naphthalene-1,2-oxide are probably responsible for pulmonary toxicity. Suggested treatment regime:

- Induce emesis and/or perform gastric lavage with large amounts of warm water where oral poisoning is suspected.
- Instill a saline cathartic such as magnesium or sodium sulfate in water (15 to 30g).
- Demulcents such as milk, egg white, gelatin, or other protein solutions may be useful after the stomach is emptied but oils should be avoided because they promote absorption.
- If eyes/skin contaminated, flush with warm water followed by the application of a bland ointment.
- Severe anaemia, due to haemolysis, may require small repeated blood transfusions, preferably with red cells from a non-sensitive individual.
- Where intravascular haemolysis, with haemoglobinuria occurs, protect the kidneys by promoting a brisk flow of dilute urine with, for example, an osmotic diuretic such as mannitol. It may be useful to alkalinise the urine with small amounts of sodium bicarbonate but many researchers doubt whether this prevents blockage of the renal tubules.
- Use supportive measures in the case of acute renal failure. GOSSELIN, SMITH HODGE: Clinical Toxicology of Commercial Products, 5th Ed.

SECTION 5 FIRE-FIGHTING MEASURES

Extinguishing media

- There is no restriction on the type of extinguisher which may be used.
- Use extinguishing media suitable for surrounding area.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.

Special protective equipment and precautions for fire-fighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves in the event of a fire. ▸ Prevent, by any means available, spillage from entering drains or water courses. ▸ Use fire fighting procedures suitable for surrounding area. ▸ **DO NOT** approach containers suspected to be hot. ▸ Cool fire exposed containers with water spray from a protected location. ▸ If safe to do so, remove containers from path of fire. ▸ Equipment should be thoroughly decontaminated after use.
Fire/Explosion Hazard	▸ Non combustible. ▸ Not considered a significant fire risk, however containers may burn. May emit poisonous fumes.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment. ▸ Contain and absorb spill with sand, earth, inert material or vermiculite. ▸ Wipe up. ▸ Place in a suitable, labelled container for waste disposal.
Major Spills	▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear full body protective clothing with breathing apparatus. ▸ Prevent, by all means available, spillage from entering drains or water courses. ▸ Consider evacuation (or protect in place). ▸ No smoking, naked lights or ignition sources. ▸ Increase ventilation. ▸ Stop leak if safe to do so. ▸ Water spray or fog may be used to disperse / absorb vapour. ▸ Contain or absorb spill with sand, earth or vermiculite. ▸ Collect recoverable product into labelled containers for recycling. ▸ Collect solid residues and seal in labelled drums for disposal. ▸ Wash area and prevent runoff into drains. ▸ After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using. ▸ If contamination of drains or waterways occurs, advise emergency services.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs.

Continued...

	▸ Use in a well-ventilated area. ▸ Prevent concentration in hollows and sumps. ▸ **DO NOT** enter confined spaces until atmosphere has been checked. ▸ **DO NOT** allow material to contact humans, exposed food or food utensils. ▸ Avoid contact with incompatible materials. ▸ When handling, **DO NOT** eat, drink or smoke. ▸ Keep containers securely sealed when not in use. ▸ Avoid physical damage to containers. ▸ Always wash hands with soap and water after handling. ▸ Work clothes should be laundered separately. Launder contaminated clothing before re-use. ▸ Use good occupational work practice. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS. ▸ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained. ▸ **DO NOT** allow clothing wet with material to stay in contact with skin
Other information	▸ Store in original containers. ▸ Keep containers securely sealed. ▸ Store in a cool, dry, well-ventilated area. ▸ Store away from incompatible materials and foodstuff containers. ▸ Protect containers against physical damage and check regularly for leaks. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Lined metal can, lined metal pail/ can. ▸ Plastic pail. ▸ Polyliner drum. ▸ Packing as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks. For low viscosity materials ▸ Drums and jerricans must be of the non-removable head type. ▸ Where a can is to be used as an inner package, the can must have a screwed enclosure. For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.): ▸ Removable head packaging; ▸ Cans with friction closures and ▸ low pressure tubes and cartridges may be used. - Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages *. - In addition, where inner packagings are glass and contain liquids of packing group I and II there must be sufficient inert absorbent to absorb any spillage *. - * unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.
Storage incompatibility	None known

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
US OSHA Permissible Exposure Levels (PELs) - Table Z1	methylene chloride	Methylene chloride	50 ppm	Not Available	Not Available	See Table Z-2
US OSHA Permissible Exposure Levels (PELs) - Table Z2	methylene chloride	Methylene Chloride	Not Available	Not Available	Not Available	See 1919.52.
US NIOSH Recommended Exposure Limits (RELs)	methylene chloride	Dichloromethane, Methylene dichloride	Not Available	Not Available	Not Available	Ca See Appendix A
US ACGIH Threshold Limit Values (TLV)	methylene chloride	Dichloromethane	Not Available	Not Available	Not Available	TLV® Basis: COHb-emia; CNS impair; BEI
US ACGIH Threshold Limit Values (TLV)	benz[a]anthracene	Benz[a]anthracene	Not Available	Not Available	Not Available	TLV® Basis: Skin cancer; BEIP
US ACGIH Threshold Limit Values (TLV)	benz[a]pyrene	Benzo[a]pyrene	Not Available	Not Available	Not Available	TLV® Basis: Cancer; BElp
US ACGIH Threshold Limit Values (TLV)	benzo[b]fluoranthene	Benzo[b]fluoranthene	Not Available	Not Available	Not Available	TLV® Basis: Cancer; BElp
US ACGIH Threshold Limit Values (TLV)	chrysene	Chrysene	Not Available	Not Available	Not Available	TLV® Basis: Cancer; BElp
US OSHA Permissible Exposure Levels (PELs) - Table Z1	naphthalene	Naphthalene	50 mg/m3 / 10 ppm	75 mg/m3 / 15 ppm	Not Available	TLV® Basis: URT irr; cataracts; hemolytic anemia
US NIOSH Recommended Exposure Limits (RELs)	naphthalene	Naphthalin, Tar camphor, White tar	50 mg/m3 / 10 ppm	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	naphthalene	Naphthalene	10 ppm	Not Available	Not Available	Not Available

EMERGENCY LIMITS

Continued...

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
methylene chloride	Methylene chloride; (Dichloromethane)	Not Available	Not Available	Not Available
acenaphthene	Acenaphthene	3.6 mg/m3	40 mg/m3	240 mg/m3
acenaphthylene	Acenaphthylene	10 mg/m3	110 mg/m3	660 mg/m3
anthracene	Anthracene	48 mg/m3	530 mg/m3	3,200 mg/m3
benz[a]anthracene	Benzo(a)anthracene	1.2 mg/m3	13 mg/m3	79 mg/m3
benz[a]pyrene	Benzo(a)pyrene; (Coal tar pitch volatiles)	0.6 mg/m3	120 mg/m3	700 mg/m3
benzo[b]fluoranthene	Benz(e)acephenanthrylene; (Benzo(b)fluoroanthene)	0.12 mg/m3	1.3 mg/m3	7.9 mg/m3
benzo[ghi]perylene	Benzo(ghi)perylene	30 mg/m3	330 mg/m3	2,000 mg/m3
chrysene	Chrysene	0.6 mg/m3	12 mg/m3	69 mg/m3
dibenz[a,h]anthracene	Dibenza(a,h)anthracene	0.093 mg/m3	1 mg/m3	2.9 mg/m3
fluoranthene	Fluoranthene	4.1 mg/m3	45 mg/m3	400 mg/m3
fluorene	Fluorene, 9H-	6.6 mg/m3	72 mg/m3	430 mg/m3
indeno[1,2,3-cd]pyrene	Indeno(1,2,3-cd)pyrene	1.2 mg/m3	13 mg/m3	79 mg/m3
naphthalene	Naphthalene	15 ppm	83 ppm	500 ppm
phenanthrene	Phenanthrene	2.1 mg/m3	23 mg/m3	360 mg/m3
pyrene	Pyrene	0.15 mg/m3	1.7 mg/m3	7.5 mg/m3

Ingredient	Original IDLH	Revised IDLH
methylene chloride	10,000 ppm	2,000 ppm
acenaphthene	Not Available	Not Available
acenaphthylene	Not Available	Not Available
anthracene	Not Available	Not Available
benz[a]anthracene	Not Available	Not Available
benz[a]pyrene	Not Available	Not Available
benzo[b]fluoranthene	Not Available	Not Available
benzo[ghi]perylene	Not Available	Not Available
benzo[k]fluoranthene	Not Available	Not Available
chrysene	Not Available	Not Available
dibenz[a,h]anthracene	Not Available	Not Available
fluoranthene	Not Available	Not Available
fluorene	Not Available	Not Available
indeno[1,2,3-cd]pyrene	Not Available	Not Available
naphthalene	500 ppm	250 ppm
phenanthrene	Not Available	Not Available
pyrene	Not Available	Not Available

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use. Employers may need to use multiple types of controls to prevent employee overexposure. ▸ Employees exposed to confirmed human carcinogens should be authorized to do so by the employer, and work in a regulated area. ▸ Work should be undertaken in an isolated system such as a "glove-box" . Employees should wash their hands and arms upon completion of the assigned task and before engaging in other activities not associated with the isolated system. ▸ Within regulated areas, the carcinogen should be stored in sealed containers, or enclosed in a closed system, including piping systems, with any sample ports or openings closed while the carcinogens are contained within. ▸ Open-vessel systems are prohibited. ▸ Each operation should be provided with continuous local exhaust ventilation so that air movement is always from ordinary work areas to the operation. ▸ Exhaust air should not be discharged to regulated areas, non-regulated areas or the external environment unless decontaminated. Clean make-up air should be introduced in sufficient volume to maintain correct operation of the local exhaust system. ▸ For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear clean, impervious garments, including gloves, boots and continuous-air supplied hood. Prior to removing protective garments the employee should undergo decontamination and be required to shower upon removal of the garments and hood. ▸ Except for outdoor systems, regulated areas should be maintained under negative pressure (with respect to non-regulated areas). ▸ Local exhaust ventilation requires make-up air be supplied in equal volumes to replaced air. ▸ Laboratory hoods must be designed and maintained so as to draw air inward at an average linear face velocity of 0.76 m/sec with a minimum of 0.64 m/sec. Design and construction of the fume hood requires that insertion of any portion of the employees body, other than hands and arms, be disallowed.
Personal protection	

Continued...

Eye and face protection	▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]
Skin protection	See Hand protection below
Hands/feet protection	▸ Wear chemical protective gloves, e.g. PVC. ▸ Wear safety footwear or safety gumboots, e.g. Rubber **NOTE:** ▸ The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact. ▸ Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed. The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended. Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: · frequency and duration of contact, · chemical resistance of glove material, · glove thickness and · dexterity Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent). · When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended. · When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended. · Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use. · Contaminated gloves should be replaced. For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended. It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times. Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers' technical data should always be taken into account to ensure selection of the most appropriate glove for the task. Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example: · Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of. · Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
Body protection	See Other protection below
Other protection	▸ Employees working with confirmed human carcinogens should be provided with, and be required to wear, clean, full body protective clothing (smocks, coveralls, or long-sleeved shirt and pants), shoe covers and gloves prior to entering the regulated area. [AS/NZS ISO 6529:2006 or national equivalent] ▸ Employees engaged in handling operations involving carcinogens should be provided with, and required to wear and use half-face filter-type respirators with filters for dusts, mists and fumes, or air purifying canisters or cartridges. A respirator affording higher levels of protection may be substituted. [AS/NZS 1715 or national equivalent] ▸ Emergency deluge showers and eyewash fountains, supplied with potable water, should be located near, within sight of, and on the same level with locations where direct exposure is likely. ▸ Prior to each exit from an area containing confirmed human carcinogens, employees should be required to remove and leave protective clothing and equipment at the point of exit and at the last exit of the day, to place used clothing and equipment in impervious containers at the point of exit for purposes of decontamination or disposal. The contents of such impervious containers must be identified with suitable labels. For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear clean, impervious garments, including gloves, boots and continuous-air supplied hood. ▸ Prior to removing protective garments the employee should undergo decontamination and be required to shower upon removal of the garments and hood.
Thermal hazards	Not Available

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	colorless

Physical state	Liquid	**Relative density (Water = 1)**	Not Available
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Available	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	Not Available	**Molecular weight (g/mol)**	Not Available

Continued...

Flash point (°C)	Not Available	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Available	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water (g/L)	Miscible	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless inhalation of vapours, fumes or aerosols, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress. Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual. Inhalation of naphthalene vapour is linked with headache, loss of appetite, nausea, damage to the eyes and kidneys. According to animal testing, long term exposure may cause excessive weakness and increased salivation, weight loss,difficulty breathing, collapse, and evidence of damage to the skin, liver and lungs.
Ingestion	Accidental ingestion of the material may be damaging to the health of the individual. Ingestion of naphthalene and related compounds may produce abdominal cramps with nausea, vomiting, diarrhoea, headache, profuse sweating, listlessness, confusion, and in severe poisonings, coma with or without convulsions. Irritation of the bladder may also occur, producing urgency, painful urination, and the passage of brown or black urine with or without albumin or casts.
Skin Contact	Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions. There is some evidence to suggest that this material can cause inflammation of the skin on contact in some persons. Workers sensitised to naphthalene and related compounds show an inflammation of the skin with scaling and reddening. Some individuals show an allergic reaction. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
Eye	Although the liquid is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn). Long term exposure to naphthalene has produced clouding of the lens (cataracts) in workers.
Chronic	Inhaling this product is more likely to cause a sensitisation reaction in some persons compared to the general population. Skin contact with the material is more likely to cause a sensitisation reaction in some persons compared to the general population. There is ample evidence that this material can be regarded as being able to cause cancer in humans based on experiments and other information. Based on experiments and other information, there is ample evidence to presume that exposure to this material can cause genetic defects that can be inherited. Ample evidence exists from experimentation that reduced human fertility is directly caused by exposure to the material. Animal testing indicates that inhalation of naphthalene may increase the incidence of respiratory tumours and may aggravate chronic inflammation. Polycyclic aromatic hydrocarbons are found in a number of materials such as coal tar, tobacco smoke, petroleum and air pollution. Some substituted derivatives have been identified as extremely liable to cause cancer, especially that of the lung and genito-urinary tract.

Polycyclic Aromatic Hydrocarbons Standard Mixture

TOXICITY	IRRITATION
Not Available	Not Available

methylene chloride

TOXICITY	IRRITATION
dermal (rat) LD50: >2000 mg/kg[1]	Eye(rabbit): 162 mg - moderate
Inhalation (mouse) LC50: 25200 ppm/7hr[2]	Eye(rabbit): 500 mg/24hr - mild
Oral (rat) LD50: 985 mg/kg[2]	Skin (rabbit): 100mg/24hr-moderate
	Skin (rabbit): 810 mg/24hr-SEVERE

acenaphthene

TOXICITY	IRRITATION
Not Available	Not Available

Continued...

acenaphthylene

TOXICITY	IRRITATION
Oral (mouse) LD50: 1760 mg/kg[2]	Not Available

anthracene

TOXICITY	IRRITATION
Oral (mouse) LD50: 4900 mg/kg[2]	Not Available

benz[a]anthracene

TOXICITY	IRRITATION
Not Available	Not Available

benz[a]pyrene

TOXICITY	IRRITATION
Not Available	Skin (mouse): 0.014 mg - mild

benzo[b]fluoranthene

TOXICITY	IRRITATION
Not Available	Not Available

benzo[ghi]perylene

TOXICITY	IRRITATION
Not Available	Not Available

benzo[k]fluoranthene

TOXICITY	IRRITATION
Not Available	Not Available

chrysene

TOXICITY	IRRITATION
Not Available	Not Available

dibenz[a,h]anthracene

TOXICITY	IRRITATION
Not Available	Not Available

fluoranthene

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3180 mg/kg[2]	Not Available
Oral (rat) LD50: 2000 mg/kgd[2]	

fluorene

TOXICITY	IRRITATION
Not Available	Not Available

indeno[1,2,3-cd]pyrene

TOXICITY	IRRITATION
Not Available	Not Available

naphthalene

TOXICITY	IRRITATION
dermal (rat) LD50: >2500 mg/kg[2]	Eye (rabbit): 100 mg - mild
Oral (rat) LD50: 490 mg/kg[2]	Skin (rabbit):495 mg (open) - mild

phenanthrene

TOXICITY	IRRITATION
Oral (mouse) LD50: 700 mg/kgd[2]	Not Available

pyrene

TOXICITY	IRRITATION
Oral (rat) LD50: 2700 mg/kgd[2]	Skin (rabbit): 500 mg/24h - mild

Legend: *1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*

METHYLENE CHLORIDE

The material may produce moderate eye irritation leading to inflammation.
The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of

Continued...

	vesicles, scaling and thickening of the skin. Inhalation (human) TCLo: 500 ppm/ 1 y - I Eye(rabbit): 10 mg - mild
ANTHRACENE	Oral (rat) TDLo: 20000 m g/kg/79w -I Skin (mouse): 0.118 mg - mild Equivocal tumorigen by RTECS criteria
BENZ[A]PYRENE	The following information refers to contact allergens as a group and may not be specific to this product. **WARNING:** This substance has been classified by the IARC as Group 1: **CARCINOGENIC TO HUMANS**. Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).
BENZO[B]FLUORANTHENE	Lung, kidney, skin tumors and tumors at site of application recorded.
BENZO[K]FLUORANTHENE	Tumours at site of application.
CHRYSENE	Target organs in include skin (tumours at site of application).
FLUORANTHENE	Equivocal tumorigen bt RTECS criteria. Tumors at site of application recorded.
NAPHTHALENE	The material may be irritating to the eye, with prolonged contact causing inflammation.
PHENANTHRENE	Tumors at site of application. Neoplastic and tumorigenic by RTECS criteria.
PYRENE	Conjunctival irritation, excitement and muscle contraction recorded.
METHYLENE CHLORIDE & DIBENZ[A,H]ANTHRACENE	**WARNING:** This substance has been classified by the IARC as Group 2A: Probably Carcinogenic to Humans.
ACENAPHTHENE & ACENAPHTHYLENE & ANTHRACENE & FLUORANTHENE & PHENANTHRENE & PYRENE	Asthma-like symptoms may continue for months or even years after exposure to the material ends.
ACENAPHTHENE & BENZO[B]FLUORANTHENE & BENZO[GHI]PERYLENE & BENZO[K]FLUORANTHENE & DIBENZ[A,H]ANTHRACENE & INDENO[1,2,3-CD]PYRENE	No significant acute toxicological data identified in literature search.
ACENAPHTHENE & ANTHRACENE & BENZO[GHI]PERYLENE & FLUORANTHENE & FLUORENE & PHENANTHRENE & PYRENE	The substance is classified by IARC as Group 3: **NOT** classifiable as to its carcinogenicity to humans.
ANTHRACENE & BENZ[A]PYRENE & NAPHTHALENE & PYRENE	The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
ANTHRACENE & BENZO[B]FLUORANTHENE & BENZO[GHI]PERYLENE & BENZO[K]FLUORANTHENE & CHRYSENE & DIBENZ[A,H]ANTHRACENE & FLUORANTHENE & INDENO[1,2,3-CD]PYRENE & PHENANTHRENE & PYRENE	**NOTE:** Substance has been shown to be mutagenic in at least one assay, or belongs to a family of chemicals producing damage or change to cellular DNA.
BENZ[A]ANTHRACENE & BENZO[B]FLUORANTHENE & BENZO[K]FLUORANTHENE & CHRYSENE & INDENO[1,2,3-CD]PYRENE & NAPHTHALENE	**WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.
BENZ[A]ANTHRACENE & BENZ[A]PYRENE & BENZO[B]FLUORANTHENE & BENZO[K]FLUORANTHENE & DIBENZ[A,H]ANTHRACENE & INDENO[1,2,3-CD]PYRENE	Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [*National Toxicology Program: U.S. Dep.*

Acute Toxicity	⊘	**Carcinogenicity**	✔
Skin Irritation/Corrosion	⊘	**Reproductivity**	✔
Serious Eye Damage/Irritation	⊘	**STOT - Single Exposure**	⊘
Respiratory or Skin sensitisation	✔	**STOT - Repeated Exposure**	⊘
Mutagenicity	✔	**Aspiration Hazard**	⊘

Legend: ✘ *– Data available but does not fill the criteria for classification*
✔ *– Data available to make classification*

Continued...

– *Data Not Available to make classification*

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

Polycyclic Aromatic Hydrocarbons Standard Mixture

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

methylene chloride

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	=13.1mg/L	1
EC50	48	Crustacea	=108.5mg/L	1
EC50	96	Algae or other aquatic plants	161.874mg/L	3
EC50	384	Crustacea	10.334mg/L	3
NOEC	96	Algae or other aquatic plants	56mg/L	4

acenaphthene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.58mg/L	4
EC50	48	Crustacea	1.275mg/L	4
EC50	96	Algae or other aquatic plants	0.5mg/L	1
EC50	384	Crustacea	0.178mg/L	3
NOEC	768	Fish	0.208-0.226mg/L	1

acenaphthylene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.991mg/L	3
EC50	96	Algae or other aquatic plants	1.450mg/L	3
EC50	384	Crustacea	0.249mg/L	3

anthracene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.00127mg/L	4
EC50	48	Crustacea	0.01119096mg/L	4
EC50	72	Algae or other aquatic plants	>0.0078mg/L	2
BCF	48	Fish	1.0mg/L	4
EC50	24	Crustacea	ca.0.0012mg/L	2
NOEC	22	Algae or other aquatic plants	0.0015-0.0017mg/L	2

benz[a]anthracene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.083mg/L	3
EC50	48	Crustacea	0.000958776mg/L	4
EC50	96	Algae or other aquatic plants	0.087mg/L	3
BCF	24	Crustacea	0.006mg/L	4
EC50	48	Crustacea	0.0014815372mg/L	4

benz[a]pyrene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.026mg/L	3
EC50	48	Crustacea	0.0009815248mg/L	4
EC50	72	Algae or other aquatic plants	0.005mg/L	4
BCF	12	Fish	7.51mg/L	4
EC50	48	Crustacea	0.0016249408mg/L	4
NOEC	360	Fish	0.00102mg/L	4

benzo[b]fluoranthene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.026mg/L	3
EC50	96	Algae or other aquatic plants	0.029mg/L	3
EC50	384	Crustacea	0.011mg/L	3

Continued...

benzo[ghi]perylene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.008mg/L	3
EC50	48	Crustacea	0.0001326432mg/L	4
EC50	96	Algae or other aquatic plants	0.010mg/L	3
BCF	24	Crustacea	0.0002mg/L	4
EC50	48	Crustacea	0.0010418018mg/L	4

benzo[k]fluoranthene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
BCF	24	Crustacea	0.0014mg/L	4
NOEC	144	Fish	0.01mg/L	4

chrysene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.083mg/L	3
EC50	96	Algae or other aquatic plants	0.087mg/L	3
BCF	240	Crustacea	0.00136968mg/L	4
EC50	384	Crustacea	0.027mg/L	3
NOEC	2016	Fish	0.116331488mg/L	4

dibenz[a,h]anthracene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.008mg/L	3
EC50	48	Crustacea	0.0005510934mg/L	4
EC50	96	Algae or other aquatic plants	0.010mg/L	3
BCF	6	Crustacea	0.00072mg/L	4
EC50	48	Crustacea	0.001558648mg/L	4
NOEC	144	Fish	0.01mg/L	4

fluoranthene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.0001mg/L	4
EC50	48	Crustacea	0.003984522mg/L	4
EC50	72	Algae or other aquatic plants	0.103mg/L	4
BCF	672	Crustacea	0.125mg/L	4
EC10	144	Crustacea	0.0078mg/L	4
NOEC	744	Crustacea	0.0006mg/L	4

fluorene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.76mg/L	4
EC50	48	Crustacea	0.212mg/L	4
EC50	96	Algae or other aquatic plants	1.346mg/L	3
BCF	576	Crustacea	1.055mg/L	4
EC50	384	Crustacea	0.238mg/L	3
NOEC	336	Crustacea	0.0625mg/L	4

indeno[1,2,3-cd]pyrene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

naphthalene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.213mg/L	4
EC50	48	Crustacea	1.6mg/L	4
EC50	72	Algae or other aquatic plants	ca.0.4mg/L	1
BCF	12	Fish	10.2mg/L	4
EC50	0.05	Crustacea	0.000000085mg/L	4
NOEC	48	Fish	0.012817mg/L	4

phenanthrene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.234mg/L	4

Continued...

	EC50	48	Crustacea	0.117mg/L	4
	EC50	72	Algae or other aquatic plants	0.324mg/L	4
	BCF	24	Algae or other aquatic plants	1mg/L	4
	EC50	96	Fish	0.049mg/L	4
	NOEC	2160	Fish	0.005mg/L	4

pyrene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.249mg/L	3
EC50	48	Crustacea	0.004327936mg/L	4
EC50	96	Algae or other aquatic plants	0.256mg/L	3
BCF	24	Algae or other aquatic plants	0.5mg/L	4
EC50	24	Crustacea	>=0.003- <=0.03mg/L	2
NOEC	168	Fish	0.0152mg/L	4

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.
Wastes resulting from use of the product must be disposed of on site or at approved waste sites.
For naphthalene:
Environmental Fate: Naphthalene may be reach surface water and soil through transportation in water or being carried by air. Most airborne naphthalene is in a vapour form and hence deposition is expected to be slow. A minimal amount of naphthalene emitted to the air is transported to other environmental components mostly by dry deposition. Naphthalene in surface water may volatililize into the atmosphere, depending on environmental condiditons. It remains in solution in water, with only small amounts associated with suspended material and benthic sediments. While naphthalene is readily volatilized from aerated soils, it adheres to soils with a high organic content. Adsorption to aquifer material reduces transportation of naphthalene through groundwater, and the presence of nonionic organic compounds such as tetrachloroethene may enhance sorption to materials that contain low carbon content. Bioconcentration of naphthalene is moderate in aquatic organisms. It is readily metabolized by fish, and invertebrates that are placed in pollutant free water rapidly eliminate any traces of the pollutant. While bioaccumulation in the food chain is unlikely, exposure of cows and chickens to naphthalene could lead to naphthalene being present in milk and eggs. While the data on the transport and partitioning of methylnaphthalenes in the environment is limited, the characteristics of these chemicals are similar to naphthalene, so they are expected to behave in a similar manner to naphthalene in the environment, and produce the same effects on aquatic organisms. Biodegradation of naphthalene occurs relatively quickly in aquatic systems. Methylnaphthalenes are biodegraded under aerobic conditions after adaptation. Degradation rates are highest in water constantly polluted with petroleum. Naphthalene biodegradation rates are higher in sediment than in the water column above it. Methylnaphthalenes biodegrades more slowly. Reported half-lives in sediments were 46 weeks for 1-methylnaphthalene and ranged from 14 to 50 weeks for 2-methylnaphthalene. In soils, the potential for biodegradation is an important factor for biological remediation of soil. Studies on biodegradation of PAHs suggest that adsorption to the organic matter significantly reduces the bioavailability for microorganisms, and thus the biodegradability, of PAHs, including naphthalene. Biodegradation is accomplished through the action of aerobic microorganisms and is reduced in anaerobic soil conditions. Naphthalene biodegrades to carbon dioxide in aerobic soils, with salicylate as an intermediate product. Abiotic degradation of naphthalene seldom occurs in soils. As with naphthalene, 1-Methylnaphthalene is easily volatilised from aerated soil, and the biodegradation half-life averages between 1.7 and 2.2 days.
Ecotoxicity: Acute toxicity data on naphthalene for several fish species (freshwater and marine), show 96h LC50 values range from 1.8 to 7.8 mg/L. Comparable results were obtained with other vertebrates (amphibians). From chronic toxicity tests, a precise NOEL is not clearly determined. A NOEC of 0.12 mg/L was observed in a 40 days test on juvenile pink salmon, but 50% mortality at 0.11 mg/L was calculated for trout fry exposed during hatching.Several data are also available for invertebrates, showing 48h EC50 values ranging from 2.1 to 24 mg/L. While chronic data on freshwater invertebrates and algae are questionable, a 50% photosynthesis reduction was observed at 2.8 mg/L in 4 hours experiments.QSAR prediction models give results consistent with experimental short-term data on fish daphnia and algae.
For Polycyclic Aromatic Hydrocarbons (PAH's):
Environmental Fate: A general rule for biodegradation of PAHs is that parent compounds tend to degrade faster than alkylated analogs. Less is known about the biodegradability of resins and asphaltenes, but the current knowledge suggests these are not very biodegradable and will persist in the environment for a long time. The more hydrophobic a compound, the greater the partitioning to non-aqueous phases.
Atmospheric Fate: PAHs travel through the atmosphere as a gas or attached to dust particles. They are carried by air currents and deposited by dry or wet (rain, dew, etc.) deposition.
Aquatic Fate: When deposited in water PAHs sink to the bottom of lakes and rivers. Some will move though the soil to contaminate groundwater. PAHs are ubiquitous in the marine environment, occurring at their highest environmental concentrations around urban centres. The availability of organic carbon controls, to a large extent, the partitioning behaviour of PAHs in sediment. Mixed microbial populations in sediment/water systems may degrade some PAHs, with degradation progressively decreasing with increasing molecular weight.
Terrestrial Fate: The rate of degradation is dependent on nutrient content and the bacterial community in soil. PAHs in soils undergo a weathering process such that the lighter chain fractions are removed (primarily by volatilization). Heavier fractions bind to soil organic matter and remain behind in the top soil horizon. As the mixture of PAHs age, bioavailability changes as the fraction remaining bind more tightly. In general, the more soluble a PAH, the higher the uptake by plants while the reverse is true for uptake by earthworms and uptake in the gastrointestinal tract of animals.
Ecotoxicity: The primary mode of toxicity for PAHs in soil dwelling terrestrial invertebrates is non-specific non-polar narcosis. The uptake of PAHs by earthworms occurs primarily by direct contact with the soluble phase of soil solution. Microbial degradation of PAHs is a key process in soils. Biodegradation of PAHs may take place over a period of weeks to months. The lipid (fat) phase, of all organisms, contains the highest levels of PAHs. Accumulation of PAHs occurs in all marine organisms, however; there is a wide range in tissue concentrations resulting from variable environmental concentrations, level and time of exposure, and species ability to metabolize these compounds. In fish, bile and liver accumulate the highest levels of PAH and metabolites. In invertebrates, the highest concentrations can be found in the internal organs, such as the liver and pancreas; tissue concentrations appear to follow seasonal cycles which may be related to variations in lipid content or spawning cycles.
DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
methylene chloride	LOW (Half-life = 56 days)	HIGH (Half-life = 191 days)
acenaphthene	HIGH (Half-life = 204 days)	LOW (Half-life = 0.37 days)
acenaphthylene	MEDIUM (Half-life = 120 days)	LOW (Half-life = 0.05 days)
anthracene	HIGH (Half-life = 920 days)	LOW (Half-life = 0.21 days)
benz[a]anthracene	HIGH (Half-life = 1360 days)	LOW (Half-life = 0.33 days)
benz[a]pyrene	HIGH (Half-life = 1060 days)	LOW (Half-life = 0.18 days)
benzo[b]fluoranthene	HIGH (Half-life = 1220 days)	LOW (Half-life = 0.6 days)
benzo[ghi]perylene	HIGH (Half-life = 1300 days)	LOW (Half-life = 0.13 days)
benzo[k]fluoranthene	HIGH (Half-life = 4280 days)	LOW (Half-life = 0.46 days)
chrysene	HIGH (Half-life = 2000 days)	LOW (Half-life = 0.33 days)

Continued...

dibenz[a,h]anthracene	HIGH (Half-life = 1880 days)	LOW (Half-life = 0.18 days)
fluoranthene	HIGH (Half-life = 880 days)	LOW (Half-life = 0.84 days)
fluorene	MEDIUM (Half-life = 120 days)	LOW (Half-life = 2.84 days)
indeno[1,2,3-cd]pyrene	HIGH (Half-life = 1460 days)	LOW (Half-life = 0.26 days)
naphthalene	HIGH (Half-life = 258 days)	LOW (Half-life = 1.23 days)
phenanthrene	HIGH (Half-life = 400 days)	LOW (Half-life = 0.84 days)
pyrene	HIGH (Half-life = 3800 days)	LOW (Half-life = 0.33 days)

Bioaccumulative potential

Ingredient	Bioaccumulation
methylene chloride	LOW (BCF = 40)
acenaphthene	LOW (BCF = 387)
acenaphthylene	MEDIUM (BCF = 545)
anthracene	HIGH (BCF = 10500)
benz[a]anthracene	HIGH (LogKOW = 5.76)
benz[a]pyrene	HIGH (LogKOW = 6.13)
benzo[b]fluoranthene	HIGH (LogKOW = 5.78)
benzo[ghi]perylene	HIGH (LogKOW = 6.697)
chrysene	HIGH (LogKOW = 5.81)
dibenz[a,h]anthracene	HIGH (LogKOW = 6.697)
fluoranthene	HIGH (LogKOW = 5.16)
fluorene	MEDIUM (BCF = 830)
naphthalene	HIGH (BCF = 18000)
phenanthrene	MEDIUM (LogKOW = 4.46)
pyrene	HIGH (LogKOW = 4.88)

Mobility in soil

Ingredient	Mobility
methylene chloride	LOW (KOC = 23.74)
acenaphthene	LOW (KOC = 6123)
acenaphthylene	LOW (KOC = 6123)
anthracene	LOW (KOC = 20400)
benz[a]anthracene	LOW (KOC = 231300)
benz[a]pyrene	LOW (KOC = 786800)
benzo[b]fluoranthene	LOW (KOC = 803100)
benzo[ghi]perylene	LOW (KOC = 2676000)
chrysene	LOW (KOC = 236100)
dibenz[a,h]anthracene	LOW (KOC = 2622000)
fluoranthene	LOW (KOC = 70850)
fluorene	LOW (KOC = 11290)
naphthalene	LOW (KOC = 1837)
phenanthrene	LOW (KOC = 20830)
pyrene	LOW (KOC = 69410)

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	▸ Containers may still present a chemical hazard/ danger when empty. ▸ Return to supplier for reuse/ recycling if possible. Otherwise: ▸ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. ▸ Where possible retain label warnings and SDS and observe all notices pertaining to the product. Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked. A Hierarchy of Controls seems to be common - the user should investigate: ▸ Reduction ▸ Reuse ▸ Recycling ▸ Disposal (if all else fails) This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

Continued...

	▸ **DO NOT** allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal. ▸ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▸ Where in doubt contact the responsible authority.

SECTION 14 TRANSPORT INFORMATION

Labels Required

Marine Pollutant	

Land transport (DOT)

UN number	1593
UN proper shipping name	Dichloromethane
Transport hazard class(es)	Class: 6.1 Subrisk: Not Applicable
Packing group	III
Environmental hazard	Not Applicable
Special precautions for user	Hazard Label: 6.1 Special provisions: IB3, IP8, N36, T7, TP2

Air transport (ICAO-IATA / DGR)

UN number	1593
UN proper shipping name	Dichloromethane
Transport hazard class(es)	ICAO/IATA Class: 6.1 ICAO / IATA Subrisk: Not Applicable ERG Code: 6L
Packing group	III
Environmental hazard	Not Applicable
Special precautions for user	Special provisions: Not Applicable Cargo Only Packing Instructions: 663 Cargo Only Maximum Qty / Pack: 220 L Passenger and Cargo Packing Instructions: 655 Passenger and Cargo Maximum Qty / Pack: 60 L Passenger and Cargo Limited Quantity Packing Instructions: Y642 Passenger and Cargo Limited Maximum Qty / Pack: 2 L

Sea transport (IMDG-Code / GGVSee)

UN number	1593
UN proper shipping name	DICHLOROMETHANE
Transport hazard class(es)	IMDG Class: 6.1 IMDG Subrisk: Not Applicable
Packing group	III
Environmental hazard	Marine Pollutant
Special precautions for user	EMS Number: F-A, S-A Special provisions: Not Applicable Limited Quantities: 5 L

Continued...

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

METHYLENE CHLORIDE(75-09-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - California Permissible Exposure Limits for Chemical Contaminants
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Hawaii Air Contaminant Limits
US - Idaho - Acceptable Maximum Peak Concentrations
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Mutagens
US - Oregon Permissible Exposure Limits (Z-1)
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Washington Permissible exposure limits of air contaminants
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - Wyoming Toxic and Hazardous Substances Table Z-2 Acceptable ceiling concentration, Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Carcinogens Listing
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US OSHA Permissible Exposure Levels (PELs) - Table Z2
US Spacecraft Maximum Allowable Concentrations (SMACs) for Airborne Contaminants
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US TSCA New Chemical Exposure Limits (NCEL)

ACENAPHTHENE(83-32-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

ACENAPHTHYLENE(208-96-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

ANTHRACENE(120-12-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

BENZ[A]ANTHRACENE(56-55-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Mutagens
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

BENZ[A]PYRENE(50-32-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Continued...

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Mutagens
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

BENZO[B]FLUORANTHENE(205-99-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.

BENZO[GHI]PERYLENE(191-24-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List

BENZO[K]FLUORANTHENE(207-08-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California Proposition 65 - Carcinogens
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - Pennsylvania - Hazardous Substance List
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US Priority List for the Development of Proposition 65 Safe Harbor Levels - No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity

CHRYSENE(218-01-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

DIBENZ[A,H]ANTHRACENE(53-70-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Mutagens
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

Continued...

FLUORANTHENE(206-44-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

FLUORENE(86-73-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

INDENO[1,2,3-CD]PYRENE(193-39-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California Proposition 65 - Carcinogens
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - Pennsylvania - Hazardous Substance List
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US Priority List for the Development of Proposition 65 Safe Harbor Levels - No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

NAPHTHALENE(91-20-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - California Permissible Exposure Limits for Chemical Contaminants
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - Oregon Permissible Exposure Limits (Z-1)
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Washington Permissible exposure limits of air contaminants
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - List of Hazardous Substances
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

PHENANTHRENE(85-01-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - California Permissible Exposure Limits for Chemical Contaminants
US - Hawaii Air Contaminant Limits
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Oregon Permissible Exposure Limits (Z-1)
US - Pennsylvania - Hazardous Substance List
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Washington Permissible exposure limits of air contaminants
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

PYRENE(129-00-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - California Permissible Exposure Limits for Chemical Contaminants
US - Hawaii Air Contaminant Limits
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Oregon Permissible Exposure Limits (Z-1)
US - Pennsylvania - Hazardous Substance List
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Washington Permissible exposure limits of air contaminants
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US SARA Section 302 Extremely Hazardous Substances
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

Federal Regulations

Continued...

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SECTION 311/312 HAZARD CATEGORIES

Immediate (acute) health hazard	Yes
Delayed (chronic) health hazard	Yes
Fire hazard	No
Pressure hazard	No
Reactivity hazard	No

US. EPA CERCLA HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES (40 CFR 302.4)

Name	Reportable Quantity in Pounds (lb)	Reportable Quantity in kg
Dichloromethane	1000	454
Acenaphthene	100	45.4
Acenaphthylene	5000	2270
Anthracene	5000	2270
Benz[a]anthracene	10	4.54
Benzo[a]pyrene	1	0.454
Benzo[b]fluoranthene	1	0.454
Benzo[ghi]perylene	5000	2270
Benzo(k)fluoranthene	5000	2270
Chrysene	100	45.4
Dibenz[a,h]anthracene	1	0.454
Fluoranthene	100	45.4
Fluorene	5000	2270
Indeno(1,2,3-cd)pyrene	100	45.4
Naphthalene	100	45.4
Phenanthrene	5000	2270
Pyrene	5000	2270

State Regulations

US. CALIFORNIA PROPOSITION 65

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm

US - CALIFORNIA PREPOSITION 65 - CARCINOGENS & REPRODUCTIVE TOXICITY (CRT): LISTED SUBSTANCE

Dichloromethane (Methylene chloride), Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Chrysene, Dibenz[a,h]anthracene, Indeno[1,2,3-cd]pyrene, Naphthalene
Listed

National Inventory	Status
Australia - AICS	Y
Canada - DSL	N (fluoranthene; benz[a]anthracene; dibenz[a,h]anthracene; indeno[1,2,3-cd]pyrene; benzo[k]fluoranthene; acenaphthylene; benzo[b]fluoranthene; benzo[ghi]perylene)
Canada - NDSL	N (benz[a]pyrene; acenaphthene; pyrene; naphthalene; chrysene; phenanthrene; methylene chloride; fluorene; benzo[k]fluoranthene; benzo[b]fluoranthene; benzo[ghi]perylene; anthracene)
China - IECSC	N (chrysene; indeno[1,2,3-cd]pyrene; benzo[k]fluoranthene; acenaphthylene; benzo[b]fluoranthene; benzo[ghi]perylene)
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	N (benz[a]pyrene; pyrene; fluoranthene; chrysene; benz[a]anthracene; phenanthrene; dibenz[a,h]anthracene; indeno[1,2,3-cd]pyrene; benzo[k]fluoranthene; acenaphthylene; benzo[b]fluoranthene; benzo[ghi]perylene)
Korea - KECI	N (fluoranthene; benz[a]anthracene; dibenz[a,h]anthracene; indeno[1,2,3-cd]pyrene; benzo[k]fluoranthene; acenaphthylene; benzo[b]fluoranthene; benzo[ghi]perylene)
New Zealand - NZIoC	Y
Philippines - PICCS	N (fluoranthene; chrysene; benz[a]anthracene; dibenz[a,h]anthracene; indeno[1,2,3-cd]pyrene; benzo[k]fluoranthene; benzo[b]fluoranthene; benzo[ghi]perylene)
USA - TSCA	N (benzo[k]fluoranthene; benzo[b]fluoranthene; benzo[ghi]perylene)
Legend:	*Y = All ingredients are on the inventory* *N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 OTHER INFORMATION

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC－TWA: Permissible Concentration-Time Weighted Average

Continued...

PC－STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

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TEL (+61 3) 9572 4700.

end of SDS

Lead

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 12/15/2014 Revision date: 12/15/2014 Version: 1.1

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

1.1. Product identifier

Product form	:	Substance
CAS No	:	7439-92-1
Formula	:	Pb
Synonyms	:	C.I. 77575, in massive state / elemental lead, in massive state / glover, in massive state
BIG no	:	10073

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

Use of the substance/mixture : Solder
Battery: component
Construction
Electrodes

1.3. Details of the supplier of the safety data sheet

GSC International, Inc.
1747 N. Deffer Drive
Nixa,
MO 65714
United States of America

Tel: 417-374-7431
Fax: 417-374-7442
Email: info@gscinternationalinc.com

1.4. Emergency telephone number

Country	Organization/Company	Address	Emergency number
MEXICO	Servicio de Informacion Toxicologica Sintox	Tintoreto #32 Edif. a Desp. Col. Nochebuena Mixcoac México, D.F.	1 800 009 2800 +52 55 5611 2634 /+52 55 5598 9095
UNITED STATES OF AMERICA	American Association of Poison Control Centers		1-800-222-1222

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Acute Tox. 4 (Oral)	H302
Acute Tox. 4 (Inhalation)	H332
Carc. 1B	H350
Repr. 1A	H360
STOT RE 2	H373
Aquatic Acute 1	H400
Aquatic Chronic 1	H410

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :

GHS07 GHS08 GHS09

Signal word (GHS-US) : Danger

Hazard statements (GHS-US) : H302+H332 - Harmful if swallowed or if inhaled
H350 - May cause cancer
H360 - May damage fertility or the unborn child
H373 - May cause damage to organs through prolonged or repeated exposure

H400 - Very toxic to aquatic life
H410 - Very toxic to aquatic life with long lasting effects

Precautionary statements (GHS-US) : P201 - Obtain special instructions before use
P202 - Do not handle until all safety precautions have been read and understood
P260 - Do not breathe dust, fume
P264 - Wash hands thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P273 - Avoid release to the environment
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
P308+P313 - If exposed or concerned: Get medical advice/attention
P314 - Get medical advice/attention if you feel unwell
P501 - Dispose of contents/container to a licensed hazardous-waste disposal contractor or collection site except for empty clean containers which can be disposed of as non-hazardous waste

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS-US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance

Name	Product identifier	%	Classification (GHS-US)
Lead (Main constituent)	(CAS No) 7439-92-1	> 99,9	Acute Tox. 4 (Oral), H302 Acute Tox. 4 (Inhalation), H332 Carc. 1B, H350 Repr. 1A, H360 STOT RE 2, H373 Aquatic Acute 1, H400 Aquatic Chronic 1, H410

Full text of H-phrases: see section 16

3.2. Mixture

Not applicable

4.1. Description of first aid measures

First-aid measures general : If you feel unwell, seek medical advice. IF exposed or concerned: Get medical advice/attention. Call a poison center/doctor/physician if you feel unwell.

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. Not applicable. Call a poison center/doctor/physician if you feel unwell.

First-aid measures after skin contact : Not applicable. Wash skin with plenty of water.

First-aid measures after eye contact : Not applicable. Rinse eyes with water as a precaution.

First-aid measures after ingestion : Not applicable. Rinse mouth. Call a poison center/doctor/physician if you feel unwell.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation : No effects known.

Symptoms/injuries after skin contact : No effects known.

Symptoms/injuries after eye contact : No effects known.

Symptoms/injuries after ingestion : No effects known.

Chronic symptoms : No effects known.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Adapt extinguishing media to the environment.

Unsuitable extinguishing media : No unsuitable extinguishing media known.

5.2. Special hazards arising from the substance or mixture

Fire hazard : DIRECT FIRE HAZARD. Non combustible.

Explosion hazard	:	DIRECT EXPLOSION HAZARD. No data available on direct explosion hazard. INDIRECT EXPLOSION HAZARD. No data available on indirect explosion hazard.
Reactivity	:	On burning: formation of metallic fumes. Oxidizes on exposure to air.

5.3. Advice for firefighters

Precautionary measures fire	:	Exposure to fire/heat: keep upwind. Exposure to fire/heat: consider evacuation. Exposure to heat: have neighborhood close doors and windows.
Firefighting instructions	:	Dilute toxic gases with water spray. Take account of toxic fire-fighting water. Use water moderately and if possible collect or contain it.
Protection during firefighting	:	Heat/fire exposure: compressed air/oxygen apparatus. Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Protective equipment	:	Gloves. Protective clothing. See "Material-Handling" to select protective clothing.
Emergency procedures	:	Mark the danger area. No naked flames.

6.1.2. For emergency responders

Protective equipment	:	Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions

Avoid release to the environment. Prevent soil and water pollution. Prevent spreading in sewers. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

For containment	:	Not applicable. Collect spillage.
Methods for cleaning up	:	Recover mechanically the product. Pick-up the material. Take collected spill to manufacturer/competent authority. Notify authorities if product enters sewers or public waters.
Other information	:	Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling	:	Meet the legal requirements. Do not discharge the waste into the drain. Handle unclean empty containers as full ones. Observe strict hygiene. Measure the concentration in the atmosphere. Carry out operations in the open/under local exhaust/ventilation or with respiratory protection. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust, fume. Use only outdoors or in a well-ventilated area. Take all necessary technical measures to avoid or minimize the release of the product on the workplace. Limit quantities of product at the minimum necessary for handling and limit the number of exposed workers. Provide local exhaust or general room ventilation. Wear personal protective equipment. Floors, walls and other surfaces in the hazard area must be cleaned regularly.
Hygiene measures	:	Separate working clothes from town clothes. Launder separately. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures	:	Does not require any specific or particular technical measures. Comply with applicable regulations.
Storage conditions	:	Store locked up. Store in a well-ventilated place. Keep cool.
Incompatible materials	:	Strong acids, strong bases and oxidation agents.
Heat-ignition	:	KEEP SUBSTANCE AWAY FROM: heat sources.
Prohibitions on mixed storage	:	KEEP SUBSTANCE AWAY FROM: oxidizing agents. Strong acids. Strong bases.
Storage area	:	Meet the legal requirements.
Special rules on packaging	:	SPECIAL REQUIREMENTS: closing. correctly labeled. meet the legal requirements. Secure fragile packaging in solid containers.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Lead (7439-92-1)		
ACGIH	ACGIH TWA (mg/m³)	0,05 mg/m³
ACGIH	Remark (ACGIH)	CNS & PNS impair
OSHA	Not applicable	

8.2. Exposure controls

Appropriate engineering controls : Provide adequate general and local exhaust ventilation. Ensure good ventilation of the work station.

Personal protective equipment : Protective goggles. Gloves.

Materials for protective clothing : GIVE EXCELLENT RESISTANCE: No data available. GIVE GOOD RESISTANCE: butyl rubber. PVC. GIVE LESS RESISTANCE: No data available. GIVE POOR RESISTANCE: No data available.

Hand protection : protective gloves.

Eye protection : Safety glasses.

Skin and body protection : Not required for normal conditions of use.

Respiratory protection : Wear respiratory protection.

Environmental exposure controls : Avoid release to the environment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Solid

Appearance : Metal.

Molecular mass : 207,20 g/mol

Color : White to blue-grey

Odor : Odorless

Odor threshold : No data available

pH : No data available

Relative evaporation rate (butyl acetate=1) : No data available

Melting point : 327 °C

Freezing point : No data available

Boiling point : 1740 °C

Flash point : Not applicable

Auto-ignition temperature : No data available

Decomposition temperature : No data available

Flammability (solid, gas) : No data available

Vapor pressure : < 0,1 hPa

Relative vapor density at 20 °C : No data available

Relative density : 11,3

Specific gravity / density : 11340 kg/m³

Solubility : insoluble in water. Substance sinks in water. Soluble in nitric acid. Insoluble in organic solvents. Water: < 0,1 g/100ml

Log Pow : 0,73 (Estimated value)

Log Kow : No data available

Viscosity, kinematic	:	Not applicable
Viscosity, dynamic	:	No data available
Explosive properties	:	No data available
Oxidizing properties	:	No data available
Explosive limits	:	No data available

9.2. Other information

VOC content	:	Not applicable (inorganic)

SECTION 10: Stability and reactivity

10.1. Reactivity

On burning: formation of metallic fumes. Oxidizes on exposure to air.

10.2. Chemical stability

Unstable on exposure to air.

10.3. Possibility of hazardous reactions

No additional information available

10.4. Conditions to avoid

No additional information available

10.5. Incompatible materials

Acids. Bases.

10.6. Hazardous decomposition products

Thermal decomposition generates : fume.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Oral: Harmful if swallowed. Inhalation: Harmful if inhaled.

Lead (\f)7439-92-1	
LD50 oral rat	> 2000 mg/kg body weight (Rat; Weight of evidence)
LD50 dermal rat	> 2000 mg/kg body weight (Rat; Experimental value; OECD 402: Acute Dermal Toxicity)
ATE US (oral)	500,000 mg/kg body weight
ATE US (gases)	4500,000 ppmV/4h
ATE US (vapors)	11,000 mg/l/4h
ATE US (dust, mist)	1,500 mg/l/4h
Additional information	Lead massive metal is not considered to be acutely toxic. It is not easily inhaled or ingested, and if it is accidentally ingested normally passes through the gastrointestinal system without significant absorption into the body. Lead is not easily absorbed through the skin.

Skin corrosion/irritation : Not classified
(Based on available data, the classification criteria are not met)

Serious eye damage/irritation : Not classified
(Based on available data, the classification criteria are not met)

Respiratory or skin sensitization : Not classified
(Based on available data, the classification criteria are not met)

Germ cell mutagenicity : Not classified
(Based on available data, the classification criteria are not met)

Carcinogenicity : May cause cancer.

Lead (7439-92-1)	
Additional information	There is some evidence that inorganic lead compounds may have a carcinogenic effect, and they have been classified by IARC as probably carcinogenic to humans. However, it is considered that this classification does not apply to lead in articles, given the very low bioavailability of metallic lead. Carcinogenicity studies of lead metal powder have been negative. Epidemiology studies of workers exposed to inorganic lead compounds have found a limited association with stomach cancer. IARC has concluded that lead metal is possibly carcinogenic to humans (Group aB).
IARC group	2B - Possibly carcinogenic to humans
National Toxicology Program (NTP) Status	3 - Reasonably anticipated to be Human Carcinogen

Reproductive toxicity : May damage fertility or the unborn child.

Specific target organ toxicity (single exposure) : Not classified

(Based on available data, the classification criteria are not met)

Specific target organ toxicity (repeated exposure) : May cause damage to organs through prolonged or repeated exposure.

Lead (7439-92-1)	
Additional information	Lead is a cumulative poison and may be absorbed into the body through ingestion or inhalation. Although inhalation and ingestion of lead in massive form are unlikely, poor hygiene practises may result in hand to mouth transfer which maybe significant over a prolonged period of time. Inorganic lead compounds have been documented in observational human studies to produce toxicity in multiple organ systems and body function including the haemotopoetic (blood) system, kidney function, reproductive function and the central nervous system.

Aspiration hazard : Not classified

(Based on available data, the classification criteria are not met)

Symptoms/injuries after inhalation : No effects known.

Symptoms/injuries after skin contact : No effects known.

Symptoms/injuries after eye contact : No effects known.

Symptoms/injuries after ingestion : No effects known.

Chronic symptoms : No effects known.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Dangerous for the environment. Very toxic to aquatic life with long lasting effects.

Ecology - air : Not dangerous for the ozone layer (Regulation (EC) No 1005/2009). Not included in the list of fluorinated greenhouse gases (Regulation (EC) No 842/2006). TA-Luft Klasse 5.2.2/II.

Ecology - water : No water pollutant (surface water). Maximum concentration in drinking water: 0.010 mg/l (lead) (Directive 98/83/EC). Highly toxic to aquatic organisms.

Lead (7439-92-1)	
LC50 fish 1	2,8 (0,44 - 542) mg/l (96h) Coughlan, D.J., S.P. Gloss, and J. Kubota 1986. Acute and Sub-Chronic Toxicity of Lead to the Early Life Stages of Small mouth Bass (Micropterus dolomieui). Water Air Soil Pollut. 28(3/4):265-275
EC50 Daphnia 1	4,46 (0,53 - 5,1) mg/l (48h) Govindarajan, S., C.P. Valsaraj, R. Mohan, V. Hariprasad, and R. Ramasubramanian 1993. Toxicity of Heavy Metals in Aquaculture Organisms: Penaeus indicus, Perna viridis, Artemia salina and Skeletonema costatum. Pollut.Res. 12(3):187-189

12.2. Persistence and degradability

Lead (7439-92-1)	
Persistence and degradability	Biodegradability: Not applicable. No (test)data available on mobility of the substance.
ThOD	Not applicable (inorganic)

12.3. Bioaccumulative potential

Lead (7439-92-1)	
Log Pow	0,73 (Estimated value)
Bioaccumulative potential	Low bioaccumulation potential (Log Kow < 4).

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Effect on ozone layer :

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Dispose in a safe manner in accordance with local/national regulations. Hazardous waste shall not be mixed together with other waste. Different types of hazardous waste shall not be mixed together if this may entail a risk of pollution or create problems for the further management of the waste. Hazardous waste shall be managed responsibly. All entities that store, transport or handle hazardous waste shall take the necessary measures to prevent risks of pollution or damage to people or animals. Reuse or recycle following decontamination. Remove to an authorized dump (Class I). Do not discharge into surface water (2000/60/EC, Council decision 2455/2001/EC, O.J. L331 of 15/12/2001).

Additional information : LWCA (the Netherlands): KGA category 05. Hazardous waste according to Directive 2008/98/EC.

SECTION 14: Transport information

In accordance with DOT

Transport document description : UN3077 Environmentally hazardous substances, solid, n.o.s. Lead(7439-92-1), 9, III

UN-No.(DOT) : UN3077

Proper Shipping Name (DOT) : Environmentally hazardous substances, solid, n.o.s.
Lead(7439-92-1)

Department of Transportation (DOT) Hazard Classes : 9 - Class 9 - Miscellaneous hazardous material 49 CFR 173.140

Hazard labels (DOT) : 9 - Class 9 (Miscellaneous dangerous materials)

DOT Symbols : G - Identifies PSN requiring a technical name

Packing group (DOT) : III - Minor Danger

DOT Special Provisions (49 CFR 172.102)	:	8 - A hazardous substance that is not a hazardous waste may be shipped under the shipping description “Other regulated substances, liquid or solid, n.o.s.”, as appropriate. In addition, for solid materials, special provision B54 applies. 146 - This description may be used for a material that poses a hazard to the environment but does not meet the definition for a hazardous waste or a hazardous substance, as defined in 171.8 of this subchapter, or any hazard class as defined in Part 173 of this subchapter, if it is designated as environmentally hazardous by the Competent Authority of the country of origin, transit or destination. 335 - Mixtures of solids that are not subject to this subchapter and environmentally hazardous liquids or solids may be classified as “Environmentally hazardous substances, solid, n.o.s,” UN3077 and may be transported under this entry, provided there is no free liquid visible at the time the material is loaded or at the time the packaging or transport unit is closed. Each transport unit must be leak-proof when used as bulk packaging. A112 - Notwithstanding the quantity limits shown in Column (9A) and (9B) for this entry, the following IBCs are authorized for transportation aboard passenger and cargo-only aircraft. Each IBC may not exceed a maximum net quantity of 1,000 kg: a. Metal: 11A, 11B, 11N, 21A, 21B and 21N b. Rigid plastics: 11H1, 11H2, 21H1 and 21H2 c. Composite with plastic inner receptacle: 11HZ1, 11HZ2, 21HZ1 and 21HZ2 d. Fiberboard: 11G e. Wooden: 11C, 11D and 11F (with inner liners) f. Flexible: 13H2, 13H3, 13H4, 13H5, 13L2, 13L3, 13L4, 13M1 and 13M2 (flexible IBCs must be sift-proof and water resistant or must be fitted with a sift-proof and water resistant liner). B54 - Open-top, sift-proof rail cars are also authorized. IB8 - Authorized IBCs: Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1 and 31HZ2); Fiberboard (11G); Wooden (11C, 11D and 11F); Flexible (13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 or 13M2). IP3 - Flexible IBCs must be sift-proof and water-resistant or must be fitted with a sift-proof and water-resistant liner. N20 - A 5M1 multi-wall paper bag is authorized if transported in a closed transport vehicle. T1 - 1.5 178.274(d)(2) Normal..... 178.275(d)(2) TP33 - The portable tank instruction assigned for this substance applies for granular and powdered solids and for solids which are filled and discharged at temperatures above their melting point which are cooled and transported as a solid mass. Solid substances transported or offered for transport above their melting point are authorized for transportation in portable tanks conforming to the provisions of portable tank instruction T4 for solid substances of packing group III or T7 for solid substances of packing group II, unless a tank with more stringent requirements for minimum shell thickness, maximum allowable working pressure, pressure-relief devices or bottom outlets are assigned in which case the more stringent tank instruction and special provisions shall apply. Filling limits must be in accordance with portable tank special provision TP3. Solids meeting the definition of an elevated temperature material must be transported in accordance with the applicable requirements of this subchapter.
DOT Packaging Exceptions (49 CFR 173.xxx)	:	155
DOT Packaging Non Bulk (49 CFR 173.xxx)	:	213
DOT Packaging Bulk (49 CFR 173.xxx)	:	240
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	:	No limit
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	:	No limit
DOT Vessel Stowage Location	:	A - The material may be stowed ‘‘on deck’’ or ‘‘under deck’’ on a cargo vessel and on a passenger vessel.

Additional information

Other information	:	No supplementary information available.

ADR

No additional information available

Transport by sea

UN-No. (IMDG)	:	3077
Proper Shipping Name (IMDG)	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
Class (IMDG)	:	9 - Miscellaneous dangerous compounds
Packing group (IMDG)	:	III - substances presenting low danger

Air transport

UN-No.(IATA)	:	3077
Proper Shipping Name (IATA)	:	Environmentally hazardous substance, solid, n.o.s.
Class (IATA)	:	9 - Miscellaneous Dangerous Goods
Packing group (IATA)	:	III - Minor Danger

SECTION 15: Regulatory information

15.1. US Federal regulations

Lead (7439-92-1)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on United States SARA Section 313 Not listed on the United States SARA Section 313	
RQ (Reportable quantity, section 304 of EPA's List of Lists)	10 lb

15.2. International regulations

CANADA
No additional information available

EU-Regulations
No additional information available

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Repr. 1A	H360Df
Acute Tox. 4 (Inhalation)	H332
Acute Tox. 4 (Oral)	H302
STOT RE 2	H373
Aquatic Acute 1	H400
Aquatic Chronic 1	H410

Full text of H-phrases: see section 16

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

Repr.Cat.1; R61
Repr.Cat.3; R62
Xn; R20/22
R33
N; R50/53

Full text of R-phrases: see section 16

15.2.2. National regulations

Lead (7439-92-1)
Listed on IARC (International Agency for Research on Cancer) Listed as carcinogen on NTP (National Toxicology Program)

15.3. US State regulations

No additional information available

SECTION 16: Other information

Revision date	:	12/15/2014

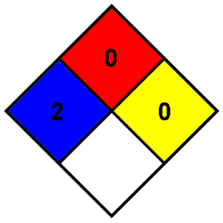
Full text of H-phrases:

Acute Tox. 4 (Inhalation)	Acute toxicity (inhalation) Category 4
Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Aquatic Acute 1	Hazardous to the aquatic environment - Acute Hazard Category 1
Aquatic Chronic 1	Hazardous to the aquatic environment - Chronic Hazard Category 1
Carc. 1B	Carcinogenicity Category 1B
Repr. 1A	Reproductive toxicity Category 1A
STOT RE 2	Specific target organ toxicity (repeated exposure) Category 2
H302	Harmful if swallowed
H332	Harmful if inhaled
H350	May cause cancer
H360	May damage fertility or the unborn child
H373	May cause damage to organs through prolonged or repeated exposure
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects

NFPA health hazard : 2 - Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.

NFPA fire hazard : 0 - Materials that will not burn.

NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating

Health : * Chronic Hazard - Chronic (long-term) health effects may result from repeated overexposure

Flammability : 0 Minimal Hazard

Physical : 0 Minimal Hazard

Personal Protection : B

SDS US (GHS HazCom 2012)

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product

Date of Issue:
19 February 2019

SAFETY DATA SHEET

1. Substance and Source Identification

Product Identifier

SRM Number: 3103a
SRM Name: Arsenic (As) Standard Solution
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is intended for use as a primary calibration standard for the quantitative determination of arsenic. A unit of SRM 3103a consists of five 10 mL sealed borosilicate glass ampoules of an acidified aqueous solution prepared gravimetrically to contain a known mass fraction of arsenic. The solution contains nitric acid at a volume fraction of approximately 10 %, which is equivalent to a concentration (molarity) of approximately 1.6 mol/L.

Company Information

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

Telephone: 301-975-2200
FAX: 301-948-3730
E-mail: SRMMSDS@nist.gov
Website: https://www.nist.gov/srm

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

2. Hazards Identification

Classification

Physical Hazard:	Not classified.	
Health Hazard:	Skin Corrosion/Irritation	Category 1B
	Serious Eye Damage/Irritation	Category 1
	Carcinogenicity	Category 1A

Label Elements

Symbol

Signal Word
DANGER

Hazard Statement(s)

H314	Causes severe skin burns and eye damage.
H350	May cause cancer through inhalation.

Precautionary Statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe fumes, mists, vapors, spray.
P264	Wash hands thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear protective gloves, protective clothing, eye protection.
P301 + P330 + P331	If swallowed: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	If on skin (or hair): Remove immediately all contaminated clothing. Rinse skin with water.
P304 + P340	If inhaled: Remove person to fresh air and keep comfortable for breathing.

P305 + P351 + P338	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a doctor.
P363	Wash contaminated clothing before reuse.
P405	Store locked up.
P501	Dispose of contents and container according to local regulations.

Hazards Not Otherwise Classified: Not applicable.

Ingredients(s) with Unknown Acute Toxicity: Not applicable.

3. Composition and Information on Hazardous Ingredients

Substance: Nitric Acid/Arsenic Acid Solution

Other Designations:

Nitric acid (aqua fortis; hydrogen nitrate; azotic acid; engraver's acid)
Arsenic acid (Arsenate; Orthoarsenic acid; H_3AsO_4)

NOTE: Arsenic in nitric acid solution forms solvated arsenic acid. The health and physical hazard information provided in this SDS are for nitric and arsenic acid. No physical or chemical data are listed for this solution. The actual effects of the solution may differ from the individual components.

Components are listed in compliance with OSHA's 29 CFR 1910.1200; for the actual values see the Certificate of Analysis.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Nitric acid	7697-37-2	231-714-2	10
Arsenic Acid	7778-39-4	231-901-9	1.9
Non-Hazardous Component(s)			
Water	7732-18-5	231-791-2	>88

4. First Aid Measures

Description of First Aid Measures:

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

Skin Contact: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get immediate medical attention. Thoroughly clean and dry contaminated clothing before reuse. Destroy contaminated shoes.

Eye Contact: Immediately flush eyes, including under the eyelids with copious amounts of water for at least 15 minutes. Seek immediate medical attention.

Ingestion: Contact a poison control center immediately for instructions. Do not induce vomiting. Give water to rinse out mouth. Never give liquids to a person with reduced awareness or becoming unconscious. If vomiting occurs, keep head lower than hips to prevent aspiration. If not breathing, give artificial respiration by qualified personnel. Seek immediate medical attention.

Most Important Symptoms/Effects, Acute and Delayed: Acid burns to skin, eyes, and lungs.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present, seek immediate medical attention.

5. Fire Fighting Measures

Fire and Explosion Hazards: Negligible fire hazard. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media:

Suitable: Use extinguishing media appropriate to the surrounding fire.

Unsuitable: None listed.

Specific Hazards Arising from the Chemical: Thermal decomposition will form oxides of nitrogen and arsine.

Special Protective Equipment and Precautions for Fire-Fighters: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA).

NFPA Ratings (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 3 Fire = 0 Reactivity = 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures: Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

Methods and Materials for Containment and Clean up: Do not touch spilled material. Notify safety personnel of spills. Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Isolate hazard area and deny entry.

7. HANDLING AND STORAGE

Safe Handling Precautions: See Section 8, "Exposure Controls and Personal Protection". Handle glass ampoules with care.

Storage: Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances (See Section 10, "Stability and Reactivity").

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:

Component: Nitric acid

NIOSH (REL):	5 mg/m^3 (2 ppm; TWA)
	10 mg/m^3 (4 ppm; STEL)
	65 mg/m^3(25 ppm; IDLH)
ACGIH (TLV):	5 mg/m^3 (2 ppm; TWA)
	10 mg/m^3 (4 ppm; STEL)
OSHA (PEL):	5 mg/m^3 (2 ppm; TWA)

Component: Arsenic acid (as As, related to Arsenic, inorganic compounds)

NIOSH (REL):	0.002 mg/m^3 (15 min, Ceiling)
	5 mg/m^3 (15 min, Ceiling)
ACGIH (TLV):	0.01 mg/m^3 (TWA)
OSHA (PEL):	10 µg/m^3 (cancer hazard, see 29 CFR 1910.1018, except Arsine as As, TWA)
	5 µg/m^3 (Action Level)

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye/Face Protection: Wear splash resistant safety goggles with a face shield. An eyewash station should be readily available near areas of use.

Skin and Body Protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

NOTE: The physical and chemical data provided are for the pure components. No physical or chemical data are available for this solution. The actual behavior of the solution may differ from the individual components.

Descriptive Properties:	**Nitric acid (10 % of this SRM)**	**Arsenic Acid (1.9 % of this SRM)**
Appearance (physical state, color, etc.):	colorless to yellow liquid	colorless or white solid
Molecular Formula:	HNO_3	H_3AsO_4
Molar Mass (g/mol):	63.01	141.95
Odor:	irritating odor	odorless
Odor threshold:	not available	not available
pH:	1 (1 M)	not available
Evaporation rate:	not available	not available
Melting point/freezing point (ºC):	–42 (–43 ºF)	96 (205 ºF)

Descriptive Properties:	Nitric acid (10 % of this SRM)	Arsenic Acid (1.9 % of this SRM)
Relative Density (g/L) as specific gravity (water = 1):	1.5027 at 25 ºC	2.2
Vapor Pressure (mmHg):	47.9 at 20 ºC	not available
Vapor Density (air = 1):	3.2	not available
Viscosity (cP):	not available	not available
Solubility(ies):	miscible with water and ether	soluble in water, alcohol and glycerol
Partition coefficient (n-octanol/water):	not available	not available
Thermal Stability Properties:		
Autoignition Temperature (ºC):	not applicable	not applicable
Thermal Decomposition (ºC):	not applicable	not available
Initial boiling point and boiling range (ºC):	83 (181 ºF)	not available
Explosive Limits, LEL (Volume %):	not applicable	not available
Explosive Limits, UEL (Volume %):	not applicable	not available
Flash Point (ºC):	not applicable	not available
Flammability (solid, gas):	not applicable	not available

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: X Stable ____ Unstable

Possible Hazardous Reactions: None listed.

Conditions to Avoid: Contact with combustible or incompatible materials.

Incompatible Materials: Incompatible with acids, combustible materials, halo carbons, amines, bases, oxidizing materials, metals, halogens, metal salts, metal oxides, reducing agents, peroxides, metal carbide, and cyanides.

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

Hazardous Decomposition: Thermal decomposition will produce oxides of nitrogen and arsenic.

Hazardous Polymerization: ____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: X Inhalation X Skin X Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Burning pain and severe skin corrosion, eye, lung, and blood damage, and cancer.

Potential Health Effects (Acute, Chronic and Delayed):

Inhalation: Inhalation of nitric acid can damage the mucous membranes and upper respiratory tract. Short term exposure may cause irritation and inflammation of the upper respiratory tract, coughing, choking, sore throat, shortness of breath, headache, dizziness, and nausea. Long term exposure to acid fumes may cause damage to teeth, bronchial irritation, chronic cough, bronchial pneumonia, and gastrointestinal disturbances. Arsenic inorganic compounds may cause foamy sputum.

Skin Contact: Nitric acid can cause severe skin burns. Severity of the damage depends on the concentration and duration of exposure. Effects of acid burns may be delayed. Short term contact with arsenic inorganic compounds can cause irritation and may cause sensitization.

Eye Contact: Nitric acid and arsenic inorganic compounds can cause severe eye irritation, corneal burns, permanent eye damage, or blindness. Severity of the damage depends on the concentration and duration of exposure.

Ingestion: Ingestion of this material is unlikely under normal conditions of use. If ingested, nitric acid can cause severe burns and damage to the gastrointestinal tract. Acute ingestion of low levels of arsenic inorganic compounds can cause tearing, diarrhea, bluish skin color, kidney damage, liver damage, and death. Chronic ingestion may have the same effects and may also cause cancer.

Numerical Measures of Toxicity:

Acute Toxicity: Not classified.

Nitric acid, Rat, Inhalation LC50: 130 mg/m^3 (4 h)

Arsenic acid, Rat, Oral LD50: 48 mg/kg

Skin Corrosion/Irritation: This SRM contains >1 % of nitric acid and it is classified as Category 1B.

Serious Eye Damage/Irritation: This SRM contains >1 % nitric acid and it is classified as Category 1.

Respiratory Sensitization: No data available; not classified.

Skin Sensitization: No data available; not classified.

Germ Cell Mutagenicity: No data available; not classified.

Carcinogenicity: Category 1A.

Listed as a Carcinogen/Potential Carcinogen X Yes ____ No

Nitric acid is not listed by NTP, IARC or OSHA as a carcinogen.

NTP lists Arsenic (inorganic compounds) as known human carcinogen. IARC Monograph 84 (2004) lists arsenic in Group 1 (carcinogenic to humans). OSHA lists inorganic arsenic as a designated carcinogen.

Reproductive Toxicity: Not classified.

Nitric acid, Rat, Oral TDLo: 21 150 mg/kg (pregnant 1 d to 21 d)
Nitric acid, Rat, Oral TDLo: 2345 mg/kg (pregnant 18 d)
Arsenic acid: Rat, Oral TDLo: 120 mg/kg (pregnant 7 to 15 d)

Specific Target Organ Toxicity, Single Exposure: No data available; not classified.

Specific Target Organ Toxicity, Repeated Exposure: No data available; not classified.

Aspiration Hazard: No data available; not classified.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data:

Nitric acid: Starfish (*Asterias rubens*) LC50: 100 mg/L – 300 mg/L (renewal/aerated water, 48 h)
Arsenic acid: Fathead minnow (*Pimephales promelas*) LC50: 25.6 mg/L (96 h)
Bluegill (*Lepomis macrochirus*) LC50: 39 mg/L – 110 mg/L (static, 96 h)
Bluegill (*Lepomis macrochirus*) LC50: 43 mg/L – 59 mg/L (flow-through, 96 h)

Persistence and Degradability: No data available.

Bioaccumulative Potential: No data available.

Mobility in Soil: No data available.

Other Adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of waste in accordance with all applicable federal, state, and local regulations.
Nitric acid and arsenic acid subject to disposal regulations: U.S. EPA 40 CFR 262.

Nitric acid Hazardous Waste Numbers: D001, D002.

Arsenic acid Hazardous Waste Numbers: P010, D004. Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above the Regulatory level (5.0 mg/L).

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: UN1760, Corrosive liquid, n.o.s. (contains nitric acid), Hazard Class 8, Packing Group II, Excepted Quantities E2.

15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): Nitric acid, 1000 lbs (454 kg) RQ;
Arsenic acid, 1 lb (0.454 kg) RQ
SARA Title III Section 302 (40 CFR 355.30): Nitric acid, 1000 lbs (454 kg) TPQ
SARA Title III Section 304 (40 CFR 355.40): Nitric acid, 1000 lbs (454 kg) EPCRA RQ
SARA Title III Section 313 (40 CFR 372.65): Nitric acid, 1 % de minimis concentration;
Arsenic acid, 0.1 % de minimis concentration (related to Arsenic inorganic compounds)
OSHA Process Safety (29 CFR 1910.119): Nitric acid, higher concentrations 500 lbs TQ (≥94.5 % by weight)

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH:	Yes.
CHRONIC HEALTH:	Yes.
FIRE:	No.
REACTIVE:	No.
PRESSURE:	No.

State Regulations:

California Proposition 65: WARNING! This product contains a chemical known (arsenic inorganic compounds) to the state of California to cause cancer.

U.S. TSCA Inventory: Nitric acid and arsenic acid are listed.

TSCA 12(b), Export Notification: Not listed.

Canadian Regulations: WHMIS Information is not provided for this material.

16. OTHER INFORMATION

Issue Date: 19 February 2019

Sources: ChemAdvisor, Inc., SDS *Nitric Acid*, 22 September 2015.

ChemAdvisor, Inc., SDS *Arsenic Acid*, 09 December 2015.

CDC; NIOSH; *NIOSH Pocket Guide to Chemical Hazards*; Department of Health and Human Services (DHHS), Centers for Disease Control and Prevention (CDC), National Institute for Safety and Health; *Nitric Acid*, 13 February 2015; available at https://www.cdc.gov/niosh/npg/npgd0447.html (accessed Feb 2019).

Hazardous Substances Data Bank (HSDB), National Library of Medicine's TOXNET system, *Nitric Acid CAS No. 7697-37-2*; available at https://toxnet.nlm.nih.gov (accessed Feb 2019).

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NRC	Nuclear Regulatory Commission
ALI	Annual Limit on Intake	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EC50	Effective Concentration, 50%	RM	Reference Material
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transport Association	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
LC50	Lethal Concentration, 50 %	STEL	Short Term Exposure Limit
LD50	Lethal Dose, 50 %	TLV	Threshold Limit Value
LEL	Lower Explosive Limit	TPQ	Threshold Planning Quantity
MSDS	Material Safety Data Sheet	TSCA	Toxic Substances Control Act
NFPA	National Fire Protection Association	TWA	Time Weighted Average
NIOSH	National Institute for Occupational Safety and Health	UEL	Upper Explosive Limit
NIST	National Institute of Standards and Technology	WHMIS	Workplace Hazardous Materials Information System
n.o.s.	Not Otherwise Specified		

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

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srmmsds@nist.gov; or via the Internet at https://www.nist.gov/srm.

Date of Issue:
19 February 2019

SAFETY DATA SHEET

1. Substance and Source Identification

Product Identifier

SRM Number: 3103a
SRM Name: Arsenic (As) Standard Solution
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is intended for use as a primary calibration standard for the quantitative determination of arsenic. A unit of SRM 3103a consists of five 10 mL sealed borosilicate glass ampoules of an acidified aqueous solution prepared gravimetrically to contain a known mass fraction of arsenic. The solution contains nitric acid at a volume fraction of approximately 10 %, which is equivalent to a concentration (molarity) of approximately 1.6 mol/L.

Company Information

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

Telephone: 301-975-2200
FAX: 301-948-3730
E-mail: SRMMSDS@nist.gov
Website: https://www.nist.gov/srm

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

2. Hazards Identification

Classification

Physical Hazard:	Not classified.	
Health Hazard:	Skin Corrosion/Irritation	Category 1B
	Serious Eye Damage/Irritation	Category 1
	Carcinogenicity	Category 1A

Label Elements

Symbol

Signal Word
DANGER

Hazard Statement(s)

H314	Causes severe skin burns and eye damage.
H350	May cause cancer through inhalation.

Precautionary Statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe fumes, mists, vapors, spray.
P264	Wash hands thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear protective gloves, protective clothing, eye protection.
P301 + P330 + P331	If swallowed: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	If on skin (or hair): Remove immediately all contaminated clothing. Rinse skin with water.
P304 + P340	If inhaled: Remove person to fresh air and keep comfortable for breathing.

P305 + P351 + P338	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a doctor.
P363	Wash contaminated clothing before reuse.
P405	Store locked up.
P501	Dispose of contents and container according to local regulations.

Hazards Not Otherwise Classified: Not applicable.

Ingredients(s) with Unknown Acute Toxicity: Not applicable.

3. Composition and Information on Hazardous Ingredients

Substance: Nitric Acid/Arsenic Acid Solution

Other Designations:

Nitric acid (aqua fortis; hydrogen nitrate; azotic acid; engraver's acid)
Arsenic acid (Arsenate; Orthoarsenic acid; H_3AsO_4)

NOTE: Arsenic in nitric acid solution forms solvated arsenic acid. The health and physical hazard information provided in this SDS are for nitric and arsenic acid. No physical or chemical data are listed for this solution. The actual effects of the solution may differ from the individual components.

Components are listed in compliance with OSHA's 29 CFR 1910.1200; for the actual values see the Certificate of Analysis.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Nitric acid	7697-37-2	231-714-2	10
Arsenic Acid	7778-39-4	231-901-9	1.9
Non-Hazardous Component(s)			
Water	7732-18-5	231-791-2	>88

4. First Aid Measures

Description of First Aid Measures:

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

Skin Contact: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get immediate medical attention. Thoroughly clean and dry contaminated clothing before reuse. Destroy contaminated shoes.

Eye Contact: Immediately flush eyes, including under the eyelids with copious amounts of water for at least 15 minutes. Seek immediate medical attention.

Ingestion: Contact a poison control center immediately for instructions. Do not induce vomiting. Give water to rinse out mouth. Never give liquids to a person with reduced awareness or becoming unconscious. If vomiting occurs, keep head lower than hips to prevent aspiration. If not breathing, give artificial respiration by qualified personnel. Seek immediate medical attention.

Most Important Symptoms/Effects, Acute and Delayed: Acid burns to skin, eyes, and lungs.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present, seek immediate medical attention.

5. Fire Fighting Measures

Fire and Explosion Hazards: Negligible fire hazard. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media:

Suitable: Use extinguishing media appropriate to the surrounding fire.

Unsuitable: None listed.

Specific Hazards Arising from the Chemical: Thermal decomposition will form oxides of nitrogen and arsine.

Special Protective Equipment and Precautions for Fire-Fighters: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA).

NFPA Ratings (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 3 Fire = 0 Reactivity = 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures: Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

Methods and Materials for Containment and Clean up: Do not touch spilled material. Notify safety personnel of spills. Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Isolate hazard area and deny entry.

7. HANDLING AND STORAGE

Safe Handling Precautions: See Section 8, "Exposure Controls and Personal Protection". Handle glass ampoules with care.

Storage: Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances (See Section 10, "Stability and Reactivity").

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:

Component: Nitric acid

NIOSH (REL):	5 mg/m^3 (2 ppm; TWA)
	10 mg/m^3 (4 ppm; STEL)
	65 mg/m^3(25 ppm; IDLH)
ACGIH (TLV):	5 mg/m^3 (2 ppm; TWA)
	10 mg/m^3 (4 ppm; STEL)
OSHA (PEL):	5 mg/m^3 (2 ppm; TWA)

Component: Arsenic acid (as As, related to Arsenic, inorganic compounds)

NIOSH (REL):	0.002 mg/m^3 (15 min, Ceiling)
	5 mg/m^3 (15 min, Ceiling)
ACGIH (TLV):	0.01 mg/m^3 (TWA)
OSHA (PEL):	10 µg/m^3 (cancer hazard, see 29 CFR 1910.1018, except Arsine as As, TWA)
	5 µg/m^3 (Action Level)

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye/Face Protection: Wear splash resistant safety goggles with a face shield. An eyewash station should be readily available near areas of use.

Skin and Body Protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

NOTE: The physical and chemical data provided are for the pure components. No physical or chemical data are available for this solution. The actual behavior of the solution may differ from the individual components.

Descriptive Properties:	**Nitric acid (10 % of this SRM)**	**Arsenic Acid (1.9 % of this SRM)**
Appearance (physical state, color, etc.):	colorless to yellow liquid	colorless or white solid
Molecular Formula:	HNO_3	H_3AsO_4
Molar Mass (g/mol):	63.01	141.95
Odor:	irritating odor	odorless
Odor threshold:	not available	not available
pH:	1 (1 M)	not available
Evaporation rate:	not available	not available
Melting point/freezing point (ºC):	–42 (–43 ºF)	96 (205 ºF)

Descriptive Properties:	Nitric acid (10 % of this SRM)	Arsenic Acid (1.9 % of this SRM)
Relative Density (g/L) as specific gravity (water = 1):	1.5027 at 25 ºC	2.2
Vapor Pressure (mmHg):	47.9 at 20 ºC	not available
Vapor Density (air = 1):	3.2	not available
Viscosity (cP):	not available	not available
Solubility(ies):	miscible with water and ether	soluble in water, alcohol and glycerol
Partition coefficient (n-octanol/water):	not available	not available
Thermal Stability Properties:		
Autoignition Temperature (ºC):	not applicable	not applicable
Thermal Decomposition (ºC):	not applicable	not available
Initial boiling point and boiling range (ºC):	83 (181 ºF)	not available
Explosive Limits, LEL (Volume %):	not applicable	not available
Explosive Limits, UEL (Volume %):	not applicable	not available
Flash Point (ºC):	not applicable	not available
Flammability (solid, gas):	not applicable	not available

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: X Stable ____ Unstable

Possible Hazardous Reactions: None listed.

Conditions to Avoid: Contact with combustible or incompatible materials.

Incompatible Materials: Incompatible with acids, combustible materials, halo carbons, amines, bases, oxidizing materials, metals, halogens, metal salts, metal oxides, reducing agents, peroxides, metal carbide, and cyanides.

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

Hazardous Decomposition: Thermal decomposition will produce oxides of nitrogen and arsenic.

Hazardous Polymerization: ____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: X Inhalation X Skin X Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Burning pain and severe skin corrosion, eye, lung, and blood damage, and cancer.

Potential Health Effects (Acute, Chronic and Delayed):

Inhalation: Inhalation of nitric acid can damage the mucous membranes and upper respiratory tract. Short term exposure may cause irritation and inflammation of the upper respiratory tract, coughing, choking, sore throat, shortness of breath, headache, dizziness, and nausea. Long term exposure to acid fumes may cause damage to teeth, bronchial irritation, chronic cough, bronchial pneumonia, and gastrointestinal disturbances. Arsenic inorganic compounds may cause foamy sputum.

Skin Contact: Nitric acid can cause severe skin burns. Severity of the damage depends on the concentration and duration of exposure. Effects of acid burns may be delayed. Short term contact with arsenic inorganic compounds can cause irritation and may cause sensitization.

Eye Contact: Nitric acid and arsenic inorganic compounds can cause severe eye irritation, corneal burns, permanent eye damage, or blindness. Severity of the damage depends on the concentration and duration of exposure.

Ingestion: Ingestion of this material is unlikely under normal conditions of use. If ingested, nitric acid can cause severe burns and damage to the gastrointestinal tract. Acute ingestion of low levels of arsenic inorganic compounds can cause tearing, diarrhea, bluish skin color, kidney damage, liver damage, and death. Chronic ingestion may have the same effects and may also cause cancer.

Numerical Measures of Toxicity:

Acute Toxicity: Not classified.

Nitric acid, Rat, Inhalation LC50: 130 mg/m^3 (4 h)

Arsenic acid, Rat, Oral LD50: 48 mg/kg

Skin Corrosion/Irritation: This SRM contains >1 % of nitric acid and it is classified as Category 1B.

Serious Eye Damage/Irritation: This SRM contains >1 % nitric acid and it is classified as Category 1.

Respiratory Sensitization: No data available; not classified.

Skin Sensitization: No data available; not classified.

Germ Cell Mutagenicity: No data available; not classified.

Carcinogenicity: Category 1A.

Listed as a Carcinogen/Potential Carcinogen X Yes ____ No

Nitric acid is not listed by NTP, IARC or OSHA as a carcinogen.

NTP lists Arsenic (inorganic compounds) as known human carcinogen. IARC Monograph 84 (2004) lists arsenic in Group 1 (carcinogenic to humans). OSHA lists inorganic arsenic as a designated carcinogen.

Reproductive Toxicity: Not classified.

Nitric acid, Rat, Oral TDLo: 21 150 mg/kg (pregnant 1 d to 21 d)
Nitric acid, Rat, Oral TDLo: 2345 mg/kg (pregnant 18 d)
Arsenic acid: Rat, Oral TDLo: 120 mg/kg (pregnant 7 to 15 d)

Specific Target Organ Toxicity, Single Exposure: No data available; not classified.

Specific Target Organ Toxicity, Repeated Exposure: No data available; not classified.

Aspiration Hazard: No data available; not classified.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data:

Nitric acid: Starfish (*Asterias rubens*) LC50: 100 mg/L – 300 mg/L (renewal/aerated water, 48 h)
Arsenic acid: Fathead minnow (*Pimephales promelas*) LC50: 25.6 mg/L (96 h)
Bluegill (*Lepomis macrochirus*) LC50: 39 mg/L – 110 mg/L (static, 96 h)
Bluegill (*Lepomis macrochirus*) LC50: 43 mg/L – 59 mg/L (flow-through, 96 h)

Persistence and Degradability: No data available.

Bioaccumulative Potential: No data available.

Mobility in Soil: No data available.

Other Adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of waste in accordance with all applicable federal, state, and local regulations.
Nitric acid and arsenic acid subject to disposal regulations: U.S. EPA 40 CFR 262.

Nitric acid Hazardous Waste Numbers: D001, D002.

Arsenic acid Hazardous Waste Numbers: P010, D004. Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above the Regulatory level (5.0 mg/L).

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: UN1760, Corrosive liquid, n.o.s. (contains nitric acid), Hazard Class 8, Packing Group II, Excepted Quantities E2.

15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): Nitric acid, 1000 lbs (454 kg) RQ;
Arsenic acid, 1 lb (0.454 kg) RQ
SARA Title III Section 302 (40 CFR 355.30): Nitric acid, 1000 lbs (454 kg) TPQ
SARA Title III Section 304 (40 CFR 355.40): Nitric acid, 1000 lbs (454 kg) EPCRA RQ
SARA Title III Section 313 (40 CFR 372.65): Nitric acid, 1 % de minimis concentration;
Arsenic acid, 0.1 % de minimis concentration (related to Arsenic inorganic compounds)
OSHA Process Safety (29 CFR 1910.119): Nitric acid, higher concentrations 500 lbs TQ (≥94.5 % by weight)

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH:	Yes.
CHRONIC HEALTH:	Yes.
FIRE:	No.
REACTIVE:	No.
PRESSURE:	No.

State Regulations:

California Proposition 65: WARNING! This product contains a chemical known (arsenic inorganic compounds) to the state of California to cause cancer.

U.S. TSCA Inventory: Nitric acid and arsenic acid are listed.

TSCA 12(b), Export Notification: Not listed.

Canadian Regulations: WHMIS Information is not provided for this material.

16. OTHER INFORMATION

Issue Date: 19 February 2019

Sources: ChemAdvisor, Inc., SDS *Nitric Acid*, 22 September 2015.

ChemAdvisor, Inc., SDS *Arsenic Acid*, 09 December 2015.

CDC; NIOSH; *NIOSH Pocket Guide to Chemical Hazards*; Department of Health and Human Services (DHHS), Centers for Disease Control and Prevention (CDC), National Institute for Safety and Health; *Nitric Acid*, 13 February 2015; available at https://www.cdc.gov/niosh/npg/npgd0447.html (accessed Feb 2019).

Hazardous Substances Data Bank (HSDB), National Library of Medicine's TOXNET system, *Nitric Acid CAS No. 7697-37-2*; available at https://toxnet.nlm.nih.gov (accessed Feb 2019).

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NRC	Nuclear Regulatory Commission
ALI	Annual Limit on Intake	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EC50	Effective Concentration, 50%	RM	Reference Material
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transport Association	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
LC50	Lethal Concentration, 50 %	STEL	Short Term Exposure Limit
LD50	Lethal Dose, 50 %	TLV	Threshold Limit Value
LEL	Lower Explosive Limit	TPQ	Threshold Planning Quantity
MSDS	Material Safety Data Sheet	TSCA	Toxic Substances Control Act
NFPA	National Fire Protection Association	TWA	Time Weighted Average
NIOSH	National Institute for Occupational Safety and Health	UEL	Upper Explosive Limit
NIST	National Institute of Standards and Technology	WHMIS	Workplace Hazardous Materials Information System
n.o.s.	Not Otherwise Specified		

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

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srmmsds@nist.gov; or via the Internet at https://www.nist.gov/srm.

APPENDIX C

List of Approved Amendments/Changes

HASP Acknowledgement/Agreement Form

Visitors Log

Tailgate Safety Meeting Form

Air Quality Monitoring Record

Equipment Calibration Log

HEALTH AND SAFETY PLAN (HASP)

List of Approved Amendments/Changes

Date	Name	Signature	Changes/Comments	Section Added

HEALTH AND SAFETY PLAN (HASP)

Acknowledgement/Agreement Form

(All Atlas, Subcontractor & Client Personnel Must Sign)

Client site Name: _____ Project site No: _____

Atlas Project No.: _____ Task No: _____

I acknowledge I have reviewed a copy of the Health and Safety Plan for this project, understand it, and agree to comply with all of its provisions. I also understand I could be prohibited by the site Health and Safety Coordinator or other Atlas personnel from working on this project for not complying with any aspect of this Health and Safety Plan:

PRINT NAME	SIGNATURE	COMPANY	DATE

Visitors Log

Client site Name: _____ **Project Site #:** _____

Atlas Project #: _____**Task #:** _____

PRINT NAME	SIGNATURE	COMPANY	DATE

Tailgate Safety Meeting Form

Site Name & Number: _____

Atlas Project Number: _____

Work Being Performed: _____

Date & Time of Meeting: _____

Name of Presenter: _____

NOTE: On the initial day of the project, the Project Manager or designee should conduct a visual inspection of the project site prior to the Tailgate Safety Meeting. This inspection should include a review of project site equipment, hazards, specific job tasks, activities or operations to be performed for that day. These specific items must be covered during the Tailgate Safety Meeting. For subsequent days, any changes to the site or operations must be covered in the Tailgate Safety Meeting. In addition, "Task-Specific" Job Safety Analysis (JSA) for the tasks/activities at the project site must be integrated into the HASP and Tailgate discussions. Tailgate Meetings should be performed each day. Employees, client representatives and subcontractors must review the Tailgate Safety Meeting, be briefed on the topics and acknowledge the HSE topics by signing this form. Individuals not fluent in the English language must have the site's health safety and environmental requirements translated to them.

Itemize the Specific Topics Discussed (if more space is needed use the back of this page):

☐ Emergency Evacuation area(s) ☐ Eye Wash / First Aid Kit / Fire Extinguisher ☐ HASP Location ☐ Hospital Route

5 KEY SAFETY CONCEPTS -

☐ **How is everyone feeling?** (Get a response) **Is everyone Rested & Mentally alert?** FOCUS IS KEY to staying injury free.

☐ **Watch out for & Coach your Coworkers** (COMMUNICATE HAZARDS when recognized).

☐ **No Improvising** – Use the proper tool for the job (Stop and Discuss ANY variance with Atlas)

☐ **No Willful Unsafe Acts** – Enjoy the day, but no horseplay or anything unsafe.

☐ **Everyone has STOP WORK authority** – USE IT whenever people aren't focused, for all near-misses and hazards.

☐ PPE is required at all times within Exclusion zone (Set the example, call out non-compliance/stop work). ☐ Proper PPE? (check)

☐ 50 lbs. or awkward, get lifting help. ☐ Eating, Drinking and use of Cell Phones in Designated Area Only.

☐ Spotters Needed for Backing Equipment. ☐ We will follow the Safe Work Plan for the work and initial each page. Major changes will need official approvals through Mark Wallinga and Jenn Williams. ☐ Use 3 part communication as we work today

☐ Caution crossing street (Use crosswalks - HAZARDS ARE HIGH). ☐ Today's Weather _____, Drink Fluids!

☐ Caution dealing with public (Irate/unstable pedestrians, customers, locals. Be aware, be courteous, don't antagonize).

☐ Keep Emotions in check. Communicate, Take Breaks when stressed, pushed, tired, not focused! (5 minute break or job shut down?)

☐ Maintain Housekeeping ☐ No FOBKs (**What else? Are there other items we haven't considered?)**

☐ **Subcontractor** – Discuss scope of work, JSA, Daily Tasks (What are we doing? What are the Hazards? What could go wrong?)

☐ JSA Reviewed? ☐ Changes to task? Get approval first. Use the GO-CARD. Contact supervisor if solutions are clear.

☐ Headcount? _____ (First time employees onsite [Sign HASP, PPE check, discuss site specifics and client expectations]).

☐ Any Shared Learning? (Site's SIRs/Hazards) ☐ Equipment Inspections ☐ Communication & Focus is Key.

☐ Everyone needs to sign the following documents: HASP, JSA and Tailgate Safety Meeting Form. ☐ Recognition to employees –if you see something, say something!

❑ **Client Requirements** - By checking the box to the left, the presenter of the Tailgate Meeting acknowledges that all client-specific requirements have been completed for both Atlas and Subcontractor employees.

***List the JSAs reviewed below. *What extra hazards are present on this site on this day?**

JSA:			

***Continued on next page.*

Tailgate Safety Meeting Form (Pg. 2)

JSAs Reviewed and Modification Documentation (If modification not required please note):

***By signing this Tailgate Safety Meeting form, you are acknowledging that you have read, reviewed and understand the health and safety topics discussed on this form.**

Daily Safety Tailgate Meeting Participants (Use the back of this form if needed)			
Print Name	**Signature**	**Company**	**Date**

***Tailgate Presenter must sign below that all information above was covered with all personnel on site.**

Print Name	Signature	Company	Date

Air Quality Monitoring Record

Date	Time	Location	Instrument	Concentration (Units)	Sampled By

APPENDIX E

Typical Waste Profile Requirements, Offsite Storage Form

Special Waste Characterization Profile

I. Requested Facility *Choose all that apply*

- ☐ **Massachusetts:** Southbridge (Southbridge, MA)
- ☐ **Maine:** Hawk Ridge (Unity, ME)
- ☐ **Maine:** Juniper Ridge (Old Town, ME)
- ☐ **New Hampshire:** NCES (Bethlehem, NH)
- ☐ **Pennsylvania:** McKean (Mt. Jewett, PA)
- ☐ **Vermont:** NEWSVT (Coventry, VT)
- ☐ **New York:** Chemung County (Lowman, NY)
- ☐ **New York:** Clinton County (Morrisonville, NY)
- ☐ **New York:** Grasslands (Chateaugay, NY)
- ☐ **New York:** Hyland (Angelica, NY)
- ☐ **New York:** Ontario County (Stanley, NY)
- ☐ **Other:** _____

II. Generator

Name: _____

Mailing Address: _____

City: _____ State: _____ ZIP Code: _____

Contact Name: _____ Title: _____

Phone: _____ Fax: _____ Email: _____

III. Bill To Customer ☐ *Same as Generator above*

Company Name: _____

Billing Address: _____

City: _____ State: _____ ZIP Code: _____

Contact Name: _____ Title: _____

Phone: _____ Fax: _____ Email: _____

IV. Consultant/Representative

Company Name: _____

Contact Name: _____ Title: _____

Phone: _____ Fax: _____ Email: _____

V. Delivery and Quantity ☐ ***One-Time Event*** *or* ☐ ***On-Going (Annually)***

Amount to Be Delivered (Estimated): _____ ☐ Tons ☐ Cubic Yards ☐ Other: _____

Density of Waste (Approximate): _____ Pounds/Cubic Yard

Delivery Vehicle: ☐ Roll-off ☐ Packer Truck ☐ Tractor Trailer ☐ Vac Truck ☐ Other: _____

Hauler Name: _____

Mailing Address: _____ Phone: _____

Transporter Permit #: _____ (for State of Disposal)

Previous Disposal Facility (Name): _____

Application Was Submitted to/Approved by Another Disposal Facility (Name): _____

VI. Waste Stream Information

Common Waste Name: _____

Location or Address of Waste Generation Site: _____

City: _____ State: _____ ZIP Code: _____ County: _____

Site Type: ☐ Industrial/Manufacturing ☐ Commercial ☐ Residential
☐ Institutional ☐ Municipal ☐ Other: _____

a. Waste Generation Process ☐ *Check if detailed Process Description is attached as a separate document*

Describe the site and waste generating process. Please be as detailed as possible. Include a process flow diagram if available.

b. Waste Description ☐ *Check if detailed Waste Description is attached as a separate document*

Describe the source of contaminants and materials used to generate the waste. Please be as specific and detailed as possible.

Describe all hazardous or nuisance properties associated with the waste:

Describe any special handling or disposal procedures:

Consistency at 70°F: ☐ Solid; ☐ Semi-Solid; ☐ Sludge; ☐ Liquid; ☐ Powder; ☐ Other _____

Ignitable (per 40 CFR 261.21): ☐ Yes ☐ No

Reactive (per 40 CFR 261.23): ☐ Yes ☐ No

Free Liquids: ☐ Yes ☐ No

% Solids: _____

Odor: _____

pH Range: _____

Is the waste an EPA listed hazardous waste under 40 CFR 261? ☐ Yes ☐ No

Is the waste non-hazardous waste from a CERCLA site? ☐ Yes ☐ No

Is the waste considered hazardous in the state of origin or the state of disposal? ☐ Yes ☐ No

Is the waste a treated hazardous waste, a de-listed hazardous waste or subject to land disposal restrictions (LDR) under 40 CFR 268, Subpart D? ☐ Yes ☐ No

c. Analytical Data

*At a minimum, full RCRA waste characterization analysis is required (§ 40 CFR 261) unless the applicant provides acceptable justification for submittal of less comprehensive data. The **generator** is responsible for proper waste characterization.*

Is representative waste characterization analysis attached?

☐ Yes → Please complete Appendix A of profile form.

☐ No → Please provide detailed explanation supporting the use of generator knowledge in lieu of analysis:

VII. Generator Certification

I hereby certify that (1) I am the duly authorized representative of the generator; (2) all information submitted on this form and on supplemental materials is true and accurate; (3) the information provided herein, including any supplemental information, such as laboratory analytical, SDS, etc., accurately describes the waste stream to be delivered to the facility and that all known or suspected hazards have been disclosed; (4) Casella can contact the laboratory directly to discuss our attached waste stream. I understand that once the waste stream is approved by Casella based on this information, any deviation in the source, composition, constituents or characteristics of the waste stream from the information described herein, may render the waste stream unacceptable for disposal, at the sole discretion of Casella. I further understand that any deviation from the information contained herein will require immediate notification to the disposal facility and cessation of disposal.

Signature (Generator): _____

Name (Print): _____ Company: _____

Title: _____ Date: _____

Appendix A

Additional Waste Stream Information

It is the Generator's responsibility to properly characterize the waste and demonstrate it is classified as non-hazardous by State and Federal regulations.

1. Samples

Samples collected and analyzed for waste characterization should be done in accordance with the EPA SW-846 Guidance Document and most recent approved EPA Method(s) for solid wastes.

Number of Samples: ____ Grab ____ Composite

Sample Source: ____ Boring(s) ____ Test Pit(s) ____ Stockpiles(s) ____ Core ____ Container

Soil/remediation projects must include a site map indicating area of excavation and sample locations.

2. Analysis

Please indicate all chemical analysis provided to support waste characterization. All testing must be performed by a laboratory certified in the State the waste is to be disposed in, where applicable.

Laboratory Name: _____ Laboratory Accreditation #: _____

Applicable Laboratory Report ID #'s: _____

Minimum Requirements

- ☐ TCLP RCRA 8 Metals
- ☐ TCLP Volatile Organic Compounds (VOCs)
- ☐ TCLP Semi-Volatile Organic Compounds (SVOCs)
- ☐ TCLP Herbicides
- ☐ TCLP Pesticides
- ☐ Reactive Sulfide
- ☐ Reactive Cyanide
- ☐ Total PCBs
- ☐ % Solids (Moisture Content)
- ☐ Free Liquids (Paint Filter)
- ☐ Corrosivity by pH
- ☐ Ignitability / Flashpoint

Additional Requirements

- ☐ Total TPH [1]
- ☐ Total PAH's [1]
- ☐ Total Organic Halogens (TOX)
- ☐ Total BTEX
- ☐ TCLP Copper [2]
- ☐ TCLP Nickel [2]
- ☐ TCLP Zinc [2]
- ☐ TCLP Vanadium [3]
- ☐ Total Sulfur/Sulfate
- ☐ TCLP PCBs
- ☐ Total Dioxins & Furans

Total Analysis AND Water Leaching Procedure (ASTM) Method D3987

- ☐ COD [2]
- ☐ Total Solids [2]
- ☐ Total Volatile Solids [2]
- ☐ Oil and Grease or Petroleum Hydrocarbons [2]
- ☐ Ammonia-Nitrogen [2]

Other

- ☐ Radiological analysis: U-238, RA-226, RA-228, TH-232, and K-40 by EPA test procedure 901.1 dry weight analysis expressed in pCi/g.
- ☐ Gamma field scans on the material and expressed in uR/hr or uRem/hr.
- ☐ Safety Data Sheets (SDS)
- ☐ Other_____

3. Generator Knowledge Statement

If the chemical analysis provided does not meet the minimum requirements, please provide an analysis waiver request with justification based on generator's knowledge of the process generating the waste.

1 VT only
2 PA only
3 ME only

VERMONT

AGENCY OF NATURAL RESOURCES

State of Vermont
Department of Environmental Conservation
Waste Management & Prevention Division
1 National Life Drive – Davis 1
Montpelier, VT 05620-3704
(802) 828-1138

MANAGEMENT OF NON-HAZARDOUS CONTAMINATED SOIL REQUEST FORM
July 2021

This form is to be used to assist in the compliance with the Investigation and Remediation of Contaminated Properties Rule (IRule) §35-803. This form takes the place of the ANR Off-site Soil Treatment Form and is to be used for the movement, stockpiling, treatment, or disposal of non-hazardous contaminated soils, both on-site and off-site. This form should be included with Soil Management Plans and Corrective Action Plans, as applicable. DEC Site Manager approval must be received, as signified by signature in Section 4, prior to the initiation of soil management work.

Section 1. General Information

Soil Source Site Name: _____

Address: _____

Facility ID#: _____and/or **Spill #**: _____and/or **SMS Site #**: _____

Will soils be temporarily stockpiled on-site or off-site for more than 90 days or between December 1st and April 1st?
__**Yes** ___**No** **if Yes, date range**: _____ to _____.

Disposal Facility: _____

Quantity of Soils: _____ cubic yards

Soil Contaminants: _____

Check proposed soil management scenario below:

- ☐ Soil will be live loaded and transported to disposal facility. **If yes, skip to Section 4.**
- ☐ Soil to be temporarily stored on/off site, then transported to disposal facility. **If yes, complete entire form**.
- ☐ Soil is Staying On-Site for Treatment. **If yes, complete entire form**.
- ☐ Soil is Destined for Off-Site Stockpile, Management and Treatment. **If yes, complete entire form.**

Section 2. Soil Stockpile Siting Criteria Checklist

☐ There are no potable drinking water supplies within 300-foot radius of the Soil Stockpile. This limit may need to be extended if water supplies are shown to be hydraulically down gradient.

☐ Soil Stockpile is not within zone one or two of a groundwater source protection area.

☐ *There are no sensitive environments within 100 feet of the treatment location including, but not limited to:

- Waterways (e.g., stream, river, lake, pond, wetland or floodplain zone);
- State or Federally listed threatened or endangered species or habitat;
- Class I or II groundwater zone;
- Residence; or
- Property boundary

- ☐ Public access to the soil is prohibited through posting no trespassing or other means approved by Secretary.
- ☐ If the owner of the soil stockpiling parcel is different from the soil generator, written approval from the landowner that also grants access to the Secretary, has been obtained before stockpiling begins.
- ☐ **The municipality in which the soils will be stockpiled or treated has been notified in writing of the soil stockpiling or treatment location. If applicable, local permits should be obtained. M**unicipal approval documents (letter, permit, etc.) attached.**
- ☐ ANR Atlas generated Map including the latitude and longitude of the location in decimal degrees where the soil will be stockpiled. Minimum acceptable accuracy is plus-or-minus 15 feet. **Map attached.**

*If setback criteria from sensitive receptors cannot be achieved, please provide written explanation.
**This is a requirement for off-site stockpiling of soils only.

Section 3. Ownership Information

Location of Soil Stockpile		**Generator/Owner of Soil/Responsible Party**	
Street Address	_____	Street Address	_____
	_____		_____
Company Name	_____	Company Name	_____
Landowner Name	_____	Owner Name	_____
Landowner Phone #	_____	Owner Phone #	_____
Landowner email	_____	Owner email	_____

Section 4. Signature Section

Responsible Party:

As the party responsible for compliance with the Investigation and Remediation of Contaminated Properties Rule and applicable statutes, I hereby certify that the representations made on this form are to the best of my knowledge true and correct.

_____ _____
Name of Owner/Operator Representative (printed) Company Title

_____ _____
Signature Date

Landowner:

As landowner of the soil treatment stockpile location, I hereby give approval to the soil generator to stockpile the soil volume cited above at the above referenced location. In addition, I hereby grant property access to DEC investigators for the purpose of inspecting the Soil Stockpile at any reasonable time.

_____
Print Name

_____ _____
Signature Date

DEC Site Manager Approval:

_____
Print Name

_____ _____
Signature of DEC Site Manager Date of Approval

APPENDIX F

Post-Remediation Inspection Form

VERMONT

LAND USE RESTRICTIONS – ANNUAL INSTITUTIONAL CONTROL INSPECTION FORM

Our records indicate that this property maintains institutional or engineering controls associated with a land use restriction. Please indicate the state of the following controls, as applicable, on the property.

SMS Site #: _____

Owner Name: _____

Site/Property Name: _____

Site/Property Address: _____

	YES	NO	COMMENTS
Paved Caps:			
1. Is there any cracking, fractures, or breaking of the pavement?	◯	◯	_____
2. Has the pavement been punctured, providing a risk of direct contact?	◯	◯	_____
Buildings/Structures:			
1. Are there visible cracks or fractures in the foundation?	◯	◯	_____
2. Have there been additions or improvements to the structure?	◯	◯	_____
3. Has there been standing water or flood in the basement of the structure (since receipt of the Certificate of Completion)?	◯	◯	_____
Sub-slab Depressurization System (SSD):			
1. Has the SSD been operational and appropriately maintained for the past year, as described in the Certificate of Completion?	◯	◯	_____
Soil/Grass Caps:			
1. Is there any evidence of erosion?	◯	◯	_____
2. Are monitoring wells at the site damaged, un-locatable, or otherwise in unacceptable condition?	◯	◯	_____
3. Have survey pins been repositioned or removed?	◯	◯	_____
4. Is there any evidence of burrowing wildlife?	◯	◯	_____
5. Are there bare spots larger than 3 square feet in grassy areas?	◯	◯	_____
6. Has there been any subsurface work conducted on the property?	◯	◯	_____

I certify that I have responded to each of the questions above to the best of my knowledge.

Signature: _____ **Date:** _____

Submit by email or submit original form to the SMS Project Manager at the address listed below:
Vermont Department of Environmental Conservation
Waste Management & Prevention Division/Sites Management Section
1 National Life Drive – Davis 1
Montpelier, VT 05620-3704

SMS Project Manager: _____

Clear Form

ADDENDA

ASBESTOS Abatement & PCB Remediation Specification

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Remediation of potentially hazardous materials

B. Disposal of building materials containing potentially hazardous elements.

1.02 DESCRIPTION OF WORK

A. Examine all Sections of the Specifications for requirements which affect the work of this Section whether or not such work is specifically mentioned in this Section.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this Section.

C. The Contractor shall furnish all labor, materials, services, training, insurance, and equipment as needed to complete removal and disposal of Polychlorinated Biphenyl (PCB) Bulk Product Waste, PCB Remediation Waste, asbestos containing, trace (<1%) asbestos containing, and lead containing materials and debris as indicated herein. The Contractor shall follow all federal, state and local ordinances, regulations, and rules pertaining to removal, storage, transportation and disposal of PCBs, asbestos and lead. Specifically this includes Mudded Joint Packings, pipe insulation, plaster on walls and ceilings, items impacted by plaster debris, door insulation, vibration cloth, boiler door insulation, boiler internals, and window caulking. The project entails the removal of the following PCB bulk product wastes (≥50 ppm): concrete floor and wall paint. The project also entails the removal of the following PCB remediation wastes (≥1 ppm): concrete.

D. All provisions of this Section relating to the health and safety of workers and the general public, as well as protection of the environment, are minimum standards. The General Contractor is responsible for determining whether any additional and/or more stringent protective measures are required by any legal requirements or prudent conservative work practices, and for implementing such measures if deemed necessary. Nothing in this Section shall be deemed to relieve the General Contractor from any liability with respect to any such legal requirements or requirement of prudent conservative practice.

E. The Consultant will render certain technical services during the Work. All services performed by such Consultant shall be considered advisory to, and for the sole and exclusive benefit of the Owner. The Contractor acknowledges that the Consultant is an independent contractor of the Owner and agrees that no act or omission by such Consultant, and no communication by said Consultant, shall be deemed in any manner to alter or modify the terms of this Contract, or to waive any provision hereof, or to bind Owner, unless specifically agreed upon by Owner in a written and signed document.

F. The Owner has retained Atlas Technical Consultants (Atlas) as the Consultant for Hazardous Material abatement activities. For the purpose of this Section, "*Consultant"* shall refer to Atlas, who will act as designated, authorized representative of the Owner for the purpose of inspecting, monitoring, and testing.

G. Examine all conditions as they exist at the project prior to submitting a bid for the work of this Section.

H. This Section establishes requirements for the removal, segregation, management, and disposal of Hazardous and other regulated wastes including Asbestos, trace (<1%) Asbestos, lead, and PCB Bulk Product Waste and PCB Remediation Waste in the form of building materials adjacent to PCB Bulk Product Waste.

I. Certain demolition debris with PCB concentrations greater than or equal to 50 ppm are regulated as PCB Bulk Product Waste pursuant to the Toxic Substances Control Act (TSCA) in 40 CFR 761.50(b)(4), or as PCB Remediation Waste as noted in 40 CFR 761.50(b)(3) if PCB concentrations are greater than or equal

to 1 ppm and have been contaminated by nearby PCB Bulk Product Waste. The removal and disposal of these materials is regulated by 40 CFR 761.

1.03 RELATED REQUIREMENTS.

A. Available Project Information: Asbestos Containing Building Materials (ACBM), trace (<1%) ACBM, PCB Bulk Product Waste, and PCB Remediation Waste have been identified at the Site.

B. Materials to be managed in accordance with this Section may also contain lead paint. The requirements for managing these contaminants, as specified in state and federal statue, must be followed in addition to those presented here.

1. This specifically applies to health and safety, work zone containment, work zone posting and waste storage, shipping papers, transportation and disposal.

2. When there is a conflict, the most stringent requirements shall apply, except that when there is a conflict between applicable regulations and this Section regarding surface preparation (e.g. etching, drilling, cutting, sanding, washing or other activities that will generate dust or building debris) and waste management, the requirements of this Section shall prevail. This specifically pertains to any activity related to the demolition, cleaning, and/or disturbance of PCB Bulk Product Waste and PCB Remediation Waste.

C. Summary: ACM materials are present in the building. Bidders must refer to applicable summary reports and all sections of this specification to determine type, extent, and location of ACM materials. Building materials in the facility have been identified as containing ≥50 ppm of PCBs and additional materials have been identified as containing ≥1 ppm of PCBs, some materials have lead content.

1.04 REFERENCE STANDARDS

A. The work of this Section shall be performed in accordance with applicable provisions of the Toxic Substances Control Act (TSCA), 40 CFR 761.61(a), and in accordance with applicable federal, state, and local regulations, laws, codes, and ordinances governing the removal, handling, transportation, and disposal of materials managed under this Section, including EPA requirements.

B. The work of this Section shall be performed in accordance with applicable provisions of the Vermont Regulations for Asbestos Control, V.S.A. Title 18, Chapter 26, and in accordance with applicable federal, state, and local regulations, laws, codes, and ordinances governing the removal, handling, transportation, and disposal of asbestos materials managed under this Section, including EPA requirements.

C. The work of this Section shall be performed in accordance with applicable provisions of the Vermont Regulations for Lead Control, V.S.A. Title 18, Chapter 38, and in accordance with applicable federal, state, and local regulations, laws, codes, and ordinances governing the removal, handling, transportation, and disposal of lead containing materials managed under this Section, including EPA requirements.

D. Contractor is solely responsible for obtaining all additional federal, state, and local permits or approvals which may be required to perform the work of this Section, including all costs, fees and taxes required or levied. Contractor shall adhere to all permit/approval requirements.

E. Contractor shall comply with all applicable federal, state, and local environmental, safety and health requirements regarding the demolition of structures or other Site features and recycling or disposal of demolition debris, as applicable.

F. The Contractor shall document that the disposal facility(ies) proposed have all certifications and permits as required by federal, state and local regulatory agencies to receive and dispose of the materials managed under this Section. Note that some materials to be managed contain asbestos and/or lead and/or PCBs.

G. The following regulations are cited for information and guidance. The list below is not all-inclusive. The Contractor shall be responsible for a thorough knowledge and full implementation of all requirements for removal, transportation, and disposal of the materials managed under this Section.

1. PCBs Manufacturing, Processing, Distribution in Commerce, And Use Prohibition, 40 CFR 761 ("TSCA").

2. Hazardous Waste Operations and Emergency Response, Federal Occupational Safety and Health Act (OSHA), 29 CFR 1910.120.

3. Safety and Health Regulations for Construction, OSHA 29 CFR Part 1926.

4. General Regulations for Hazardous Waste Management, EPA, 40 CFR 260.

5. Regulations for Identifying Hazardous Waste, Hazardous Waste Generators and Hazardous Waste Transporters, EPA, 40 CFR 261, 262 and 263.

6. Regulations for Owners and Operators of Permitted Hazardous Waste Facilities, EPA, 40 CFR 264.

7. Interim Status Standards for Owners and Operators of Permitted Hazardous Waste Facilities, EPA. 40 CFR 265.

8. Standards for Management of Specific Hazardous Wastes and Facilities, EPA, 40 CFR 266.

9. Interim Standards for Owners and Operators of New Hazardous Waste Land Disposal Facilities, EPA, 40 CFR 267.

10. Hazardous Materials Regulations Relating to Transportation, 49 CFR 171-180 – U.S. Department of Transportation (U.S. DOT).

11. Regulations Relating to Transportation, 49 CFR Subtitle B Parts 100-185 – U.S. Department of Transportation (U.S. DOT).

12. Publications, Practices for Respiratory Protection, z88.2-1992 - American National Standards Institute (ANSI).

13. Vermont Hazardous Waste Management Regulations, 3 V.S.A. section 2853 (5) and 10 V.S.A. chapter 159, Vermont Department of Environmental Conservation.

H. The following guidance documents are cited for information and guidance. The list below is not all-inclusive. The Contractor shall be responsible for a thorough knowledge and full implementation of all requirements for removal, transportation, and disposal of the materials managed under this Section.

1. Contractors Handling PCBs in Caulk during Renovation; EPA, EPA-747-F-09-004.

2. Preventing Exposures to PCBs in Caulking Material; EPA, EPA-747-F-09-005 (September 2009).

1.05 SUBMITTALS

A. Prior to the start of work, prepare and submit the following items to the Consultant and applicable regulatory agency as specified. Do not commence work activities until the submittals are approved by the Consultant and owner.

B. Schedule: Provide a work schedule at least 15 business days prior to the start of work outlined in this Section.

C. Certification: Provide signed certification stating you have read and understand and will agree to and abide by conditions specified in 40 CFR 761.61(a) at least 15 business days prior to the start of work outlined in this Section.

D. Work Plan: Provide a detailed work plan illustrating proposed work practices for demolition, transportation and disposal of asbestos, PCB and lead containing materials at least 30 business days prior to the start of work outlined in this section.

E. Health and Safety Plan (HASP): Developed in accordance with Occupational Safety and Health Administration (OSHA) regulations and any other applicable federal, state, or local regulations at least 10 business days prior to the start of work outlined in this Section.

F. Certifications, Licenses and Permits: Certifications, licenses and permits required for complying with any applicable federal, state and local laws, codes, policies and regulations in connection with the work outlined in this Section at least 5 business days prior to the start of the work outlined in this Section. Proof of submittal and acceptance by applicable state or federal agency required to Consultant.

G. Waste Profiles: All waste profiles, applications and questionnaires, prior to forwarding them to the party requiring these documents, at least 5 business days prior to the start of the work outlined in this Section.

H. Shipping Papers: Any manifests or other documents required to transport and dispose of the items identified in this Section at least 5 business days prior to shipment of waste materials. The Contractor shall not transport or dispose of any materials until authorized by the Owner. Completed copies of all manifests, Certificates of Disposal, other applicable documents, and certified scale weight receipts, as applicable, must be furnished to the Owner as attachments to all invoices.

I. Work Method Changes: Significant changes to the means and methods used to complete the work outlined in this Section at least 15 business days prior to making change, for the Owner review and approval. Note that significant changes will also require approval by EPA, which may take up to 30 days or more. Any additional costs incurred by Contractor as a result of delay due to EPA approval of changes shall be borne by Contractor.

J. Completion Report: Report that summarizes and documents the removal and disposal of all materials associated with activities outlined in this Section. The report shall be a prerequisite for payment. At a minimum the report shall include the name of the disposal facility(ies), a summary of materials disposed, and a copy of the manifest, PCB Waste Certificates of Disposal, and other applicable documentation.

1.06 EXISTING CONDITION

A. Previous reports & Hazardous material documentation assessments
   a. *Analysis of Brownfield Clean up Alternatives*- Stantec, dated March 2022
   b. *St. Johnsbury Community Center – St. Johnsbury, Vermont, Interior Asbestos Inspection, Limited*. Crothers Environmental Group, dated November 2008
   c. *Environmental Survey, Former Saint Johnsbury Armory, 1249 Main Street, Saint Johnsbury, Vermont.* Cardno ATC, dated March 28, 2013.
   d. *Draft Targeted Brownfields Assessment Report, Former St. Johnsbury Armory, St. Johnsbury, Vermont TDD NO. BR-01-20-06-0001*. KGSNE, dated March 9, 2021

PART 2 - GENERAL REQUIREMENTS

A. Examine all conditions as they exist at the project prior to submitting a bid for the work of this Section.

B. The Contractor shall furnish all labor, materials, services, training, insurance, and equipment as needed to complete removal and disposal of PCB containing, asbestos containing, and lead containing materials and debris as indicated herein. The Contractor shall follow all federal, state and local ordinances, regulations,

and rules pertaining to removal, storage, transportation and disposal of Lead, PCB, and Asbestos containing materials.

C. All provisions of this Section relating to the health and safety of workers and the general public, as well as protection of the environment, are minimum standards. The General Contractor is responsible for determining whether any additional and/or more stringent protective measures are required by any legal requirements or prudent conservative work practices, and for implementing such measures if deemed necessary. Nothing in this Section shall be deemed to relieve the General Contractor from any liability with respect to any such legal requirements or requirement of prudent conservative practice.

D. The Consultant will render certain technical services during the Work. All services performed by such Consultant shall be considered advisory to, and for the sole and exclusive benefit of the Owner. The Contractor acknowledges that the Consultant is an independent contractor of the Owner and agrees that no act or omission by such Consultant, and no communication by said Consultant, shall be deemed in any manner to alter or modify the terms of this Contract, or to waive any provision hereof, or to bind Owner, unless specifically agreed upon by Owner in a written and signed document.

E. The Owner has retained ATC Group Services LLC dba Atlas Technical Consultant (Atlas) as the Consultant for Hazardous Material abatement activities. For the purpose of this Section, "*Consultant"* shall refer to Atlas, who will act as designated, authorized representative of the Owner for the purpose of inspecting, monitoring, and testing.

J. Examine all conditions as they exist at the project prior to submitting a bid for the work of this Section. Sampling has determined that PCBs, lead and ACBM are present. **Samples collected have indicated PCB concentrations in excess of 50 ppm, lead above instrument detection levels, and asbestos concentrations greater than 1%.**

K. This Section establishes requirements for the removal, segregation, management, and disposal of Hazardous and other regulated wastes including Asbestos, Lead and PCB containing materials.

L. Certain demolition debris with PCB concentrations greater than or equal to 50 ppm are regulated as PCB Bulk Product Waste pursuant to the Toxic Substances Control Act (TSCA) in 40 CFR 761.50(b)(4), or as PCB Remediation Waste as noted in 40 CFR 761.50(b)(3) if PCB concentrations are greater than or equal to 1 ppm and have been contaminated by nearby PCB Bulk Product Waste. The removal and disposal of these materials is regulated by 40 CFR 761 and 29 CFR 1910.120.

M. The Consultant and Owner have the authority to stop the abatement and demolition work at any time the Consultant or Owner determines that conditions are not in accordance with the Specifications and applicable regulations. The stoppage of work shall continue until corrective steps have been taken to the satisfaction of the Consultant and Owner. Standby time required for resolving violations and Specification interpretations or contractual obligations shall be at the Contractor's expense.

N. Contractor onsite staff shall include a competent person as defined by 29 CFR 1926.32(f). This individual shall possess sufficient training and experience to identify and the authority to correct hazards related to this section.

PART 3 – EXECUTION

3.01 REMEDIATION

A. Known PCB Bulk product and associated remediation waste materials, ACBM, and trace (<1%) ACBM are to be removed prior to renovation. If previously unknown suspect ACBM is discovered during remediation activities, all work potentially disturbing the material(s) must cease until such time that the material can be assessed for asbestos content by the owner's representative.

B. Unless otherwise noted, all work practices shall be full procedures in accordance with the TSCA requirements utilizing trained HAZWOPER remediation contractors. Any alternative procedures shall be approved by the Consultant and the Owner and will be written and presented for. All applicable notifications, permits and fees will be the responsibility of the selected contractor.

C. Asbestos work areas will be subject to Phase Contrast Microscopy (PCM) air clearance sampling. PCB work areas may be subject to clearance testing via PCB air sampling, wipe sampling, and/or substrate sampling. Analysis associated with the first round of clearance samples in a work area will be performed by the Consultant at the owner's expense. Clearance sampling will be conducted in accordance with Vermont Regulations for Asbestos Control (VRAC) and TSCA requirements. Additional sampling rounds will be at the expense of the abatement contractor.

D. Disturbance of materials containing identifiable concentrations of PCBs, Lead, and Asbestos must be conducted in accordance with all applicable OSHA and EPA regulations.

3.02 DISPOSAL

A. All costs associated with the proper disposal of PCB, Lead, and Asbestos containing materials shall be borne by the Contractor. All materials shall be disposed of in accordance with all applicable federal, state, county or local laws and guidelines, and the provisions of this Section.

3.03 DOCUMENTATION & CLOSE OUT

A. The Contractor shall not transport or dispose of any materials until authorized by the Owner. Completed copies of all manifests, Certificates of Disposal, other applicable documents, and certified scale weight receipts, as applicable, must be furnished to the Owner as attachments to all invoices.

B. Completion Report that summarizes and documents the removal and disposal of all materials associated with activities outlined in this Section. The report shall be a prerequisite for payment. At a minimum the report shall include the name of the disposal facility(ies), a summary of materials disposed, and a copy of the manifest(s), and other applicable documentation.

END OF SECTION

BID FORM

PROJECT IDENTIFICATION:

Former St. Johnsbury Armory
Main Street
St. Johnsbury, Vermont 05819

THIS BID IS SUBMITTED TO:

Town of St. Johnsbury
Joseph Kasprzak
51 Depot Square, Suite 3
St. Johnsbury, Vermont 05819

The undersigned BIDDER proposes and agrees, if the Bid is accepted, to enter into an agreement with OWNER to perform and furnish all Work as specified or indicated in the Work Plan for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.

2. BIDDER accepts all of the terms and conditions of the Invitation to Bid and Work Plan. BIDDER promises and agrees that this Bid will remain subject to acceptance for thirty days after the day of Bid opening. BIDDER will sign and submit the Agreement with the documents required by the Bidding Requirements within ten days after the date of OWNER's Notice of Award.

3. In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:

(a) BIDDER has examined copies of all the Bidding Documents and of the following Addenda (receipt of all which is hereby acknowledged):

Date Revised:	Addenda Number:
_____	_____
_____	_____

(b) BIDDER has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and laws and regulations that in any manner may affect cost, progress, performance or furnishing of the work.

(c) BIDDER has studied carefully all reports and drawings of physical conditions included with this Work Plan, and accepts that all measurements (if provided) and technical data included herein is INDUSTRIAL HYGENIST'S estimates and BIDDER has made such investigations of his own as necessary and has based his bid on those investigations.

(d) BIDDER has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests and studies (in addition to or which pertain to the physical conditions at the site or otherwise may affect the cost, progress, performance or furnishing of the Work) as BIDDER considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, and no additional examinations, investigations, explorations, tests, reports or similar information or data are or will be required by BIDDER for such purposes.

(e) BIDDER has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.

(f) BIDDER has given Owner and Consultant written notice of all conflicts, errors or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by the Owner is acceptable to BIDDER.

(g) This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other BIDDER to submit a false or sham bid;

BIDDER has not solicited or induced any person, firm or corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for itself any advantage over any other bidder or over OWNER.

4. BIDDER agrees to complete the work described in the Work Plan for the following price:

Fill in Lump Sum Bid Amount in Tables below.

Location	**Description**	**Approximate Quantity** (To be filled in by Contractor)	**Lump Sum Bid Amount** (To be filled in by Contractor)
Base Bid- Item 1			
Entire Building- (ACM) **>1% Asbestos content confirmed and assumed**	Mudded Joint Packings		$
	air cell pipe insulation		
	plaster walls and ceilings and debris impacted materials		
	door insulation		
	vibration cloth		
	boiler door insulation		
	boiler internal materials		
	Window Caulking		
Base Bid- Item 2			
PCB Containing Material >50 ppm and associated remediation waste **(following asbestos removal and building demolition)**	Grey and Blue Floor Paint- Basement		$
	Concrete below paint to full depth of slab (approximately 5.5")		
	Wall Paint- Basement		
	Concrete behind wall paint to full depth of wall (approximately 6")		
Alternate 1			
PCB Containing Material >50 ppm and associated remediation waste ***(prior to building demolition)***	Grey and Blue Floor Paint- Basement		$
	Concrete below paint to full depth of slab (approximately 5.5")		
	Wall Paint- Basement		
	Concrete behind wall paint to full depth of wall (approximately 6")		
Alternate 2			
Bonding	100% Bid Bond	$	$
	100% Performance Bond	$	$
	100% Labor and Materials Bond	$	$

The Abatement Contractor is responsible for verifying all quantities of materials, there will be no change orders issued for additional quantities.

The contractor shall provide, on an additional sheet all labor rates (including off-shift, overtime and holiday rates), material and disposal costs for additional work which may be awarded during this contract period. All labor and material rates must be included. The owner will not accept charges for items not included in this submittal.

5. BIDDER agrees that the work shall be completed in the specified number of working days from the date of the Notice to Proceed, and Bidder accepts the provisions of this agreement as to liquidated damages in the event of failure to complete the Work on time. The Contractor shall pay the owner **$500.00** for each day that expires after the time specified in this work plan for the completion of the project. The contractor shall also be responsible for the payment of all Industrial Hygienist and air monitoring costs, which occur after the project completion date.

6. The following documents are attached to and made a condition of the Bid:

   Bidder qualifications and other requirements (including proof of bonding) as presented in the Work Plan.

7. Communications regarding this bid shall be addressed to the address of the bidder indicated below:

   Name _____
   Address _____
   Phone # _____

8. The Client reserves the right to reject any and all bids, to accept the bid that, in the opinion of the Board, serves the best interest of the client, and to waive any informality in the bidding.

9. The terms used in this Bid which are defined in the General Conditions of the Construction Contract included as part of the Contract Documents have the meanings assigned to them in the General Conditions.

SUBMITTED ON_____20___.

A Corporation

By_____

(Corporation Name)

_____

(State of Incorporation)

By_____

(Authorized Signature)

_____

(Title)

(Corporate Seal)

Attest

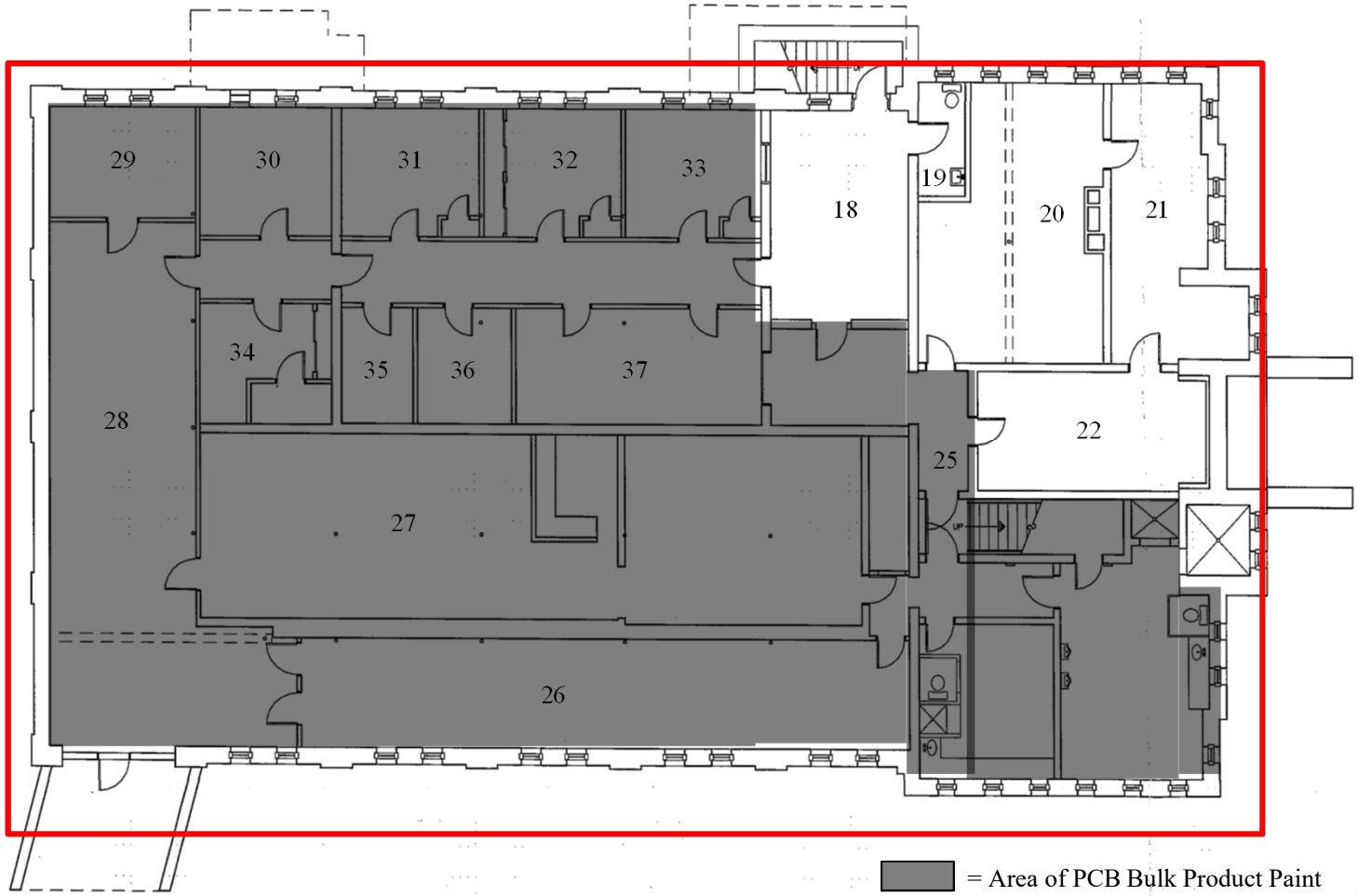
(Secretary)

Business Address:

_____

Phone Number:_____

END OF BID FORM



= Area of PCB Bulk Product Paint

= ACM removal area

23 = Room Numbers

ACM and Product Location Diagram

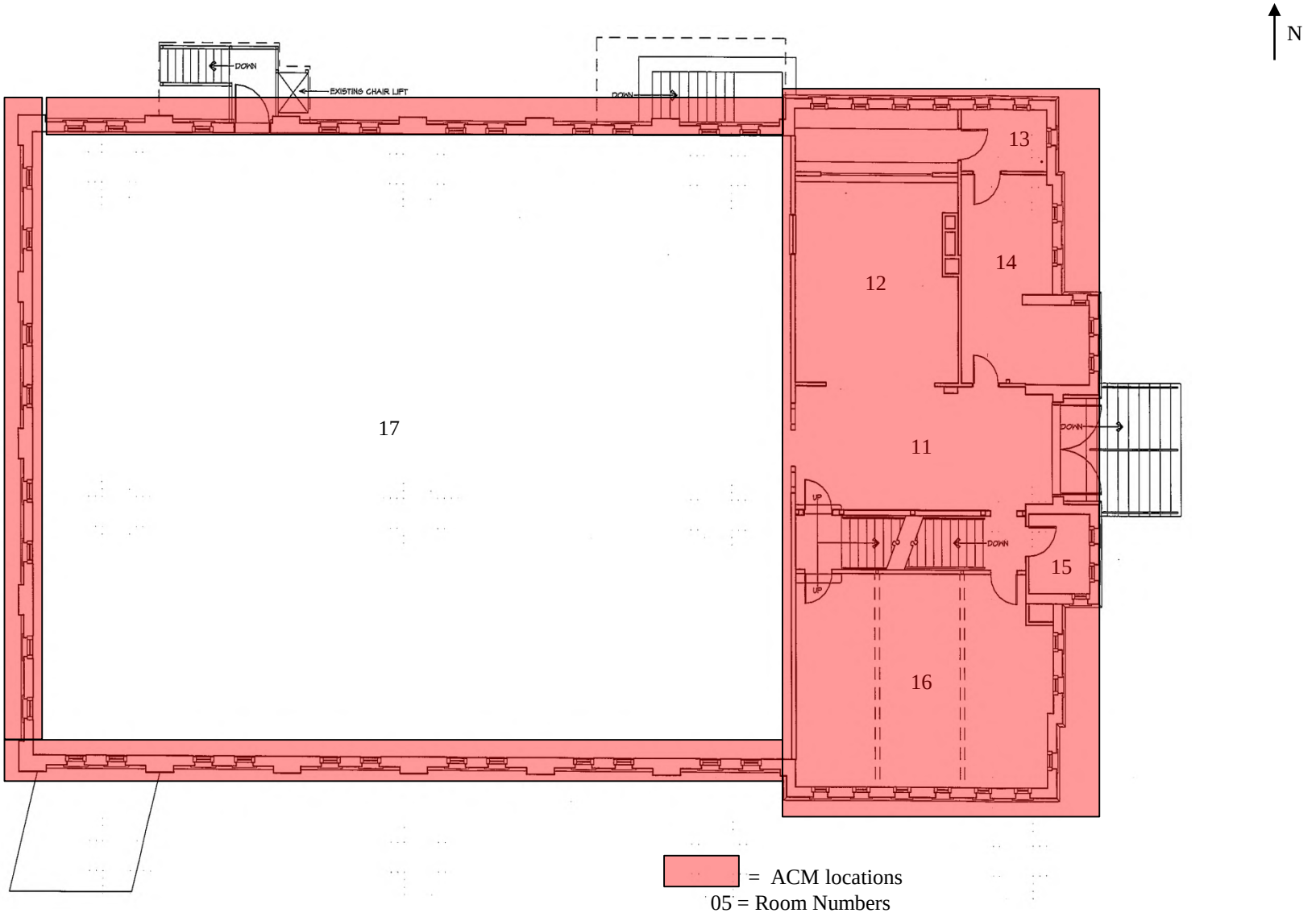
Address: **St. Johnsbury Armory- Basement**
1249 Main Street
St. Johnsbury, Vermont

ATLAS

51 Knight Lane, Williston, Vermont 05495
Phone:(802) 862-1980

Source: Field Notes

SCALE: Not to scale



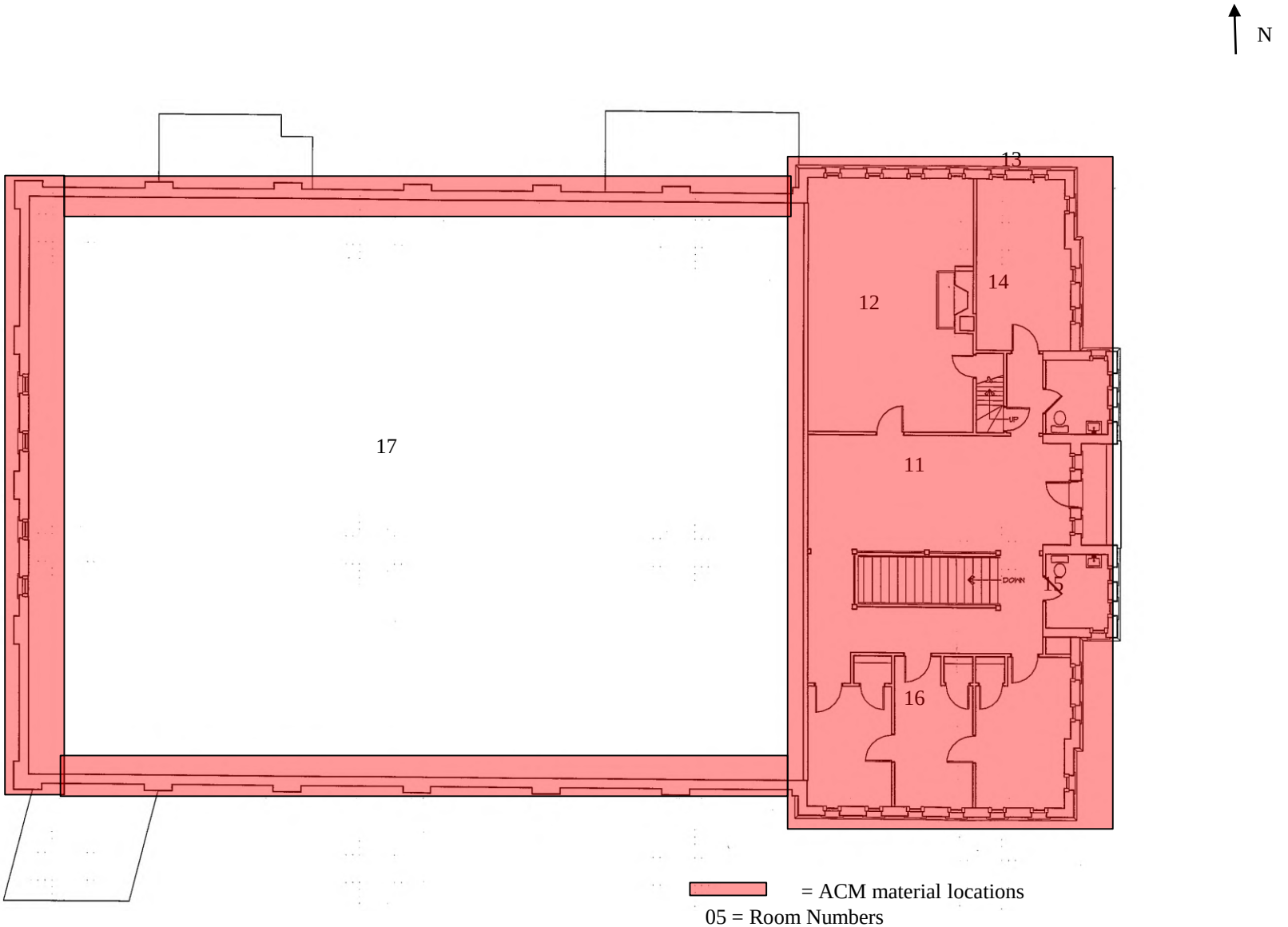
ACM and PCB Location Diagram

Address: **St. Johnsbury Armory- 1st Floor**
1249 Main Street
St. Johnsbury, Vermont

51 Knight Lane, WIlliston, Vermont 05495
Phone:(802) 862-1980

Source: Field Notes

SCALE: Not to scale



ACM and PCB Location Diagram

Address: **St. Johnsbury Armory- 2nd Floor**
1249 Main Street
St. Johnsbury, Vermont

ATLAS

51 Knight Lane, Williston, Vermont 05495

Phone:(802) 862-1980

Source: Field Notes

SCALE: Not to scale

51 Knight Lane
Williston, VT 05495
(802) 862-1980 | oneatlas.com

Atlas Project Number: 280EM00860

October 18, 2022

Mr. Joe Kasperzak
Assistant Town Manager
Town of St. Johnsbury
51 Depot Square, Suite 3
St. Johnsbury, VT 05819

Transmitted via electronic mail to: jkasprzak@stjvt.com

RE: Remediation Planning Cost Estimate-V3
St. Johnsbury Armory Building
St. Johnsbury, Vermont

Dear Joe:

The following planning cost estimates are for PCB, Lead, Asbestos, and soil remediation/abatement and associated consulting costs associated with the St. Johnsbury Armory facility in St. Johnsbury, Vermont. Additional costs associated with EPA work plan approvals, annual air quality sampling, and General Contractor VOSHA Lead in Construction compliance area also included. The cost estimates are based on previous site investigation work conducted by ATC Group Services and KGSNE, LLC at the facility to identify PCB, asbestos, lead containing materials and contaminated shallow soils at the site. Atlas Technical Consultants (Atlas) was contracted by the town of St. Johnsbury Vermont to provide this updated cost estimate for budget planning proposes. A breakdown of the cost estimate is provided in attached Updated Remediation Cost Table.

Background

This cost estimate is based on the complete removal of all PCB Bulk Product and remediation waste, asbestos containing materials and lead based paint from the facility as well as excavation of shallow soils impacted with lead and PAHs, and decommissioning of soil vapor probes. Please note the provided estimate is based on Atlas' experience and comparison to similar projects Atlas has been involved with and do not include reconstruction costs. Variables such as time of year, final scope and changes in regulation can have dramatic effect on the actual costs of the project. The cost estimates are based on 2022 rates and should be used for planning purposes only. Actual project costs may differ from planning cost estimates.

PCB Containing Material Remediation Cost Estimate:

Previous testing has shown that PCB Bulk Product (>50 mg/Kg), PCB Remediation Waste (material impacted by bulk product), and Excluded PCB products are present at the site. The PCB Bulk Product wastes must be removed from the site, however, EPA does not give a mandated timeline for this to happen. Remediation wastes must also be managed either by removal or managed in place via an EPA approved plan. All PCB containing

materials classified as Excluded product do not have to be remediated from a regulatory standpoint.

It is not anticipated at this time that the waste stream is likely to be considered hazardous for lead. However, until proven through proper waste stream delineation testing (TCLP) the cost estimate assumes TSCA PCB materials will have to be transported and disposed of as RCRA hazardous waste for lead at an approved facility.

Atlas has included cost estimates for all the PCB Bulk Product, PCB Remediation Waste and Excluded PCB Product wastes. Please note the estimate includes a 25% contingency. Contrary to previous cost estimates, it is understood that encapsulation of some portion of the PCB Remediation waste materials (rather than full removal) will be required. As such, Atlas' costs include this effort.

Estimated costs provided herein are for the full removal of all Bulk Product (>50ppm of PCB), and Remediation Waste (>1ppm and <50ppm) with the exception of the east end of the basement foundation walls and two approximately 34 foot long sections of brick walls in the former drill hall space (northeast and southeast walls), in place via an EPA approved plan. The price assumes the remaining brick walls will be treated with epoxy encapsulate paint via an EPA approved plan.

The total estimated costs for PCB remediation is **$2,950,938 (including 25% contingency).** A breakdown of these costs can be found in the attached Table 1. This estimate also includes pre- and post-remedial actions related to the abatement project to achieve immediate post-remedial compliance with likely EPA requirements for long-term maintenance and monitoring. It does not, however, include future and on-going maintenance and annual monitoring costs. Atlas estimates that development and project management to get EPA approval will take between 6 months and 1 year. These future annual costs are anticipated to not exceed $15,000 each year.

Asbestos Abatement Cost Estimate:

This cost estimate is for the asbestos abatement at the above referenced facility. This estimate is based on the complete removal of all identified thermal pipe insulation, plaster, Safe Door, Boiler, Window Caulking, and Vibration Cloth throughout the facility. Atlas assumes that the abatement contractors are given sufficient time periods to conduct the work and that significant overtime will not be required. Some asbestos containing materials such as plaster wall materials and window caulking will be removed as part of the PCB remediation at the site. As such those costs have been included in that section of the cost estimate.

The planning budget includes an estimate for the asbestos abatement consulting costs including air monitoring and final clearance activities. Consulting costs assume full oversite for a 2 week (10 day) asbestos-only remediation effort which includes 6 PCM clearances for the project. The 2 weeks assumes that the oversight costs for the combined PCB/asbestos wastes have been budgeted in the previous section of this letter.

Estimated Abatement Contractor Cost	**$17,200**
Estimated Abatement Consultant Costs	**$17,200**
Total Estimated Asbestos Costs	**$34,400**

Lead Abatement Costs

While Lead Based Painted (LBP) surfaces have been identified at the site, Atlas does not anticipate any lead abatement to be required at the facility. The State of Vermont considers the abatement of lead based paint to be the permanent removal of a lead hazard from a facility. If LBP surfaces are impacted with the purpose of removing a lead hazard than that is considered abatement. If those same surfaces are impacted as a function of another activity, i.e. renovation, than the work is considered renovation and subject to the VOSHA lead in construction regulations.

Due to this fact, Atlas understands that any LBP impacted at the site will be part of the renovation process and therefore will not be considered abatement but part of the selected general contractors VOSHA compliance.

Atlas recommends the inclusion of a **$10,000** contingency for VOSHA compliance for budgeting purposes.

Contaminated Soil Excavation and Disposal Costs and Vapor Probe Decommissioning

Previous sampling and testing identified shallow soil impacted by lead and PAHs. Proposed excavation will address greenspace areas (i.e., areas not covered by asphalt) only within the regulated areas. A total estimated area of 1,022 square feet or 65 cubic yards is estimated for disposal. Also, vapor probes will be decommissioned, and a CAP Completion Report will be prepared.

Estimated cost for contaminated soil removal and disposal:	**$76,176**
Estimated cost for Soil Vapor Probe Decommissioning:	**$3,552**
Estimated cost for CAP Completion Report:	**$5,380**

Thank you for selecting Atlas for your environmental management needs. If you have any questions feel free to contact us at (802) 862-1980.

Respectfully submitted,
Atlas Technical Consultants LLC

Joe Hayes
Operations Manager
Direct Line +1 802 871 8359Email:
joseph.hayes@oneatlas.com

Daniel P. White, PG
Senior Project Manager
Direct Line +1 781 404 1432
Email: daniel.white@oneatlas.com

Attachment: Updated Remediation Cost Table

Table 1
St. Johnsbury Armory
St. Johnsbury, Vermont
Hazardous Materials Remediation - Cost Estimates

PCB Building Material Remediation

Line Item	Area	Action	Cost	Unit	Approximate Quantity*	Total
Removal of TSCA PCB Materials (PCB Bulk Product Waste >50ppm or assumed >50ppm and PCB Remediation Waste >1 ppm)						
		Labor - remove TSCA paint from walls to remain	$35.00	SF	3,000	$105,000
		Labor - remove concrete slab with TSCA paint intact	$20.00	SF	7,600	$152,000
	Basement	Labor & materials - Protect slab and basement walls during demo	$10,000.00	LS	1	$10,000
		Labor - remove masonry/found. walls with TSCA paint intact	$25.00	SF	2,500	$62,500
		Labor - remove wood stud/plaster walls & ceilings with TSCA paint	$15.00	SF	9,600	$144,000
	First Floor	Labor - remove wood floor and walls in gym with coating intact	$15.00	SF	6,800	$102,000
	Second Floor	Labor - remove red trim with TSCA paint intact	$15.00	SF	100	$1,500
	Exterior	Labor - remove TSCA painted entry concrete and entry structure	$60.00	SF	500	$30,000
	TOTAL	Trucking and disposal (Hazardous Waste - TSCA landfill)	$12,000.00	30yd	62	$744,000
Removal of Non-TSCA PCB Materials (Excluded PCB Product, >1 and <50ppm)						
		Labor - remove plaster with non-TSCA paint	$15.00	SF	12,500	$187,500
	First Floor	Labor - remove wood flooring with non-TSCA coating	$15.00	SF	2,100	$31,500
		Labor - remove non-TSCA paint from 3 gym walls (to be removed/rer	$35.00	SF	4,700	$164,500
		Trucking and disposal (Non-Hazardous Waste - Non-TSCA Landfill)	$7,000.00	30yd	16	$112,000
		Labor removal - remove plaster with non-TSCA paint	$15.00	SF	7,000	$105,000
	Second Floor	Labor removal - remove wood flooring with non-TSCA coating	$15.00	SF	2,100	$31,500
		Trucking and disposal (Non-Hazardous Waste - Non-TSCA Landfill)	$7,000.00	30yd	9	$63,000
	Basement	Labor removal- stair wood and plaster	$15.00	SF	1,000	$15,000
		Trucking and disposal (Non-Hazardous Waste - Non-TSCA Landfill)	$7,000.00	30yd	2	$14,000
		Labor to remove entry way structure	$25.00	SF	200	$5,000
	Exterior	Labor to remove windows	$250.00	Window	127	$31,750
		Trucking and disposal (Non-Hazardous Waste - Non-TSCA Landfill)	$7,000.00	30yd	4	$28,000
Encapsulation						
	Basement Walls	Apply Encapsulate - Labor/material (Epoxy, 2 layers)	$20.00	SF	3,000	$60,000
Additional Costs						
	Additional PCB Sampling	Building Materials				$18,000
	PCB Work Plan	EPA approval				$15,000
	PCB Remedial Construction Monitoring	Coord. and Observation During Demolition/Renovation	5% of PCB Abatement Total			$110,000
	Post Remediation Sampling	Wipe, Air				$10,000
	TSCA O&M Plan, Deed Restriction	For long-term management of remaining materials				$8,000
	Annual Monitoring (per year) - Future Costs					NA
		PCB Building Material Abatement				
		Total PCB Abatement	$2,199,750.00		25% contingency	**$2,749,688**
		Additional cost	$161,000.00		25% contingency	**$201,250**
		TOTAL PCB				**$2,950,938**

Table 1
St. Johnsbury Armory
St. Johnsbury, Vermont
Hazardous Materials Remediation - Cost Estimates

Asbestos Abatement

Line Item	Area	Action	Cost	Unit	Approximate Quantity*	Total
Asbestos Material						
Thermal Systems Insulation	Basement	Abatement	$50.00	LF	150	$7,500
Safe Door	Basement	Abatement	$1,000.00	DOOR	1	$1,000
Boiler	Basement	Abatement	$7,500.00	UNIT	1	$7,500
Vibration Cloth	Basement	Abatement	$120.00	EACH	10	$1,200
Fire brick	Throughout	Not being removed	~~$10.00~~	~~SF~~	~~75~~	~~$750~~
Plaster walls & ceilings	Throughout	Being removed with PCB waste	~~$15.50~~	~~SF~~	~~30,100~~	~~$466,550~~
Window Caulking	Exterior	Being removed with PCB waste	~~$15.00~~	~~LF~~	~~1650~~	~~$24,750~~
Additional Costs						
	Abatement monitoring		$1,100.00	day	10	$11,000
	Air quality monitoring		$950.00	clearance	6	$5,700
	VT DOH permitting		$500.00	per plan	1	$500

Asbestos Abatement	
Total Asbestos Abatement	**$17,200**
Total Add Costs	**$17,200**
Total Asbestos	**$34,400**

VOSHA Lead in Construction Compliance

Part of general contractor scope - no abatement anticipated	Contingency	Total	**$10,000**

Table 1
St. Johnsbury Armory
St. Johnsbury, Vermont
Hazardous Materials Remediation - Cost Estimates

Soil CAP Implementation / Remediation

Task	Type	Units	Quantity	Rate	Mark-up	Item Total	Task Total
Environmental Professional Costs							
1. Soil Vapor Point Decommissioning							
Atlas Labor	Sr. Project Manager	hrs	2	$150	--	$300	
and Expenses	Staff Scientist	hrs	8	$80	--	$640	
-assumes 1 day	Field Truck	day	1	$150	--	$150	
					Atlas Subtotal	$1,090	
Drilling Subcontractor	Mob/Demob	ea	1	$350	*1.15*	$403	
	Well Abandonment - Labor	hrs	8	$210	*1.15*	$1,932	
	Well Abandonment - Material	ft	60	$2	*1.15*	$104	
	Surface Completion	ea	3	$7	*1.15*	$24	
				Drilling Subcontractor Subtotal		$2,462	
		Task Total					$3,552
2. Soil Excavation Oversight							
Atlas Labor	Principal	hrs	2	$150	--	$300	
and Expenses	Sr. Project Manager	hrs	20	$120	--	$2,400	
-assumes preparation,	Staff Scientist	hrs	36	$80	--	$2,880	
waste characterization sampling,	Sampling charge	ea	2	$15	--	$30	
waste profiling, pre-construction	Field Truck	day	3	$150	--	$450	
meeting, and 3 days of oversight	Waste Characterization Samples	ea	2	$785	*1.15*	$1,806	
		Task Total					$7,866
3. CAP Completion Report/LUR							
Atlas Labor	Principal	hrs	2	$150	--	$300	
	PE	hrs	6	$150	--	$900	
	Sr. Project Manager	hrs	12	$120	--	$1,440	
	Staff Scientist	hrs	24	$80	--	$1,920	
	CADD	hrs	8	$70	--	$560	
	Administrative	hrs	4	$65	--	$260	
		Task Total					$5,380
		Total Estimated EP Costs:					**$16,798**
General Contractor Costs							
1. Contaminated Soil Management							
GC Costs	Soil Handling Costs	CY	198	$50	--	$9,900	
Costs to be vertified by CM	Offsite Stockpiling Costs, if needed	CY	198	$25	--	$4,950	
	T&D Costs	Ton	277.2	$175	--	$48,510	
	Delivered Backfill Costs	CY	198	$25	--	$4,950	
		Total Estimated GC Costs:					**$68,310**