Site Health and Safety Plan and Community Air Monitoring Plan Hunts Point Parcel A-2

For the Property Located at the
NE Corner of the Southern Intersection of Food Center Drive and Halleck Street, Bronx, NY 10474
Block 2778, Lot 100
NYSDEC BCP Site No. C203094

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
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November 2017

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ACRONYMS AND ABBREVIATIONS

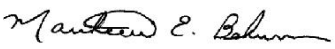
CAMP	Community Air Monitoring Plan
CFR	Code of Federal Regulations
CHSM	Corporate Health and Safety Manager
CPR	cardiopulmonary resuscitation
FBSG	feet below site grade
HAZWOPER	hazardous waste operations and emergency response
HDPE	high density polyethylene
HEPA	high-efficiency particulate air
IDLH	immediately dangerous to life and health
Integral	Integral Engineering, P.C.
OSHA	Occupational Safety and Health Administration
PEL	permissible exposure limit
PPE	personal protective equipment
RAWP	Remedial Action Work Plan
SHSP	site health and safety plan
SSO	site safety officer
STEL	short-term exposure limit
SVOCs	semi-volatile organic compounds
VOCs	volatile organic compounds

SITE HEALTH AND SAFETY PLAN APPROVAL

This site health and safety plan (SHSP) has been reviewed and approved for the redevelopment of the property located at the SW Intersection of Food Center Drive & Halleck Street, Bronx, NY.

November 27, 2017

Project Manager — Date



July 14, 2017

Corporate Health and Safety Manager — Date

SITE HEALTH AND SAFETY PLAN ACKNOWLEDGMENT

In the absence of an appropriate subcontractor or consultant health and safety plan, and with the written approval of Integral Consulting Inc. (Integral) corporate health and safety manager (CHSM), the subcontractor or consultant may utilize the Integral site health and safety plan (SHSP), provided there is written concurrence from the subcontractor or consultant that they will directly administer the plan for its employees. The Integral SHSP is a minimum standard for the site and will be strictly enforced for all Integral personnel, or its subcontractors or consultants where applicable.

I have reviewed the SHSP prepared by Integral, drafted November 27, 2017 for the fieldwork at the Hunts Point Parcel A-2, Bronx, NY property. I understand the purpose of the plan, and I consent to adhere to its policies, procedures, and guidelines while an employee of Integral, or its subcontractors or consultants. I have had an opportunity to ask questions regarding this plan, which have been answered satisfactorily by Integral.

Employee signature	Company	Date
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1 INTRODUCTION

It is the policy of Integral Engineering, P.C. (Integral) to provide a safe and healthful work environment that is compliant with applicable regulations. No aspect of the work is more important than protecting the health and safety of all workers.

This site health and safety plan (SHSP) provides general health and safety provisions to protect workers from potential hazards during field activities performed under the remediation and redevelopment for the property located at the SW Intersection of Food Center Drive and Halleck Street, Bronx, NY (hereafter referred to as the "site"). This SHSP has been prepared in accordance with local, State, and federal Occupational Safety and Health Administration (OSHA) safety regulations (29 CFR [Code of Federal Regulations] 1910 and 29 CFR 1926).

Work performed under the redevelopment will be in full compliance with applicable health and safety laws and regulations, including site-specific and OSHA worker safety requirements and Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) requirements. This SHSP follows both OSHA hazardous waste operations and emergency response and applicable regulations in 29 CFR 1910 and 29 CFR 1926.

Attachments to the SHSP provide a site-specific map and specific routes to the hospital from the site (Attachment 1), regulatory notices (Attachment 2), safety procedures (Attachment 3), material safety data sheets (Attachment 4), and a near-miss incident report form (Attachment 5).

This SHSP has been prepared to identify potential site hazards to the extent possible based on information available to Integral. Integral cannot guarantee the health or safety of any person entering this site. Because of the potentially hazardous nature of this site and the activity occurring thereon, it is not possible to discover, evaluate, and provide protection for all possible hazards that may be encountered. Strict adherence to the health and safety guidelines set forth herein will reduce, but not eliminate, the potential for injury and illness 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 evaluation by trained health and safety personnel.

A copy of this SHSP must be in the custody of the field crew during field activities. All individuals performing fieldwork must read, understand, and comply with this plan before undertaking field activities. Once the information has been read and understood, the individual must sign the Site Health and Safety Plan Acknowledgment form provided as part of this plan. The signed form will become part of the project file.

This plan may be modified at any time based on the judgment of the Integral site safety officer (SSO) in consultation with the project manager and Integral corporate health and safety manager (CHSM) or designee. Any modification will be presented to the onsite team during a safety briefing and will be recorded in the field logbook.

1.1 OBJECTIVES AND METHODS

The primary objective of the remedial action is to remove and/or stabilize Manufactured Gas Plant (MGP) related wastes, specifically coal tar and purifier waste, located in the subsurface of the Site.

To meet these objectives, field activities will consist of the oversight of all land disturbances including land clearing, material excavation, blending and stockpiling of coal tar, backfilling, grading and in-situ stabilization (ISS) of purifier waste. Additional soil borings and core drilling is also expected during implementation of the remedial action. The Community Air Monitoring Plan (CAMP) will be implemented during all ground intrusive and dust-generating activities. The CAMP is described in Section 5 of this SHSP.

Impacted material consisting of coal tar will be remediated, while impacted material consisting of purifier waste will remain in place and remediated via ISS. Grab soil and/or groundwater samples for end-point sampling and waste characterization purposes as well as post ISS cores will be collected and screened with a properly calibrated photoionization detector (PID) with notes of visual/olfactory evidence. Soil, groundwater, and core samples will either be collected by Integral personnel or supervised by Integral and completed by a subcontractor under their own Health and Safety Plan. This will be determined on an as-needed basis.

1.2 ORGANIZATION

This SHSP covers soil/ISS borings, land clearing/grubbing, material excavation and stockpiling, backfilling, ISS, community air monitoring, and soil and groundwater sampling activities as part of the remedial action for the Site. Chemical and physical hazard evaluations are presented in Sections 2 and 3, respectively. Specific health and safety guidelines associated with each task, including a brief description of the work, are discussed in Section 11 (Task-Specific Safety Procedures).

1.3 ROLES AND RESPONSIBILITIES

All Integral personnel on this site must comply with the requirements of this SHSP. The Integral SHSP is a minimum standard for the Site and will be strictly enforced for all Integral personnel, or subcontractors or consultants, where applicable. The specific responsibilities and authority of management, safety and health, and other personnel on this site are detailed in the following paragraphs.

1.3.1 Site Safety Officer

The Site Safety Officer (SSO) has full responsibility and authority to implement this SHSP and to verify compliance. He or she reports to the project manager and is onsite or readily

accessible to the Site during all work operations. The SSO is responsible for assessing Site conditions and directing and controlling emergency response activities. The specific responsibilities of the SSO include the following:

- Managing the safety and health functions on this site
- Serving as the onsite point of contact for safety and health concerns
- Assessing site conditions for unsafe acts and conditions and ensuring corrective action
- Ensuring that all Integral employees and subcontractors understand and follow the SHSP
- Ensuring that daily work schedules and tasks are reasonable for the required levels of effort and weather conditions
- Confirming local emergency response phone numbers and locations
- Conducting and documenting the initial and daily or periodic health and safety briefings
- Evaluating and modifying the level of protective apparel and safety equipment, based on site conditions
- Ensuring that the field team observes all necessary decontamination procedures.

If the SSO determines that site conditions are unsafe, he or she has the authority to suspend field operations until the problem is corrected. The SSO can modify SHSP procedures in the field. Any changes must be documented in the field logbook, and field staff must be immediately informed of the change. The project manager and Integral's CHSM must be notified by phone or e-mail within 24 hours of any major changes to the SHSP.

1.3.2 Project Manager

The project manager has overall responsibility to ensure that personnel working onsite are safe. The specific responsibilities of the project manager include:

- Ensuring that the SHSP is developed prior to the field work or site visit
- Reviewing and approving the SHSP prior to the field work or site visit
- Ensuring employee understanding of and compliance with the SHSP.

1.3.3 Corporate Health and Safety Manager

The CHSM provides guidance to the project manager and SSO on SHSP preparation and reviews and approves the SHSP. The CHSM also serves as an arbitrator if there is a conflict

between the project manager, SSO, and field personnel. In addition, the CHSM[1] conducts periodic unannounced audits of Integral field operations to ensure compliance with the site-specific health and safety plan.

1.3.4 Field Personnel

All Integral personnel and subcontractors, where applicable, on this site are responsible for reading and complying with this SHSP, using the proper personal protective equipment (PPE), reporting unsafe acts and conditions, and following the work and safety and health instructions of the project manager and SSO. All Integral personnel, subcontractors, or consultants can and are encouraged to suspend field operations if they feel conditions have become unsafe.

1.4 SITE DESCRIPTION

The Site is located in the area known as the Hunts Point Food Distribution Center (HPFDC) in the Bronx, NY and is identified as Block 2778, Lot 100. The site is approximately 3.5 acres and is bound by Food Center Drive to the South, Halleck Street to the West, Viele Avenue to the North, and a parking lot and Nebraskaland (former VCA Site A OU-1) to the east. The true metes and bounds of Parcel A-2 is 3.2 acres but the fenced-in Site contains an additional 0.3 acres of off-site area that will be included for a total of 3.5 acres.

The property is currently owned by New York City Small Business Services (NYCSBS) and managed by the New York City Economic Development Corporation (NYCEDC). The Site is located within a larger area formerly used as a Manufactured Gas Plant (MGP), operated by Con Edison, from approximately 1926 to 1960. Plant operations included the manufacturing, storage, and distribution of coal gas.

- **Owners/tenants:** *NYCSBS/NYCEDC*
- **Site history:** *Former Con Edison Manufactured Gas Plant*
- **Current site use:** *Vacant*
- **Hazardous waste site:** *No*
- **Industrial waste site:** *No*
- **Topography (if applicable):** *Relatively flat with the exception of the northern soil/fill stockpile (approx. 10,000 yds^3)*
- **Site access:** *Food Center Drive*
- **Nearest drinking water/sanitary facilities:** *On-site or in vicinity*
- **Nearest telephone:** *Cellular*

[1] The audit task may be delegated to an office health and safety representative by the CHSM.

- **Size of site:** *3.2 acres with 0.3 acres off-site*
- **Pathways for hazardous substance dispersion:** *Dermal, Inhalation*

A detailed Site map is provided in Attachment 1 to this SHSP.

1.5 PROJECT MANAGER AND OTHER KEY CONTACTS

Table 1. Project Manager and Other Key Contacts

	Name (Affiliation)	Work Telephone	Cell Phone
Project Manager	Kevin McCarty (Integral)	(212) 440-6707	(917) 510-5147
SSO	Stacey Ng (Integral)	(212) 440-6713	(516) 998-8791
SSO (Alternate)	Ashley Platt (Integral)	(212) 440-6715	(908) 892-1354
CHSM	Matthew Behum (Integral)	(410) 573-1982, ext. 512	(443) 454-1615
Client Contact	Tracey Bell (NYCEDC)	(212) 312-3752	(347) 771-3200

2 CHEMICAL HAZARD EVALUATION

Potentially hazardous chemicals known to exist at the site are primarily Volatile Organic Compounds (VOCs), Heavy Metals, Semi-Volatile Organic Compounds (SVOCs), and Cyanide. While hydrogen sulfide (H_2S) has not been detected at Site to date, Section 2.5 provides detailed information for H_2S awareness in the event that it is detected during implementation of the remedial action. The chemicals of concern, applicable chemical properties, and potential exposure routes are presented in the following sections.

2.1 VOLATILE ORGANIC COMPOUNDS

VOCs such as benzene, toluene, ethylbenzene, and xylenes (BTEX) are expected to be present at Hunts Point Parcel A-2 as soil and groundwater contaminants in both the dissolved and free phase. These compounds tend to have a depressant effect on the Central Nervous System (CNS), may cause chronic liver and kidney damage, and certain VOCs (Benzene) are suspected human carcinogens. Short term, or acute, exposure to VOCs may include symptoms of headaches, dizziness, nausea, and skin and eye irritation. Workers on site can expect the primary route of exposures to VOCs to be inhalation, making respiratory protection the primary control against elevated levels of VOCs.

2.2 HEAVY METALS

Heavy metals such as arsenic, chromium, and mercury are typically found in MGP contamination associated with Hunts Point Parcel A-2. Exposure to elevated concentrations of these and other heavy metals at concentrations where exposure symptoms might occur is not expected. However, it is important to note that symptoms of acute exposure to chromium may include irritation of the eyes, nose and throat as well as wheezing and coughing. Acute exposure to mercury includes dizziness, salivation, nausea, vomiting, diarrhea, constipation, emotional disturbance, and kidney injury. Similar to VOCs, the primary route of exposure is through the inhalation of dust when soils become disturbed and the particles become airborne.

2.3 COAL TAR AND COAL TAR PRODUCTS

Coal Tar and Coal Tar products consist of a mixture of SVOCs, mainly Polycyclic Aromatic Hydrocarbons (PAHs) including the following: acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluorethene, benzo(a)pyrene, benzo(e)pyrene, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3cd)pyrene, 2-methyl-napthalene, naphthalene, phenanthrene, phenols, and pyrene.

Coal tar and its products are expected to be present within impacted soil and potentially the groundwater in both the dissolved and free form phases. It is believed the currently unused Hunts Point Parcel A-2 was used as a dumping ground for the by-products created from MGP processes.

Direct contact of coal tar to the skin can cause irritation and may produce itching, burning, swelling and redness. Long term exposure to coal tar vapors, specifically naphthalene, can also cause irritation to the eyes, as well as nausea, headache, fever, anemia, liver damage, vomiting, convulsions, and coma. High exposure levels may also increase the risk of cancers to the lungs, kidneys, and skin.

It is anticipated that Integral's major route of entry for work activities to be conducted at the site will be though direct contact, during handling of soil and groundwater samples and inhalation as soils are disturbed and/or excavated from the subsurface.

2.4 PURIFIER WASTE

Purifier waste is a typical byproduct of MGP operations. As part of the manufacturing process for production of coal gas, the gas must at first be cooled and then purified to remove impurities that would hinder its quality. These impurities typically include sulfur and cyanide compounds. To filter these compounds out of the gas, it is pressurized and then passed through layers of lime and/or wood chips permeated with iron fillings, also known as "purifier beds." Over time, these beds would become unusable, and fill up with coal tar. Purifier waste is typically found as a dark mixture of wood chips with a strong burnt odor. Once exposed to the ground surface, the waste often develops an iridescent blue color known as "Prussian Blue."

2.4.1 Cyanide Compounds

Cyanide compounds are common by-products of purifier wastes and manufactured gas production. Hydrogen cyanide (HCN) is a toxic gas which is a chemical asphyxiant that replaces oxygen in the blood, causing cells to suffocate. Also potentially present are ferrocyanides, which are not considered toxic because the hydrogen cyanide ion is bound too tightly to the iron present in this molecule. Because of this tight bond, ferrocyanides will not replace the oxygen in blood cells. A large amount of energy in the form of heat and/or acid is required to release cyanide from the ferrocyanide molecule; therefore HCN and ferrocyanides are not concerns for this site, however plans to monitor for HCN during boring activities is planned via a hydrogen cyanide monitor included in the MultiRae.

2.5 HYDROGEN SULFIDE AWARENESS

Hydrogen sulfide is a colorless gas known for its pungent "rotten egg" odor at low concentrations. It is extremely flammable, soluble in water, and highly toxic (Tables 2 and 3). Hydrogen sulfide is used or produced in a number of industries, including oil and gas refining, mining, pulp and paper processing, and rayon manufacturing (OSHA 2015a). Integral employees or subcontractors may come in contact with hydrogen sulfide during excavation operations.

Potential acute effects and symptoms from hydrogen sulfide exposure are listed in Table 3. Typical background concentrations range from 0.1 to 0.3 parts per billion. At 0.01 to 1.5 parts per million (ppm), humans start detecting the rotten egg smell emitted by hydrogen sulfide in the atmosphere. Nausea may begin with prolonged exposures ranging from 2 to 5 ppm (i.e., <10 ppm permissible exposure limit [PEL]; Table 2). Exposure to concentrations at 20 ppm can result in irritability and fatigue. Death may occur after 48 hours of exposure to hydrogen sulfide at 100 to 150 ppm, with more immediate, acute effects occurring at higher concentrations, including immediate paralysis of olfactory nerves.

Employees working at sites with potential exposure to hydrogen sulfide will be outfitted with a gas-detector instrument with an alarm set to 10 ppm (National Institute of Occupational Safety and Health [NIOSH] 10-minute ceiling recommended exposure limit / Occupational Safety and Health Administration [OSHA] construction 8-hour PEL). If the detector alarm sounds, indicating that a 10 ppm hydrogen sulfide atmosphere has been reached, work will cease and all staff will evacuate the area. As long as hydrogen sulfide atmospheres at a work site are 10 ppm or higher, work may only commence if supplied air is available (e.g., a self-contained breathing apparatus [SCBA]). Integral field personnel do not maintain appropriate training for SCBAs; consequently, if it is necessary to don an SCBA at a jobsite, Integral will contract the fieldwork to a qualified and properly trained subcontractor.

During sampling and excavation activities, all staff (Integral personnel and subcontractors) will be aware of site-specific contingency planning as well as evacuation routes, emergency contact information, and hospital routes as documented in this SHSP. All staff will also fully understand the potential dangers of hydrogen sulfide exposure and will take appropriate safety precautions to assure adequate protection during fieldwork as outlined in the health and safety meeting. Kickoff tailgate meetings will be conducted prior to all sampling events to highlight and discuss these precautions.

Table 2. PELs for Hydrogen Sulfide

Threshold	Concentration (ppm)
NIOSH REL (10-minute ceiling)	10
General industry ceiling limit / OSHA 1926 standard	20
Construction 8-hour limit / OSHA 1910 standard	10

Notes:
NIOSH = National Institute of Occupational Safety and Health
OSHA = Occupational Safety and Health Administration
PEL = permissible exposure limit
ppm = parts per million
REL = recommended exposure limit

Source: https://www.osha.gov/SLTC/hydrogensulfide/hazards.html

Table 3. Acute Symptoms and Effects of Hydrogen Sulfide Exposure in Humans

Concentration (ppm)	Symptoms / Effects
0.00011–0.00033	Typical background concentrations
0.01–1.5	Odor threshold (rotten egg smell)
2–5	Prolonged exposure may cause nausea
20	Possible fatigue, irritability
100	Coughing and olfactory fatigue
100–150	Loss of smell (olfactory paralysis); death may occur by 48 hours
200–300	Marked conjunctivitis and respiratory tract irritation after 1 hour; pulmonary edema may occur from prolonged exposure
500–700	Collapse in 5 minutes; serious eye damage after 30 minutes; death in 30 to 60 minutes
700–1,000	Immediate collapse in one to two breaths; death in minutes
1,000–2,000	Nearly instant death

Notes:
ppm = parts per million

Source: https://www.osha.gov/SLTC/hydrogensulfide/hazards.html

2.6 EVALUATION OF ORGANIC VAPOR EXPOSURE

Exposure to organic vapors in the work zones will be evaluated and/or controlled by the following:

- Monitoring air concentrations for organic vapors in the breathing zone and work zones will be completed using a PID + 4-gas meter (MultiRae).
- If action levels for MultiRae detections (see section 5.4) are met, contingency plans will be enforced.

2.7 EVALUATION OF SKIN CONTACT AND ABSORPTION

Skin contact by contaminants may be controlled by use of proper hygiene practices, PPE, and good housekeeping procedures. PPE is discussed in Section 4 and will be donned by Integral personnel wherever there is potential to come in contact with contaminated media or materials during site work.

2.8 CHEMICAL PROPERTIES

The following table (Table 4) lists the historical site maximum constituent concentrations for constituents at the Site. The table also lists the chemical properties and OSHA permissible exposure limit (PEL), short-term exposure limit (STEL), and immediately dangerous to life and health (IDLH) level. Breathing zone air can be monitored to ensure that the chemicals do not exceed the PEL. If any of the chemicals exceed the PEL, immediate action is required (e.g., don respirators, leave site) as designated in Section 5 (Air Monitoring) in this SHSP.

Table 4. Chemical Properties

Chemical of Concern	Concentration (site maximum or range expected)	Medium	OSHA PEL	OSHA STEL	OSHA IDLH	IP(eV)	Carcinogen or Other Hazard
Alconox (Tetrasodium Pyrophosphate)	Concentrated	Decon	5 mg/m^3	--	--	--	Irritant
Isobutylene	Concentrated	Gas	--	--	--	--	Flammable; Asphyxiant
Hydrogen Cyanide	Unknown	Soil Gas	TWA 10 ppm (11 mg/m^3 [skin])	NIOSH STEL 4.7 ppm	50 ppm	13.60	Asphyxiant
Hydrogen Sulfide	Unknown	Soil Gas	20ppm, 10-minute max (NIOSH REL 10 ppm, 10-minute max [15mg/m^3])	--	100 ppm	10.46	Toxic; Irritant
Arsenic	31.6 mg/kg	Soil	TWA 0.010 mg/m^3 (NIOSH REL 0.002 mg/m^3)	--	5 mg/m^3	--	Carcinogen; Toxic; Combustible
Benzene	1.8 ug/L	Soil, Groundwater	TWA 1 ppm (NIOSH REL TWA 0.1 ppm)	5 ppm (NIOSH STEL 1 ppm)	500 ppm	9.24	Carcinogen
Carbon Disulfide	1900 ug/L	Groundwater	TWA 20 ppm (NIOSH REL TWA 1 ppm)		NIOSH IDLH 500 ppm	--	Toxic; Irritant
Coal Tar Pitch Volatiles (PAHs)	30679 mg/kg	Soil	TWA 0.2 mg/m^3 (NIOSH REL 0.1 mg/m^3)	--	80 mg/m^3	--	Carcinogen
Chromium	80.1 mg/kg	Soil	TWA 0.005 mg/m^3 (NIOSH REL 0.0002 mg/m^3)	--	15 mg/m^3	--	Carcinogen
Cyanide	1280 mg/kg, 4240 ug/L	Soil, Groundwater	TWA 5 mg/m^3 (NIOSH REL 5 mg/m^3)		NIOSH IDLH 25 mg/m^3		Toxic; Asphyxiant; Irritant

Chemical of Concern	Concentration (site maximum or range expected)	Medium	OSHA PEL	OSHA STEL	OSHA IDLH	IP(eV)	Carcinogen or Other Hazard
Ethylbenzene	Unknown	Soil	TWA 100 ppm (NIOSH REL TWA 100 ppm)	NIOSH STEL 125 ppm	800 ppm	8.76	Toxic; Irritant
Lead	2210 mg/kg, 347 ug/L	Soil	TWA 0.050 mg/m^3 (NIOSH REL 0.050 mg/m^3)	--	100 mg/m^3	--	--
Mercury	2.78 mg/kg	Soil, Groundwater	TWA 0.1 mg/m^3 (NIOSH REL TWA 0.05 mg/m3	--	10 mg/m^3	10.4	Toxic; Irritant
Naphthalene	30679 mg/kg	Soil, Groundwater	TWA 10 PPM (NIOSH REL TWA 10ppm)	NIOSH STEL 15 ppm	250 ppm	8.12	Toxic; Irritant
Toluene	36 mg/kg	Soil	TWA 200 PPM (NIOSH REL TWA 100 ppm)	NIOSH STEL 150 ppm	500 ppm	8.82	Flammable liquid
Xylene	52 mg/kg	Soil	100 ppm (NIOSH REL 100pm)	--	900 ppm	8.44-8.56	Flammable

Notes:
-- = none established
Ca = carcinogen
IDLH = immediately dangerous to life and health
IP(eV) = ionization potential (electron volts)
mg/kg = milligrams per kilogram
mg/m^3 = milligrams per cubic meter
NA = not available
PEL = permissible exposure limit
ppm = parts per million
STEL = short-term exposure limit

Table 5 below summarizes the chemical characteristics and potential chemical exposure routes at the site.

Table 5. Chemical Characteristics and Potential Chemical Exposure Routes

	Likely	Possible	Unlikely
Potential Chemical Exposure Routes at the Site:			
Inhalation		X	
Ingestion			X
Skin absorption		X	
Skin contact		X	
Eye contact		X	
Chemical Characteristics:			
Corrosive			X
Flammable		X	
Ignitable			X
Reactive			X
Volatile		X	X
Radioactive			X
Explosive			X
Biological agent			X
Particulates or fibers		X (dust, metals)	
If likely, describe:			

3 PHYSICAL HAZARD EVALUATION AND GUIDELINES

The following sections present general physical hazards and guidelines.

3.1 GENERAL PHYSICAL HAZARDS

The following table (Table 6) presents possible physical hazards that are expected to be present during field activities.

Table 6. General Physical Hazards

Possible Hazard	Yes	No	Proposed Safety Procedure
Heavy equipment	X		Stay back from operating equipment; wear safety vests and hard hats; coordinate and maintain eye contact with equipment operator.
Material handling	X		Lift properly; seek assistance if necessary; do not overfill coolers or boxes. Seek assistance if drums must be moved.
Adverse weather	X		Seek shelter during electrical storms; work in adverse weather conditions only with proper training and equipment.
Excavations	X		Do not enter excavations greater than 4 ft in depth without evaluation by a qualified person and implementation of applicable trenching and excavation safeguards as required by law.
Plant/animal hazards	X		Know local hazards and take appropriate precautions. Use insect repellent if mosquitoes are persistent.
Uneven terrain/tripping	X		Use caution, wear properly fitting shoes or boots, and keep work area orderly.
Noise	X		Wear ear protection when working around heavy equipment and other noise sources.
Heat Stress	X		Follow heat stress information (Attachment 3). *Note:* potential for heat stress will depend on season and location of the site.
Cold/hypothermia	X		Keep warm and dry; bring changes of clothes; do not work in extreme conditions without proper equipment and training. Follow cold stress information (Attachment 3). *Note:* potential for cold/hypothermia will depend on season and location of the site.
Falling objects	X		Wear hard hats near overhead hazards (i.e., winch).

Summary of potential physical hazards posed by proposed site activities:

Activity	Potential Hazard
Land clearing; Excavation and Drilling Oversight; Material transport; Community Air Monitoring	Heavy equipment, slips/trips/falls, falling objects, noise, plant/animal hazards, material handling, adverse weather, cold/hypothermia, heat stress, excavations
Sample handling/mobilization	Material handling, slips/trips/falls

4 PERSONAL PROTECTIVE EQUIPMENT AND SAFETY EQUIPMENT

The following sections address PPE and safety equipment required for completing the field activities.

4.1 PERSONAL PROTECTIVE EQUIPMENT

Based on the hazards identified above in Sections 2 and 3, the following table (Table 7) identifies the PPE required for site activities.

Table 7. Personal Protective Equipment

Site Activity	Level of Protection	
	Initial	Contingency [a]
Excavation and Drilling Oversight	D	Leave Exclusion Zone and assess situation
Air Monitoring	D	Leave Exclusion Zone and assess situation
Soil Sampling	D	Leave Exclusion Zone and assess situation

[a] Based on unexpected change in site conditions

Each level of protection will incorporate the following PPE:

Level D	X	Long pants and shirt or work coveralls, hard hat, latex or nitrile gloves, eye protection, traffic safety vest, and steel-toed boots are required. Hearing protection and work gloves are required as needed.

4.2 SAFETY EQUIPMENT

The following safety equipment will be onsite during the proposed field activities.

Air Monitoring (check the items required for this project)

- [X] PID
- [X] LEL/O_2 meter
- [X] H_2S meter
- [ ] Air sampling pumps
- [X] DustTrak II (particle monitor)
- [ ] Radiation meter

☐ Detector pump and tubes (e.g., benzene)
☐ Other: _____

First Aid Kit (mandatory, including absorbent compress, adhesive bandages, adhesive tape, antiseptic, burn treatment, medical exam gloves, sterile pad, CPR shield, triangle bandage, scissors [for cutting off the PPE from an injured person])
(check additional items required for the site)

☒ Emergency blanket
☒ Insect repellent
☒ Sunscreen
☐ Other: _____

Other (check the items required for this project)

☒ Eyewash
☒ Drinking water
☐ Fit test supplies
☒ Fire extinguisher

☐ Stopwatch for monitoring heart rate for heat stress monitoring[2]
☐ Thermoscan® thermometer for heat stress monitoring
☐ Survival kit[3]
☐ Personal flotation device
☐ Cool vests
☐ Windsock
☒ Cellular phone
☐ Radio sets
☐ Global positioning system
☐ Other: _____

[2] Heart rate monitoring requires special training.
[3] Consult the CHSM for guidance for site-specific survival kits.

5 AIR MONITORING

The purpose of the air monitoring program is to avoid or minimize exposure of the field personnel and the public to potential environmental hazards in the soil during remedial activities. Results of the air monitoring will be used to determine the appropriate response action, if needed.

29 CFR 1910.120(h) specifies that monitoring shall be performed where there may be a question of employee exposure to hazardous concentrations of hazardous substances in order to assure proper selection of engineering controls, work practices and personal protective equipment so that employees are not exposed to levels which exceed permissible exposure limits, or published exposure levels if there are no permissible exposure limits, for hazardous substances.

Air monitoring will be conducted when entering previously uncharacterized sites, when working in the vicinity of uncontained chemicals or spills, when opening containers and well casings, and prior to opening confined spaces. (Note: Integral personnel are not trained or authorized to enter confined spaces under any circumstances.) Air monitoring must be conducted to identify potentially hazardous environments and determine reference or background concentrations. Air monitoring can sometimes be used to augment judgment in defining exclusion zones.

5.1 INTRODUCTION

Personal air monitoring involves collection of samples within the breathing zone of the field personnel to better understand exposures, ensure appropriate levels of PPE, and document compliance with regulation. Such samples may be full shift for comparison to PELs (or other applicable occupational exposure limits) or short term, for comparison to STELs. Some chemicals in soil or aqueous media may volatilize or become aerosolized and be inhaled by field personnel.

A total of three CAMP stations, each containing a MultiRae and DustTrak will be set up on-site during all excavation and material management activities. Two stations will be set up at downwind locations in the immediate vicinity of the active excavation and in the staging/material loading area. Background concentrations will be established at the third station (an upwind location), away from the work activities.

Breathing zone air can be monitored to ensure that the chemicals do not exceed a regulatory or project-specific action level (generally 50 percent of the PEL). Integral commonly uses photoionization detectors (PIDs) and dust meters (e.g., MINIRAM [Miniature Real-time Aerosol Monitor]) for monitoring volatile organic compounds and particle constituents, respectively. In practice, the air directly in the field personnel's breathing zone is monitored with the PID and

dust meter for 10-15 seconds. The highest reading is recorded in the project logbook and checked against the site-specific action level in the table below (Table 8). If any of the constituents exceed the action level presented in Section 5.4, immediate action is required (e.g., don respirators, leave site, etc.) as designated[4].

The following sections provide general guidance on the selection and calibration of PIDs, 4-gas meters and dust meters, which are typically rented for Integral field projects.

5.2 PHOTOIONIZATION DETECTOR AND 4-GAS METER (MULTIRAE)

It is critical to order a MultiRae (PID + 4-gas meter) with a detector lamp with the appropriate ionization energy to detect VOC chemicals of interest at the site. The ionization energy of the lamp must be greater than the ionization potential of the chemicals of interest. (Ionization potentials are listed in the National Institute of Occupational Safety and Health [NIOSH] pocket guide to chemicals and are presented in Section 2). Be sure that the meter arrives at least a day prior to the start of the fieldwork so field personnel can familiarize themselves with the operation of the meter and confirm that it was not damaged during shipping. Field personnel must also read the operation manual to become familiar with operation of the MultiRae prior to use in the field. Note that moisture may damage the detector lamp and/or provide erroneous readings, so a moisture filter is used on the probe. Also note that the MultiRae will only accurately quantitate the material used in the calibration process. A response factor is used to measure the sensitivity of the meter to particular chemicals present at the site. Response factors are normally presented in the operation manual for the MultiRae.

The MultiRae must be calibrated daily in accordance with the manufacturer's specifications, which are provided in the operation manual. The calibration typically requires the use of a span gas (generally 100 ppm isobutylene and 4-gas mix (CO, H_2S, O_2 & N_2)) and zero gas (generally fresh air). Be sure that all the required calibration equipment/supplies are provided with the PID (e.g., span gas cylinder, regulator, tubing, and Tedlar™ bag). Record calibration data in the field logbook.

A MultiRae (PID + 4-gas) will be set up at an upwind location and two locations downwind of major excavations. The MultiRae will continuously calculate 15-minute running average concentrations. If downwind PID readings are sustained at 5 ppm above background levels, work will stop until concentrations have subsided. The MultiRae will also be used to monitor oxygen (O^2), hydrogen sulfide (H_2S), and hydrogen cyanide (HCN) concentrations immediately in the working areas. Monitoring for vapors should be conducted in the breathing zone of employees using these MultiRae's during remedial activities in the potentially contaminated

[4] Note that neither the PID nor the MINIRAM can identify chemicals. The PID detects total ionizable volatile organic compounds and the MINIRAM detects total particles of sufficient diameter to be detected.

areas. If levels are sustained for one minute in the breathing zone above 5 ppm for VOCs, 5 ppm for H_2S, and 1 ppm for HCN, Integral will stop work until these concentrations have subsided.

The action levels for organic vapors are based on the *VOC Monitoring, Response Levels, and Actions* section of the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (Appendix 1A of DER-10).

5.3 DUST METERS (DUSTTRAK II)

It is critical that the dust meter is capable of measuring the concentrations of airborne dust that are at or below the site-specific action levels presented below. Be sure that the meter arrives at least a day prior to the start of the fieldwork so field personnel can familiarize themselves with the operation of the meter and confirm that it was not damaged during shipping. Field personnel must also read the operation manual to become familiar with its operation prior to use in the field.

The dust meter must be field checked (i.e., zeroed) daily in accordance with the manufacture's specifications, which are provided in the operation manual. A dust meter field check typically involves zeroing the meter with ambient or filtered air. Be sure that all the required zeroing and operational equipment/supplies are provided with the dust meter. Record field check data in the field logbook.

Real time monitoring for airborne dust should be performed during excavation activities with equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The instrument to be used is the DustTrak II Aerosol Monitor or equivalent with a latching alarm. The instrument will be fitted with an omnidirectional sampling inlet to get representative samples under a variety of wind speeds and directions. A RAM-TCH inlet heater may also be used in humid conditions to remove water vapor from the sampling stream.

The dust monitor should be set up upwind and downwind of the excavation activities to verify that dust control methods are adequate. If the downwind PM-10 particulate level is 100 $\mu g/m^3$ greater than background for the 15-minute period or if airborne dust is observed leaving the work area, dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do no exceed 150 $\mu g/m^3$ above the upwind level and provided that no visible dust is migrating from the work area. Should dust control measures fail to reduce total dust concentrations below 150 $\mu g/m^3$, above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 $\mu g/ m^3$ of the upwind level and in preventing visible dust migration.

5.4 ACTION LEVELS

The following table (Table 8) lists action levels have been established to determine appropriate actions to be taken during site investigation activities:

Table 8. Action Levels

Instrument	Observation	Action	Comments
MultiRae (VOC)	≤5 ppm over background sustained for 1 minute	Continue working	No respiratory protection required
MultiRae (VOC)	≥5 ppm over background sustained for 1 minute	Stop Work	Stop work activities until organic vapor levels subside below 5 ppm
MultiRae (H_2S)	≤5 ppm over background sustained for 1 minute	Continue working	No respiratory protection required
MultiRae (H_2S)	≥5 ppm over background sustained for 1 minute	Stop Work	Stop work, cover area, withdraw from area, institute engineering controls, contact SSO & CHSM
MultiRae (HCN)	≤1 ppm over background sustained for 1 minute	Continue working	No respiratory protection required
MultiRae (HCN)	≥1 ppm over background sustained for 1 minute	Stop Work	Stop work, cover area, withdraw from area, institute engineering controls, contact SSO & CHSM
Dust Meter	<100 µg/m^3	Continue working	
Dust Meter	≥100 µg/m^3	Employ dust suppression techniques	Stop and re-evaluate work activities if dust concentration is above 150 µg/m^3

The action level for dust is based on the *Particulate Monitoring, Response Levels, and Actions* section of the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (Appendix 1A of DER-10).

Dust monitoring measurements should be recorded on the instrument data logger and downloaded daily. Data should be cleared from the data logger before the next day's use. The readings should be recorded every 15 minutes as well as complete sampling time integrated averages. The field notebook or other suitable log book should be used to describe the location of the dust monitor relative to the dust generating activities as well as wind direction. A copy of this description should be attached to the printout of the dust monitor data.

Weekly air monitoring reports shall be submitted to the Department while excavation and redevelopment activities are performed at the site.

Maintain, calibrate, and field check all air monitoring equipment in accordance with the manufacturer's recommendations.

6 HEALTH AND SAFETY TRAINING AND MEDICAL MONITORING

The following sections present requirements for health and safety training and medical monitoring.

6.1 HEALTH AND SAFETY TRAINING AND MEDICAL MONITORING

State and federal laws establish training requirements for workers at uncontrolled hazardous waste sites (including areas where accumulations of hazardous waste create a threat to the health and safety of an individual, the environment, or both). Integral and its subcontractor personnel are required to complete the following training requirements prior to working at the site.

6.2 TRAINING REQUIREMENTS

Task	No Training	24-hour	40-hour[a]	Supervisor[b]	First Aid/CPR[c]	Medical Monitoring
Integral Field Personnel						
Stacey Ng			X	X	X	X
Ashley Platt			X		X	X
Kathryn Corso			X		X	X

Notes:

[a] Must have current OSHA 8-hour refresher if it has been more than a year since the OSHA 40-hour training.

[b] At least one person onsite must be OSHA HAZWOPER supervisor trained if this is a hazardous waste site.

[c] All Integral field samplers onsite must be first aid/CPR trained.

[d] Integral subcontractors and consultants may have requirements that are more stringent than those listed above. These are minimum training and monitoring requirements required to work on this site.

6.2.1 Site Safety Meetings

Site safety meetings must be held before beginning new tasks or when new staff enter the site. Site safety meetings should be held at a minimum of once a week and should be held daily on complex or high hazard projects. Tailgate safety meetings should occur every morning during review of the day's work plan, covering specific hazards that may be encountered. Additional meetings will be held at any time health and safety concerns are raised by any of the personnel. Attendance and topics covered, including tailgate meetings, are to be documented in the field logbook.

6.3 MEDICAL MONITORING

OSHA requires medical monitoring for personnel potentially exposed to chemical hazards in concentrations in excess of the PEL for more than 30 days per year and for personnel who must use respiratory protection for more than 30 days per year. Integral requires medical monitoring for all employees potentially exposed to chemical hazards.

Will personnel working at this site be enrolled in a medical monitoring program?	Yes	X	No	

7 EMERGENCY RESPONSE PLAN

The following sections discuss emergency recognition and prevention, emergency response and notification, emergency decontamination, and site communications.

7.1 EMERGENCY RECOGNITION AND PREVENTION

It is the responsibility of all personnel to monitor work at the site for potential safety hazards. All personnel are required to immediately report any unsafe conditions to the SSO. The SSO is responsible to immediately take steps to remedy any unsafe conditions observed at the work site.

The following are examples of some emergency situations that could occur during the Hunts Point Parcel A-2 field activities:

- Slips, trips and falls (on sloped areas, steel stairs, etc.)
- Lacerations from scrap metal (in soil, waste piles, etc.)
- The air monitoring action level is exceeded
- Entrainment of clothes or objects in moving equipment or parts
- Serious injury or illness (e.g., physical injury, heart attack)
- Severe thunderstorm with lightning.

Immediate actions will be taken by the field team under the leadership of the SSO in response to these emergencies.

7.2 EMERGENCY RESPONSE AND NOTIFICATION

If an emergency at the site warrants it, all personnel must immediately evacuate the affected work area and report to the SSO at the predetermined emergency assembly location:

Field vehicle

In case of injury, field personnel should take precautions to protect the victim from further harm and notify local or facility emergency services. In remote areas, it will be necessary to have first aid-trained personnel on the field team. The victim may require decontamination prior to treatment if practicable—requirements will vary based on site conditions.

Emergency medical care will be provided by:

- [X] Local emergency medical provider (NYPD/FDNY)
- [ ] Facility emergency medical provider
- [ ] First aid-trained field staff (for remote areas only)

Local Resources	Name	Telephone	Notified Prior to Work (Yes/No)?
Fire	FDNY	911	No
Police	NYPD	911	No
Ambulance	FDNY	911	No
Hospital	Lincoln Medical Hospital	(718) 579-5016	No
Site phone	N/A		
Directions to the hospital:	See attached map.		

The SSO must confirm that the hospital listed is still in operation and that it has an emergency room. **It is required that the SSO drive to the hospital so that the directions are practiced and understood prior to initiating fieldwork.**

Corporate Resources	Name	Work Telephone	Cell Phone
Integral CHSM [a]	Matthew Behum	Office: (410) 573-1615	(443) 454-1615
Integral President	Bill Locke	Office: (720) 465-3315	(303) 548-1111
Integral Human Resources Manager	Amy Logan	Office: (303) 404-2944 ext. 12	NA
Medical Consultant	Dr. Peter Greaney, MD (WorkCare)	Office: (800) 455-6155 ext. 2219	NA
Incident Intervention Consultation Line		1-(888) 449-7787	

Notes:

[a] If the CHSM cannot be reached, call Eron Dodak – Office: (503) 943-3614; Cell: (503) 407-2933. If Eron Dodak cannot be reached, call Ian Stupakoff–Office: (360) 705-3534; Cell: (360) 259-2518. If Ian Stupakoff cannot be reached, call David Livermore–Office: (503) 943-3613; Cell: (503) 806-4665.

In case of serious injuries, death, or other emergency, the Integral CHSM must be notified immediately at the phone numbers listed above. The Integral CHSM will notify the project manager and Integral's president. The project manager will notify the client.

7.3 EMERGENCY DECONTAMINATION PROCEDURES

In case of an emergency, if possible, gross decontamination procedures will be promptly implemented. If a life-threatening injury occurs and the injured person cannot undergo decontamination procedures onsite, then the medical facility will be informed that the injured person has not been decontaminated and given information regarding the most probable chemicals of concern. Decontamination procedures should not be implemented if there is not a reasonable possibility that the injured party requires such intervention.

Decontamination procedures will only be used if practical and if they will not further injure the person or delay treatment. Decontamination procedures should not be implemented if there is not a reasonable possibility that the injured party requires such intervention. The SSO will make the determination on whether or not to decontaminate the injured person. The following steps will be followed for decontaminating injured personnel while onsite:

- If it will not injure the person further, cut off PPE using scissors or scrub the gross contamination from the injured person's PPE (e.g., Tyvek® coveralls, work boots) with a Liquinox® or Alconox® solution followed by a rinse with tap or deionized/distilled water
- Remove PPE if feasible without further injuring the person.

7.4 SITE COMMUNICATIONS

Each field team will carry a cell phone that is in good working order. If there is any type of emergency that requires the site to be evacuated (e.g., severe thunderstorm with lightening, chemical release), the field team leader will blow the air horn three times. When the horn sounds, all personnel will meet at the predetermined emergency assembly location (Food Centre Drive entrance). All other emergency notifications that do not require evacuation (e.g., a minor injury) will be conducted using a cell phone. Emergency phone numbers are listed above in Section 7.2.

7.5 BUDDY SYSTEM

The buddy system will be used at the site at all times. The buddy system is a system of organizing employees into field teams in such a manner that each employee of the field team is designated to be observed by at least one other employee in the field team. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

8 WORK ZONES

Work zones are defined as follows:

Contamination reduction zone	Area between the exclusion and support zones that provides a transition between contaminated and clean zones
Exclusion zone	Any area of the site where hazardous substances are present, or are reasonably suspected to be present, and pose an exposure hazard to personnel
Support zone	Any area of the site, so designated, that is outside the exclusion and contamination reduction zones

Site control measures in work zones are described below for each type of field activities.

8.1 EXCAVATION AND ISS OVERSIGHT, LAND CLEARING/GRUBBING, SOIL BORINGS AND AIR MONITORING

Exclusion zone: An approximate 12-ft radius around heavy machinery will be clearly marked with orange traffic safety cones, caution tape, before entry to ensure safe working conditions. Only properly equipped and trained (i.e., wearing level D PPE) personnel will be allowed in this area.

Contamination reduction zone: All decontamination activities will occur inside the exclusion zone.

Support zone: All areas outside the exclusion and contaminant reduction zones.

Controls to be used to prevent entry by unauthorized persons: No unauthorized personnel will be allowed into the exclusion/contaminant reduction zones.

9 EQUIPMENT DECONTAMINATION AND PERSONAL HYGIENE

9.1 EQUIPMENT DECONTAMINATION PROCEDURES

After sampling is completed, the exclusion zone will be used as the contaminant reduction zone for decontamination activities, provided there is no contamination remaining after the sampling is completed. To minimize or prevent personal exposure to hazardous materials, all personnel working in the exclusion zone and contaminant reduction zone will comply with the following decontamination procedures:

- All gloves, rain gear, and boots will be removed prior to entering the field vehicle.

Decontamination equipment required at the site includes the following:

- Buckets or tubs
- Laboratory grade distilled/deionized water
- Site water
- Scrub brushes (long-handled)
- Liquinox or Alconox detergent
- Plastic bags
- Foil
- Paper towels
- Garbage bags
- Clean garden sprayer

All non-disposable components of the sampling equipment (e.g., stainless steel spoons and bowls used for sample composting) that contact the sediment will be decontaminated using the following steps:

1. Rinse with site water/tap water
2. Wash with Alconox or Liquinox detergent
3. Rinse with site water/tap water
4. Allow to air dry
5. Wrap up compositing equipment in aluminum foil.

9.2 PERSONAL HYGIENE

The following personal hygiene practices will be used at the site to reduce exposure to chemicals.

- Long hair will be secured away from the face so it does not interfere with any activities.

- All personnel leaving potentially contaminated areas will wash their hands, forearms, and faces in the contaminant reduction zone prior to entering any clean areas or eating areas.
- Personnel leaving potentially contaminated areas will shower (including washing hair) and change to clean clothing as soon as possible after leaving the site.
- No person will eat, drink, or chew gum or tobacco in potentially contaminated areas. Single portion drink containers and drinking of replacement fluids for heat stress control will be permitted only in support areas.
- Smoking is prohibited by Integral personnel and subcontractors in all areas of the site because of the potential for contaminating samples and for the health of the field team.

10 VEHICLE SAFETY, SPILL CONTAINMENT, AND SHIPPING INSTRUCTIONS

10.1 VEHICLE SAFETY

Integral's vehicle safety program requires the following:

- Cell phone usage while driving is not allowed, including the use of hands-free devices. If it not feasible to wait to use the cell phone until arriving at your destination, pull off the road and park in a safe location to use the cell phone. Do not pull to the side of the road to use a cell phone because this significantly increases the risk of a rear-end collision.
- All vehicles are to be operated in a safe manner and in compliance with local traffic regulations and ordinances.
- Drivers are to practice defensive driving and drive in a courteous manner.
- Drivers are required to have a valid driver's license and liability insurance (per local state laws).
- Seat belts are to be worn by the driver and all passengers.
- No persons are allowed to ride in the back of any trucks or vans, unless equipped with seatbelts.
- Vehicles are to be driven in conformance with local speed limits.
- Personnel who are impaired by fatigue, illness, alcohol, illegal or prescription drugs, or who are otherwise physically unfit, are not allowed to drive or work on Integral field sites.
- Personnel are to avoid engaging in other distractions such as changing radio stations while driving.
- Motor vehicle accidents are to be reported to the responsible law enforcement agency, the Integral human resources manager, and the Integral CHSM on the same day of occurrence. Documentation of damage should be photographed.
- Personnel who have experienced work-related vehicle accidents or citations may be required to complete a defensive driving program.

10.2 SPILL CONTAINMENT

No bulk chemicals will be used at the site.

10.3 SHIPPING INFORMATION

Federal laws and international guidelines place restrictions on what materials may be shipped by passenger and cargo aircraft. In addition, 49 CFR regulates labeling, manifesting, and shipment of all packages containing potentially hazardous materials. In the course of this field investigation, the following items will be shipped to and from the site as shown below:

Item	Hazardous Constituent	Quantity	Packaging	How Shipped
Samples	None	(various quantities) solid and liquid matrix samples	Coolers	Laboratory courier
Calibration Gas (Isobutylene and 4-gas mix)	None	Two (2) 17 liter canisters	Pressurized canister	Equipment rental courier

A 24-hour emergency response number (on any shipping documents such as a Uniform Hazardous Waste Manifest, Shipper's Declaration of Dangerous Goods, etc.) is required for shipments of all dangerous or hazardous goods. Integral does not have a 24-hour emergency contact number for dangerous or hazardous goods shipment. No dangerous or hazardous goods may be shipped by Integral until an account is set up with a 24-hour emergency response service, such as CHEM-TEL (1-813-248-0573). If any hazardous or dangerous goods need to be shipped for a project, they must be shipped directly to the site by the supplier. Any hazardous or dangerous goods that are not used in the course of the field effort must remain at the site.

The samples will be prepared and labeled for shipment in accordance with the sampling and analysis plan developed for the site.

Air shipment of equipment with lithium batteries is required to note the presence of these batteries. Warning labels are available from the equipment rental agency and can be copied.

11 TASK-SPECIFIC SAFETY PROCEDURE SUMMARY

11.1 EXCAVATION AND ISS OVERSIGHT, LAND CLEARING/GRUBBING, SOIL BORINGS AND AIR MONITORING

Integral personnel will wear the appropriate PPE at the Site as outlined in Section 4 while working outside field vehicles and when around or in contact with contaminated media. The work area breathing zone will be monitored frequently using a PID, a handheld enhanced PID, hydrogen sulfide meter, and dust meter as outlined in Section 5. Care will be exercised while lifting, assembling, and decontaminating equipment. Personnel will wear high visibility vests or clothing while working around vehicular traffic and heavy equipment operation. Hearing protection will be worn at all times while working in proximity to noisy equipment.

Integral personnel will stay outside of the swing radius of operational backhoes and/or drill rig machinery at all times, and will first gain the attention of the operator when needing to approach the path of the machine. Personnel will work upwind or crosswind to excavation activities whenever possible. Equipment will only be approached from the front or side of the cab. A fire extinguisher will be available within 25 feet of motorized work at all times.

Integral personnel will stay clear of excavation edges unless the ground is confirmed to be stable and not undercut. Personnel will not enter excavations greater than 4 feet in depth. Excavation spoils and other materials will be kept at least 2 feet from the trench edges.

ATTACHMENT 1

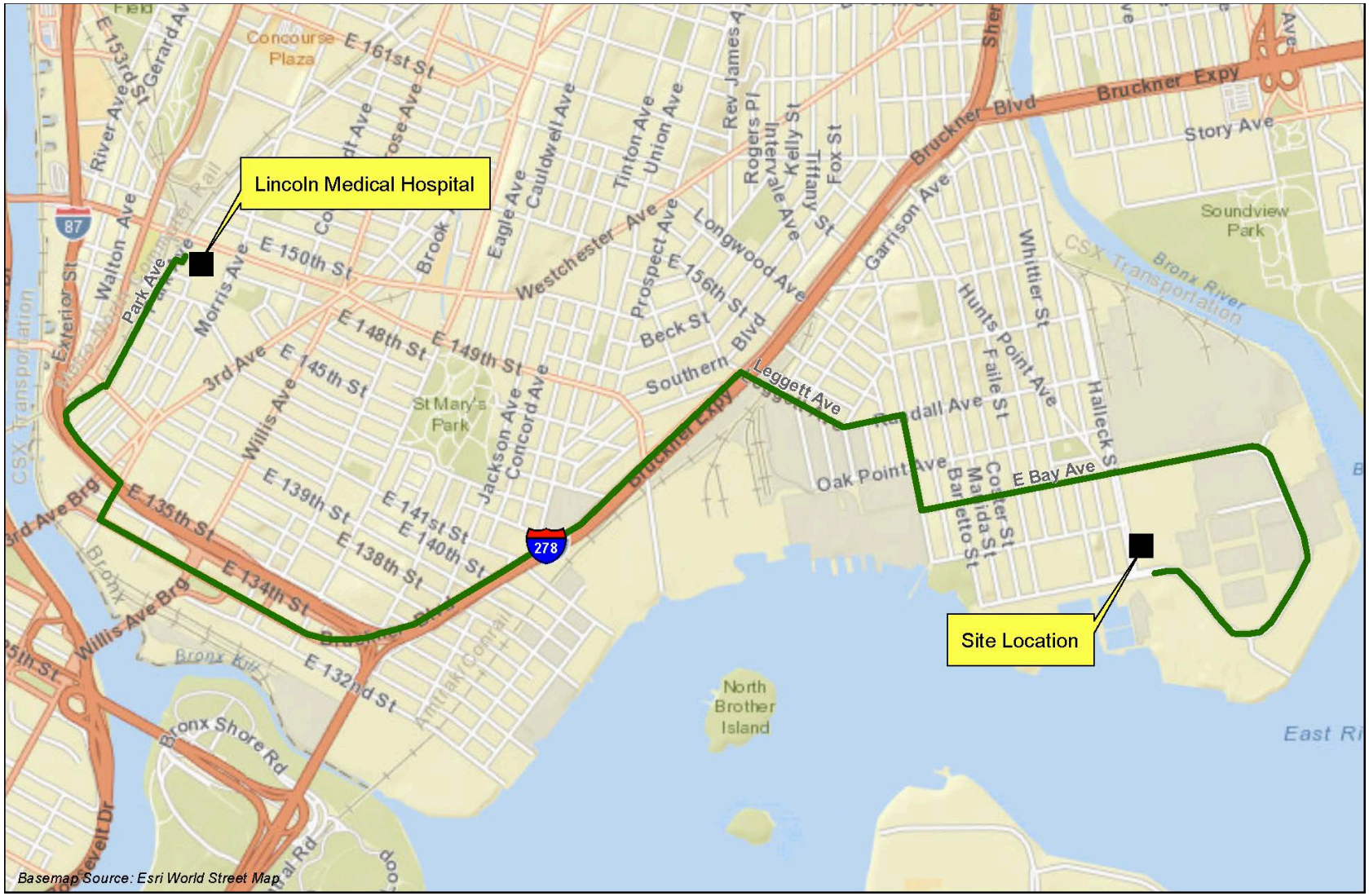
SITE MAP AND HOSPITAL ROUTE

N:\GIS\Projects\E050_NYCEcoDev_NYEDC\Production_MXDs\AOU2\HASP\Figure_1_site_map.mxd 12/7/2016 12:57:25 PM

integral engineering p.c.
61 Broadway, Suite 1601
New York, New York 10006
www.integral-corp.com

Parcel A-2
Site Map

Attachment 1. Site Map and Hospital Route



Food Center Drive, Bronx, NY 10474 to Lincoln Medical and Mental Health Center — Drive 5.3 miles, 25 min

Food Center Drive
Bronx, NY 10474

Take Food Center Dr, E Bay Ave and Bruckner Blvd to Lincoln Ave

17 min (4.4 mi)

1. Head east on Food Center Dr

0.9 mi

2. Continue straight to stay on Food Center Dr

0.1 mi

3. Keep left to stay on Food Center Dr

0.3 mi

4. Continue straight onto E Bay Ave

0.5 mi

5. Turn right onto Tiffany St

0.2 mi

6. Turn left onto Randall Ave

0.2 mi

7. Continue onto Arlington Leon Eastmond, Sr. Way/Leggett Ave
   Continue to follow Leggett Ave

0.3 mi

8. Turn left onto Bruckner Blvd

0.8 mi

9. Keep left to stay on Bruckner Blvd

1.2 mi

Take E 135th St and Park Ave to E 149th St

4 min (0.9 mi)

10. Turn right onto Lincoln Ave

0.1 mi

11. Turn left onto E 135th St

0.3 mi

12. Continue onto Park Ave

0.4 mi

13. Turn right onto E 149th St
    Destination will be on the right

36 s (341 ft)

ATTACHMENT 2

REGULATORY NOTICES

You Have a Right to a Safe and Healthful Workplace.

IT'S THE LAW!

- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in the inspection.
- You can file a complaint with OSHA within 30 days of discrimination by your employer for making safety and health complaints or for exercising your rights under the *OSH Act*.
- You have a right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violation.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records or records of your exposure to toxic and harmful substances or conditions.
- Your employer must post this notice in your workplace.

The *Occupational Safety and Health Act of 1970 (OSH Act)*, P.L. 91-596, assures safe and healthful working conditions for working men and women throughout the Nation. The Occupational Safety and Health Administration, in the U.S. Department of Labor, has the primary responsibility for administering the *OSH Act*. The rights listed here may vary depending on the particular circumstances. To file a complaint, report an emergency, or seek OSHA advice, assistance, or products, call 1-800-321-OSHA or your nearest OSHA office: • Atlanta (404) 562-2300 • Boston (617) 565-9860 • Chicago (312) 353-2220 • Dallas (214) 767-4731 • Denver (303) 844-1600 • Kansas City (816) 426-5861 • New York (212) 337-2378 • Philadelphia (215) 861-4900 • San Francisco (415) 975-4310 • Seattle (206) 553-5930. Teletypewriter (TTY) number is 1-877-889-5627. To file a complaint online or obtain more information on OSHA federal and state programs, visit OSHA's website at **www.osha.gov**. If your workplace is in a state operating under an OSHA-approved plan, your employer must post the required state equivalent of this poster.

1-800-321-OSHA
www.osha.gov

U.S. Department of Labor • Occupational Safety and Health Administration • OSHA 3165

ATTACHMENT 3

SAFETY PROCEDURES

FROSTBITE

What happens to the body:

Freezing in deep layers of skin and tissue; pale, waxy-white skin color; skin becomes hard and numb; usually affects fingers, hands, toes, feet, ears, and nose.

What to do: (land temperatures)

- Move the person to a warm, dry area. Don't leave the person alone.
- Remove wet or tight clothing that may cut off blood flow to the affected area.
- **Do not** rub the affected area because rubbing damaged the skin and tissue.
- Gently place the affected area in a warm water bath (105°) and monitor the water temperature to **slowly** warm the tissue. Don't pour warm water directly on the affected area because it will warm the tissue too fast, causing tissue damage. Warming takes 25-40 minutes.
- After the affected area has been warmed, it may become puffy and blister. The affected area may have a burning feeling or numbness. When normal feeling, movement, and skin color have returned, the affected area should be dried and wrapped to keep it warm. **Note:** If there is a chance the affected area may get cold again, do not warm the skin. If the skin is warmed and then becomes cold again, it will cause severe tissue damage.
- Seek medical attention as soon as possible.

How to Protect Workers

- Recognize the environmental and workplace conditions that lead to potential cold-induced illnesses and injuries.
- Learn the signs and symptoms of cold-induced illnesses/injuries and what to do to help the worker.
- Train workers about cold-induced illnesses and injuries.
- Select proper clothing for cold, wet, and windy conditions. Layer clothing to adjust to changing environmental temperatures. Wear a hat and gloves, in addition to underwear that will keep water away from the skin (polypropylene.)
- Take frequent short breaks in warm, dry shelters to allow the body to warm up.
- Perform work during the warmest part of the day.
- Avoid exhaustion or fatigue because energy is needed to keep muscles warm.
- Use the buddy system (work in pairs.)
- Drink warm, sweet beverages (sugar water, sports-type drinks.) **Avoid drinks with caffeine** (coffee, tea, or hot chocolate) **or alcohol**.
- Eat warm, high-calorie foods like hot pasta dishes.

Workers are at increased risk when…

- They have predisposing health conditions such as cardiovascular disease, diabetes, and hypertension.
- They take certain medications. Check with your doctor, nurse, or pharmacy and ask if medicines you take affect you while working in cold environments.
- They are in poor physical condition, have a poor diet, or are older.

HYPOTHERMIA - (Medical Emergency)

What happens to the body:

Normal body temperature (98.6°F/37°C) drops to or below 95°F/35°C; fatigue or drowsiness; uncontrolled shivering; cool, bluish skin; slurred speech; clumsy movements; irritable, irrational, or confused behavior.

What to do: (land temperatures)

- Call for emergency help (i.e., ambulance or 911).
- Move the person to a warm, dry area. Don't leave the person alone.
- Remove wet clothing and replace with warm, dry clothing or wrap the person in blankets.
- Have the person drink warm, sweet drinks (sugar water or sports-type drinks) if he is alert. **Avoid drinks with caffeine** (coffee, tea, or hot chocolate) **or alcohol**.
- Have the person move his arms and legs to create muscle heat. If he is unable to do this, place warm bottles or hot packs in the armpits, groin, neck, and head areas. **Do not** rub the person's body or place him in a warm water bath. This may stop his heart.

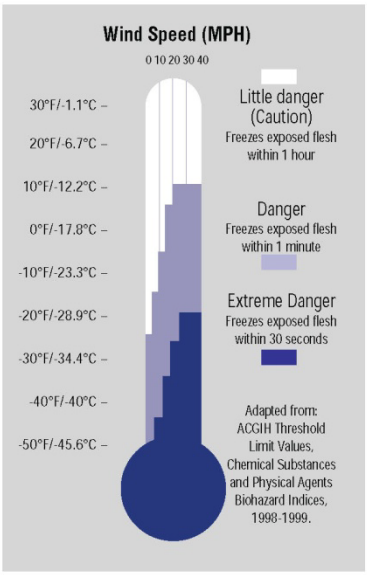
What to do: (water temperatures)

- Call for emergency help (i.e., ambulance or 911). Body heat is lost up to 25 times faster in water.
- **Do not** remove any clothing. Button, buckle, zip, and tighten any collars, cuffs, shoes, and hoods because the layer of trapped water closest to the body provides a layer of insulation that slows the loss of heat. Keep the head out of the water and put on a hat or hood.
- Get out of the water as quickly as possible or climb on anything floating. **Do not** attempt to swim unless a floating object or another person can be reached because swimming or other physical activity uses body heat and reduces survival time by about 50 percent.
- If getting out of the water is not possible, wait quietly and conserve body heat by folding arms across the chest, keeping thighs together, bending knees, and crossing ankles. If another person is in the water, huddle together with chests held closely.

THE COLD STRESS EQUATION

LOW TEMPERATURE + WIND SPEED + WETNESS = INJURIES & ILLNESS

When the body is unable to warm itself, serious cold-related illnesses and injuries may occur, and permanent tissue damage and death may result. **Hypothermia** can occur when *land temperatures* are **above** freezing or *water temperatures* are below 98.6°F/37°C. Cold-related illnesses can slowly overcome a person who has been chilled by low temperatures, brisk winds, or wet clothing.



Oregon Occupational Safety & Health Division
440-3336E-S (9/03)

HEAT EXHAUSTION

What happens to the body:

Headaches, dizziness, or light-headedness, weakness, mood changes, irritability or confusion, feeling sick to your stomach, vomiting, fainting, decreased and dark-colored urine, and pale, clammy skin.

What should be done:

- Move the person to a cool shaded area. Don't leave the person alone. If the person is dizzy or light-headed, lay him on his back and raise his legs about 6-8 inches. If the person is sick to his stomach, lay him on his side.
- Loosen and remove heavy clothing.
- Have the person drink some cool water (a small cup every 15 minutes) if he is not feeling sick to his stomach.
- Try to cool the person by fanning him. Cool the skin with a cool spray mist of water or wet cloth.
- If the person does not feel better in a few minutes call for emergency help (ambulance or call 911.)

(If heat exhaustion is not treated, the illness may advance to heat stroke.)

HEAT STROKE - A Medical Emergency

What happens to the body:

Dry, pale skin (no sweating); hot red skin (looks like a sunburn); mood changes; irritability, confusion, and not making any sense; seizures or fits, and collapse (will not respond).

What should be done:

- Call for emergency help (i.e., ambulance or 911.)
- Move the person to a cool, shaded area. Don't leave the person alone. Lay him on his back and if the person is having seizures, remove objects close to him so he won't hit them. If the person is sick to his stomach, lay him on his side.
- Remove heavy and outer clothing.
- Have the person drink some cool water (a small cup every 15 minutes) if he is alert enough to drink anything and not feeling sick to his stomach.
- Try to cool the person by fanning him or her. Cool the skin with a cool spray mist of water, wet cloth, or wet sheet.
- If ice is available, place ice packs in armpits and groin area.

How to Protect Workers

- Learn the signs and symptoms of heat-induced illnesses and what to do to help the worker.
- Train workers about heat-induced illnesses.
- Perform the heaviest work during the coolest part of the day.
- Slowly build up tolerance to the heat and the work activity (usually takes up to 2 weeks.)
- Use the buddy system (work in pairs.)
- Drink plenty of cool water (one small cup every 15-20 minutes.)
- Wear light, loose-fitting, breathable (like cotton) clothing.
- Take frequent short breaks in cool, shaded areas (allow your body to cool down.)
- Avoid eating large meals before working in hot environments.
- Avoid caffeine and alcoholic beverages (these beverages make the body lose water and increase the risk of heat illnesses.)

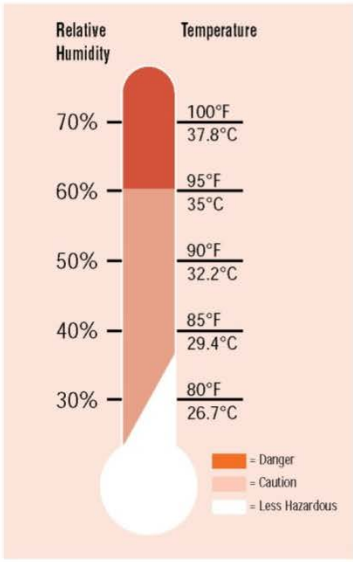
Workers are at increased risk when...

- They take certain medications. Check with your doctor, nurse, or pharmacy to see if medicines you take affect you when working in hot environments.
- They have had a heat-induced illness in the past.
- They wear personal protective equipment.

THE HEAT EQUATION

HIGH TEMPERATURE + HIGH HUMIDITY + PHYSICAL WORK = HEAT ILLNESS

When the body is unable to cool itself through sweating, **serious** heat illnesses may occur. The most severe heat-induced illnesses are **heat exhaustion** and **heat stroke**. If actions are not taken to treat heat exhaustion, the illness could progress to heat stroke and **death**.



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440-3333E-S(9/03)

ATTACHMENT 4

SAFETY DATA SHEETS

Safety Data Sheet
H2S Mix CH4

Section 1: Product and Company Identification

SpecAir Specialty Gases
22 Albiston Way
Auburn, ME 04210
Phone: 207-784-5788
Toll Free: 800-292-6218
Fax: 207-784-5383
http://www.specair.com/

Product Code: H2S Mix CH4

Synonyms:
Recommended Use:
Usage Restrictions:

Section 2: Hazards Identification

Warning

Hazard Classification:
Gases Under Pressure

Hazard Statements:
Contains gas under pressure; may explode if heated
Toxic to aquatic life

Precautionary Statements

Storage:
Protect from sunlight.
Store in well-ventilated place.

Section 3: Composition/Information on Ingredients

	CAS #	Concentration

Hydrogen Sulfide	7783-06-4	10 ppm - 100 ppm
Carbon Monoxide	630-08-0	50 ppm - 800 ppm
Methane	74-82-8	1.45% - 2.5%
Oxygen	7782-44-7	12% - 20.9%
Nitrogen	7727-37-9	Balance

	Chemical Substance	Chemical Family	Trade Names
Hydrogen Sulfide	HYDROGEN SULFIDE	inorganic, gas	HYDROGEN SULFIDE (H2S); DIHYDROGEN MONOSULFIDE; DIHYDROGEN SULFIDE; HYDROSULFURIC ACID; SULFUR DIHYDRIDE; SULFURETED HYDROGEN; SULFUR HYDRIDE; STINK DAMP; SEWER GAS; RCRA U135; UN 1053; H2S
Carbon Monoxide	CARBON MONOXIDE	inorganic, gas	CARBON OXIDE; CARBON OXIDE (CO); UN 1016; CO
Methane	METHANE, COMPRESSED GAS	hydrocarbons, gas	FIRE DAMP; MARSH GAS; METHYL HYDRIDE; NATURAL GAS; METHANE; UN 1971; R50; CH4
Oxygen	OXYGEN, COMPRESSED GAS	inorganic, gas	OXYGEN; DIOXYGEN; MOLECULAR OXYGEN; OXYGEN MOLECULE; PURE OXYGEN; UN 1072; O2
Nitrogen	NITROGEN, COMPRESSED GAS	inorganic, gas	DIATOMIC NITROGEN; DINITROGEN; NITROGEN; NITROGEN-14; NITROGEN GAS; UN 1066; N2

Section 4: First Aid Measures

	Skin Contact	Eye Contact	Ingestion	Inhalation	Note to Physicians
Hydrogen Sulfide	Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.	Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.	If a large amount is swallowed, get medical attention.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen.
Carbon Monoxide	Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.	Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.	If a large amount is swallowed, get medical attention.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen.
Methane	Wash exposed skin with soap and water.	Flush eyes with plenty of water.	If a large amount is swallowed, get medical attention.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen.
Oxygen	None expected	None expected	Not likely route of exposure	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.	None
Nitrogen	Wash exposed skin with soap and water.	Flush eyes with plenty of water.	If a large amount is swallowed, get medical attention.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen.

Section 5: Fire Fighting Measures

	Suitable Extinguishing Media	Products of Combustion	Protection of Firefighters

	Suitable Extinguishing Media	Products of Combustion	Protection of Firefighters
Hydrogen Sulfide	Let burn unless leak can be stopped immediately. Large fires: Use regular foam or flood with fine water spray.	Sulfur oxides	▪ Any self-contained breathing apparatus with a full facepiece. ▪ Protective material types: butyl rubber, polyvinyl chloride (PVC), neoprene
Carbon Monoxide	Carbon dioxide, regular dry chemical Large fires: Use regular foam or flood with fine water spray.	Carbon dioxide	▪ Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. ▪ Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Methane	Carbon dioxide, regular dry chemical Large fires: Use regular foam or flood with fine water spray.	Carbon monoxide, carbon dioxide, water	▪ Respiratory protection may be needed for frequent or heavy exposure. Any self-contained breathing apparatus with a full facepiece. ▪ Respiratory protection may be needed for frequent or heavy exposure. Any self-contained breathing apparatus with a full facepiece.
Oxygen	Non-flammable. Use extinguishing agent appropriate for the material which is burning. Use water in large quantities for fires involving oxygen.	Oxides of burning material	▪ Respiratory protection may be needed for frequent or heavy exposure. ▪ None
Nitrogen	Non-flammable. Use suitable extinguishing media for surrounding fire. Cylinders may rupture or explode if exposed to heat.	Non-flammable	▪ Respiratory protection may be needed for frequent or heavy exposure.

Section 6: Accidental Release Measures

	Personal Precautions	Environmental Precautions	Methods for Containment
Hydrogen Sulfide	Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas. Ventilate closed spaces before entering. Evacuation radius: 150 feet. For tank, rail car or tank truck: 800 meters (1/2 mile). Do not touch spilled material.	Avoid heat, flames, sparks and other sources of ignition.	Stop leak if possible without personal risk. Remove sources of ignition. Reduce vapors with water spray. Do not get water directly on material.
Carbon Monoxide	Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering.	Avoid heat, flames, sparks and other sources of ignition. Keep out of water supplies and sewers.	Stop leak if possible without personal risk. Reduce vapors with water spray. Remove sources of ignition.
Methane	Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering.	Avoid heat, flames, sparks and other sources of ignition.	Stop leak if possible without personal risk. Reduce vapors with water spray. Remove sources of ignition.
Oxygen	Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering.	Avoid contact with combustible materials.	Stop leak if possible without personal risk.
Nitrogen	Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas.	No significant effects from contamination expected.	Stop leak if possible without personal risk.

	Methods for Cleanup	Other Information
Hydrogen Sulfide	Collect runoff for disposal as potential hazardous waste. Dike for later disposal. Absorb with sand or other non-combustible material. Add an alkaline material (lime, crushed limestone, sodium bicarbonate, or soda ash).	Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).
Carbon Monoxide	Stop leak, evacuate area. Wear protective equipment.	Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65).
Methane	Not available	Not available
Oxygen	Stop leak and ventilate	None
Nitrogen	N/A	N/A

Section 7: Handling and Storage

	Handling	Storage

	Handling	Storage
Hydrogen Sulfide	Store and handle in accordance with all current regulations and standards. Protect from physical damage. Store outside or in a detached building. Store in a cool, dry place. Store in a well-ventilated area. Avoid contact with light. Grounding and bonding required. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Notify State Emergency Response Commission for storage or use at amounts greater than or equal to the TPQ (U.S. EPA SARA Section 302). SARA Section 303 requires facilities storing a material with a TPQ to participate in local emergency response planning (U.S. EPA 40 CFR 355.30). Keep separated from incompatible substances.	Subject to handling regulations: U.S. OSHA 29 CFR 1910.119.
Carbon Monoxide	Keep separated from incompatible substances.	Store and handle in accordance with all current regulations and standards. Grounding and bonding required. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.
Methane	Store and handle in accordance with all current regulations and standards. Grounding and bonding required. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.	Keep separated from incompatible substances.
Oxygen	Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.	Keep separated from incompatible substances.
Nitrogen	Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.	Keep separated from incompatible substances.

Section 8: Exposure Controls/Personal Protection

	Exposure Guidelines
Hydrogen Sulfide	HYDROGEN SULFIDE: 20 ppm OSHA ceiling 50 ppm OSHA peak 10 minute(s) (once if no other measurable exposure occurs) 10 ppm (14 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993) 15 ppm (21 mg/m3) OSHA STEL (vacated by 58 FR 35338, June 30, 1993) 10 ppm ACGIH TWA 15 ppm ACGIH STEL 10 ppm (15 mg/m3) NIOSH recommended ceiling 10 minute(s) TLV-TWA: 1ppm Upper respiratory irritation (ACGIH)
Carbon Monoxide	CARBON MONOXIDE: 50 ppm (55 mg/m3) OSHA TWA 35 ppm (40 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993) 200 ppm (229 mg/m3) OSHA ceiling (vacated by 58 FR 35338, June 30, 1993) 25 ppm ACGIH TWA 35 ppm (40 mg/m3) NIOSH recommended TWA 10 hour(s) 200 ppm (229 mg/m3) NIOSH recommended ceiling
Methane	METHANE, COMPRESSED GAS: ALIPHATIC HYDROCARBON GASES ALKANE (C1-C4): 1000 ppm ACGIH TWA METHANE: No occupational exposure limits established. ALIPHATIC HYDROCARBON GASES ALKANE (C1-C4): 1000 ppm ACGIH TWA
Oxygen	OXYGEN, COMPRESSED GAS: No occupational exposure limits established.
Nitrogen	NITROGEN, COMPRESSED GAS: NITROGEN: ACGIH (simple asphyxiant)

Engineering Controls

Handle only in fully enclosed systems.

	Eye Protection	Skin Protection	Respiratory Protection
Hydrogen Sulfide	Wear splash resistant safety goggles with a face shield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.	Wear appropriate chemical resistant clothing.	Any self-contained breathing apparatus with a full facepiece.
Carbon Monoxide	Eye protection not required, but recommended.	Protective clothing is not required.	Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Methane	Eye protection not required, but recommended.	Protective clothing is not required.	Respiratory protection may be needed for frequent or heavy exposure. Any self-contained breathing apparatus with a full facepiece.
Oxygen	Eye protection not required, but recommended.	Protective clothing is not required.	Respiratory protection may be needed for frequent or heavy exposure.
Nitrogen	Eye protection not required, but recommended.	Protective clothing is not required.	Respiratory protection may be needed for frequent or heavy exposure.

General Hygiene considerations

- Avoid breathing vapor or mist
- Avoid contact with eyes and skin
- Wash thoroughly after handling and before eating or drinking

Section 9: Physical and Chemical Properties

	Physical State	Appearance	Color	Change in Appearance	Physical Form	Odor	Taste
Hydrogen Sulfide	Gas	Colorless	Colorless	N/A	Gas	Rotten egg odor	N/A
Carbon Monoxide	Gas	Colorless	Colorless	N/A	Gas	Odorless	Tasteless
Methane	Gas	Colorless	Colorless	N/A	Gas, liquid	Odorless	Tasteless
Oxygen	Gas	Clear	Colorless	N/A	Gas	Odorless	Tasteless
Nitrogen	Gas	Clear	Colorless	N/A	Gas	Odorless	Tasteless

	Flash Point	Flammability	Partition Coefficient	Autoignition Temperature	Upper Explosive Limits	Lower Explosive Limits
Hydrogen Sulfide	Flammable	Not available	Not available	500 F (260 C)	44-46%	4.0-4.3%
Carbon Monoxide	Flammable	Not available	1479.11 (log = 3.17) (estimated from water solubility)	1128-1202 F (609-650 C)	0.74	12.0-12.5%
Methane	-369 F (-223 C)	Not available	724.44 (log = 2.87) (estimated from water solubility)	999 F (537 C)	15%	5%
Oxygen	Not flammable	Not available	Not available	Nonflammable	Nonflammable	Nonflammable
Nitrogen	Not flammable	Not available	Not available	Nonflammable	Nonflammable	Nonflammable

	Boiling Point	Freezing Point	Vapor Pressure	Vapor Density	Specific Gravity	Water Solubility	pH	Odor Threshold	Evaporation Rate	Viscosity
Hydrogen Sulfide	-78 to -77 F (-61 to -60.3 C)	-123 F (-86 C)	15200 mmHg @ 25 C	1.2 (Air=1)	1.192	2.58-2.9% @ 20 C	4.5-<7 (saturated solution)	0.13 ppm	Not applicable	0.0128 cP @ 25 C
Carbon Monoxide	-312.7 F (-191.5 C)	-326 F (-199 C)	760 mmHg @ -191 C gas; cannot be liquefied at room temperature	0.968 (Air=1)	Not applicable	2.3% @ 20 C	Not applicable	Not available	Not applicable	0.01657 cP @ 0 C
Methane	-260 F (-162 C)	-297 F (-183 C)	760 mmHg @ -161 C	0.555 (Air=1)	Not applicable	3.5% @ 17 C	Not applicable	Not available	Not applicable	0.01118 cP @ 27 C
Oxygen	-297 F (-183 C)	-360 F (-218 C)	760 mmHg @ -183 C	1.1 (Air=1)	Not applicable	3.2% @ 25 C	Not applicable	Not available	Not applicable	0.02075 cP @ 25 C
Nitrogen	-321 F (-196 C)	-346 F (-210 C)	760 mmHg @ -196 C	0.967 (Air=1)	Not applicable	1.6% @ 20 C	Not applicable	Not available	Not applicable	0.01787 cP @ 27 C

	Molecular Weight	Molecular Formula	Density	Weight per Gallon	Volatility by Volume	Volatility	Solvent Solubility
Hydrogen Sulfide	34.08	H2-S	1.539 g/L @ 0 C	Not available	Not available	Not applicable	Soluble: Carbon disulfide, alcohol, ether, glycerol, gasolines, kerosene, crude oil, alkali solutions
Carbon Monoxide	28.01	C-O	1.250 g/L @ 0 C	Not available	100%	Not applicable	Soluble: Alcohol, benzene, acetic acid, ethyl acetate, chloroform, cuprous chloride solutions
Methane	16.04	C-H4	0.717 g/L @ 0 C	Not available	Not applicable	Not applicable	Soluble: Alcohol, ether, benzene, organic solvents
Oxygen	31.9988	O2	1.309 g/L @ 25 C	Not available	Not applicable	Not applicable	Soluble: Alcohol
Nitrogen	28.0134	N2	1.2506 g/L	Not available	100%	1	Soluble: Liquid ammonia

Section 10: Stability and Reactivity

	Stability	Conditions to Avoid	Incompatible Materials
Hydrogen Sulfide	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Combustible materials, metals, oxidizing materials, halogens, metal oxides, metal salts, bases, rust, oxidants, oxygen, copper powder, acetaldehyde, silver fulminate
Carbon Monoxide	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Oxidizing materials, halogens, metal oxides, metals, combustible materials, lithium
Methane	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Halogens, oxidizing materials, combustible materials
Oxygen	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Combustible materials, halo carbons, metals, bases, reducing agents, amines, metal salts, oxidizing materials, alkaline earth and alkali metals
Nitrogen	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Metals, oxidizing materials

	Hazardous Decomposition Products	Possibility of Hazardous Reactions
Hydrogen Sulfide	Oxides of sulfur	Will not polymerize.
Carbon Monoxide	Oxides of carbon	Will not polymerize.
Methane	Oxides of carbon	Will not polymerize.
Oxygen	Miscellaneous decomposition products	Will not polymerize.
Nitrogen	Oxides of nitrogen	Will not polymerize.

Section 11: Toxicology Information

Acute Effects

	Oral LD50	Dermal LD50	Inhalation
Hydrogen Sulfide	444 ppm inhalation-rat LC50	Irritation 0.000125 ppm/5 hour(s) eyes-human	Irritation, lack of sense of smell, sensitivity to light, nausea, vomiting, difficulty breathing, headache, drowsiness, dizziness, disorientation, tremors, visual disturbances, suffocation, lung congestion, internal bleeding, heart damage, nerve damage, brain damage, coma, death
Carbon Monoxide	LC50 Inhalation Gas. Rat 1807 ppm 4 hours	Not available	Changes in body temperature, changes in blood pressure, nausea, vomiting, chest pain, difficulty breathing, irregular heartbeat, headache, drowsiness, dizziness, disorientation, hallucinations, pain in extremities, tremors, loss of coordination, hearing loss, visual disturbances, eye damage, suffocation, blood disorders, convulsions, coma
Methane	Not available	Not available	Nausea, vomiting, difficulty breathing, irregular heartbeat, headache, drowsiness, fatigue, dizziness, disorientation, mood swings, tingling sensation, loss of coordination, suffocation, convulsions, unconsciousness, coma
Oxygen	Not established	Not established	Irritation, changes in body temperature, nausea, difficulty breathing, irregular heartbeat, dizziness, disorientation, hallucinations, mood swings, pain in extremities, tremors, lung congestion, convulsions
Nitrogen	Not available	Not available	Nausea, vomiting, difficulty breathing, headache, drowsiness, dizziness, tingling sensation, loss of coordination, convulsions, coma

	Eye Irritation	Skin Irritation	Sensitization
Hydrogen Sulfide	Irritation, sensitivity to light, visual disturbances	Irritation liquid: frostbite	Harmful if inhaled, respiratory tract irritation, skin irritation, eye irritation, blood damage
Carbon Monoxide	No information on significant adverse effects	No information on significant adverse effects	Blood damage, suffocation
Methane	No information on significant adverse effects	No information on significant adverse effects	Difficulty breathing
Oxygen	No information on significant adverse effects	No information on significant adverse effects	No significant target effects reported.
Nitrogen	Contact with rapidly expanding gas may cause burns or frostbite	No information on significant adverse effects	Difficulty breathing

Chronic Effects

	Carcinogenicity	Mutagenicity	Reproductive Effects	Developmental Effects
Hydrogen Sulfide	Not available	Not available	Available.	No data

	Carcinogenicity	Mutagenicity	Reproductive Effects	Developmental Effects
Carbon Monoxide	Not available	Available.	Available.	No data
Methane	Not available	Not available	Not available	No data
Oxygen	Not known.	Available.	Available.	No data
Nitrogen	Not hazardous	Not available	Not available	No data

Section 12: Ecological Information

Fate and Transport

	Eco toxicity	Persistence / Degradability	Bioaccumulation / Accumulation	Mobility in Environment
Hydrogen Sulfide	Fish toxicity: Acute LC50 7 ug/L Fresh water Fish - Fathead minnow - Pimephales promelas - FRY 96 hours; 14.9 ug/L 96 hour(s) LC50 (Mortality) Fathead minnow (Pimeph Invertibrate toxicity: 9730 ug/L 1.5 hour(s) (Mortality) Mediterranean mussel (Mytilus galloprovincialis) Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Highly toxic to aquatic life.	Not available	Not available
Carbon Monoxide	Fish toxicity: 75000 ug/L 1 day(s) LC100 (Mortality) Orangespotted sunfish (Lepomis humilis) Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Relatively non-persistent in the environment. Highly volatile from water.	Not available	Not expected to leach through the soil or the sediment.
Methane	Fish toxicity: Not available Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Relatively non-persistent in the environment. Moderately volatile from water.	Accumulates very little in the bodies of living organisms.	Not expected to leach through the soil or the sediment.
Oxygen	Fish toxicity: Not available Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Low bioaccumulation	Not available
Nitrogen	Fish toxicity: Not available Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Not available	Not available

Section 13: Disposal Considerations

Hydrogen Sulfide	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): U135.
Carbon Monoxide	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
Methane	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
Oxygen	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
Nitrogen	Dispose in accordance with all applicable regulations.

Section 14: Transportation Information

U.S. DOT 49 CFR 172.101

DOT Information For This Mixture

Shipping Name	Compressed gas, n.o.s. (Nitrogen, Oxygen)
UN Number	UN1956
Hazard Class	2.2
Hazard Information	Non-Flammable Gas

Individual Component Information

	Proper Shipping Name	ID Number	Hazard Class or Division	Packing Group	Labeling Requirements	Passenger Aircraft or Railcar Quantity Limitations	Cargo Aircraft Only Quantity Limitations	Additional Shipping Description
Hydrogen Sulfide	Hydrogen sulfide	UN1053	2.3	Not applicable	2.3; 2.1	Forbidden	Forbidden	Toxic-Inhalation Hazard Zone B
Carbon Monoxide	Carbon monoxide, compressed	UN1016	2.3	Not applicable	2.3; 2.1	Forbidden	25 kg	Toxic-Inhalation Hazard Zone D
Methane	Methane, compressed	UN1971	2.1	Not applicable	2.1	Forbidden	150 kg	N/A
Oxygen	Oxygen, compressed	UN1072	2.2	Not available	2.2; 5.1	75 kg or L	150 kg	N/A
Nitrogen	Nitrogen, compressed	UN1066	2.2	Not applicable	2.2	75 kg or L	150 kg	N/A

Canadian Transportation of Dangerous Goods

	Shipping Name	UN Number	Class	Packing Group / Risk Group
Hydrogen Sulfide	HYDROGEN SULFIDE; or HYDROGEN SULPHIDE	UN1053	2.3; 2.1	Not applicable
Carbon Monoxide	Carbon monoxide, compressed	UN1016	2.3; 2.1	Not applicable
Methane	Methane, compressed	UN1971	2.1	Not applicable
Oxygen	Oxygen, compressed	UN1072	2.2; 5.1	Not applicable
Nitrogen	Nitrogen, compressed	UN1066	2.2	Not applicable

Section 15: Regulatory Information

U.S. Regulations

	CERCLA Sections	SARA 355.30	SARA 355.40
Hydrogen Sulfide	100 LBS RQ	500 LBS TPQ	100 LBS RQ
Carbon Monoxide	Not regulated.	Not regulated.	Not regulated.
Methane	Not regulated.	Not regulated.	Not regulated.
Oxygen	Not regulated.	Not regulated.	Not regulated.
Nitrogen	Not regulated.	Not regulated.	Not regulated.

SARA 370.21

	Acute	Chronic	Fire	Reactive	Sudden Release
Hydrogen Sulfide	Yes	No	Yes	No	Yes
Carbon Monoxide	Yes	No	Yes	No	Yes
Methane	Yes	No	Yes	No	Yes
Oxygen	No	No	Yes	No	Yes
Nitrogen	Yes	No	No	No	Yes

SARA 372.65

Hydrogen Sulfide	HYDROGEN SULFIDE: Administrative stay issued Aug. 22, 1994
Carbon Monoxide	Not regulated.

Methane	Not regulated.
Oxygen	Not regulated.
Nitrogen	Not regulated.

OSHA Process Safety

Hydrogen Sulfide	1500 LBS TQ
Carbon Monoxide	Not regulated.
Methane	Not regulated.
Oxygen	Not regulated.
Nitrogen	Not regulated.

State Regulations

	CA Proposition 65
Hydrogen Sulfide	Not regulated.
Carbon Monoxide	Known to the state of California to cause the following: Carbon monoxide Developmental toxicity (Jul 01, 1989)
Methane	Not regulated.
Oxygen	Not regulated.
Nitrogen	Not regulated.

Canadian Regulations

	WHMIS Classification
Hydrogen Sulfide	A, B1, D1A, D2B.
Carbon Monoxide	A, B1, D1A, D2A.
Methane	A, B1
Oxygen	A,C
Nitrogen	A

National Inventory Status

	US Inventory (TSCA)	**TSCA 12b Export Notification**	**Canada Inventory (DSL/NDSL)**
Hydrogen Sulfide	Listed on inventory.	Not listed.	Listed on inventory.
Carbon Monoxide	Listed on inventory.	Not listed.	Listed on inventory.
Methane	Listed on inventory.	Not listed.	Listed on inventory.
Oxygen	Listed on inventory.	Not listed.	Not determined.
Nitrogen	Listed on inventory.	Not listed.	Listed on inventory.

Section 16: Other Information

	NFPA Rating
Hydrogen Sulfide	HEALTH=4 FIRE=4 REACTIVITY=0
Carbon Monoxide	HEALTH=3 FIRE=4 REACTIVITY=0
Methane	HEALTH=1 FIRE=4 REACTIVITY=0
Oxygen	HEALTH=0 FIRE=0 REACTIVITY=0
Nitrogen	HEALTH=1 FIRE=0 REACTIVITY=0

0 = minimal hazard, 1 = slight hazard, 2 = moderate hazard, 3 = severe hazard, 4 = extreme hazard

SAFETY DATA SHEET

Isobutylene

Section 1. Identification

GHS product identifier : Isobutylene

Chemical name : 2-methylpropene

Other means of identification : 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene)

Product use : Synthetic/Analytical chemistry.

Synonym : 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene)

SDS # : 001031

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

24-hour telephone : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE GASES - Category 1
GASES UNDER PRESSURE - Liquefied gas

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Extremely flammable gas.
May form explosive mixtures with air.
Contains gas under pressure; may explode if heated.
May cause frostbite.
May displace oxygen and cause rapid suffocation.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Always keep container in upright position. Approach suspected leak area with caution.

Prevention : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Response : Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.

Storage : Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.

Disposal : Not applicable.

Hazards not otherwise classified : In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : 2-methylpropene

Other means of identification : 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene)

CAS number/other identifiers

CAS number : 115-11-7

Product code : 001031

Ingredient name	%	CAS number
Isobutylene	100	115-11-7

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Section 4. First aid measures

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. Extremely flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance. Eliminate all ignition sources if safe to do so.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : Accidental releases pose a serious fire or explosion hazard. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Eliminate all ignition sources. Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Isobutylene	**ACGIH TLV (United States, 3/2015).** TWA: 250 ppm 8 hours.

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Section 8. Exposure controls/personal protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

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. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas. [Liquefied compressed gas.]

Color : Colorless.

Molecular weight : 56.12 g/mole

Molecular formula : C4-H8

Boiling/condensation point : -6.9°C (19.6°F)

Melting/freezing point : -140.7°C (-221.3°F)

Critical temperature : 144.75°C (292.6°F)

Odor : Characteristic.

Odor threshold : Not available.

pH : Not available.

Flash point : Closed cup: -76.1°C (-105°F)

Burning time : Not applicable.

Burning rate : Not applicable.

Evaporation rate : Not available.

Flammability (solid, gas) : Extremely flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and oxidizing materials.

Lower and upper explosive (flammable) limits : Lower: 1.8%
Upper: 9.6%

Vapor pressure : 24.3 (psig)

Vapor density : 1.94 (Air = 1)

Specific Volume (ft ^{3}/lb) : 6.6845

Gas Density (lb/ft ^{3}) : 0.1496 (25°C / 77 to °F)

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : 0.263 g/l

Partition coefficient: n-octanol/water : 2.34

Auto-ignition temperature : 465°C (869°F)

Decomposition temperature : Not available.

SADT : Not available.

Section 9. Physical and chemical properties

Viscosity : Not applicable.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

Incompatible materials : Oxidizers

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Isobutylene	LC50 Inhalation Vapor	Rat	550000 mg/m³	4 hours

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Section 11. Toxicological information

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Isobutylene	2.34	-	low

Section 12. Ecological information

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1055	UN1055	UN1055	UN1055	UN1055
UN proper shipping name	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE
Transport hazard class(es)	2.1 	2.1 	2.1 	2.1 	2.1 
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	**Limited quantity** Yes. **Packaging instruction** **Passenger aircraft** Quantity limitation: Forbidden. **Cargo aircraft** Quantity limitation: 150 kg **Special provisions** 19, T50	Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2). **Explosive Limit and Limited Quantity Index** 0.125 **ERAP Index** 3000 **Passenger Carrying Ship Index** Forbidden **Passenger Carrying Road or Rail Index** Forbidden **Special provisions** 29	-	-	**Passenger and Cargo Aircraft**Quantity limitation: 0 Forbidden **Cargo Aircraft Only** Quantity limitation: 150 kg

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Section 14. Transport information

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

United States inventory (TSCA 8b): This material is listed or exempted.

Clean Air Act (CAA) 112 regulated flammable substances: isobutylene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Fire hazard
Sudden release of pressure

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Isobutylene	100	Yes.	Yes.	No.	No.	No.

State regulations

Massachusetts : This material is listed.

New York : This material is not listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

International regulations

International lists

National inventory

Australia : This material is listed or exempted.

Canada : This material is listed or exempted.

China : This material is listed or exempted.

Europe : This material is listed or exempted.

Japan : This material is listed or exempted.

Malaysia : Not determined.

Section 15. Regulatory information

New Zealand : This material is listed or exempted.

Philippines : This material is listed or exempted.

Republic of Korea : This material is listed or exempted.

Taiwan : This material is listed or exempted.

Canada

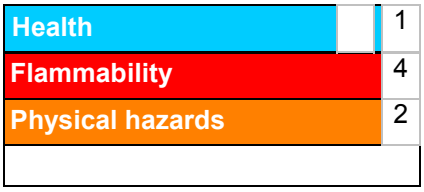
WHMIS (Canada) : Class A: Compressed gas.
Class B-1: Flammable gas.

CEPA Toxic substances: This material is not listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

Canada Label requirements : Class A: Compressed gas.
Class B-1: Flammable gas.

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

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

Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
Flam. Gas 1, H220 Press. Gas Liq. Gas, H280	Expert judgment Expert judgment

History

Date of printing : 7/11/2016

Date of issue/Date of revision : 7/11/2016

Date of previous issue : No previous validation

Section 16. Other information

Version : 0.01

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 03/10/2016 **Revision** : 03/10/2016

Trade Name: Liquinox

1 Identification of the substance/mixture and of the supplier

1.1 Product identifier

Trade Name: Liquinox
Synonyms:
Product number: Liquinox

1.2 Application of the substance / the mixture : Cleaning material/Detergent

1.3 Details of the supplier of the Safety Data Sheet

Manufacturer	Supplier
Alconox, Inc. 30 Glenn Street White Plains, NY 10603 1-914-948-4040	Not Applicable

Emergency telephone number:
ChemTel Inc
North America: 1-800-255-3924
International: 01-813-248-0585

2 Hazards identification

2.1 Classification of the substance or mixture:

In compliance with EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments.

Hazard-determining components of labeling:
Alcohol ethoxylate
Sodium alkylbenzene sulfonate
Sodium xylenesulphonate
Lauramine oxide

2.2 Label elements:

Eye irritation, category 2A.
Skin irritation, category 2.

Hazard pictograms:

Signal word: Warning

Hazard statements:
H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P332+P313 If skin irritation occurs: Get medical advice/attention.
P501 Dispose of contents and container as instructed in Section 13.

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Additional information: None.

Hazard description

Hazards Not Otherwise Classified (HNOC): None

Information concerning particular hazards for humans and environment:

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

Classification system:

The classification is according to EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments, and extended by company and literature data. The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

3 Composition/information on ingredients

3.1 Chemical characterization : None

3.2 Description : None

3.3 Hazardous components (percentages by weight)

Identification	Chemical Name	Classification	Wt. %
CAS number: 68081-81-2	Sodium Alkylbenzene Sulfonate	Acute Tox. 4; H303 Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	10-25
CAS number: 1300-72-7	Sodium Xylenesulphonate	Eye Irrit. 2; H319	2.5-10
CAS number: 84133-50-6	Alcohol Ethoxylate	Skin Irrit. 2 ; H315 Eye Dam. 1; H318	2.5-10
CAS number: 1643-20-5	Lauramine oxide	Skin Irrit. 2 ; H315 Eye Dam. 1; H318	1-2

3.4 Additional Information: None.

4 First aid measures

4.1 Description of first aid measures

General information: None.

After inhalation:

Maintain an unobstructed airway.

Loosen clothing as necessary and position individual in a comfortable position.

After skin contact:

Wash affected area with soap and water.

Seek medical attention if symptoms develop or persist.

After eye contact:

Rinse/flush exposed eye(s) gently using water for 15-20 minutes.

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Remove contact lens(es) if able to do so during rinsing.
Seek medical attention if irritation persists or if concerned.

After swallowing:

Rinse mouth thoroughly.
Seek medical attention if irritation, discomfort, or vomiting persists.

4.2 Most important symptoms and effects, both acute and delayed

None

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

No additional information.

5 Firefighting measures

5.1 Extinguishing media

Suitable extinguishing agents:

Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition.

For safety reasons unsuitable extinguishing agents : None

5.2 Special hazards arising from the substance or mixture :

Thermal decomposition can lead to release of irritating gases and vapors.

5.3 Advice for firefighters

Protective equipment:

Wear protective eye wear, gloves and clothing.
Refer to Section 8.

5.4 Additional information :

Avoid inhaling gases, fumes, dust, mist, vapor and aerosols.
Avoid contact with skin, eyes and clothing.

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures :

Ensure adequate ventilation.
Ensure air handling systems are operational.

6.2 Environmental precautions :

Should not be released into the environment.
Prevent from reaching drains, sewer or waterway.

6.3 Methods and material for containment and cleaning up :

Wear protective eye wear, gloves and clothing.

6.4 Reference to other sections : None

7 Handling and storage

7.1 Precautions for safe handling :

Avoid breathing mist or vapor.
Do not eat, drink, smoke or use personal products when handling chemical substances.

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7.2 Conditions for safe storage, including any incompatibilities :

Store in a cool, well-ventilated area.

7.3 Specific end use(s):

No additional information.

8 Exposure controls/personal protection

8.1 Control parameters :

84133-50-6, Alcohol Ethoxylate, AIHA TWA 10 mg/m3.

8.2 Exposure controls

Appropriate engineering controls:

Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling.

Respiratory protection:

Not needed under normal conditions.

Protection of skin:

Select glove material impermeable and resistant to the substance.

Eye protection:

Safety goggles or glasses, or appropriate eye protection.

General hygienic measures:

Wash hands before breaks and at the end of work.
Avoid contact with skin, eyes and clothing.

9 Physical and chemical properties

Appearance (physical state, color):	Pale yellow liquid	**Explosion limit lower:** **Explosion limit upper:**	Not determined or not available. Not determined or not available.
Odor:	Not determined or not available.	**Vapor pressure at 20°C:**	Not determined or not available.
Odor threshold:	Not determined or not available.	**Vapor density:**	Not determined or not available.
pH-value:	8.5 as is	**Relative density:**	Not determined or not available.
Melting/Freezing point:	Not determined or not available.	**Solubilities:**	Not determined or not available.
Boiling point/Boiling range:	Not determined or not available.	**Partition coefficient (n-octanol/water):**	Not determined or not available.
Flash point (closed cup):	Not determined or not available.	**Auto/Self-ignition temperature:**	Not determined or not available.

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Evaporation rate:	Not determined or not available.	**Decomposition temperature**:	Not determined or not available.
Flammability (solid, gaseous):	Not determined or not available.	**Viscosity**:	a. Kinematic: Not determined or not available. b. Dynamic: Not determined or not available.
Density at 20°C:	Not determined or not available.		

10 Stability and reactivity

10.1 Reactivity : None

10.2 Chemical stability : None

10.3 Possibility hazardous reactions : None

10.4 Conditions to avoid : None

10.5 Incompatible materials : None

10.6 Hazardous decomposition products : None

11 Toxicological information

11.1 Information on toxicological effects :

Acute Toxicity:

Oral:

: LD50 >5000 mg per kg Rat, Oral) - product .

Chronic Toxicity: No additional information.

Skin corrosion/irritation:

Alcohol Ethoxylate: May cause mild to moderate skin irritation.

Sodium Alkylbenzene Sulfonate: Causes skin irritation.

Lauramine oxide: Causes skin irritation.

Serious eye damage/irritation:

Sodium Alkylbenzene Sulfonate: Causes serious eye irritation.

Alcohol Ethoxylate: Causes moderate to severe eye irritation and conjunctivitis.

Sodium xylenesulphonate: Rabbit: irritating to eyes.

Lauramine oxide: Causes serious eye damage.

Respiratory or skin sensitization: No additional information.

Carcinogenicity: No additional information.

IARC (International Agency for Research on Cancer): None of the ingredients are listed.

NTP (National Toxicology Program): None of the ingredients are listed.

Germ cell mutagenicity: No additional information.

Reproductive toxicity: No additional information.

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STOT-single and repeated exposure: No additional information.

Additional toxicological information: No additional information.

12 Ecological information

12.1 Toxicity:

Sodium Alkylbenzene Sulfonate: Fish, LC50 1.67 mg/l, 96 hours.
Sodium Alkylbenzene Sulfonate: Aquatic invertebrates, EC50 Daphnia 2.4 mg/l, 48 hours.
Sodium Alkylbenzene Sulfonate: Aquatic Plants, EC50 Algae 29 mg/l, 96 hours.
Lauramine oxide: Fish, LC0 24.3 mg/l, 96h [Killifish (Cyprinodontidae)]
Lauramine oxide: Aquatic invertebrates, (LC50): 3.6 mg/l 96 hours [Daphnia (Daphnia)].
Lauramine oxide: Aquatic plants, EC50 Algae 0.31 mg/l 72 hours [Algae]
Alcohol Ethoxylate: Aquatic invertebrates, (LC50): 4.01 mg/l 48 hours [Daphnia (daphnia)].

12.2 Persistence and degradability: No additional information.

12.3 Bioaccumulative potential: No additional information.

12.4 Mobility in soil: No additional information.

General notes: No additional information.

12.5 Results of PBT and vPvB assessment:

PBT: No additional information.

vPvB: No additional information.

12.6 Other adverse effects: No additional information.

13 Disposal considerations

13.1 Waste treatment methods (consult local, regional and national authorities for proper disposal)

Relevant Information:

It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities. (US 40CFR262.11).

14 Transport information

14.1 UN Number: ADR, ADN, DOT, IMDG, IATA		None
14.2 UN Proper shipping name: ADR, ADN, DOT, IMDG, IATA		None
14.3 Transport hazard classes: ADR, ADN, DOT, IMDG, IATA	**Class:** **Label:** **LTD.QTY:**	None None None
US DOT **Limited Quantity Exception:**		None

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Bulk:	**Non Bulk:**
RQ (if applicable): None	**RQ (if applicable)**: None
Proper shipping Name: None	**Proper shipping Name**: None
Hazard Class: None	**Hazard Class**: None
Packing Group: None	**Packing Group**: None
Marine Pollutant (if applicable): No	**Marine Pollutant (if applicable)**: No
additional information.	additional information.
Comments: None	**Comments**: None

14.4 Packing group: ADR, ADN, DOT, IMDG, IATA	None
14.5 Environmental hazards :	None
14.6 Special precautions for user:	None
Danger code (Kemler):	None
EMS number:	None
Segregation groups:	None

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.

14.8 Transport/Additional information:

Transport category:	None
Tunnel restriction code:	None
UN "Model Regulation":	None

15 Regulatory information

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

North American

SARA

Section 313 (specific toxic chemical listings): None of the ingredients are listed.
Section 302 (extremely hazardous substances): None of the ingredients are listed.

CERCLA (Comprehensive Environmental Response, Clean up and Liability Act) Reportable

Spill Quantity: None of the ingredients are listed.

TSCA (Toxic Substances Control Act):

Inventory: All ingredients are listed.
Rules and Orders: Not applicable.

Proposition 65 (California):

Chemicals known to cause cancer: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for females: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for males: None of the ingredients are listed.

Chemicals known to cause developmental toxicity: None of the ingredients are listed.

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Canadian

Canadian Domestic Substances List (DSL):
All ingredients are listed.

EU

REACH Article 57 (SVHC): None of the ingredients are listed.

Germany MAK: Not classified.

Asia Pacific

Australia

Australian Inventory of Chemical Substances (AICS): All ingredients are listed.

China

Inventory of Existing Chemical Substances in China (IECSC): All ingredients are listed.

Japan

Inventory of Existing and New Chemical Substances (ENCS): All ingredients are listed.

Korea

Existing Chemicals List (ECL): All ingredients are listed.

New Zealand

New Zealand Inventory of Chemicals (NZOIC): All ingredients are listed.

Philippines

Philippine Inventory of Chemicals and Chemical Substances (PICCS): All ingredients are listed.

Taiwan

Taiwan Chemical Substance Inventory (TSCI): All ingredients are listed.

16 Other information

Abbreviations and Acronyms: None

Summary of Phrases

Hazard statements:

H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:

P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P332+P313 If skin irritation occurs: Get medical advice/attention.
P501 Dispose of contents and container as instructed in Section 13.

Manufacturer Statement:

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling,

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use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

NFPA: 1-0-0

HMIS: 1-0-0

ATTACHMENT 5

NEAR-MISS INCIDENT REPORT

Near-Miss Incident Report

(completed by field staff)

Employee: _____

Office or site location: _____

Near-Miss Incident (check one or more): Exposure ( ) Physical injury ( ) Property damage ( )

Location (city and state):_____ Project and Contract No. _____

Date of incident: _____ Time of incident: _____

Fully describe the incident, including how it happened, persons involved, if chemicals were involved in the incident, etc.:

_____

_____

_____

_____

_____

_____

Was the operation being conducted under an established safety plan? (Yes / No)

If yes, attach a copy. If no, explain: _____

_____

_____ _____

Employee's signature Date

_____ _____

Project manager's signature Date

_____ _____

Site safety officer's signature Date

Corporate Health and Safety Manager Review and Comments

Corrective action/procedure changes carried out at the site:

_____

_____

_____

Corrective actions to be taken to prevent similar incidents at other sites:

_____

_____

_____

_____ _____

Corporate health and safety manager's signature Date

ATTACHMENT 6

EMPLOYEE EXPOSURE/INJURY INCIDENT REPORT

Employee Exposure/Injury Incident Report

(completed by the CHSM or designee)

Employee:			
Office or field location:			
Incident:			
Potential or known exposure (describe):			
Physical injury or illness (describe):			
Location (city and state):		Project and Contract No.	
Date of incident:		Time of incident:	
Date incident reported:		Person to whom incident was reported:	
Weather condition during incident:		Temperature:	Precipitation:
Wind speed and direction:		Cloud cover:	
Name of materials potentially encountered (chemical exposure):			
Chemical and phase (i.e., liquid, solid, gas, vapor, fume, mist), radiological, etc.:			
Describe the exposure/injury in detail and the parts of the body affected (attach extra sheets if necessary):			
Describe exact onsite or offsite location where the incident occurred:			
What was the employee doing when the exposure/injury occurred? (Describe briefly as site reconnaissance, soil sampling, etc.):			

How did the incident occur? Describe fully the factors that led to or contributed to the incident:				
Was medical treatment given? ☐ Yes ☐ No If yes, when?				
By whom?		Name of paramedic:		
		Name of physician:		
		Other:		
Where?	Onsite		Offsite	
If offsite, name of hospital or clinic:				
Length of inpatient stay (dates):				
Was Integral Consulting management notified? ☐ Yes ☐ No If yes, when?				
Name and title of manager(s) notified:				
Did the exposure/injury result in permanent disability or death? ☐ Yes ☐ No				
If yes, explain:				
Number of days away from work		Number of days of restricted work activity:		
Has the employee returned to work? (Yes / No) If yes, date:				
Names of other persons affected during the incident:				
Names of persons who witnessed the incident:				
Name and title of field team leader or immediate supervisor at the site:				
Was the operation being conducted under an established safety plan? ☐ Yes ☐ No				

If yes, attach a copy. If no, explain:	

Was personal protective equipment (PPE) used by the employee? ☐ Yes ☐ No

If yes, list items:	

Did any limitations in safety equipment or PPE affect or contribute to exposure? ☐ Yes ☐ No

If yes, explain:	

Attachments to this report:		Medical report(s) (if not confidential)		Site safety plan
		Other relevant information		

Employee's signature		Date
Site safety officer's signature		Date
Project manager's signature		Date

Corporate health and safety manager review and comments

Corrective action/procedure changes carried out on the project:
Corrective actions to be taken to prevent similar incidents at other sites:

Corporate Health and Safety Manager's signature		Date